USEFUL TELEPHONE NUMBERS

*Only a full cardiac arrest call can be made. You cannot call individual arrest team members. Only use the 2222 number. Do not call switchboard on “0”

<table>
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<tr>
<th>Service</th>
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<tr>
<td>AAU</td>
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<tr>
<td>Public Health</td>
<td>(271) 1257</td>
<td></td>
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<tr>
<td>Guy’s Poisons Unit</td>
<td></td>
<td>#6119</td>
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<tr>
<td>Clinical Audit Manager</td>
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<td>Clinical Audit Office</td>
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HOW TO USE THE SC(NHS)FT BLEEP SYSTEM:
- Dial *8
- Recorded message states “dial your paging information now”
- Enter bleep number, followed by your telephone extension number
- Recorded message says “paging request accepted, please replace your handset”
1.

EMERGENCY DEPARTMENT MEDICAL GUIDELINES

5/8/2020 – 4/8/2021

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**ACUTE INJURY AND ORTHOPAEDIC**

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Sheffield Children’s NHS Foundation Trust
- Emergency Department

Statement of Intent

This handbook contains information relevant to all staff working in the Emergency Department at Sheffield Children’s Hospital NHS) Foundation Trust. The contents are regularly reviewed and are founded upon best practice and the appropriate evidence base. It is therefore for use only between the dates clearly printed on the front cover.

It consists almost exclusively of Clinical Guidelines, with occasional Policies (e.g. RSV Management) and one Clinical Protocol (DKA). For definitions of these, please see below.

Further information is available within the Sheffield Children’s Hospital NHS) Foundation Trust Medical, Surgical, X-ray and Pharmacy Medical Guidelines and these are referenced where appropriate.

For each section:-

The Clinical Sponsor is Dr C Rimmer

Definitions

Clinical Guideline
This is a systematically developed statement to assist practitioner and patient decisions about appropriate health care for specific circumstances. They sit alongside, but do not replace, the knowledge and skills of experienced health professionals. As a member of the ED staff you are expected to be aware of, and follow, the principles contained within these Clinical Guidelines.

Clinical Protocol
This is a precise and detailed plan for a regimen of therapy. When following protocols you will be expected to document reasons for deviations from the detailed plan for clinical, ethical and legal purposes.

Policy
This is a statement of intent that an organisation will follow a particular course of action. Policies usually relate to managerial arrangements.
TRUST MEDICAL STANDARDS OF CARE

* ADAPTED FOR THE EMERGENCY DEPARTMENT *
By Dr A SMITH

1. High quality communication with children; parents, carers and colleagues
   accurate and complete written records of care / Medway entries

2. Complete patient record including dates, times, signatures, GMC number

3. Allergy recording

4. Accurate pathology sample / request form information especially for request to cross-match
   blood.

5. Prevention of Cross Infection
   Hand washing (right time, place and technique)
   Management of invasive devices

All the above have written standards and will be subject to audit and incident reports of non-
compliance. The ED takes part in the Trustwide annual case notes audit.

For more information, please contact the Clinical Governance Department on 17277.

(Reviewed by Dr J Gilchrist, June 2020)
(Adapted for the ED by Dr A Smith, Aug 2004)
(Written by Dr L Girardier & approved by the Clinical Effectiveness Committee, Aug 2004)
1. DEPARTMENT POLICIES

1.1 Emergency Department
1.2 Transport for patients
1.3 Telephone enquires
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1.21 Procedures in the ED following referral to in-patient teams
1.22 Referral to the Emergency Department review clinic (and other hospital clinics)
1.23 Algorithm for involving PICU
1.24 Mental Health in Children and Young People
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1.26 Major incident plan
1.27 Department incident plan
1.28 X-rays and the PACS system
1.29 Emergency department laboratory requests
1.30 Education and training
1.31 Study and annual leave
1.32 Sick leave
DEPARTMENTAL POLICIES

1.1 EMERGENCY DEPARTMENT

A. INTRODUCTION
The Department’s main role is to undertake prompt diagnosis and management of acute problems in children. However, parents often become very anxious about the condition of their child, even if the child is not seriously ill or injured. The ED doctor must develop a perspective of the parent’s point of view. Be aware of the parent who insists that there is something wrong with their child. They are often right!

B. ADVICE
If you are in any doubt about the diagnosis or management of any case, advice should be sought from a senior doctor in the Emergency Department or from the specialist teams. Do not request advice from another ED SHO or a junior doctor who has the same / less experience than you have. There are paediatric medical, surgical, orthopaedic and anaesthetic doctors on-call within the hospital. There are also on-call doctors or nurse specialists, contactable via switchboard for other specialities including:

24/7
- Plastic surgery/burns - Maxillofacial
- Neurosurgery - ENT
- Dermatology - Ophthalmology

In normal working hours – if patients are already known to specialist teams and are attending with a relevant problem, it is sometimes more appropriate to contact the specialist team directly, particularly if the patient doesn’t need admitting. These teams include

- Gastroenterology
- Neurology / Epilepsy
- Immunology
- Allergy
- Diabetes / Endocrine
- Respiratory
- Metabolic
- Rheumatology

C. CLINICAL RECORDS PROTOCOL
It is essential to ensure the following in the patients’ record:

- The patient’s full name, ED number and NHS number is on every page / chart / ECG / etc. NHS number is a statutory requirement.
- Clinician name and unique ED number are clearly entered at the top of the card.
- Clinician signature, grade and GMC number is at the end of the entry
DEPARTMENTAL POLICIES

1.1 EMERGENCY DEPARTMENT

- All items are readable and written in permanent, photocopy-friendly black ink.
- Avoid blank spaces and draw a line under your final clinical entry.
- Do not use ditto marks.
- Do not use unapproved abbreviations; jargon, etc. (see 1.1–C–Appendix A for approved abbreviations)
- Do not use correction fluid. Score out all errors with a single line, initial, date and time them.
- Allergies and reactions must be recorded, including negative statements, e.g. unknown.
- The following must be included; Assessment. Diagnosis / Problem Treatment / Care Plan Investigation / Referral Review / Evaluation / Discharge Drug therapy record
- Record of information given to patients / parents, both written and verbal.
- Record of informed consent, if applicable.
- Record of discharge plan / referral / handover.
- Record or copy of any letters (excluding automatically generated Medway discharge letters), if appropriate. A copy will usually be placed in the notes by the ED secretaries after typing

NB AUDIT OF ED NOTES USING THE ABOVE STANDARDS IS UNDERTAKEN AS PART OF THE ROUTINE AUDIT ACTIVITY OF THE EMERGENCY DEPARTMENT

Record the site of injury or limb affected clearly by writing RIGHT or LEFT and not an abbreviation. ‘R’ and ‘L’ are NOT acceptable.

Record the digit affected by name, e.g. index finger, etc. and not by number.

The same applies to all X-ray request forms (see section 1.28). The ‘relevant clinical details’ section that you fill in is important legally.

Record the time:

- Patient is initially seen by the doctor.
- Referral to in-patient doctors occurs.
- These are all VERY important steps to help us to monitor our compliance with transit time standards, and improve the patient pathway.

On discharge or transfer of patient, check and complete the computer clinical details, (Medway) including the time patient left the Department (if you are the last member of staff to deal with the patient).

Return ED cards to ED Reception for coding and filing. Original ED cards are NEVER to leave the department.

[Info leaflet available – No. 27* “Are we getting it right?” – Complaints procedures*]

Appendix A

Acceptable abbreviations – agreed by consensus
DEPARTMENTAL POLICIES

1.1 EMERGENCY DEPARTMENT

Below is a list of abbreviations acceptable for use in the ED notes. This applies IN CONTEXT only.
If there is room for any ambiguity abbreviations MUST NOT be used, e.g. it would be acceptable to use HAS for High Arm Sling at the end of the notes on arm trauma under the heading of management and as Human Albumin Solution within a section on resuscitation attached to a volume – 200ml HAS given – but if there could be any doubt on meaning it must be written in full. Remember just because you can only think of one explanation for initials it doesn’t mean others don’t have a different one – PU – passing urine or peptic ulcer?!

You MUST NOT abbreviate right and left

<table>
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<tr>
<th>Abbreviation</th>
<th>Description</th>
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<td>A. B. C.</td>
<td>Airway, Breathing, Circulation</td>
</tr>
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<td>A&amp;E</td>
<td>Accident and Emergency Department</td>
</tr>
<tr>
<td>Abdo</td>
<td>Abdomen / abdominal system</td>
</tr>
<tr>
<td>Abx</td>
<td>Antibiotics</td>
</tr>
<tr>
<td>AF</td>
<td>Atrial Fibrillation (not anterior fontanelle)</td>
</tr>
<tr>
<td>a.m.</td>
<td>Morning</td>
</tr>
<tr>
<td>A.S.A.P.</td>
<td>As Soon As Possible</td>
</tr>
<tr>
<td>ASD</td>
<td>Atrio-septal defect</td>
</tr>
<tr>
<td>A.V.P.U.</td>
<td>Alert Voice Pain Unconscious.</td>
</tr>
<tr>
<td>AXR</td>
<td>Abdominal Xray</td>
</tr>
<tr>
<td>BAS</td>
<td>Broad arm sling</td>
</tr>
<tr>
<td>bd</td>
<td>2 x day</td>
</tr>
<tr>
<td>BID</td>
<td>Brought in dead</td>
</tr>
<tr>
<td>BO/ BNO</td>
<td>Bowels open / not open</td>
</tr>
<tr>
<td>BM</td>
<td>Near patient blood glucose.</td>
</tr>
<tr>
<td>BP</td>
<td>Blood pressure</td>
</tr>
<tr>
<td>BS</td>
<td>Breath sounds / Bowel sounds – In the specific context of that system exam</td>
</tr>
<tr>
<td>o c</td>
<td>Degrees centigrade</td>
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<tr>
<td>c&amp;c</td>
<td>Collar and cuff</td>
</tr>
<tr>
<td>circ”</td>
<td>Circulation</td>
</tr>
<tr>
<td>CN</td>
<td>Cranial nerves - in systems examination only</td>
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<tr>
<td>CNS</td>
<td>Central nervous system</td>
</tr>
<tr>
<td>C/O</td>
<td>Complain of</td>
</tr>
<tr>
<td>CVS</td>
<td>Cardio vascular system</td>
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°c

SC(NHS)FT Reg. I.D. No. 1118 © Emergency Department Medical Guidelines
### DEPARTMENTAL POLICIES

#### 1.1 EMERGENCY DEPARTMENT

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<td>capillary refill time</td>
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<td>CXR</td>
<td>Chest X ray</td>
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<td>Δ</td>
<td>Diagnosis</td>
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<tr>
<td>ΔΔ</td>
<td>Differential diagnosis</td>
</tr>
<tr>
<td>D&amp;V</td>
<td>Diarrhoea and vomiting</td>
</tr>
<tr>
<td>DKA</td>
<td>Diabetic ketoacidosis</td>
</tr>
<tr>
<td>DIC</td>
<td>Disseminated intravascular coagulation</td>
</tr>
<tr>
<td>DIP/DIPJ</td>
<td>Distal interphalangeal / joint</td>
</tr>
<tr>
<td>DNA</td>
<td>Did not attend</td>
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<td>D in a circle</td>
<td>Discharged - At end of notes only (otherwise could be mistaken for Disability / day / diagnosis / development, etc.)</td>
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<td>DTP + P +…</td>
<td>Old immunisation schedule</td>
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<tr>
<td>DTPiPH +…</td>
<td>new immunisation schedule (note polio intramuscular)</td>
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<td>D/W</td>
<td>discussed with</td>
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<td>ENT</td>
<td>Ear nose &amp; throat</td>
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<td>EtOH</td>
<td>Alcohol</td>
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<tr>
<td>Ext&quot;</td>
<td>Extension</td>
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<td>Foreign Body</td>
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<tr>
<td>FBC</td>
<td>Full Blood Count</td>
</tr>
<tr>
<td>FH / FHx</td>
<td>Family History</td>
</tr>
<tr>
<td>Flex&quot;</td>
<td>Flexion</td>
</tr>
<tr>
<td>FOOSH</td>
<td>Fall onto outstretched hand</td>
</tr>
<tr>
<td>FROM</td>
<td>Full Range of movement</td>
</tr>
<tr>
<td>FTNVD</td>
<td>Full term normal vaginal delivery - in birth history only</td>
</tr>
<tr>
<td>F/U</td>
<td>Follow up</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>GCS</td>
<td>Glasgow Coma Score</td>
</tr>
<tr>
<td>GP</td>
<td>General Practitioner</td>
</tr>
<tr>
<td>Grav</td>
<td>Gravida (in obstetric history)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>HAS</td>
<td>High arm sling / human albumin solution – in context</td>
</tr>
<tr>
<td>HI</td>
<td>Head injury (as in HI instructions / advice. Not &quot;no HI&quot; in initial history)</td>
</tr>
<tr>
<td>Hib</td>
<td>Haemophilus Influenza B immunisation</td>
</tr>
</tbody>
</table>
# DEPARTMENTAL POLICIES

## 1.1 EMERGENCY DEPARTMENT

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>HPC</td>
<td>History of presenting complaint</td>
</tr>
<tr>
<td>HS</td>
<td>Heart Sounds</td>
</tr>
<tr>
<td>HSP</td>
<td>Henoch Scholnlein Purpura</td>
</tr>
<tr>
<td>Hx</td>
<td>History</td>
</tr>
<tr>
<td>I &amp; D</td>
<td>Incision and drainage</td>
</tr>
<tr>
<td>IDDM</td>
<td>Insulin dependent diabetes mellitus</td>
</tr>
<tr>
<td>IO</td>
<td>Intraosseous</td>
</tr>
<tr>
<td>IM</td>
<td>Intramuscular</td>
</tr>
<tr>
<td>Imp</td>
<td>Impression</td>
</tr>
<tr>
<td>ITP</td>
<td>Idiopathic Thrombocytopenic Purpura</td>
</tr>
<tr>
<td>IV</td>
<td>Intravenous</td>
</tr>
<tr>
<td>IVI</td>
<td>Intravenous infusion</td>
</tr>
<tr>
<td>Lat</td>
<td>Lateral</td>
</tr>
<tr>
<td>LFT</td>
<td>Liver function tests</td>
</tr>
<tr>
<td>LOC/LOC</td>
<td>Loss of consciousness/ No LOC</td>
</tr>
<tr>
<td>LMP</td>
<td>Last menstrual period</td>
</tr>
<tr>
<td>LRTI</td>
<td>Lower respiratory tract infection</td>
</tr>
<tr>
<td>(M)C&amp;S</td>
<td>(Microscopy,) culture and sensitivity</td>
</tr>
<tr>
<td>MC +/- P +/- J</td>
<td>Metacarpal / palangeal / joint</td>
</tr>
<tr>
<td>MDI</td>
<td>Metered dose inhaler</td>
</tr>
<tr>
<td>Med</td>
<td>Medial</td>
</tr>
<tr>
<td>M/G</td>
<td>Middle grade</td>
</tr>
<tr>
<td>MMR</td>
<td>Mumps, measles, rubella immunisation</td>
</tr>
<tr>
<td>Mx</td>
<td>Management</td>
</tr>
<tr>
<td>NAD</td>
<td>No abnormality detected</td>
</tr>
<tr>
<td>NAI</td>
<td>Non Accidental Injury</td>
</tr>
<tr>
<td>NBI</td>
<td>No bony injury</td>
</tr>
<tr>
<td>NBM</td>
<td>Nil by mouth</td>
</tr>
<tr>
<td>Neb</td>
<td>Nebuliser</td>
</tr>
<tr>
<td>NKO</td>
<td>Not knocked out</td>
</tr>
<tr>
<td>Neuro</td>
<td>Neurological</td>
</tr>
<tr>
<td>NPU</td>
<td>Not passed urine</td>
</tr>
<tr>
<td>NVD</td>
<td>Normal vaginal delivery</td>
</tr>
<tr>
<td>No / NVD</td>
<td>No Neurovascular deficit</td>
</tr>
<tr>
<td>NWB</td>
<td>Non weight bearing</td>
</tr>
</tbody>
</table>
## DEPARTMENTAL POLICIES

### 1.1 EMERGENCY DEPARTMENT

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>NS</td>
<td>Nervous system</td>
</tr>
<tr>
<td>O/E</td>
<td>On examination</td>
</tr>
<tr>
<td>od</td>
<td>Once a day</td>
</tr>
<tr>
<td>ortho</td>
<td>Orthopaedics / pod</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Para</td>
<td>Parity (in obstetric history)</td>
</tr>
<tr>
<td>PC</td>
<td>Presenting complaint</td>
</tr>
<tr>
<td>PERL/A</td>
<td>Pupils Equal and Reactive to Light / and Accommodation</td>
</tr>
<tr>
<td>PICU</td>
<td>Paediatric Intensive Care</td>
</tr>
<tr>
<td>PIP/J</td>
<td>Proximal interpalangeal / joint</td>
</tr>
<tr>
<td>Plt /Ptls</td>
<td>Platelets – in context of FBC results only</td>
</tr>
<tr>
<td>PNS</td>
<td>Peripheral nervous system</td>
</tr>
<tr>
<td>PO</td>
<td>Per oral</td>
</tr>
<tr>
<td>POP</td>
<td>Plaster of Paris</td>
</tr>
<tr>
<td>pm</td>
<td>Afternoon</td>
</tr>
<tr>
<td>Pron”</td>
<td>Pronation</td>
</tr>
<tr>
<td>PR</td>
<td>Per rectum</td>
</tr>
<tr>
<td>PU</td>
<td>Passing / ed urine</td>
</tr>
<tr>
<td>PWB</td>
<td>Partial weight bearing</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>qds</td>
<td>4 x per day</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reg</td>
<td>Registrar</td>
</tr>
<tr>
<td>RESP</td>
<td>Respiration / respiratory</td>
</tr>
<tr>
<td>RESUS</td>
<td>Resuscitation</td>
</tr>
<tr>
<td>RR</td>
<td>Respiratory rate</td>
</tr>
<tr>
<td>RS</td>
<td>Respiratory system</td>
</tr>
<tr>
<td>RTA</td>
<td>Road Traffic Accident</td>
</tr>
<tr>
<td>RTC</td>
<td>Road Traffic Collision</td>
</tr>
<tr>
<td>R/V</td>
<td>Review</td>
</tr>
<tr>
<td>Rx</td>
<td>Treatment</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SaO₂</td>
<td>Oxygen Saturation</td>
</tr>
<tr>
<td>SATS</td>
<td>Oxygen Saturation</td>
</tr>
<tr>
<td>S/B</td>
<td>Seen By</td>
</tr>
<tr>
<td>SC</td>
<td>Subcutaneous injection</td>
</tr>
<tr>
<td>SCBU</td>
<td>Special Care Baby Unit</td>
</tr>
</tbody>
</table>
## DEPARTMENTAL POLICIES

### 1.1 EMERGENCY DEPARTMENT

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>SH / SHx</td>
<td>Social History</td>
</tr>
<tr>
<td>SHO</td>
<td>Senior House Officer</td>
</tr>
<tr>
<td>S/N</td>
<td>Staff nurse</td>
</tr>
<tr>
<td>SOB</td>
<td>Short(ness) of Breath</td>
</tr>
<tr>
<td>SpR</td>
<td>Specialist Registrar</td>
</tr>
<tr>
<td>supin(^n)</td>
<td>Supination</td>
</tr>
<tr>
<td>SVT</td>
<td>Supraventricular Tachycardia</td>
</tr>
<tr>
<td>SXR</td>
<td>Skull X-ray</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>T ((^\circ)C)</td>
<td>Temp (in conjunction with number)</td>
</tr>
<tr>
<td>TB</td>
<td>Tuberculosis / TB immunisation in immunisation box</td>
</tr>
<tr>
<td>TCI</td>
<td>To Come In</td>
</tr>
<tr>
<td>tds</td>
<td>3 x day</td>
</tr>
<tr>
<td>Temp</td>
<td>Temperature</td>
</tr>
<tr>
<td>TTO</td>
<td>To Take Out (drugs)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>U&amp;E / Ca / PO(_4)</td>
<td>Urea &amp; electrolytes / calcium / phosphate</td>
</tr>
<tr>
<td>URTI</td>
<td>Upper respiratory tract infection</td>
</tr>
<tr>
<td>UTD</td>
<td>Up to Date</td>
</tr>
<tr>
<td>UTI</td>
<td>Urinary tract infection</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>VF</td>
<td>Ventricular fibrillation</td>
</tr>
<tr>
<td>VSD</td>
<td>Ventriculo septal defect</td>
</tr>
<tr>
<td>VT</td>
<td>Ventricular tachycardia</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>WCC</td>
<td>White cell count</td>
</tr>
<tr>
<td>Wt</td>
<td>Weight</td>
</tr>
<tr>
<td>WB</td>
<td>Weight bearing</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Full Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>#</td>
<td>Fracture</td>
</tr>
<tr>
<td>↓</td>
<td>Decrease/ed/ing</td>
</tr>
<tr>
<td>↑</td>
<td>Increase/ed/ing</td>
</tr>
<tr>
<td>/7</td>
<td>Days</td>
</tr>
<tr>
<td>/52</td>
<td>Weeks</td>
</tr>
<tr>
<td>/12</td>
<td>Months</td>
</tr>
</tbody>
</table>
DEPARTMENTAL POLICIES

1.1 EMERGENCY DEPARTMENT

| /40 | Weeks gestation |
| 1° | Primary |
| 2° | Secondary |
| ♀ | Female |
| ♂ | Male |
| < | Less than |
| > | Greater than |

D. THESE GUIDELINES

These guidelines are designed to help you cope with situations and medical conditions you may meet while working here. It is not a Paediatric Emergency textbook. It is updated regularly and should not be used either a) outside of the effective dates clearly stated in the footer of each page or b) outside of the environment to which it relates i.e. SC (NHS) FT. If, for example, you take this book with you to your next training post and rely upon it there for clinical decision making, we cannot be held responsible for any problems that arise as a result.

E. TEACHING

The ED has a comprehensive teaching programme which targets the learning needs of each of the different groups who work here. This occurs on various dates. It is essential to take responsibility for finding out which teaching sessions you are supposed to attend, where these are and for turning up on time. (see section 1.30)

F. CLINICAL AUDIT MEETING

- These meetings are held at the end of each six-month block. All available staff should attend this meeting and contribute where possible.
- Projects are chosen from the ED Departmental Audit Programme or by yourself.
- Projects are usually allocated at your initial appraisal with your Consultant mentor.
- More than one member of staff may participate in the same project.
- Multidisciplinary audits are encouraged, e.g. with X-ray, pharmacy, paediatricians.
- SC (NHS) FT has a pro-active clinical audit office that can provide advice and assistance with all aspects of audit project work. This can range from the initial design, through data identification, collection and analysis, to the preparation of final reports and presentation materials. The link for the ED is Keith Bradbury.
- There is an overall audit lead for the department, however, your immediate audit work supervisor may be a Middle Grade in the department, or your Educational Supervisor.

G. RESEARCH

The trust has an active Research and Development department

The Emergency Department participates in many multicentre research projects, as well as welcoming local projects. Participation in any on-going research project is encouraged.

The ED has a good track record of getting departmental work submitted to National conferences as abstracts and posters.

(Section 1.1 updated by Dr J Gilchrist, Feb 2018)
1.2 TRANSPORT HOME FOR PATIENTS

The ED does not generally provide assistance for transport home. Specifically, it does not provide taxis for those who have arrived by ambulance. Taxis can be provided by the hospital only if there is a valid medical indication.

Liaise with the ED Nurse in Charge who will organise this if appropriate.

Parents/carers can apply for assistance with transport expenses. This is available Monday to Friday between 09:00 and 16:30 hrs.

For parents/carers on certain Benefits (e.g. Income Support, Working Family Tax Credit) direct to General Office (ext. 17285). Claimants will require proof of their Benefit plus an ED attendance slip. If a taxi is medically indicated the family will need a letter to support this from the doctor.

Other parents/carers who wish to request assistance should be directed to the SC (NHS) FT Social Work Department (ext. 17310). They have charitable funds available for bus fares.

(Section 1.2 updated by Dr J Gilchrist Feb 2018)
(Reviewed by Dr J Yassa, Aug 2003)

1.3 TELEPHONE ENQUIRIES

Parents or carers contacting the hospital for medical advice are transferred to 111 by switch board. Over 350 calls a year to the ED are avoided by this mechanism. Outside calls for advice should therefore not come through to the ED telephones but occasionally do.

Callers contacting the Emergency Department directly should similarly be advised to speak to 111.

If an enquiry is related to an obvious emergency that either requires attendance to the Emergency Department or the need to call for an ambulance, then the parent should be advised to call 999, we cannot do this for them.

Sometimes a call relates to a recent ED attendance or for results. In this instance it is advisable to request the ED notes and the call to be returned by the senior doctor in the department.

(Section 1.3 updated by Dr J Gilchrist Feb 2018)
1.4 LETTERS TO GPs

All patients discharged from the ED will automatically have a GP letter generated from Medway, hence the importance of correctly filling in the Medway section of ‘Record Clinical Details’. If a detailed discharge note is required, make use of the free text box within this section of Medway.

These letters are currently posted 3 times per week in order to meet the requirement that the GP receives it within 48 hours of attendance. If matters are more urgent, the discharge letter can be printed off directly via Medway at the time of discharge and posted or sent with the patient. If the discharge letter is sent urgently, document this in the ED records.

A system exists for faxing letters to the patient’s GP when an appointment or intervention is required in the next three working days. The pro forma to complete can be found in the paperwork drawers at the nurses station or on the shared drive: G:\ED\Referral Forms. A list of GP surgery Fax numbers is kept behind reception. This pathway is a useful way of allowing patients to appropriately re-enter the primary care system when they may have become stuck re-attending the Emergency Department for problems that should be managed in a General Practice setting.

Urgent communication is sometimes easier by phone but the details of the call must also be recorded in the ED records. A list of GP telephone numbers that bypass the patient queue systems is available at reception.

All discharge letters from Medway are notified to the health visitor (under 5s) and school nurses (over 5s)

(Section 1.4 up-dated by Dr J Gilchrist, March 2018)
1.5 POLICE REQUESTS FOR INFORMATION ABOUT PATIENTS

Guidelines on patient capacity and confidentiality are available from the GMC (ref 1-3) and the Department of Health (ref 4, 5). Information may be given to the police if the patient with capacity and/or the parent/carer consents or without consent only if this would be in the public interest. In all cases consent to release information should be requested unless it is impractical to do so, or when it would undermine the purpose of the disclosure (ref 5).

The genuine identity of the police officer making the request should be confirmed.

If the police contact the department on the telephone about a patient then you need to confirm their identity which involves calling them back via their switchboard. If the request is not specific to a patient e.g. related to a missing child then check with the consultant or senior doctor what information is appropriate to release.

Non-clinical information about patients can be released to the police without the patient or parent/carer's consent only in cases of “serious crime” or “serious arrestable offence” (e.g. murder, rape, child abuse) (ref 4, 5) or because of a duty to report gunshot or knife crime (ref 3). The information may only be given to a police officer of the rank of inspector or above by the senior doctor in the department, after the Consultant or senior doctor available has agreed to release the information. This will usually be limited to the minimum, or relevant, information, to satisfy the request.

In practical terms this is usually only a statement of whether the child has attended and was admitted or discharged, and no more.

Clinical information should not usually be released to the police without the written consent of the patient's parent/carer. If the police come to the Emergency Department following an RTA or any other incident in which a child has been injured, consent should be sought by the doctor before the police are allowed to question the child.

In all cases a record of the request and the information released should be made.

It should be noted that there are specific statutory requirements for disclosures to the police, for example, under the Road Traffic Act (1988), the Prevention of Terrorism Act (2000), Female Genital Mutilation Act (2003) (ref 5, 6). Always consult the senior doctor in the ED before giving information.

**Police Statements**

As a general rule, signed parental permission should be obtained before medical details are released in a police statement (see section 1.6). Occasionally, however, this appears inappropriate, e.g. when parents are suspected of non-accidental injury and are refusing permission for a statement. All these cases should be referred to the Consultant in charge of the case in question prior to the release of information.

(Section 1.5 reviewed by Dr K Burgess / Dr S Gibbs May 2018)
(Reviewed & up-dated by Dr J Yassa, Aug 2003)

[Info leaflet available – No. 49 – “Protecting identifiable information?”]
1.5 POLICE REQUESTS FOR INFORMATION ABOUT PATIENTS

References
1. Confidentiality, GMC 2017
2. 0-18 years: guidance for all doctors, GMC 2018
3. Confidentiality: reporting gunshot and knife wounds. GMC 2017
6 Disclosure of Personal Information to the Police, NHS Information Governance Alliance 2016
1.6 FORMAT FOR POLICE STATEMENTS

Police statements must be submitted using forms MG11 and MG11 (cont.) which are available from the ED secretaries. Once complete in full, hand to the ED secretaries for checking and to be sent.

N.B.
- Do not give opinions unless you have enough experience to justify them.
- No statement to be given to the Police until written permission for release of the information is given by the patient's parents / guardian.
- All statements to be checked by an ED Middle Grade or a Consultant before being released.
- Sign and date the statement, and obtain a witness signature on every page.
  - There is a payment from the Police for giving a professional statement, claim the fee on the accompanying form

(Section 1.6 updated by Dr S Gibbs, May 2018)
(Reviewed & up-dated by Dr A K Smith, Jan 2004)
1.7 UNACCOMPANIED CHILDREN & CONSENT

A. EMERGENCY CARE
B. ASSESSING CAPACITY TO CONSENT
C. SITUATIONS WHERE TREATMENT IS REFUSED OR CONSENT IS WITHHELD

If a child comes to the Emergency Department without a parent or legal guardian there may be a problem of legal consent for examination, investigations and treatment.

A. EMERGENCY CARE

The GMC guidance on capacity, consent and medical treatment in 0-18 year olds (ref 1) states: -

"You can provide emergency treatment without consent to save the life of, or prevent serious deterioration in the health of any child or young person."

And

"You can provide medical treatment to a child or young person with their consent if they are competent to give it."

In other cases, immediate management should be undertaken. An extract from a letter from the hospital's solicitor clarifies the situation. "In law a teacher would be regarded as being in loco parentis for most purposes and that would include the securing of necessary emergency treatment. In my view the whole issue comes down to the extent of the emergency - i.e. the extent to which the treatment can be postponed until the parent is available. The doctor should provide such treatment as is immediately necessary ranging from sutures / dressing to the more serious cuts / wounds. The doctor should take the immediate steps medically necessary to contain the situation and delay the less urgent measures until the parents have been consulted."

In non-urgent cases you should not proceed with treatment until the parents have been contacted and consulted.

B. ASSESSING CAPACITY TO CONSENT

A young person's ability to make decisions depends more on their ability to understand and weigh up options, than on their age. When assessing a young person's capacity to make decisions, you should bear in mind that:

a) a young person under 16 may have capacity to make decisions, depending on their maturity and ability to understand what is involved

b) at 16 a young person can be presumed to have capacity to make most decisions about their treatment and care. In certain circumstances, such as special educational needs (SEN), it may be important to assess their capacity to consent. (Ref 1)

Children and young people can only consent to investigation or treatment if they are able to:

- understand the nature, purpose, benefits, risks and consequences of not proceeding;
- retain the information discussed;
- use and weigh this information, and
- communicate their decision to others (Ref 2)
1.7 UNACCOMPANIED CHILDREN & CONSENT

C. SITUATIONS WHERE TREATMENT IS REFUSED OR CONSENT IS WITHHELD

A young person with capacity to consent, who refuses, should be respected. The young person may agree to a limited examination and the process may be adapted, meeting the young person's agreement. The clinician should offer information about the consequences of refusal and offer a further opportunity. Any risks to the child should be discussed with the consultant in the department and they may involve the named professionals (Ref 2)

Respect for young people's views is important in making decisions about their care. If they refuse treatment, particularly treatment that could save their life or prevent serious deterioration in their health, this presents a challenge that needs careful consideration (Ref 1) and should always involve the Emergency Department Consultant. In such situations it may be appropriate to contact the police and local authority who will decide whether to apply for an EPO (Ref 2).

Parents cannot override the competent consent of a young person to treatment that you consider is in their best interests (Ref 1).

In England, Wales and Northern Ireland, the law on parents overriding young people’s competent refusal is complex. In such situation it is advised to seek legal advice if you think treatment is in the best interests of a competent young person who refuses (Ref 1).

(Section 1.7 reviewed by Dr S Scammell & Dr S Gibbs May 2018)
(Up-dated by Dr J Yassa, Aug 2003)

References
1. 0-18 years: guidance for all doctors, GMC 2007, updated April 2018
2. Child protection Companion. RCPCH 2013
3. Consent: patients and doctors making decisions together, GMC 2008

1.8 LEGAL STATUS OF CHILDREN

When a child is subject to a care order, the local authority acquires parental responsibility in addition to the parent(s) and can determine the extent to which the parents may meet their responsibility. Any person with parental responsibility may act alone, except in a way which is incompatible with an order.

If the child is the subject of a court order, you must find out the directions of the court. The child's consent also is critical and an examination undertaken without it may be held in law to be an assault.

N.B.
These issues are not always clear-cut, so discuss with someone senior. The Trust legal department or head of Risk Management may need to be involved.

(Section 1.8 reviewed Dr S Gibbs May 2018)
(Reviewed by Dr J Yassa, Aug 2003)
1.9 PATIENTS AND PARENTS ACCESS TO MEDICAL RECORDS

It is ED policy that original ED cards MUST NOT leave the ED at any time. This rule of access applies to anyone making an enquiry including other clinicians, Trust employees, Governance Department / Risk, the Police etc.

All requests for access to ED medical records by patients or their parents should be managed in accordance with the Trust Clinical Records Management Policy – available via the intranet – CP1526 Access to medical records policy. Requests must be in writing and should be forwarded to the Trust Head of Risk Management in a sealed envelope.

(Section 1.9 reviewed by Dr S Gibbs April 2018)
(Reviewed by Dr J Yassa, Aug 2003)
1.10 EMERGENCY AMBULANCE CALLS TO THE ED

A. BACKGROUND

The phone at the rear of the nursing station is used for informing the department of the imminent arrival of a sick or traumatised patient. It has a different ring tone to the rest of the department phones and should not be ignored if you are the only person available to answer it. However, this phone is NOT normally to be answered by junior doctors as senior decision making is often required (in the case of major trauma) about whether to accept a patient or for them to be transferred to Leeds. This requires knowledge of the provision of tertiary specialities at SCH and the wider Y&H Region.

Examples of calls are:

- Major trauma
- Cardiac arrest
- Fitting child
- Sick child / meningococcal disease
- Any situation where an ambulance crew feel a ‘courtesy call’ to the ED may be helpful

However, this does not mean that we will be warned of every such case that arrives!

B. PROCEDURE

On answering the phone the crew should declare ‘Trauma’ or ‘Medical’. If not, ask and fill in the appropriate part of the form. The crew will give the relevant information they want to pass. Please fill in the form (ATMISTER form) that is kept on the clipboard by the phone. Occasionally in trauma cases the ambulance service ask about bypassing a nearby hospital and coming directly to SCH. SCH will accept any trauma patient when bypass is considered appropriate by the ambulance service staff as long as definitive provision of care does not mean transfer to Leeds (e.g. cardio-thoracic injuries, need for vascular interventional radiology).

C. ATMISTER FORM

ATMISTER stands for Age and sex, Time of incident, Mechanism of injury, Injuries suspected, Signs (vital sign observations) Treatments given, Estimated time of arrival and Resources required e.g. major haemorrhage protocol to be initiated. It is a form designed primarily for trauma cases but is used also for the medical cases phoned through. There are 2 parts to the ATMISTER form, for trauma and for other resus cases. Document this and hand it to the most senior medical member of staff in the department. The ATMISTER form becomes part of the notes and must remain with the ED card.

D. ACTIONS TO TAKE

Call

- the ‘Cardiac Arrest Team’ on 2222 for medical emergencies and cardiac arrests
- the ‘Trauma Team’ on 2222 for major trauma. This includes traumatic cardiac arrests.
1.10 EMERGENCY AMBULANCE CALLS TO THE ED

- If multiple major casualties are expected, then activate the MAJAX plan or multiple trauma escalation plan if there are two or three seriously ill or injured cases incoming
- Radiology in trauma
- think carefully about informing other relevant members of staff e.g. orthopaedics or plastics.
- consider accessing the in-patient hospital notes on EDMS on the computer in resus.
- perform some simple drug calculations as these are easier when not under duress.

If the call is a traumatic cause of cardiac arrest, put out a TRAUMA call, not arrest call. This involves the additional input of the surgeons who may be key in helping to reverse the cause of the initial arrest. This includes ‘traumatic’ causes of cardiac arrest e.g. drowning, hanging, asphyxiation from house fires.

The main purpose of all calls is to allow the ED time to prepare. Use this carefully and assemble an appropriate team. Designate a team leader and prepare team badges, available on entry into resus from the Nurses station.

During the day when more members, and more senior staff, are on duty, it may be appropriate to wait until the patient arrives to assess the situation. A senior member of ED staff should make such decisions and should be involved anyway under such circumstances.

E. PATIENTS AGED > 16 YEARS

There is an arrangement between the ED and YAS that nearly all patients over 16 years of age are not to be brought to this department. The exceptions are those patients under active follow up at SCH for their underlying condition. See section 1.12.

F. AMBULANCE HANOVER

The NHS England Quality Indicators (commenced April 2011, updated 2017) require that all patients arriving by ambulance are assessed and ‘handed over’ within 15 minutes of arrival. To facilitate this, ED staff need to be aware that this target exists and to ensure a speedy process of handover from the ED side. The yellow Patient Record Form that the crew fill out has a place to sign and time the handover process and this should be filled in wherever possible. The crew and ED nursing staff then have to electronically document this on the screens situated near the Nurses Station and next to triage.

Achievement of the ED standard will facilitate YAS in meeting their total 30 minute turnaround target which includes a further 15 minute after handover in ED

(Section 1.10 updated by Dr J Gilchrist, March 2018)
(Written by Mr C FitzSimmons, Feb 2005)
1.11 INITIAL ASSESSMENT OF PATIENTS

A. TRIAGE

The overall purpose of initial assessment/triage is to **rapidly** sort patients arriving in the Emergency Department in order to prioritise the timing and location of the care required. Triage comes from the French verb 'trier' meaning 'to sort'.

B. AIMS

The aims and benefits of the initial assessment are:
- Early assessment and prioritisation of children and their families.
- Reduction in waiting time.
- Control of the flow of patients by assigning the appropriate area for treatment and balancing the workload with available resources.
- Initiation of emergency care and diagnostic measures.
- Provision of a safe environment and continual re-assessment.
- Crisis intervention and reducing aggression.
- Provision of information.
- Identifying health promotion needs.

C. PROCESS

A nurse is dedicated to initial assessment and will constantly monitor for the arrival of new patients. All nurses who undertake this role will have at least eighteen months' paediatric emergency experience and hold a PLS or APLS provider certificate.

The assessment nurse will:
- Carry out base line observations, including a PO2s score (Appendix 2) and weigh each child as appropriate.
- Make an assessment of and score the child's pain using the Children's Hospital Pain Tool.
- Give analgesia as required using the departmental Patient Group Directives.
- Request an X-ray using the 'glass laceration policy', where appropriate.
- Make and document a risk assessment for moving and handling of each patient.
- Redirect patients to the most appropriate area /agency for management.
- Legibly and accurately document all findings, observations and medication using either Medway or standardised documentation.
- Assign a level of priority using the Children’s Hospital Triage tool which incorporates the five category national triage scale (Appendix 1 on following page), based upon the assessment findings.
- Assign patients who fit the criteria (Appendix 3) to the Primary Care stream so that the department co-ordinator can stream these patients accordingly.
1.11 INITIAL ASSESSMENT OF PATIENTS

- Assign patients who fit the criteria (Appendix 4) to the STARR team pathway so that the department co-ordinator can stream these patients accordingly.

- Liaise with and hand over children requiring further treatment or monitoring to the nurse co-ordinator.
- Where appropriate initiate fluid challenges or urine collection.
- Continuously monitor patients in the waiting area and respond appropriately to changes in their condition.

Remember prioritisation is not needed when there is a doctor or nurse practitioner immediately available to see the child, e.g. when streaming. However, some children will still benefit from a brief assessment (generally illness presentations) where they are weighed and base line observations recorded.

Ref:

Appendix 1

D. THE NATIONAL TRIAGE SCALE

This is a consensus scale devised by the College of Emergency Medicine. This scale has been widely adopted nationally and is incorporated into the Manchester Triage System and Sheffield Children’s NHS Foundation Trust Triage System.

<table>
<thead>
<tr>
<th>Triage Category</th>
<th>Category Name</th>
<th>Colour code</th>
<th>Target Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 / A</td>
<td>Immediate</td>
<td>Red</td>
<td>0 mins</td>
</tr>
<tr>
<td>2 / B</td>
<td>Very Urgent</td>
<td>Orange</td>
<td>10 mins</td>
</tr>
<tr>
<td>3 / C</td>
<td>Urgent</td>
<td>Yellow</td>
<td>60 mins</td>
</tr>
<tr>
<td>4 / D</td>
<td>Standard</td>
<td>Green</td>
<td>120 mins</td>
</tr>
<tr>
<td>5 / E</td>
<td>Non-Urgent</td>
<td>Blue</td>
<td>240 mins</td>
</tr>
</tbody>
</table>
1.11 INITIAL ASSESSMENT OF PATIENTS

Appendix 2

Paediatric Observation Priority Score (POPS) Chart

This chart is not a substitute for good clinical judgement and any concerns about the condition of a child should be brought to the attention of a senior nurse or doctor.

<table>
<thead>
<tr>
<th>Age</th>
<th>Score</th>
<th>2</th>
<th>1</th>
<th>0</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any</td>
<td>Sats</td>
<td>&lt;50%</td>
<td>90-94%</td>
<td>&gt;95%</td>
<td>90-94%</td>
<td>&lt;90%</td>
</tr>
<tr>
<td>Any</td>
<td>Breathing</td>
<td>Stridor</td>
<td>Audible grunt or wheeze</td>
<td>No distress</td>
<td>Mild or Moderate Recession</td>
<td>Severe Recession</td>
</tr>
<tr>
<td>Any</td>
<td>AVPU</td>
<td>Pain</td>
<td>Voice</td>
<td>Alert</td>
<td>Voice</td>
<td>Pain</td>
</tr>
<tr>
<td>Any</td>
<td>Gut Feeling</td>
<td>High level concern</td>
<td>Low level concern</td>
<td>Well</td>
<td>Low level concern</td>
<td>Child looks unwell</td>
</tr>
<tr>
<td>Any</td>
<td>Other</td>
<td>Oncology</td>
<td>Patient</td>
<td>Significant PMH+</td>
<td>Significant PMH+</td>
<td>Congenital heart disease</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Total Score</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-1</td>
<td>2-3</td>
</tr>
<tr>
<td>4-7</td>
<td>8+</td>
</tr>
</tbody>
</table>

Any child scoring above 8 should be considered for transfer to resuscitation.

*Significant PMH includes:
- Ex-premature
- Syndromic conditions
- Cardiac problems
- Asthma
- Diabetes
- Long term steroids
- All other chronic conditions

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This is version 1.2 August 2015
1.11 INITIAL ASSESSMENT OF PATIENTS

Appendix 3

Patient Criteria for Triage to Primary Care Stream

- Well children over 3 months old
- POPs score <2

- Minor illness e.g. sore throat
- Cough without wheeze/use of accessory muscles
- Coryza
- Gastroenteritis with no signs of dehydration
- Abdominal pain (not associated with D+V) without vomiting, fever (>38.5C) or altered gait
- Blanching rash
- Fever (> 6 month olds)
- Genitourinary medicine and gynaecological problems
- Emergency contraception
- Non traumatic eye problems e.g. conjunctivitis, hay fever, jelly eye
1.11 INITIAL ASSESSMENT OF PATIENTS

Appendix 4

Pathway for patients presenting with deliberate self-harm at triage

- This pathway applies to medically fit, young people aged less than 16 years with a history of self-harm, threatened self-harm or suicidal ideation.
- If aged over 16 years, the young person should attend the Emergency Department at the Northern General Hospital to be seen by the adult liaison psychiatry team (even if under CAMHS).
- This is not intended for use with psychiatric presentations other than self-harm.
- Discuss any concerns with the senior doctor in the Emergency Department.

<table>
<thead>
<tr>
<th>Patient name</th>
<th>Hospital number</th>
<th>Date</th>
<th>Time</th>
<th>Presenting complaint</th>
</tr>
</thead>
</table>

Checklist for referral from triage

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Y</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>No history of ingestion / overdose / intoxication</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No wounds requiring wound closure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Willing to stay for psychosocial assessment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Verbal consent for referral to STAR team</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- If the patient fulfils the above criteria then contact the STAR team. Between 09:00 and 21:00 every day including weekends. Referrals accepted up to 19:30.
- Monday - Friday 09:00-17:00 phone admin support team on 0114 3053104 who will accept the referrals on behalf of the STAR team.
- After 17:00 and weekends ring the STAR team co-ordinator via their office on 0114 3053327 or via switchboard.

Time referral made

<table>
<thead>
<tr>
<th>Referrer</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

Named nurse

Patient’s location

(Section 1.11 reviewed by ED Sister & Nurse Manager, J Parker, April 2018)
(Appendix 1 written by ED Sister & Nurse Manager J Morcombe, Aug 2003)
1.12 MANAGING PATIENTS AGED 16 YEARS+ ATTENDING THE ED

Any child (or adult) requiring resuscitation room management will receive it regardless of age.

However, for less serious complaints, the ED will not manage any patients aged over 16 years, irrespective of whether the problem is an ED problem (e.g. minor injury), or a problem the patient is currently under an in-patient team with, unless the patient is under current active follow up from SCH. Reception will check whether the young person has been seen at SCH within the last 12 months and remains under ongoing follow up.

If this is the case and this can be confirmed, the patient receives normal management from the ED staff, like any other attendance. In cases where the child is well known to an inpatient team and is attending with a related problem the young person should receive an initial assessment by ED medical staff and the patient should be referred to the relevant team without delay. The inpatient notes should be reviewed on EDMS before referral if possible.

If the patient is not under active follow up the patient will not be seen in the ED but will be assessed and redirected to further care as appropriate. This may mean transfer to NGH ED, Broad Lane walk-in-centre, GP, etc. Where appropriate ED staff may facilitate transport for transfers.

(Section 1.12 reviewed by ED sister / Nurse Manager, J Parker, April 2018)
(Written by ED sister / Nurse Manager J Morcombe, Aug 2004)
1.13 CHILDREN WITH CHRONIC HEALTH PROBLEMS

If the patient is 16 years+ then see Section 1.12 - Procedure for managing patients aged 16 years+ attending the ED at SC(NHS)FT.

Children less than 16 years old who have a chronic condition managed at SC (NHS) FT and who present to the Emergency Department with an illness related to their chronic health problem will be seen by the ED team. This should include a brief assessment and referral to the on-call Speciality team. The assessment and referral may be made by the triage nurse or the ED doctor, depending on the nature of the presenting problem.

If the child presents with a problem other than the above, they should be managed in the ED as normal.

If a patient has recently been an inpatient under the care of the medical or surgical teams and been discharged but then returns to the ED with a related problem, they should be referred directly back to the team concerned. This can also be initiated from triage or by the nurse in charge. Post-operative wound infections, orthopaedic frames concerns, plastic surgery wound dressing issues and ongoing medical conditions are good examples of this.

(Section 1.13 reviewed by ED Sister / Nurse Manager, J Parker April 2018)
(Written by Dr A Smith, Aug 2004)
1.14 TRIAGE / MINOR STREAMING GUIDELINES

Minors stream can include:
- All minor injuries.
- Minor illness where it is likely the child will not require a period of observation i.e. skin rashes / infections, earache, D&V with no dehydration, toothache etc.

Streaming can operate generally between 11:00hrs - 23:00hrs, 7 days a week.

**Decision** – The Senior Nurse and Medical Coordinator on each shift will identify who will operate the stream. This should include an ENP and / or Dr, with a dedicated treatment nurse. (All should be competent to make autonomous clinical decisions about treatment / investigations / discharge).

There should be a separate dedicated area - room 4/5, AAU consulting room or room 2*. If medical staff are operating the stream then a nurse must remain with the Dr and complete any treatment in this room whilst the Dr completes the ED card and Medway episode – the nurse can also weigh and give analgesia if the child has not had a formal triage.

Triage of walk-in patients is unnecessary when streaming is in operation and there is no queue.

Triage / Assessment nurse will assess suitability of children to be included in the stream (quick visual assessment only if no queues). The treatment nurse can select patients for stream when the triage nurse is busy or there is a queue for triage.

Staff in dedicated stream will not be allocated other duties or moved unless exceptional circumstances arise, i.e. Resus.

During busy times for streaming, extra staff can be asked to help see patients / do treatments, if majors are quiet.

*Room 2* should be used when medical staff operate the stream with a dedicated treatment nurse. The room should be set up with scales / dressing trolley (fully stocked), to ensure treatments can be carried out in the room.

The benefits of operating streaming include:
- Reducing patients waiting time.
- Reduces need for hand-overs.
- Good learning opportunities for nursing staff in clinical assessment of minor injury / illness.
- Good learning opportunity for junior doctor in clinical assessment / wound management from senior medics / ENP’s.
- Can quickly relieve the overall onus on the ED / waiting room at busy times

(Section 1.14 reviewed by ED Sister/ Nurse Manager, J Parker, April 2018)
Written by Sister J Morcombe Aug 2004)
1.15 GUIDELINES FOR CONTACTING THE CONSULTANT ON-CALL

The Consultant on-call should be informed of the following circumstances when they will discuss the situation and decide on the plan of action:

1. All patients that trigger a ‘Major Trauma’ call.
2. All cases in the Resuscitation Room when the Consultant is in the building.
3. Any case in the Resuscitation Room when the Consultant is not in the building where you require advice or support.
4. Any cases causing concern which are not being addressed by the medical staff in the hospital
5. All deaths.
6. Sickness in staff leading to insufficient staff on duty.
7. Multiple casualty incident.
8. Major incident.
10. Violence to staff.
11. Any matters which need a Consultant, which concern you enough and which cannot wait until the next working day.

You should inform the Consultant on-call the following morning of:
- Child protection cases. (unless any of the above indications for contacting the consultant more urgently are also met)

Any member of nursing or medical staff can contact the consultant in the above circumstances. Switch have all our numbers, or they can be found in the Majax list.

(Section 1.15 reviewed by Dr D O'Donnell Feb 2018)
(Written by Dr A Smith, Aug 2002)
1.16 SENIOR DOCTOR SUPPORT FOR THE ED

A. ‘IN-HOURS’ COVER

From 08.00 to midnight the ED junior doctor should in the first instance refer to the ED Senior grade doctor present in the department. This may be a Consultant or a Middle Grade.

B. ‘OUT-OF-HOURS’ COVER

Outside the above hours, there is always a senior ED nurse on duty overnight for immediate advice and support. The ED consultant is available for advice and support at all times.

C. ADVICE AND SUPPORT BY PATIENT CATEGORY

SC(NHS)FT ED operates a “Hospital at Night” senior doctor / middle grade support system. This is a formalised arrangement within the hospital and between specialities.

When there is no ED middle grade doctor available in the department the ED junior doctor may refer to the following for advice and support: -

<table>
<thead>
<tr>
<th>Patient category</th>
<th>Middle Grade/Senior Support</th>
</tr>
</thead>
<tbody>
<tr>
<td>Major Trauma</td>
<td>ED Consultant + Trauma Team</td>
</tr>
<tr>
<td>Cardiac Arrest</td>
<td>Crash team</td>
</tr>
<tr>
<td>Medical</td>
<td>Medical SpR</td>
</tr>
<tr>
<td>Surgical</td>
<td>Surgical SpR</td>
</tr>
<tr>
<td>Orthopaedic</td>
<td>Orthopaedic SpR</td>
</tr>
<tr>
<td>Minor Trauma</td>
<td>Senior ED Nurse +/- next day ED clinic</td>
</tr>
</tbody>
</table>

If a child attends and is triage category A or B then the call for senior support should be made immediately.

The ED consultant can be contacted for any problems or concerns not resolved by the above system.

(Section 1.16 reviewed by Dr D O’Donnell Feb 2018)
(Section 1.16 written by Dr A Smith, March 2008)
1.17 MEDICAL CO-ORDINATOR ROLE

A. WHO, WHERE, WHEN?

This role is carried out either by the Emergency Department consultant between 08:00 – midnight 7 days per week, or the ED middle grade or CT3 at other times. Inform the nurse coordinator each shift who is providing the medical co-ordinator role.

B. RESPONSIBILITIES OF THE ROLE

- Answer all ‘red phone’ calls unless being addressed by the ED middle grade or the senior nursing staff
- Handle ‘red phone’ calls once answered if decision making is required around patient destination e.g. Trauma Unit calls
- 4 hour standard in conjunction with Nurse Co-ordinator (including keeping Medway up to date, checking for ‘missed patients’)
- Overview and review the management plan of all: Category A + B patients or patients with long waiting times
- Instigate the escalation plan for sick/long-waiting patients
- Co-ordinate all medical care in the ED in liaison with the Nurse Co-ordinator
- Allocate medical staff to clinical areas/tasks and for breaks
- Overall responsibility for medical rota shortfalls, sickness and any other managerial or staffing issues for that shift.
- Available for senior medical advice on all ED patients
- Overview and policing the clinical management of all patients requiring observation or investigations
- Early assessment of any patient who requires facilitated discharge
- Child protection role in being made aware of any issues raised by any member of ED staff
- Review of rooms to ensure optimum use of space within the department
- Any disagreement between nursing and medical staff should be discussed with the medical coordinator.

In general, this role is about deflecting interruptions away from the rest of the team to maximise their efficiency e.g. addressing reception coding queries or telephone enquiries. Flexibility is required. The Medical Co-ordinator should manage their own clinical workload while overseeing the smooth running of the department.

(Section 1.17 reviewed by Dr D O’Donnell Feb 2018)
(Section 1.17 written by Dr C Fitzsimmons, May 2010)
1.18 ESCALATION GUIDELINE FOR SPECIALTY PATIENTS IN THE EMERGENCY DEPARTMENT

A. RESPONSIBILITIES
B. ACTIONS TO BE TAKEN

A. RESPONSIBILITIES
Escalation action to be invoked by ED Consultant 08:00 to midnight and ED senior nurse midnight to 08:00. Action is taken when the accepting Specialty team is unlikely to be able to meet normal process within the required time standard due to workload.

The ultimate responsibility that patients spend no longer than 4 hours in the ED rests with the accepting Specialty consultant on call.

B. ACTIONS TO BE TAKEN

<table>
<thead>
<tr>
<th>Time Standard</th>
<th>Normal Process</th>
<th>Escalation process</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 hour from referral or 3 or more waiting to be seen</td>
<td>Patient reviewed by ST1-3 doctor from the accepting Specialty team</td>
<td>ED Consultant/Middle Grade to review referral(s)  Inform accepting Specialty team ST4+ doctor on call  Admit to AAU if clinically indicated and available. For Paediatric patients 1st on call Paediatric ST4+ doctor</td>
</tr>
<tr>
<td>3 hours from arrival</td>
<td>Decision to admit/discharge</td>
<td>indicated Inform accepting Specialty ST4+ doctor on call  Admit to AAU if clinically and available.</td>
</tr>
<tr>
<td></td>
<td>Admission to ward/AAU or discharged</td>
<td>Inform accepting Specialty Consultant on call</td>
</tr>
</tbody>
</table>

(Section 1.18 reviewed by Dr D O’Donnell, Feb 2018)  (Section 1.18 written by Dr A Smith, April 2017)
1.19 HAND OVER AND REFERRAL OF PATIENTS

A. RATIONALE

Handover of care is one of the most hazardous procedures in medicine. When carried out improperly it can be a major contributory factor to subsequent error and harm to patients. We need to ensure that the risks involved in the process of transferring clinical responsibility are minimised. Well communicated, clear, accurate and agreed hand over is essential for the safety of our patients.

B. PATIENTS WITHIN THE DEPARTMENT – ALL STAFF

Spend the last 15 minutes of your shift completing the management of patients under your care so that handover of patients is minimised. It may however be necessary at times to handover patients to colleagues. This should be to a colleague who will be on duty for at least the next few hours. You should communicate with that colleague, who and where the patient is, how long they have been in the department for and document in the notes the following on the handover section within the ED card:

- Your differential diagnosis
- Your proposed plan
- Outstanding action needed
- Who you are handing over to and the time
- That the nursing coordinator has been informed of the hand over

Both doctors (or ENP’s) should then sign the documented handover episode in the notes.

When handing over a patient it is important to consider which key points need to be handed over and to how to communicate all relevant information as effectively and clearly as possible.

For the verbal part of handover, a useful communication tool to follow is SBARE, which can help to structure the handover as follows:

**Situation:** e.g.: This is … age…who has….
**Background:** He presented with … We’ve done…
**Assessment:** He is currently… His last obs were…
**Recommendation:** He still needs…/is waiting for
**Escalation:** If he is not improving, this is the plan…

If you are being handed over a patient you should be clear of their clinical presentation, proposed plan and what is required of you. It is always good practice to see and assess the patient yourself before acting on any investigation results or discharge plans. Any concerns should be discussed with the ED senior doctor / medical coordinator.

C. SENIOR HANDOVER

The senior doctor coming on shift at 0800 and 1600 will lead handover of all the patients in dept. This is recorded on the shared drive folder available on all the desktops. This will
1.19 HAND OVER AND REFERRAL OF PATIENTS

usually take place in the clean utility room, with the nursing coordinator and the current staff. It will include discussion of all unwell patients; all breached or delayed patients and all relevant staffing or equipment issues.

(Section 1.19 reviewed by Dr D O'Donnell Feb 2018)
(Written by Dr C Rimmer, May 2010)
1.20 MAKING REFERRALS FROM THE EMERGENCY DEPARTMENT

A. BACKGROUND

Working in the ED necessitates the help of other specialities from time to time. This help is usually recruited via making a referral, unless it is time critical in which case a 222 arrest call or trauma call is put out to summon all necessary teams simultaneously.

B. PROCESS

A referral needs some thought before being made. There is a skill to it being done correctly. Often a senior ED opinion is what you need, not a different dept. Think - what is it that you are asking for – advice in general or for a patient to be seen and/or admitted? If you are seeking advice make this clear at the outset and generally request this input from a senior doctor who can make the necessary decision in the speciality concerned e.g. the Medical Registrar.

If you are requesting a referral, then make this via the speciality SHO in the majority of cases. Exceptions are Burns and Plastic Surgery, Orthopaedics and ENT and Ophthalmology where the SpR takes the calls. State up front ‘I would like to make this referral to you…….’ so there is no doubt about the purpose of your call.

C. SBARE TOOL

We use the SBARE tool as a useful way to structure the conversation:

S - Situation
- I am (name), I am calling about (child X)
- Age xx
- Weight xx
- I am calling because I am concerned that……..

B - Background
- Child (X) has attended on (XX date) with (e.g. respiratory infection)
- Child (X)’s condition has changed in the last (XX mins)
- Their last set of obs were (XXX)
- The child’s normal condition is…
- (e.g. alert/drowsy/confused, pain free)
1.20 MAKING REFERRALS FROM THE EMERGENCY DEPARTMENT

A - Assessment:
- I think the problem is (XXX)
- and I have…
- (e.g. given O2 /analgesia, stopped the infusion)
- OR
- I am not sure what the problem is but child is deteriorating

R - Recommendation:
- I need you to…
- Come to see the child in the next (XX mins)
- AND
- Is there anything I need to do in the meantime?
- (e.g. stop the fluid/repeat the obs)

E – Escalation
- If the patient does not get better we will do…
- If you are unable to see this patient we need to…

D. TIMING

If you believe the child to be sick and needing to be seen urgently then this needs to be made clear. If less urgent but a priority, then state this. Once the referral is made the expectation is that the patient should be reviewed in a timely fashion. To this end always document on the ED card the name of the doctor you referred to and the time that you made the referral. There is also a referral option on Medway to document this information. Once the patient has been referred they are still the responsibility of the Emergency Department in the event of any ongoing treatment or deterioration.

E. THE 3 ‘GOLDEN RULES’

There are 3 ‘rules’ to any referral in this department

1. If you refer a patient, the patient is SEEN by the speciality concerned. They cannot refuse a referral.
2. Referrals do NOT come back to the ED.
3. Problems with referrals go up a GRADE IN THE SPECIALITY CONCERNED and if this does not resolve the issue, involve a higher grade of doctor in the ED

The rationale for these -

1. A referral is a request for a speciality team to see a patient and make a management decision. It does not necessarily mean an admission but that decision rests with the speciality doctor dealing with the case. If you ask an in-patient team to see a patient i.e. refer it to them, then they must SEE them. It is not acceptable to be given advice
1.20 MAKING REFERRALS FROM THE EMERGENCY DEPARTMENT

and told to send the patient home. Referrals MUST be SEEN. Make it clear that you are not asking for advice and that if seeing the patient is a problem, you will speak to their senior (usually Registrar) and politely bring the conversation to a close. Document the difficulty and the time. Then move up to the next grade of doctor in the speciality concerned. This will usually resolve most problems.

2. Once seen the team concerned CANNOT refer the patient back to you. An example might be the patient with abdominal pain who the surgeons believe is not surgical in nature and who attempt to pass the patient back to you for referral elsewhere eg medical team or even discharge home. This is not acceptable. If a team think that referral to another speciality is appropriate then they must do this because a) they will need to justify why they believe the patient does not fall under their remit and b) you have already made your best attempt at diagnosing the problem. You cannot now refer the same patient to another speciality when you believed the issue was best placed in the first speciality. If the team concerned feel that the patient is suitable for discharge home then they can arrange this themselves.

As in point 1, you initially refer to a more senior doctor in the speciality concerned if there is any obstruction to your referral. If this is also difficult and does not meet with the desired outcome then refer back to your own (ED) senior doctor for advice. They will refer again to the speciality middle grade involved and if this fails to get the desired result the senior ED doctor will go to the speciality Consultant. Logically in this manner referral disputes end up with a Consultant to Consultant conversation if they cannot be resolved. It is extremely rare for this to ever happen. Another reason for this escalation is that it is NOT acceptable for another doctor to be obstructive to referrals as it can make ED juniors reluctant to refer again when it is necessary clinically. This could be potentially dangerous, and the involvement of an ED senior will ensure this is dealt with so that it does not occur again. For this reason the ED seniors also want to be informed if you have made a referral but had difficulty in doing so.

(Section 1.20 reviewed by Dr J Stone, March 2018)
(Written by Mr C FitzSimmons, May 2012)
1.21 PROCEDURES IN THE ED
FOLLOWING REFERRAL TO IN-PATIENT TEAMS

Any requested procedure that will involve Emergency Department nurses will only be done at the discretion of the nurse in charge of ED at that time.
After taking into consideration the work load and care requirements of other children in the Emergency Department, any nursing involvement requested in procedures / treatments (e.g. cannulation) will be prioritised by the nurse in charge.

Additional to nursing staff workload is the consideration of the 4 hour standard for all patients transiting the ED. This is a Trust wide standard of care and all efforts should be made to achieve it. Unnecessary procedures being requested to take place in the ED (e.g. for convenience) will not automatically be allowed. Where possible, requests will be met but it is inappropriate for a child to remain over 4 hours in the ED rather than go to an available bed on a ward because, for example, cannulation has not yet taken place and speciality staff wish for this to occur while in the ED.
There is a clear escalation policy for sick patients who have not improved or stabilised within 2 HOURS of arrival. Please see Section 1.22

The final decision on this rests with the ED Consultant on call for the day, but the principle remains that the moving of a child to a suitable ward environment takes priority over performing tests.

(Section 1.21 reviewed by Dr J Gilchrist, May 2018)
(Written by Dr J Yassa & Sister J Morcombe, Aug 2003)
1.22 – REFERRAL TO THE EMERGENCY DEPARTMENT REVIEW CLINIC (AND OTHER HOSPITAL CLINICS)

A. BACKGROUND

The Emergency Department has a Consultant-led Review Clinic held in the department every morning (Monday to Friday) from 09:30am. This is for the review of certain categories of condition (see list below) and exists partly for the safety netting of patients from overnight where it may be unclear what is the best course of action. It is important not to overload the clinic beyond its slots (a maximum of 12) so that the clinic can continue to function well.

B. PROCESS

Patients that are suitable for a pre-booked ED Clinic review (see list below) should be told to return to the ED reception desk once their treatment is complete and make an appointment for the ED Clinic. Give them a completed clinic referral request slip to hand in at ED reception. Use the same process to book ED Dressing Clinic, Fracture clinic, ENT clinic, Ophthalmology clinic, asthma clinic and rapid access clinic.

Patients that are suitable for an open access ED clinic review (see list below) should be given an information leaflet that explains the process of telephoning for an appointment. Also explain to the parent / carer what they specifically need to look for when deciding if they need a clinic review (see below). Document in notes that an open appointment offered. This type of appointment may not be appropriate where there are language barriers.

C. TIMING

See the table below. Bringing back a soft tissue injury or “sprain” too early is unhelpful as it is too soon to see any significant improvement or progress. For the conditions listed below see the designated timeframe for returning to clinic. If you want to do something outside of these please clear it with an ED senior first. Open appointments can only be offered up to 2 weeks.

Also consider that when asking patients to come back on a particular day for clinic that Monday is often very busy. ED reception can tell you how many patients are currently booked onto clinic for any given day of the following week if asked.

Always make it clear to parents that they can return to ED sooner if there is a problem before the clinic date and that if the problem seems to have completely resolved that they can cancel the clinic appointment and not attend. They must inform the ED however or they will be marked as a DNA and may be contacted to see if all is OK.
1.22 – REFERRAL TO THE EMERGENCY DEPARTMENT REVIEW CLINIC (AND OTHER HOSPITAL CLINICS)

## D. (i) APPROPRIATE CONDITIONS FOR PREBOOKED ED CLINIC

<table>
<thead>
<tr>
<th>Condition</th>
<th>Don’t review at all if</th>
<th>In meantime</th>
<th>ED clinic at</th>
</tr>
</thead>
<tbody>
<tr>
<td>Limping child</td>
<td>-</td>
<td>Analgesia</td>
<td>3 days</td>
</tr>
<tr>
<td>Burns</td>
<td>Very minor</td>
<td>Mepitel dressing</td>
<td>7 days</td>
</tr>
<tr>
<td>Toddler’s #</td>
<td>-</td>
<td>Long leg softcast POP</td>
<td>14 days</td>
</tr>
<tr>
<td>Elbow injury with Fat pads but no # under 5 yrs</td>
<td>-</td>
<td>C&amp;C</td>
<td>7 days</td>
</tr>
<tr>
<td>Fingertip lacerations/partial amputations</td>
<td>Very minor</td>
<td>Mepitel dressing, steristrips</td>
<td>7 days</td>
</tr>
<tr>
<td>Thumb sprains with possible UCL or RCL laxity</td>
<td>-</td>
<td>Thumb spica</td>
<td>10 days</td>
</tr>
<tr>
<td>Wounds with higher risk for infection</td>
<td>-</td>
<td>Dressing</td>
<td>3 days</td>
</tr>
<tr>
<td>Animal / human bites needing antibiotics</td>
<td>Not a puncture or not needing antibiotics</td>
<td>Dressing, elevate and antibiotics</td>
<td>3 days</td>
</tr>
<tr>
<td>Abscess or paronychia AFTER I &amp; D</td>
<td>Needed antibiotics only</td>
<td>Antibiotics</td>
<td>3 days</td>
</tr>
</tbody>
</table>

## (ii) APPROPRIATE CONDITIONS FOR OPEN ACCESS ED CLINIC

<table>
<thead>
<tr>
<th>Condition</th>
<th>Don’t review at all if</th>
<th>In meantime</th>
<th>Appointment advice</th>
</tr>
</thead>
<tbody>
<tr>
<td>? scaphoid #</td>
<td>-</td>
<td>Neoprene wrist splint (Scaphoid POP if severe pain and fracture clinic)</td>
<td>Remove splint at 10 days – if after a few hours of mobilisation the wrist is still painful replace splint and call for ED appointment</td>
</tr>
<tr>
<td>Elbow injury with fat pads but no # in children age 5yrs and older</td>
<td>-</td>
<td>C&amp;C</td>
<td>Remove C&amp;C at 7 days – if after a few hours of mobilisation the elbow is still painful or limited movement replace C&amp;C and call for ED appointment</td>
</tr>
<tr>
<td>Ankle sprains NEEDING CRUTCHES</td>
<td>No need for crutches (the vast majority</td>
<td>Crutches, NSAIDs, elevation, and gradually start weight bearing</td>
<td>If at 7 days still needing crutches call for ED appointment. If better please return crutches</td>
</tr>
<tr>
<td>Knee injury NEEDING SPLINT or crutches</td>
<td>Minor injuries without need for splint or crutches</td>
<td>Ice, rest, analgesia, Thackery splint</td>
<td>Remove splint when / if feeling more comfortable. At 10 days if still needing crutches call for ED appointment. If better please return crutches</td>
</tr>
<tr>
<td>Pulled elbow that HAS NOT RELOCATED</td>
<td>Relocated</td>
<td>C&amp;C</td>
<td>Remove from C&amp;C after 3 days. If after a few hours still not using arm normally replace C&amp;C and call for appointment.</td>
</tr>
</tbody>
</table>
1.22 – REFERRAL TO THE EMERGENCY DEPARTMENT REVIEW CLINIC 
(AND OTHER HOSPITAL CLINICS)

(iii) APPROPRIATE CONDITIONS FOR ED DRESSING CLINIC
If a patient needs to come back simply for repeat dressing of a wound or a wound check, these can be seen in the ED Dressing Clinic which is held every weekday morning. Use the booking slip as per other ED clinics.

E. Rapid Access Clinic

This is a service provided by the paediatric team. It should be used in cases that don't warrant an acute admission but require a senior medical opinion sooner than a routine referral allows. Their referrals come from a mix of GP and the Emergency Department.

How to refer;

The patients can book an appointment at ED reception by using the clinic booking slip. There are currently 4 appointments available every weekday afternoon. Reception staff requires the patient's demographics and the ED card forms the referral once it has been scanned onto EDMS.

Who to refer;

These could include;
Non-surgical abdominal pain
Persistent diarrhoea with weight loss
Faints and funny turns
Palpitations
Headache with one or more red flags
Unspecified rash without fever
Feeding difficulties with vomiting
Faltering growth in neonates (from day 8)
Feeding problems in babies under 4 weeks

This list is not exhaustive and other conditions can be referred at the discretion of the senior Emergency Department doctor.

This is a valuable resource and should not be over-used by patients who can wait for a routine clinic appointment. Please consider alternatives first (GP, routine out-patients) and discuss any referrals with a senior Emergency Department doctor to ensure the correct use of resources.

F. CONDITIONS FOR REVIEW ELSEWHERE

A routine medical or surgical out-patient referral may be the best option for some patients. In this case send a written referral letter (the ED secretaries will type this up for you)
1.22 – REFERRAL TO THE EMERGENCY DEPARTMENT REVIEW CLINIC
(AND OTHER HOSPITAL CLINICS)

Ongoing problems with allergies, asthma, eczema or diabetes control could all be reviewed
by the relevant Clinical Nurse Specialists who are available for contact at the time of the first
presentation or can make clinic appointments for patients after discharge. We also have
emergency slots at the nurse specialist Asthma clinic (use clinic booking slip)

Most definite fractures should be sent to fracture clinic (use clinic booking slip), however
there are some exceptions, for example buckle fractures of the distal radius, minor
finger/metacarpal fractures and clavicles (see section 4 ED guidelines).

Eye injuries should be sent to eye clinic if there are concerns (use clinic booking slip)

Foreign bodies lodged in noses or ears should be sent to ENT clinic for removal if they cannot
be removed in the ED. (Use clinic booking slip)

(Section 1.22 reviewed & updated by Dr J Gilchrist Jan 2019)
(Section 1.22 reviewed & updated by Dr J Stone March 2018)
(Section 1.22 written by Mr C FitzSimmons, May 2012)
1.23 ALGORITHM FOR INVOLVING PCCU IN THE MANAGEMENT OF PATIENTS IN ED/AAU

A. SCOPE

This algorithm applies when a decision is made that PCCU involvement in the management of patients in ED/AAU may be required.

The decision to involve PCCU may be based on the child’s physiological state (POPS of 8+/PEWS chart/guideline) or on the child’s physical condition, e.g. stridor or burn to airway.

B. DECISION MAKING FLOWCHART

(Section 1.23 reviewed by C O’Connell March 2018)
(Section 1.23 reviewed by D O’Donnell May 2015)
1.24 MENTAL HEALTH IN CHILDREN & YOUNG PEOPLE

A. BACKGROUND
Mental health problems in children and young people are common and the Emergency Department is an important and frequently accessed entry point for these patients. Young people with mental health problems should be treated in a respectful and non-stigmatising way and judgemental attitudes should be avoided.

B. TRIAGE
A young person presenting with a mental health problem should be assessed for any physical needs including self-poisoning, self-injury or possible organic causes accounting for their presentation. All patients with a physical health concern should have a set of observations. The risk assessment should begin at triage. Gathering a few important pieces of information at this stage will help to identify the appropriate area for the patient to be nursed, their risk of absconding, their capacity and whether special measures may be necessary such as 1:1 nursing. Contact details should be verified in case the patient doesn't wait or absconds from the department.

C. DELIBERATE SELF-HARM
Deliberate self-harm (DSH) in young people is increasing. It may take the form of self-injury (cutting, jumping, hanging, burning), self-poisoning (with prescription or over-the-counter medicines) or other risk-taking behaviors. A single episode of self-harm is significant. Anyone with a past history of deliberate self-harm is likely to have repeat attempts and is at increased risk of suicide in the future.

Between 09:00-19:00 7 days a week: Young people presenting with thoughts of self-harm who haven’t taken an overdose or got any wounds requiring closure can be referred to the Supportive Treatment and Recovery (STAR) team from triage without waiting to see a doctor. These patients should be identified as soon as possible. The patient should wait in a suitable, safe area according to their risk and be kept informed of the referral process.
Patients with ingestion or wounds requiring closure are not suitable for referral to the STAR team at triage and should see an Emergency Department doctor first. Any immediate medical or surgical needs should be addressed (see guideline 3.25). After assessment, if the patient has ongoing medical needs they should be referred to the medical team, otherwise they can be referred to the STAR team for their mental health assessment. If the STAR team are not available then the patient should be admitted under the medical team for assessment when possible.
1.24 MENTAL HEALTH IN CHILDREN & YOUNG PEOPLE

Between 19:00 – 09:00 7 days a week: Young people presenting with deliberate self-harm (DSH) outside of the usual STAR team hours should be assessed by an Emergency Department doctor. Any immediate medical or surgical needs should be addressed (see guideline 3.25) as well as addressing their mental health. You may need to interview the patient and relatives/carers individually.

The following should be recorded:

- Details of the act of self-harm
- Triggers
- Underlying mental health problems
- Social situation and support
- Mental state examination – appearance and behaviour, mood, thoughts, speech and insight
- Substance use
- Risk to self and others

All patients presenting outside of STAR team hours should then be admitted to a ward under the medical team. The STAR team will see them the following day (or when the patient is medically fit).

All patients presenting with DSH should have a paediatric liaison nurse referral.

D. OTHER MENTAL HEALTH PRESENTATIONS

Other mental health problems including psychosis, eating disorders, substance misuse and behavioural problems are not suitable for referral to the STAR team. If the young person is presenting with symptoms for the first time they should be assessed for any underlying organic cause. If needed, they should then be discussed with the on-call CAMHS doctor via switchboard.

E. PATIENT AGED OVER 16 YEARS

SCH ED currently only sees patients aged less than 16 years with mental health problems. Even if the patient is under CAMHS they will need to be directed to the Northern General Hospital to see the adult liaison psychiatry team.

F. SECTION 136

Section 136 is part of the Mental Health Act (MHA) used by the police to take a person in mental health crisis to a place of safety. The Emergency Department should only be used for s136 patients aged less than 16 years. Otherwise, it should be expected that patients aged 16-18 years be taken to the 136 suite at Becton. If there is no space available at Becton, they should be taken to the 136 suite at Maple ward. The police are responsible for the safety of the patient and should remain with them if they are managed in the ED (ED can only take over the legal responsibility for a s136 detention if they have the staff and space to ensure the wellbeing of the patient and prevent them absconding).

A s136 lasts for 24 hours, which commences on arrival to the Emergency Department. There is a legal obligation that a mental health assessment is performed within that time. Medical treatment should occur alongside mental health assessment. The on call CAMHS psychiatrist needs to be notified immediately, irrespective of the time of presentation, as well as the
1.24 MENTAL HEALTH IN CHILDREN & YOUNG PEOPLE

Approved Mental Health Practitioner (AMHP) service on 0114 226 3636. This allows the mental health assessment to start as soon as possible. When a s136 ends, the patient might be placed under another section of the MHA (section 2 or 3), be admitted to hospital voluntarily or be discharged.

G. EMERGENCY TRANQUILISATION

Emergency medical treatment can be given to a patient who has a mental health problem who is deemed not to have capacity. This treatment should be in their best interests i.e. the option that is least restrictive of their freedom and future choices. If tranquilisation is felt to be necessary, the appropriate medications are available in resus. Please follow guideline 1.24 “Management of disturbed or violent patients over 12 years old including emergency tranquilisation”.

H. PATIENTS WHO DO NOT WAIT TO BE SEEN OR ABSCOND

If a patient leaves the department without being seen or absconds an attempt should be made to contact them. If it is documented that they lacked capacity or if their history suggests they are high risk (to themselves or others) there should be a local search and the police informed.

I. PATIENTS WHO REQUIRE TIER 3 IN-PATIENT CARE

Patients who require admission to in-patient CAMHS (either voluntary or in-voluntary) should have a bed arranged by the CAMHS team who have access to a bed register both locally and nationally. If there is a delay of >4 hours the patient should wait in an appropriate waiting area/ward, should have a trained mental health nurse/support worker with them and have regular CAMHS reviews.

(Section 1.24 written by Dr H Stewart, June 2020)
1.25 MANAGEMENT OF DISTURBED OR VIOLENT PATIENTS OVER 12 YEARS OLD INCLUDING EMERGENCY TRANQUILISATION

A. INTRODUCTION
This guideline is aimed at patients whose behaviour may result in causing physical or psychological harm to themselves or others. It is not intended for ‘mildly agitated’ patients. The following tranquilisation doses are for children over the age of 12 years. For children under 12 years please refer to the BNFc or to the consultant.

Aggressive behaviour may be the result of metabolic disturbances, organ failure, alcohol withdrawal, drug intoxication, malignancy, head injury, or hypoglycaemia. It is always important to take as thorough a patient history as possible.

Once treatable causes have been excluded, a combination of medical and non-medical approaches will be required to manage these patients. Tranquilisation is the final stage in the pathway of managing such children. The drugs recommended in this guideline are not kept as stock items on every ward but an emergency pack of relevant drugs is available from the resuscitation room in the “emergency tranquilisation box”.

B. LEGAL POSITION ON RESTRAINT
In law, the general position is that an individual may be restrained, or a nurse or other person may protect themselves, only with such a degree of force as is necessary and reasonable in the circumstances. The ability to restrain a violent person or those who intend to harm others is possible whether the person is detained (under Mental Health Act 1983) or not.

C. NON-DRUG MANAGEMENT
- Ensure the safety of child and others.
- Move child to a room (having first removed dangerous equipment) if necessary.
- Remain calm, speak quietly and try to defuse the situation.
- Pay attention to the patient’s perceived grievances
- Involve parents and carers if possible.
- Use restraint and tranquilisation only if the child is a risk to themselves or others
- Staff involved in physically restraining the patient should be trained and proficient in current control and restraint techniques (SCH porters are trained in this)
- At all times communicate with the patient e.g. if tranquilisation is to be used explain this to the child and offer them the choice of route of administration.

Communicate risk – when admitting a child always inform nursing staff on ward if they have potential to show challenging behaviour.

Nurse safely – nursing staff will undertake a more formal risk assessment and arrange for the child to be nursed in the most appropriate bed e.g. HDU
1.25 MANAGEMENT OF DISTURBED OR VIOLENT PATIENTS OVER 12 YEARS OLD INCLUDING EMERGENCY TRANQUILISATION

Agree an action plan – The child should be involved in or be made aware of these discussions. Parental consent should be obtained if possible but under common law restraint and tranquilisation can be used without consent if the child is at risk to themselves or others.

D. DRUG MANAGEMENT
- The decision to medicate a patient should always be made by a Consultant.
- Oral therapy should be offered initially, then IM as necessary (the intravenous route is preferred for a rapid effect but is usually impractical).
- Give small amounts (can always repeat doses) and allow time for drugs to work.
- If a patient is on other regular medication, check the BNF for potential interactions.
- NICE recommend that the first line therapy should belorazepam^4. 
- If the patient is already on antipsychotics, or has allergies or C/Is to Lorazepam or Haloperidol seek advice from the pharmacist before administering other medication.
- IM chlorpromazine should not be used. It is erratically absorbed and can make patients very hypotensive.
- Drug treatment should not be continued for more than 24 hours.
- A baseline ECG should be obtained prior to haloperidol administration if possible to assess QT interval (Haloperidol may cause further prolongation and risk of arrhythmia)
- If using Haloperidol in an unknown or antipsychotic naïve patient, give procyclidine orally or IM to prevent acute dystonic reactions (see Algorithm).
- The patient should be informed that medication is going to be given and why.
- Parents / carers should be involved as much as possible and informed of the plan
- RESUSCITATION FACILITIES MUST BE AVAILABLE BEFORE TREATMENT IS COMMENCED.

E. DRUGS AND DOSAGES

<table>
<thead>
<tr>
<th>Drug</th>
<th>Initial Dose</th>
<th>Presentation</th>
<th>Administration</th>
<th>Onset of Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lorazepam</td>
<td>0.5 mg orally or</td>
<td>1mg tablets</td>
<td>Oral: Can crush and mix with water or juice to ease administration</td>
<td>20 to 30 mins</td>
</tr>
<tr>
<td></td>
<td>0.5 mg IM</td>
<td>4mg/ml injection</td>
<td>IM: Dilute with an equal volume of sodium chloride 0.9% or water for injections before IM administration</td>
<td>20 to 30 mins</td>
</tr>
<tr>
<td>Haloperidol</td>
<td>3 mg orally</td>
<td>2mg/ml oral liquid</td>
<td>Oral administration</td>
<td>~ 60 mins</td>
</tr>
<tr>
<td></td>
<td>3 mg IM</td>
<td>5mg/ml injection</td>
<td>IM administration</td>
<td>~ 60 mins</td>
</tr>
</tbody>
</table>

Note on doses: If a patient is already taking antipsychotic medication, is a heavy user of alcohol or drugs, or has a high BMI, higher doses of Lorazepam or Haloperidol may be required. (Max dose single dose of Lorazepam 2 mg and Haloperidol 5mg)

Never mix lorazepam and haloperidol in the same syringe.
1.25 MANAGEMENT OF DISTURBED OR VIOLENT PATIENTS OVER 12 YEARS OLD INCLUDING EMERGENCY TRANQUILISATION

Cautions
- Use of Lorazepam in patients with impaired respiratory function.
- Use of Haloperidol in those with cardiac disease, CNS depression, in patients taking Atomoxetine or anti-arrythmics (use benzodiazepine only)
1.25 MANAGEMENT OF DISTURBED OR VIOLENT PATIENTS OVER 12 YEARS OLD INCLUDING EMERGENCY TRANQUILISATION

F. ALGORITHM

CONSIDER CAUSE
Inform consultant on call

Non-drug measures
Talk patient down where possible
Allow patient to calm down in a quiet room
Regular observation (See box below for observations needed)

OFFER ORAL MEDICATION *
Lorazepam 0.5mg
Repeat after 30 mins if required (maximum dose Lorazepam 4mg / 24 hrs)
OR
Lorazepam 0.5mg AND Haloperidol 3 mg if more urgent tranquillisation is needed. Repeat after 30 mins if required. (Max dose Haloperidol 10mg/24hrs)
If Haloperidol given: also give procyclidine 2.5mg orally

NO RESPONSE
Allow patient to calm down in a quiet room
Regular observation (See box below for observations needed)

ACCEPTED

ADMINISTER PARENTERAL THERAPY *
Lorazepam 0.5 mg IM.
Repeated after 30 minutes if required (maximum dose Lorazepam 4mg / 24 hrs)
OR
Lorazepam 0.5 mg IM AND Haloperidol 3mg IM (in separate syringes) if > urgent tranquillisation is required. Repeat after 30 mins (Max dose Haloperidol 10mg/24hrs)
If Haloperidol given: also give procyclidine 2.5mg PO/IM

NOT ACCEPTED
Place in recovery position
Monitor heart rate respiratory rate blood pressure O2 saturation conscious level.

RESPONSE

POST EVENT DOCUMENTATION - see below
1.25 MANAGEMENT OF DISTURBED OR VIOLENT PATIENTS OVER 12 YEARS OLD INCLUDING EMERGENCY TRANQUILISATION

G. MONITORING
Following tranquilisation: pulse, respiratory rate, oxygen saturations, BP and level of consciousness should be monitored every 10 minutes for one hour then hourly for four hours or until the patient becomes active again.
For severe extrapyramidal reactions:
Give procyclidine 5mg IM single dose, followed if necessary by oral treatment.

For reversal of sedative effects of benzodiazepines: if RR < 10
Give flumazenil 200 micrograms by intravenous injection over 15 seconds, then 100 micrograms at 60 second intervals if required; (maximum total dose 1mg).
If the patient is epileptic, use assisted ventilation rather than flumazenil to treat respiratory depression.

H. POST EVENT
– Document fully all action and communication in the medical notes.
– Complete an incident form.
– Arrange a debriefing – with other staff and the supervising Consultant.
– The patient and parents / carers should also be debriefed as soon as possible after the acute event.

References:
4. NICE (NG10) 2015 Violence and aggression: short-term management in mental health, health and community settings

Section 1.25 reviewed by Dr C O’Connell, April 2018
Updated by Dr K Price, Dr C Rimmer and pharmacist Sarah Brownsmith April 2011)
(Produced by K Bourne, Pharmacist, Dr K Price, Consultant Paediatrician)
1.26 MAJOR INCIDENT PLAN

There is a full “Major Incident Plan” hanging on the notice board in the Registrars Office. Please read this at the earliest opportunity. Do not attempt to read it once a major incident has been called.

A. INSTRUCTIONS FOR ED STAFF

B. SPECIFIC INSTRUCTIONS FOR THE SENIOR DOCTOR IN THE ED

C. INSTRUCTIONS FOR JUNIOR ED DOCTORS ON DUTY

In the event of a major incident SC(NHS)FT is allocated to receive up to 12 major and 40 minor cases.

A. INSTRUCTIONS FOR ED STAFF

a. A major incident may be declared either via Ambulance Control contacting ED, Ambulance Control contacting switchboard or possibly by ED receiving large numbers of casualties from the same source. In all cases, switchboard should be informed as they are responsible for initiating the key personnel cascade, who in turn, activate the Departmental cascades.

b. Switchboard will inform the ED Consultant of the Major Incident, if they are not already aware.

c. The senior doctor in the Department allocates tasks to other medical staff to prepare the Department and promptly co-ordinates the clearing of patients already in the Department.
   1) Non-urgent patients should be referred to their own GPs or asked to return later.
   2) Patients without life-threatening conditions, but who do require treatment, will be transferred to AAU and someone allocated to their management. Medical patients requiring admission should be transferred straight to the wards.
   3) Any patients requiring urgent treatment should be treated before being transferred to another area of the hospital.

d. An ED Control Room will be set up in Consulting Room 2 from where doctors will be allocated to patients/areas. Role cards will be issued.
   12 resuscitation trolleys will be set up as follows:
   Resus x 2, procedure room x 1, trolley bay x 4, high dependency bed x 1, playroom x 1, dressing cubicles x 3.

e. All casualties will come in via ED main reception, as the Ambulance doors will be locked.
   The senior doctor on duty will triage in the cleared ED waiting area. They will be accompanied by a senior ED nurse and a clerk. They will assess patients, direct them to a suitable area of the Department, (the clerk will identify patients with a number on a prepared wrist label and set of stationery).
   1) Major injuries to ED areas as appropriate.
   2) Minor injuries to OPD.

f. The senior doctor should log the patients name, situation in the Department, the assessment category and the doctor delegated to that patient, on a form available in the ‘Major Incident Cupboard’.
1.26 MAJOR INCIDENT PLAN

There is a full “Major Incident Plan” hanging on the notice board in the Registrars Office. Please read this at the earliest opportunity. Do not attempt to read it once a major incident has been called.

- All medical staff should report back to the ED Control Room when they have determined their patient's condition, have carried out any resuscitation and determined possible outcome.

- The senior doctor should liaise with the Hospital Control Room (Theatre Seminar Room) to keep them informed of the situation in ED.

B. SPECIFIC INSTRUCTIONS FOR THE SENIOR DOCTOR IN THE ED (copy available in the Major Incident cupboard)

- The senior doctor in the ED on being informed of a possible Major Incident will discuss the situation with the senior nurse on duty who will activate the plan if necessary.
- Inform other ED staff of Major Incident and co-ordinate the clearing of patients already in the Department.
  1) Non-urgent patients to their own GP or to return later.
  2) Patients needing treatment should be treated promptly if there is time. If this is not possible, they should be asked to wait in AAU.
  3) Patients requiring urgent treatment should be treated before being transferred to another area of the hospital.
- Take up a position in the cleared ED waiting area with the senior ED nurse, assess patients and direct them to the appropriate area of the ED.
  1) Major cases to ED.
  2) Minor cases to OPD.
- Direct other doctors as they arrive to appropriate patient areas to match the patients' needs.
- Log patient's situation, patient assessment information and designated doctor.
- Collect brief information on patient's condition and whereabouts as doctors report back after seeing patients.

C. INSTRUCTIONS FOR JUNIOR ED DOCTORS ON DUTY (copy available in Major Incident cupboard)

- On being informed of a Major Incident assist in clearing the Department of existing patients under the direction of the Senior ED doctor.
  1) Non-urgent patients to their own GP or to return later.
  2) Patients needing treatment should be treated promptly if there is time. If this is not possible, they should be sent to AAU.
  3) Patients requiring urgent treatment should be treated before being transferred to another area of the hospital.
- Report to senior doctor in the ED control room, who will direct you to appropriate patient.
- Report back to the ED control room after assessing and carrying out any urgent treatment of your patient to allow him / her to co-ordinate the Major Incident.
**1.26 MAJOR INCIDENT PLAN**

There is a full “Major Incident Plan” hanging on the notice board in the Registrars Office. Please read this at the earliest opportunity. Do not attempt to read it once a major incident has been called.

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**CHEMICAL INCIDENT AND RISK OF CONTAMINATION**  
(Reg. I.D. No. 1136)

In the event of an incident involving chemicals or other contaminants most patients are likely to be decontaminated at the scene and the ambulance and fire services have specialised units for this. However, some children may be brought to hospital still at risk of presenting a contamination hazard. These children must first be washed before entering the ED. The ED has a unit which can be positioned in the Western Bank car park, so that decontamination can take place. The patients are stripped, washed and rinsed by trained staff (usually nurses) wearing full protective clothing with a filtered clean air source. The decontamination unit and protective clothing are kept in the Majax room, Stephenson Unit.

**On no account** must a child be brought into the Emergency Department prior to being decontaminated, however ill they are. This would necessitate the closure of the Department and jeopardise all other patient care.

In the event of a mass casualty incident, patients will be taken to Western Park Museum and accommodated there until they are able to be transferred back to Sheffield Children’s Hospital. Some equipment is housed at the museum to facilitate this. A contact list for museum key holders is available in The ED Lead Nurse’ office.

(Section 1.26 reviewed by D O'Donnell 2015)
(Section 1.26 reviewed by Sister J Evans, Feb 2014)
(Plan reviewed & up-dated by ED Sister J Evans, Aug 2003)
1.27 DEPARTMENTAL INCIDENT PLAN

A. DEFINITION

Departmental Incident:

| The available resources for ED are outstripped leading to an inability to safely manage the workload of the department. |
| Factors may include |
| - Multiple number of category A or B patients |
| - High overall patient attendance |
| - Staff shortage |

The nature of an incident varies depending on the time of day and the availability of sources of help within the hospital

During the day, with more senior doctors, it may not be appropriate to call a departmental incident even though the department is very busy and a significant added load is expected, as long as the general wait will not exceed 4 hours and the appropriate specialities are available to take over the care of any patients referred to them.

At night, with fewer support staff around the hospital a smaller increase in workload may lead to a departmental incident.

The nature of an incident may also be very variable and may primarily involve nursing or medical staff rather than the whole department.

B. RESPONSIBILITIES

Responsibility for calling an internal incident:

| - 08:00-midnight | The ED consultant and the ED senior nurse. |
| - Midnight-08:00 | The ED senior nurse. |
1.27 DEPARTMENTAL INCIDENT PLAN

C. DEPARTMENTAL INCIDENT PLAN

INTERNAL INCIDENT PLAN

- 08:00-midnight Departmental incident called by ED consultant and ED senior nurse.
- midnight-08:00 Departmental incident called by ED senior nurse and ED Consultant on call contacted

Actions - ED consultant and ED senior nurse

- Liaise with senior nurse / 524 bleep holder / executive on-call.
- Review current ED medical and nursing staff.
- Review whether possible for current staff to extend their shift.
- Review rotas for staff working later that day to ascertain whether possible to call in early.
  (Increasing a shift to greater than 14 hours total should be avoided as tiredness will decrease efficiency and therefore ultimately make the situation worse)
- Review whether staff on days off could be called in
- Prioritise patient treatment as appropriate.
- Move all stable referred patients to the admitting ward where possible (including those who have not yet been ‘clerked’ by the admitting team)
- Contact registrars and/or consultants from admitting teams to review any specialty patients that remain within the department
- Review notes and POPS of patients and where appropriate advise parents they may seek alternative care
- Liaise with other consultant specialists on-call, depending on nature of incident.

(Section 1.27 reviewed by Dr C O’Connell, March 2018)
(Section 1.27 reviewed by Dr A Smith, February 2017)
(Written by Dr J Cumberland, Aug 2002)
A. GENERAL INFORMATION

An X-ray is not a substitute for a careful clinical examination. Aim to expose children to as little radiation as possible.

Medico-legally the most important thing is to take a full history, examine thoroughly and record findings, both negative and positive, e.g. that the child had no swelling, a full range of movements, was weight bearing, etc. Many unnecessary X-rays and irradiation can be avoided.

If you feel an X-ray is indicated it should be performed according to clinical need and the ED guidelines relevant to the appropriate body region e.g. Ottawa ankle rules.

**ALL FILMS SEEN BY ED STAFF SHOULD HAVE A COMMENT ADDED TO DIGITAL X-RAY (PACS) SYSTEM. THIS IS OBLIGATORY.** (see section B)

It ensures that when films are reported by radiology, the opinion of the ED doctor is known and allows missed diagnoses to be brought back to the ED within 24 hours and the patient to be recalled rapidly. This is a safety net in place for you – use it!

**IF THERE IS NO COMMENT MADE IT HAS TO BE ASSUMED THAT ANY ABNORMALITY HAS BEEN MISSED AND THIS CAN GENERATE UNNECESSARY WORK.**

Specific Protocols

**Nose Injury**

Not normally X-rayed as it gives a large dose of irradiation to the lens, misses most fractures and does not alter immediate treatment of the injury (see section 5.8).

**Hip Pain**

See section 4.23 “Irritable Hip”.

Limping children need to be assessed to see what if any area needs to be x-rayed. Often no x-ray is necessary. Children under 8 years of age do not routinely need a hip x-ray. A child over 8 years with hip pain should have a frog lateral X-ray of the hips at initial consultation to exclude SUFE. Do not request an AP X-ray of the hips.

**Other X-rays**

It is important to provide the radiographer with relevant, legible information regarding the exact site of suspected injury.

**Hands**

Describe the digits by name rather than number, e.g. thumb, index, ring. The standard views for hands and feet are AP and oblique.

**Wrist**

Standard views are AP and lateral.

**Scaphoid**

Ask for standard wrist views if a child presents with scaphoid tenderness.

A fracture may not be visible immediately after the injury. If there is clinical suspicion of a fracture it should be treated as such, and a splint applied. Arrange for the child to be reviewed in ED in 10-14 days, and from there...
1.28 X-RAYS AND THE PACS SYSTEM

request scaphoid views if scaphoid tenderness persists. See section 4.19-D.

Elbows The head of the radius should be opposite the epiphysis for the capitellum in all views. Any seriously swollen elbow in which you can find no bony injury on X-ray should be seen by a senior person.

Ulna For suspected mid-shaft fractures of the radius or ulna the radiograph should include the wrist and elbow joint. A fracture of the ulna shaft is frequently associated with displacement of the radial head (Monteggia fracture).

Skull The indications for radiological investigation following head trauma are included in section 4.6. The investigation of choice is CT not skull X-ray.

Facial Bones The standard views are occipitomental, occipitomental with 30 degree tilt and a lateral. If orbital injury is suspected specific orbital views should be requested.

Chest injury Outside of major trauma it is usually unnecessary to take a chest X-ray for injuries. Ribs tend not to fracture. If concerned about pneumothorax or other lung injury then CXR may be required.

Ankles See section 4.13 Ottawa ankle rules.

C - Spine See section 4.5 Cervical spine injury

Glass Injury All injuries involving glass require an X-ray to exclude a retained foreign body. Note this on the request card. If a radiolucent FB is suspected an ultrasound scan may be required.

B. RISK MANAGEMENT OF MISSED FRACTURES

With the huge range of injury and illness seen in this department it is inevitable that on occasion pathology on x-rays will be missed. It is therefore essential to have consistent safety nets in place in order to minimise the risk of a clinically important “miss”.

At SCH there is a reliable ‘hot’ reporting system which will usually pick up any anomalies within 24 hrs. X-rays are reported at weekends too. In order for this to work properly it is ESSENTIAL for the radiologists to have some indication of what the original clinician thought of the x-ray.

If the x-ray is not commented on and is abnormal it has to be assumed that the pathology has been missed; the radiologist has to bring the name to the ED, the middle grade becomes involved, reception have to pull the ED card and this then has to be reviewed. Sometimes the parents have to be rung to bring the child back. Please therefore make sure you always mark the comment box on the PACS system.

Commenting on x-rays:
1. Click on the "text" button the top left hand left hand corner of the screen
2. Go to the “new study” section in the middle of the right half of the screen. At the bottom of this section (scroll down) there is a grey box in which you can type comments
*If the x-ray is grossly abnormal a simple “Abnormal” will suffice. If the injury is more subtle or if there is a possible abnormality on the x-ray but clearly no clinical findings at this site it is helpful to comment on what you think is wrong +/- what follow up arrangements have been made.

Since we do not make you log in individually between every x-ray, please add your name or initials to the end of your comment to create an audit trail.
C. GP REQUESTS FOR X-RAYS
The X-ray Department offers an open access service to GPs for conventional radiography. Children are asked to attend between 09:30 and 16.30 hrs Monday to Friday. Any child presenting to ED with a GP request card in hours should be sent to X-ray and does not need to be seen by an ED doctor. Out of hours, patients will be diverted back to ED to be booked in and examined as all other ED patients. If you strongly disagree with the GP in the need for an X-ray, please check with the senior ED doctor on duty before discharging the patient. In all cases, the GP should be fully informed of the findings and management.

D. IR(ME)R STANDARDS - Ionising Radiation (Medical Exposures) Regulations
The ionising radiation regulations require that the Trust has procedures in place to ensure the safety of patients having investigations involving ionising radiation. This section contains edited versions of the employers’ procedures. These are available in the X-ray Department. In summary, it is inherent upon the requesting practitioner to have considered the risk: benefit analysis of performing the investigation. This particularly applies to CT where large radiation doses are involved. Do not routinely request CT where x-ray is appropriate e.g. in major trauma for chest injuries and cervical spine injuries.

a) Identification of Referrers, Practitioners & Operators (EP01)
The Trust has entitled all medically qualified staff to act as referrers. Other non-medically qualified health professionals employed by the Trust may be entitled to refer to Radiology (eg ENPs) under local arrangements with the Radiology Department.

b) Identification of Individuals Undergoing a Medical Exposure (EP02)
In any medical exposure it is important to ensure that the individual undergoing the exposure is correctly identified. Mistakes are especially easy when the individual is too young or too ill to answer, is sedated, or there are language barriers or other difficulties.
The referrer must ensure that the patient details entered on the referral form are correct and legible. They should not sign a referral unless these details have already been completed satisfactorily. Be especially vigilant that forms generated on Medway are for the right patient and the right body part from the drop down list. Drop down lists make it all too easy to choose the wrong option e.g. body site or side. NB – the ED Medway system provides a pre-print preview of the x-ray card and this is purposeful for you to review you have the right patient, the right request, right body area etc.

c) Medical Exposure, Pregnancy and Breastfeeding (EP03)
The likelihood of pregnancy in a female of childbearing age, (and, for Nuclear Medicine examinations, whether a female is breastfeeding) should be determined BEFORE they undergo a medical exposure. Often a child’s mother is there when an X-ray exposure is made. Please advise if the child’s mother is pregnant.

The justification for a medical exposure must take into account potential risks to the foetus. The referrer must ask about pregnancy or the possibility of pregnancy and pass that information onto the radiographer on the referral form and verbally as appropriate so that steps may be taken to minimise the radiation dose to the foetus. This is especially important if the exposure includes the abdominal or pelvic area or any administration of a radionuclide. Be aware that “Childbearing age” should include the age range 12 to 55 years. For Nuclear Medicine procedures it is equally important for referral information to include whether the patient is breastfeeding to prevent the inadvertent exposure of a nursing infant.
Not Pregnant
If there is no possibility of pregnancy the referral should proceed as normal.

Pregnancy Confirmed or Uncertain
If pregnancy cannot be ruled out the referrer should indicate on the referral form that the person is, or might be pregnant.
If the exposure for which the patient is to be referred is listed as a high dose procedure in the referral guidelines, and pregnancy is uncertain, the referrer should indicate on the referral form whether the referral can safely be delayed to within the first ten days of the menstrual cycle.

If the referrer is unsure of the correct action to take (s)he should contact the practitioner to whom the referral is being made directly.

(Section 1.28 updated by Dr C Rimmer, April 2018)
(Section 1.28 [D] reviewed by S Howe, Superintendent Radiographer, Aug 2006)
1.29  EMERGENCY DEPARTMENT LABORATORY REQUESTS

A. VENOUS BLOOD SAMPLES
B. CAPILLARY BLOOD SAMPLES
C. RESULTS
D. POINT OF CARE TESTING

A. VENOUS BLOOD SAMPLES
Venous blood samples must be taken by ED medical or nursing staff. Laboratory request forms should be generated using Medway. Take care when labelling samples. **Specimen bottles must be labelled by hand** - this is particularly important for cross-match studies. If the patient is a known “Category 3” patient (e.g. HIV, Hep B/C) then you must apply the yellow “Category 3 risk” stickers to both the specimen bottle and request form. Hospital case notes are not always available to verify whether a patient is Category 3 but if you know they are, use the stickers!

The laboratory staff must be informed by phone of all urgent investigations and the forms should be clearly marked “Urgent”. FBC samples, if not required urgently, may still be taken but stored until the next day, still giving reliable results.

**See section 4.4 for urgent blood transfusion information.**

B. CAPILLARY BLOOD SAMPLES
The laboratories offer the Emergency Department a routine and an emergency service for capillary blood samples. Many tests can be performed on a ‘finger prick’ microspecimen taken by laboratory staff during normal working hours (09:00 – 16:45, Monday - Friday). These include, FBC, ESR, U&E’s, Glucose, Paracetamol levels and CRP.

It is only possible to do 3 or 4 specified tests on any one capillary finger prick, so please bear this in mind. If you are doing a lot of samples it may be better to consider a venous sample. Clotting studies cannot be performed on a capillary sample; the blood for these must be free-flowing (i.e. venous or arterial). If it is required you must do it yourself in the department along with other necessary bloods/ cannulation. It is **not** acceptable to do the coagulation studies and then send the patient down to the labs for capillary blood samples.

C. RESULTS
Generally, laboratory staff do not phone results – they are available on the hospital computer system, via the “ICE” desktop icon.

D. POINT OF CARE TESTING
Blood gas analysers, also including ISE module (sodium potassium chloride, ionised calcium) and co-oximetry are situated in the Procedure room in the ED (and also PCCU). Lactate and glucose are also available. They are for use by TRAINED and AUTHORISED doctors, nurses and laboratory staff ONLY. The analysers are connected to Clinical Chemistry by computer link. Blood gas investigations required by untrained staff must be referred to Clinical Chemistry within and outside normal working hours. Training opportunities are offered at Induction; otherwise please contact the laboratory if training is required. Do NOT put marrow aspirate from an intra-osseous line through the ED analyser. Do not send to the lab without making clear it is marked as ‘marrow sample’.

(Section 1.29 reviewed by Dr C Rimmer, April 2018)
(Section 1.29 reviewed Dr A Smith, Aug 2014)
INTRODUCTION TO PAEDIATRIC EMERGENCY MEDICINE COURSE INFORMATION

1.30 EDUCATION & TRAINING

A. INTRODUCTION
The following information will provide you with an outline of the training available during your six month post in the ED. It gives the rationale and aims of the teaching and the format of the sessions. The teaching will consist of sessions within the ED. In addition training includes both the hospital and the departmental induction programmes, opportunities to attend emergency department review clinics and appropriate external courses.

B. RATIONALE
Training in Paediatric Emergency Medicine is of value to GP, Paediatric and Emergency Medicine trainees. It arms them to cope in their clinical practice with the whole spectrum of emergency and urgent problems with which children present. It helps them develop their knowledge of the range of normal and to assess and manage the child within the family setting. Training will be delivered by the Emergency Department and where appropriate by other relevant specialties to allow benefit of their different experience and perspectives.

C. AIMS AND OBJECTIVES
The programme content is recognised by the RCGP and RCPCH for training in Paediatrics and the RCEM for training in Paediatric Emergency Medicine. We provide training in both emergency and acute paediatrics.

Specific aims and objectives include:
- Recognition of the seriously ill or injured child.
- Ability to perform Basic Life Support (BLS) on a child.
- Ability to resuscitate the seriously ill or injured child.
- Understanding of normal growth and development.
- Understanding of common childhood illnesses and their management.
- Knowledge of injury and orthopaedic problems in childhood and their early management.
- Knowledge of common surgical problems and their early management.
- Knowledge of child protection issues.
- Understanding of common psychological problems in children and principle of management e.g. self-harm.
- Training in paediatric pain management.

The training is being constantly updated to fulfil the needs of both the trainees and the Trust. It depends on the commitment of both trainers and trainees. Any helpful suggestions or topics not covered will be welcome. We will try to meet your needs as far as possible.
INTRODUCTION TO PAEDIATRIC EMERGENCY MEDICINE COURSE INFORMATION

1.30 EDUCATION & TRAINING

D. TIMETABLE FOR THE ED TRAINING PROGRAMME SESSIONS
The ED teaching sessions take place on Wednesday afternoons. There are 8 core sessions over the six month post. Each session is run three times in six months which allows all junior doctors in the ED the opportunity to attend each session. Each trainee will receive a timetable of sessions they are expected to attend.

Each ED junior doctor is expected to attend all the training sessions that they are rostered for; it is included in your contracted hours. The only junior doctors not required to attend are those who are ‘OFF’ on the rota. If you are not rostered to attend the teaching you are always welcome to attend in your own time. Failure to attend the required number of teaching sessions will result in a failure to complete your annual ARCP.

E. FORMAT OF THE ED TRAINING PROGRAMME SESSIONS
Teaching sessions are usually held in the Theatre seminar room. There is a 15 minute break for tea / coffee. The sessions will consist of a mixture of the following:
- Interactive sessions.
- Formal talks.
- Scenarios.
- Case presentations.
- Audit presentations by ED junior doctors

A register is kept and each session will finish with an evaluation.

G. OTHER TRAINING OPPORTUNITIES

CLINICS
The ED has a Review Clinic every morning Monday-Friday at 09.30hours. The ED junior doctor on the morning shift can attend the clinic with the ED consultant. When attending clinics you may wish to complete an outpatient framework document from your junior doctor portfolio.

The consultant rota for ED clinics, shop floor cover and on call can be found in the medical rota folder at the nurses’ station.

Junior doctors may attend Outpatient Clinics in the hospital in addition to the above clinics if interested. If you choose to attend outpatient clinics this will form part of your study leave (see section 1.31) and the dates of attendance must be arranged in conjunction with the rota organiser.

INTERESTING X-RAYS IN THE ED
There is an ‘Interesting X-ray’ book in the Department. You should log any interesting x-rays there. There is a six weekly ED X-ray meeting in the X-ray seminar room at which these x-rays will be reviewed. Dates for the meetings will be circulated by email.

INTERESTING CASES IN THE ED
You should log any interesting cases in your eportfolio and may wish to present them during your designated slot in the teaching programme.
INTRODUCTION TO PAEDIATRIC EMERGENCY MEDICINE COURSE INFORMATION

1.30 EDUCATION & TRAINING

Inform the M&M co-ordinator (currently Edward Snelson) of any interesting cases you think should be discussed at the Emergency Department Mortality and Morbidity meeting.

FEEDBACK FROM WARD REVIEWS

You are welcome to visit patients on the Ward who you admitted. You can access inpatient discharge summaries once the child has been discharged using the Medway system (see below). You should get into the practice of doing this regularly.

How to view an inpatient discharge summary on Medway
From Left Navigation Pane – select MPI
Select Search for a patient
Enter the patient surname or hospital number in top right search box
Select the relevant patient from the list by click OK
Click on HOUSE ICON or the patient name in the top section of the screen
Click green MENU button
Select View Clinical Notes
Open inpatient discharge summary (check date is the right one)
Close at top X to return to homepage

(Section 1.30 up-dated by Dr C Rimmer, April 2018)
(Written by Dr A Smith, Aug 2005)
1.31 STUDY & ANNUAL LEAVE

A. STUDY LEAVE

B. ANNUAL LEAVE

C. GUIDELINES FOR BOOKING LEAVE

A. STUDY LEAVE FOR JUNIOR DOCTORS

STUDY LEAVE ALLOWANCE
Junior doctors in a six month post have 15 days study leave.

STUDY LEAVE ALLOCATED FOR INTERNAL TEACHING
Junior doctors in the Emergency Department of the Children’s Hospital have a comprehensive teaching package. This consists of the induction programme and a regular protected teaching programme on Wednesday afternoons. This equates to 5 days study leave in the six month post.

SUMMARY OF STUDY LEAVE ALLOCATED
All ED junior doctors have 5 days equivalent of study leave provided by the ED teaching programme, as above. In addition all ED junior doctors will complete a one day PLS course if not already a current PLS/APLS (or equivalent) provider.
ED junior doctors have 9 or 10 days of study leave remaining to take as necessary in the 6 month post.
Junior doctors from the Paediatric Specialty Training Programme should attend STEPP days as required.
Junior doctors from the EM Specialty Training Programme should attend the Y&H Deanery regional EM CT3 teaching days as required.
Junior doctors from the General Practice Specialty Training Programme should attend 6 Thursday GP training days.
Depending on the above requirements there may be a further number of days of study leave remaining to take as necessary in the 6 month post according to hospital guidelines.

REQUESTING STUDY LEAVE
All Study Leave must be requested six weeks in advance, including attendance at outpatient clinics. First discuss this with your Educational Supervisor. If in agreement complete the form and have your educational supervisor and the rota organiser countersign the form. Study leave taken on days off is not taken from your study leave time allowance although if appropriate will be taken from your allocated budget. You are not automatically entitled to day(s) off in lieu but if those extra hours take your average weekly hours for the six month post over 48 hours per week them we will arrange compensatory time back.

B. ANNUAL LEAVE FOR JUNIOR DOCTORS

The junior doctor rota in the Emergency Department is structured to incorporate holidays. We will try our best to accommodate reasonable requests.

No leave is allowed in the first two weeks of the job for training and induction purposes.

C. GUIDELINES FOR BOOKING ANNUAL LEAVE AND STUDY LEAVE

It is imperative that leave in the ED is co-ordinated to maintain the correct level of shop floor cover. This Guideline covers the booking arrangements for all Middle Grade annual and study
1.31 STUDY & ANNUAL LEAVE

leave and Junior doctor study leave in the Emergency Department of the Sheffield Children’s Hospital.

Fill in a Leave Request Form  
(6 weeks’ notice minimum)

↓

Give Form to the Rota Organiser

↓

Rota Organiser & Consultant will Check  
That the Leave is Appropriate &  
How the Rota can be Covered

↓

Rota Organiser to Sign the Leave Form

↓

Consultant to Sign the Leave Form & Return to Middle Grade or Junior Doctor

↓

Send Leave Form to:--  
Annual Leave - Medical Personnel Department, HR  
Study Leave – Postgraduate Medical Education  
Paediatric and General Practice trainees – SCH  
Emergency Medicine trainees - NGH

It is anticipated that the middle grade and junior doctor rota organiser for this year will be

JANE DAWSON

(Reviewed by Dr C Rimmer, April 2018)
1.32 SICK LEAVE

A. REPORTING SICK LEAVE

If you are unable to work because of sickness you must:
- Contact the senior doctor on duty in the ED as soon as you know you are unable to work.
- We ask you to inform us by 10am if you are sick for a shift on the same day so that we can arrange necessary cover.
- If there is no senior doctor on duty then sickness should be reported to the nurse in charge of the Emergency Department.
- Inform the senior doctor the shift(s) you should be working so they can arrange cover.
- Give an estimate of how long you will be absent from work.
- Inform Medical Personnel at the next available opportunity.

While absent from work because of sickness you are required to:
- Contact us 24 hours where practical (but at least 4 hours) before the start of your next expected shift to state whether you are able to return to work. If you remain unable to work you should give a further estimate of how long you will be absent.
- On the 4th day of sickness provide a Self-Certificate (SC1).
- On the 7th day of sickness provide a Medical Certificate (Med3).

Upon return to work:
- You will have a back to work interview with the senior doctor on duty and complete the Record of Sick Leave form.

B. RECORDING SICK LEAVE - Senior Doctor / Nurse in Charge

If a doctor reports they are unable to work because of sickness you should:
- Ascertain which shift(s) the doctor should be working so you can arrange cover.
- Ask the doctor for an estimate of how long they expect to be unable to work.
- Advise the doctor that they must contact the senior doctor on duty in the ED 24 hours before their next expected shift to confirm they are fit to return to work.
- Record the doctor’s name, date(s) of the sick leave and shift(s) requiring cover then pass the information to the ED secretaries (out of hours send via email).
- If this is the 4th day of sickness advice the doctor they must provide a Self-Certificate (SC1) and record receipt of this on the Record of Sick Leave form.
- If this is the 7th day of sickness advice the doctor they must provide a Medical Certificate (Med3) and record receipt of this on the Record of Sick Leave form.

When a doctor returns to work after a period of sick leave you should:
- Interview the doctor to ensure they are fit to return to work.
- With the doctor, complete the Record of Sick Leave form for this episode. This is stored in the ED secretaries’ office. The completed form should then be returned to the ED secretaries.
1.32 SICK LEAVE

SICKNESS CALL RECEIVED BY SENIOR DOCTOR* IN CHARGE OF DEPARTMENT
* If no senior grade doctor on duty Nurse in Charge to take call

IS THIS THE 1ST DAY OF ABSENCE?

YES

- Record on rota
- Rearrange staff cover in conjunction with ED secretaries and HR

- Complete Record of Sick Leave form
  - Give completed form to ED secretaries

Normal absence notification times:
- Early shift - 90 mins prior to shift
- Afternoon shift or Night shift - asap but by 10am

NO

- Record on rota and Record of Sick Leave form
  - Rearrange staff cover

4th Day

- Self certificate required (SC1)
  - Record certificate received and forward to HR

7th day:

- Medical certificate required (Med 3)
  - Record certificate received and forward to HR

If absent over 12 days in year:
- Notify supervising Consultant
  - Possible informal interview (Sick Letter 1)
  - Record points agreed at interview

If absent over 28 days:
- Discuss with supervising Consultant
  - Supervising Consultant arranges formal interview with HR department and staff rep present (Sick Letter 2)
  - Summary letter sent after each formal interview, date for review set

Formal absence process continues until resolution of absence
1.32 SICK LEAVE

ON RETURN FROM SICK LEAVE

YES

Absence less than 4 days?

NO

Is there:
- Regular absence around - days off, weekends, holidays or rotational night duty?
- Regular un-certificated absences?
- Previous absences for the same reasons?

YES

Supervising Consultant arranges private informal interview on return of staff on duty. Clearly state reason for interview.
- Have detailed sickness record available, inform staff member of sickness record.
- Clarify reason for absence and try to establish any problems eg. social, medical or occupational.
- Identify and agree action plan to overcome absence.
- Set date for evaluation.

NO

Record return on Record of Sick Leave form.
Check for up to date certification.

No further action

(Section 1.32 reviewed by Dr C Rimmer, April 2018)
(Written by Dr A Smith, Aug 2004)
1.33 RE-ATTENDER WITHIN 72 HOURS

Review previous ED attendance(s) including notes and investigations

New full history and examination

Consultant/ST4+ assessment if any of the following on return visit:
- Diagnostic uncertainty
- POPS ≥ 3
- Triage category A, B or C
- ≥3 visits
- All febrile <1 years

If suitable for discharge:
- Document specific safety netting advice
- Give advice leaflet (if not already provided on previous visit)
- Arrange follow up if appropriate

(Section 1.33 written by Dr A Rawnsley, February 2020)
DRUGS AND PRESCRIBING

2.1 GENERAL INFORMATION

A. PRESCRIBING

Important points in prescribing are:

- Any allergies and sensitivity to drugs or other treatments must be clearly documented on the ED card and when prescribing TTOs on Medway.
- Ensure you know what else the child is taking, the side effects of any drugs you prescribe and possible interactions. For drug information consult the cBNF.
- All hand written prescriptions that are administered need to be written in CAPITALS.
- All prescriptions to be dated, timed and signed for by the prescriber and the administrator.
- Only use recognised abbreviations of mg, mls or g.
- If a dose is in micrograms, this should be written in full (mcg is NOT to be used).
- If a dose is in units, this should be written in full (u is NOT to be used).
- Use approved names only and don't abbreviate drug names.
- A responsible adult must understand the instructions, be warned of possible problems and know the length of treatment. Ensure that prescriptions are explained clearly with the help of an interpreter if needed.
- Always consult the cBNF for children if you have any uncertainty related to prescribing.

B. TTOs

For most TTO medicine prescribe and dispense one unit (e.g. one bottle of Paracetamol). For antibiotics a full course should be dispensed. If separate items (e.g. Movicol sachets) only give two or three days’ supply. Parents should be directed to their GP for a follow-up prescription if required. Please fill in a prescription form on Medway and if dispensing check the medicine bottle label has been completed properly.

C. ANTIBIOTIC PRESCRIBING

All antibiotic courses should be prescribed with the duration of treatment

- Appropriate treatment length will depend on the clinical condition of the patient, the site of infection and the likely (or proven) causative organism. Guidance for certain conditions is given in the Trusts Antibiotic guidelines.
- Most infections can be resolved adequately with 5 - 7 days of treatment. An unnecessarily long course of antibiotics contributes to increased prevalence of resistance and multi-resistance to antimicrobial drugs and increases the likelihood of side effects. (see Trust guideline 356 Antibiotic Review Guidelines)
DRUGS AND PRESCRIBING

2.1 GENERAL INFORMATION

D. OUT OF HOURS MEDICINES
Out of usual pharmacy opening hours there is an adequate stock of drugs in ED and further supplies can be obtained from the emergency drug cupboard located in the Emergency Department.

Some of the children at SC(NHS)T are on specialist drugs and if these need to be prescribed they may not be readily available outside the hospital. If such drugs are needed outside hours, please consult the on-call pharmacist.

(Section 2.1 reviewed by Dr J Gilchrist April 2020)
(Section 2.1 reviewed by L Cawthorne, July 2008)
### 2.2 Antibiotics - Quick Reference Guide - What to Use & When

This guidance does not cover the treatment of line infections, haematology / oncology patients, patients with Tuberculosis, or patients with Cystic Fibrosis - please refer to separate guidelines.

<table>
<thead>
<tr>
<th>Type of Infection</th>
<th>First Line Antibacterial</th>
<th>Second Line Antibacterial</th>
<th>Route</th>
<th>Preferred Oral Switch</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute Bone and Joint Infection</td>
<td>Osteomyelitis</td>
<td>Cefuroxime</td>
<td>IV</td>
<td></td>
<td>Full IV course may be required.</td>
</tr>
<tr>
<td></td>
<td>Septic Arthritis</td>
<td></td>
<td>initially</td>
<td></td>
<td>Treat acute osteomyelitis for 6 weeks minimum.</td>
</tr>
<tr>
<td></td>
<td>(over 3 months old)</td>
<td></td>
<td>Seek advice</td>
<td></td>
<td>Chronic osteomyelitis for 12 weeks minimum. If a bacterial pathogen is isolated a change to a narrower spectrum antibiotic may be advisable. Discuss with Paediatric Microbiologist.</td>
</tr>
<tr>
<td></td>
<td>(Liaise with Microbiologist)</td>
<td></td>
<td>before switch to oral agent</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>First line:</td>
<td>Co-amoxiclav or flucloxacillin</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Second line:</td>
<td>Clindamycin</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Neonates up to 3 months old</td>
<td></td>
<td>If sepsis/meningitis add high dose amoxicillin</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Seek specialist advice from Orthopaedics, Paediatrics and Microbiology/Infectious Diseases.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Compound Fracture</td>
<td>IV co-amoxiclav</td>
<td>IV then oral</td>
<td></td>
<td>Review need for continuing therapy as advised by Consultant Orthopaedic Surgeon</td>
</tr>
</tbody>
</table>
ANTIBIOTICS

2.2 ANTIBIOTICS - QUICK REFERENCE GUIDE- WHAT TO USE & WHEN

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<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central Nervous System Infection</td>
<td>Bacterial Meningitis</td>
<td>Cefotaxime</td>
<td></td>
<td>IV</td>
<td>Full course of parenteral therapy</td>
</tr>
<tr>
<td></td>
<td>or Meningococcal sepsis</td>
<td>(consider use of high dose IV aciclovir if HSV encephalitis is a clinical possibility)</td>
<td></td>
<td></td>
<td>Meningococcal: 7 days</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Unknown pathogen: 10 days</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Pneumococcal: 14 days</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(Refer to Bacterial Meningitis section of Medical Guideline for treatment duration of other pathogens)</td>
</tr>
<tr>
<td></td>
<td>Neonatal meningitis/</td>
<td>Cefotaxime + Amoxicillin</td>
<td>IV</td>
<td></td>
<td>Full course of parenteral therapy</td>
</tr>
<tr>
<td></td>
<td>sepsis Up to 3 months’ old</td>
<td>(plus high dose IV aciclovir)</td>
<td></td>
<td></td>
<td>Meningococcal: 7 days</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Unknown pathogen: 10 days</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Pneumococcal: 14 days</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(Refer to Bacterial Meningitis section of Medical Guideline for treatment duration of other pathogens)</td>
</tr>
<tr>
<td>Dental Infections</td>
<td>Acute Abscess</td>
<td>Amoxicillin</td>
<td>IV</td>
<td></td>
<td>Full course of parenteral therapy</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Severe: Amoxicillin +</td>
<td></td>
<td></td>
<td>Treat for up to 21 days</td>
</tr>
<tr>
<td></td>
<td></td>
<td>metronidazole</td>
<td></td>
<td></td>
<td>High dose IV amoxicillin required –see antibiotic dosage guidelines</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Empyema-see Pneumonia</td>
<td>If penicillin allergic:</td>
<td>Oral</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>metronidazole</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
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<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eye Infections</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ophthalmia Neonatorum</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Chlamydial conjunctivitis</td>
<td>Clarithromycin</td>
<td></td>
<td>Oral</td>
<td>Oral switch</td>
<td>Treat for 14 days Contact tracing mandatory</td>
</tr>
<tr>
<td>2. Gonococcal</td>
<td>Cefotaxime (single IV/IM dose treatment see BNFc)</td>
<td></td>
<td></td>
<td></td>
<td>Contact tracing mandatory</td>
</tr>
<tr>
<td>Severe bacterial conjunctivitis</td>
<td>Chloramphenicol 0.5% eye drops or 1% ointment</td>
<td>Fusidic acid 1% eye drops</td>
<td>Topical</td>
<td></td>
<td>Continue antibiotics for 48 hrs after eyes are clear. Ensure correct samples are taken for chlamydia and gonococcus. NB Most cases of mild conjunctivitis are allergic or viral in origin and do not require antibiotics.</td>
</tr>
</tbody>
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<th>Preferred Oral Switch</th>
<th>Comment</th>
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<tbody>
<tr>
<td><strong>Eye Infections</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Severe Peri-orbital cellulitis (or under 3 months) or Orbital cellulitis</td>
<td>Flucloxacillin + Cefotaxime + Metronidazole</td>
<td>Omit flucloxacillin if allergic to penicillin</td>
<td>IV</td>
<td>Co-amoxiclav</td>
<td>Arrange ENT and Ophthalmology review within 24 hours of admission. Length of IV treatment depends on condition.</td>
</tr>
<tr>
<td>Mild periorbital cellulitis (see guideline 1694)</td>
<td>Co-amoxiclav</td>
<td></td>
<td></td>
<td></td>
<td>Treat for 5-7 days</td>
</tr>
<tr>
<td><strong>Gastro-intestinal Infection</strong></td>
<td>Peritonitis</td>
<td>Cefuroxime + Metronidazole</td>
<td>If fail to improve consider adding amoxicillin and d/w microbiologist</td>
<td>IV</td>
<td>Co-amoxiclav</td>
</tr>
</tbody>
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</tr>
</thead>
<tbody>
<tr>
<td>Salmonellosis and Shigellosis</td>
<td>Only treat with antibiotics if systemically unwell.</td>
<td></td>
<td></td>
<td></td>
<td>If treatment with antibiotics required consult Microbiologist</td>
</tr>
<tr>
<td>Campylobacter enteritis</td>
<td>Only treat with antibiotics if systemically unwell.</td>
<td></td>
<td></td>
<td></td>
<td>NB: Notifiable disease</td>
</tr>
<tr>
<td></td>
<td>Non-invasive disease is usually self limiting.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Escherichia coli 0157</td>
<td>Do not treat with antibiotics</td>
<td></td>
<td></td>
<td></td>
<td>NB: Notifiable disease</td>
</tr>
<tr>
<td>Antibiotic associated colitis</td>
<td>Metronidazole</td>
<td>Vancomycin</td>
<td>Oral</td>
<td></td>
<td>Treat for 14 days</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>NB. Relapses are not due to antibiotic resistance – re-treatment with</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>metronidazole is acceptable. Presence of <em>Clostridium difficile</em> toxin</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>is not usually clinically significant in children under 2 years old.</td>
</tr>
</tbody>
</table>

NB: Notifiable disease
# ANTIBIOTICS

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<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Severe: IV Benzylpenicillin (+ Clarithromycin if slow response or mycoplasma outbreak)</td>
<td>IV Clarithromycin</td>
<td>IV</td>
<td>Co-amoxiclav</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pre-existing respiratory diagnosis (also consider previous microbiology)</td>
<td>Mild: Oral Co-amoxiclav</td>
<td>Oral</td>
<td>Co-amoxiclav</td>
<td>It is not possible to give general guidance. Consider the underlying condition &amp; discuss with microbiology if required.</td>
</tr>
<tr>
<td></td>
<td>Severe: IV Cefuroxime</td>
<td>Mild: Oral cefaclor if penicillin allergic</td>
<td>IV</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Sepsis</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

SC(NHS)FT Reg. I.D. No. 1677

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SC(NHS)FT Implemented Aug 2020  Review August 2023 (do not use after this date)  Page 85 of 492
### ANTIBIOTICS

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<th>Route</th>
<th>Preferred Oral Switch</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Skin Infections</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Impetigo</td>
<td>Flucloxacillin</td>
<td>Clarithromycin</td>
<td>Oral</td>
<td></td>
<td>Treat impetigo for 10-14 days Severe infection: add Amoxicillin to Flucloxacillin</td>
</tr>
<tr>
<td>Wound infection</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pin-site infection</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Infected eczema</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Mild Cellulitis</strong></td>
<td>Amoxicillin + Flucloxacillin</td>
<td>Clarithromycin</td>
<td>Oral</td>
<td>Amoxicillin + Flucloxacillin OR Co-amoxiclav alone</td>
<td>Length of treatment depends on clinical condition Severe infection may require IV therapy</td>
</tr>
<tr>
<td><strong>Severe Cellulitis</strong></td>
<td>Benzylpenicillin + Flucloxacillin</td>
<td>Clarithromycin</td>
<td>IV</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Human / Animal Bites</strong></td>
<td>Co-amoxiclav</td>
<td>If penicillin allergic: Co-trimoxazole</td>
<td>Oral</td>
<td></td>
<td>Cleanse wound Consider tetanus immunoglobulin +/- vaccine if necessary Assess hepatitis B or rabies risk. Prophylaxis for 3 days.</td>
</tr>
</tbody>
</table>
# ANTIBIOTICS

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<th>Route</th>
<th>Preferred Oral Switch</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Human / Animal Bites (established infection)</td>
<td>Co-amoxiclav</td>
<td>If penicillin allergic: Clindamycin PLUS Ciprofloxacin</td>
<td>Oral (or IV if oral is inappropriate)</td>
<td>Cleanse wound Consider tetanus immunoglobulin +/- vaccine if necessary Assess hepatitis B or rabies risk. Treat for 10-14 days.</td>
<td></td>
</tr>
</tbody>
</table>

### Upper Respiratory Tract Infection

<p>| | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute Epiglottitis</td>
<td>Cefotaxime</td>
<td>Ceftriaxone</td>
<td>IV</td>
<td>Full course of parenteral therapy</td>
<td>Secure airway. Length of treatment depends on clinical condition</td>
</tr>
<tr>
<td>Acute Otitis Media</td>
<td>Amoxicillin</td>
<td>Clarithromycin</td>
<td>Oral</td>
<td></td>
<td>Recurrent infection: Co-amoxiclav. Treat for 5-7 days</td>
</tr>
<tr>
<td>Sinusitis</td>
<td>Amoxicillin</td>
<td>Clarithromycin</td>
<td>Oral</td>
<td></td>
<td>Treat for 5-7 days</td>
</tr>
<tr>
<td>Tonsillitis</td>
<td>Phenoxyemethylpenicillin (Penicillin V)</td>
<td>Clarithromycin</td>
<td>Oral</td>
<td></td>
<td>Treat for 10 days</td>
</tr>
<tr>
<td>Pertussis</td>
<td>Clarithromycin</td>
<td></td>
<td>Oral</td>
<td></td>
<td>Treat for 7 days</td>
</tr>
</tbody>
</table>
## ANTIBIOTICS

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<th>Second Line Antibacterial</th>
<th>Route</th>
<th>Preferred Oral Switch</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urinary Tract Infection Prophylaxis</td>
<td>Trimethoprim</td>
<td>Nitrofurantoin</td>
<td>Oral</td>
<td></td>
<td>Treat for 3 days</td>
</tr>
<tr>
<td>Urinary Tract Infection Treatment: Mild infection (and &gt; 3 months of age)</td>
<td>Trimethoprim</td>
<td>Cefalexin or Nitrofurantoin</td>
<td>Oral</td>
<td></td>
<td>NB. Refer to sensitivities</td>
</tr>
</tbody>
</table>

NB: Refer to the sensitivities of the strains causing the infection.
## ANTIBIOTICS

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<th>Route</th>
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<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urinary Tract Infection</td>
<td>Suspected pyelonephritis</td>
<td>Trimethoprim</td>
<td>Oral</td>
<td></td>
<td>Treat for 7 days</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cefuroxime</td>
<td>IV</td>
<td>Trimethoprim but may need full course of IV therapy</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Neonates and infants or patients who are acutely ill or vomiting</td>
<td>Refer to sensitivities of current and previous isolates</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

If oral antibiotics are not appropriate initially for example due to vomiting, clinical concerns of septicaemia and awaiting CSF/blood culture results, use intravenous antibiotics according to SCH antibiotic guideline. It is reasonable to switch to oral antibiotics after 2-4 days to complete 7 day course, depending on clinical progress and results.
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<thead>
<tr>
<th>Type of Surgery</th>
<th>1st line Antibiotic</th>
<th>Alternative</th>
<th>Number of Doses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gastro Intestinal Tract Surgery</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contaminated GI/GU Surgery</td>
<td>IV Cefuroxime (initial dose 50mg/kg then 20mg/kg tds (max 1.5g tds)</td>
<td>Contact Microbiologist or Pharmacist for advice</td>
<td>5 days</td>
</tr>
<tr>
<td></td>
<td>PLUS Metronidazole 7.5mg/kg tds (max 500mg)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>PLUS Amoxicillin 20mg/kg tds (max 500mg tds)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>If allergic to 1st and 2nd line drug, contact Microbiologist or Pharmacist for advice</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gastric</td>
<td>Cefuroxime 50mg/kg (max 1.5g)</td>
<td>Co-amoxiclav 30mg/kg (max 1.2g)</td>
<td>No further doses</td>
</tr>
<tr>
<td></td>
<td>N.B. This is a penicillin</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Small Bowel/Elective Colonic</td>
<td>Cefuroxime 50mg/kg (max 1.5g)</td>
<td>Co-amoxiclav 30mg/kg (max 1.2g)</td>
<td>No further doses</td>
</tr>
<tr>
<td></td>
<td>PLUS Metronidazole 7.5mg/kg (max 500mg)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
# ANTIBIOTICS

## 2.2 ANTIBIOTICS - QUICK REFERENCE GUIDE- WHAT TO USE & WHEN

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<thead>
<tr>
<th>Type of Surgery</th>
<th>1st line Antibiotic</th>
<th>Alternative</th>
<th>Number of Doses</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>If allergic to 1st and 2nd line drug,</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>contact Microbiologist or Pharmacist for advice</td>
<td></td>
</tr>
<tr>
<td>Appendicectomy</td>
<td>Cefuroxime 50mg/kg (max 1.5g)</td>
<td>Co-amoxiclav 30mg/kg (max 1.2g)</td>
<td>Normal or inflamed non-perforated appendix:</td>
</tr>
<tr>
<td></td>
<td>PLUS</td>
<td>N.B. This is a penicillin</td>
<td>No further doses unless specified by surgeon</td>
</tr>
<tr>
<td></td>
<td>Metronidazole 7.5mg/kg (max 500mg)</td>
<td></td>
<td>Perforation:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>As for contaminated surgery (see above).</td>
</tr>
<tr>
<td>Renal Tract Surgery</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contaminated surgery: See</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contaminated GI/GU Surgery above</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pyeloplasty, nephrectomy, etc.</td>
<td>Co-amoxiclav 30mg/kg (max 1.2g)</td>
<td>Cefuroxime 50mg/kg (max 1.5g)</td>
<td>No further doses unless culture results</td>
</tr>
<tr>
<td>(NB check latest urine culture results).</td>
<td>N.B. This is a penicillin</td>
<td>Or</td>
<td>indicate infection or stents in situ.</td>
</tr>
<tr>
<td>Orthopaedic</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>General</td>
<td>Cefuroxime 50mg/kg (max 1.5g)</td>
<td>Clindamycin 6mg/kg</td>
<td>No further doses</td>
</tr>
<tr>
<td>Compound fracture</td>
<td>Co-amoxiclav 30mg/kg (max 1.2g)</td>
<td>Clindamycin 6mg/kg</td>
<td>Review need for continuing therapy</td>
</tr>
<tr>
<td></td>
<td>N.B. This is a penicillin</td>
<td></td>
<td></td>
</tr>
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# ANTIBIOTICS

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<th>Number of Doses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spinal Rods, SUFE, ORIF, Hip reconstruction or other complex procedures</td>
<td>Cefuroxime 50mg/kg (max 1.5g)</td>
<td>If allergic to 1st and 2nd line drug, contact Microbiologist or Pharmacist for advice</td>
<td>3 in total: 1 at induction, 2 post op</td>
</tr>
<tr>
<td>Neurosurgery</td>
<td>Cefuroxime 50mg/kg (max 1.5g)</td>
<td>No further doses</td>
<td></td>
</tr>
<tr>
<td>Tonsillecctomy, adenoid removal, Sinus</td>
<td>Not routinely required</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supraglottoplasty</td>
<td>Cefuroxime 50mg/kg (max 1.5g)</td>
<td>No further doses</td>
<td></td>
</tr>
<tr>
<td>Mastoiditis</td>
<td>Piperacillin/tazobactam (Tazocin) 90mg/kg (max 4.5g) <strong>N.B. This is a penicillin</strong></td>
<td>If Penicillin allergic Ceftazidime PLUS Metronidazole</td>
<td>No further doses</td>
</tr>
<tr>
<td>Thoracic</td>
<td>Co-amoxiclav 30mg/kg (max 1.2g) <strong>N.B. This is a penicillin</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pectus Bar</td>
<td>Cefuroxime 50mg/kg (max 1.5g)</td>
<td>Surgical advice about further doses</td>
<td></td>
</tr>
<tr>
<td>TOF</td>
<td></td>
<td></td>
<td></td>
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SC(NHS)FT  Implemented Aug 2020   Review August 2023 (do not use after this date) Page 92 of 492
## ANTIBIOTICS

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<tbody>
<tr>
<td>Diaphragmatic hernia</td>
<td>Cefuroxime 50mg/kg (max 1.5g) PLUS</td>
<td>If allergic to 1st and 2nd line drug, contact Microbiologist or Pharmacist for advice</td>
<td>Surgical advice about further doses</td>
</tr>
<tr>
<td></td>
<td>Metronidazole 7.5mg/kg (max 500mg)</td>
<td>(Reviewed by Dr S. Thompson &amp; Dr J Gilchrist, January 2020)</td>
<td></td>
</tr>
</tbody>
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<th>Method of administration</th>
<th>Length of treatment</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amoxicillin</td>
<td>Neonatal meningitis</td>
<td>&lt; 7 days</td>
<td>100mg/kg 12 hourly</td>
<td>Slow IV infusion over 30 minutes</td>
<td>21 days Avail. oral preparations: 250mg capsules 125mg in 5ml suspension</td>
</tr>
<tr>
<td></td>
<td>Age 0-3 months</td>
<td>7-28 days</td>
<td>100mg/kg 8 hourly</td>
<td>Oral</td>
<td>Otitis: 5-7 days Sinusitis: 7 days Dental abscess: 7 days</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&gt;1 month</td>
<td>100mg/kg 6 hourly</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mild Pneumonia</td>
<td></td>
<td>1 month – 1 year a day</td>
<td>125mg three times a day</td>
<td>Oral</td>
<td>Otitis media: 5-7 days Sinusitis: 7 days Dental abscess: 7 days</td>
</tr>
<tr>
<td>Otitis media</td>
<td></td>
<td>1-5 years</td>
<td>250mg three times a day</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sinusitis</td>
<td></td>
<td>5-18 years</td>
<td>500mg three times a day</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cellulitis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dental abscess</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Benzyldpenicillin</td>
<td>Severe cellulitis</td>
<td>Age &lt; 7 days</td>
<td>50mg/kg twice day</td>
<td>Slow IV over 30 minutes</td>
<td>Age 1 month – 18 years: Max 2.4g four times daily</td>
</tr>
<tr>
<td>Pneumonia</td>
<td></td>
<td>7 – 28 days</td>
<td>50mg/kg three times a day</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>a day</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 month - 18 years</td>
<td>50mg/kg four times daily</td>
<td></td>
<td></td>
</tr>
</tbody>
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<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cefaclor</td>
<td>Bacterial chest infection</td>
<td>Age 1 month - 1 year 62.5mg three times a day</td>
<td>Oral</td>
<td></td>
<td>Doses may be doubled in infections caused by less susceptible organisms</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Age 1 - 5 years a day</td>
<td></td>
<td></td>
<td>Avail. oral preparations: 250mg &amp; 500mg capsules</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Age &gt; 5 years a day</td>
<td></td>
<td></td>
<td>125mg in 5 ml suspension</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>250mg in 5 ml suspension</td>
</tr>
</tbody>
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<th>Length of treatment</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cefalexin</td>
<td>UTI</td>
<td>&lt; 7 days 25mg/kg (max 125mg) twice daily 7-21 days 25mg/kg (max 125mg) three times a day 21-28 days 25mg/kg (max 125mg) four times a day 1 mth – 12 yrs 25mg/kg twice daily (Max 1g) OR 1 month – 1 year 125mg twice daily 1-5 years 125mg - 250mg three times a day 6-12 years 250mg-500mg three times a day 12-18 years 500mg twice daily</td>
<td>Oral</td>
<td>7 days</td>
<td>Avail. oral preparations: 250mg &amp; 500mg tablets 125mg in 5 ml suspension 250mg in 5 ml suspension</td>
</tr>
</tbody>
</table>
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</tr>
</thead>
<tbody>
<tr>
<td>Cefotaxime</td>
<td>Neonatal meningitis, osteomyelitis &amp; sepsis</td>
<td>Age &lt; 7 days 50 mg/kg twice daily</td>
<td>Slow IV bolus</td>
<td>7-21 days 50mg/kg three times daily</td>
<td>Maximum adult daily dose 12g</td>
</tr>
<tr>
<td></td>
<td></td>
<td>7-21 days 50mg/kg three times daily</td>
<td></td>
<td>&gt; 21 days 50mg/kg three times a day</td>
<td>Emergency treatment: Initial dose of 100mg/kg (max dose 2g) may be given as a short infusion</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Refer to Bacterial Meningitis Guideline in Medical Guidelines</td>
</tr>
<tr>
<td></td>
<td>Meningitis</td>
<td>Age &gt; 1 month 50mg/kg four times daily</td>
<td></td>
<td></td>
<td>NB: osteomyelitis &gt;3 months, see cefuroxime</td>
</tr>
<tr>
<td></td>
<td>Acute Epiglottitis</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Meningococcal sepsis</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Osteomyelitis</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
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<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ceftriaxone</td>
<td>Meningitis</td>
<td>Birth -to 15 day</td>
<td>IV infusion over</td>
<td>60 minutes in neonates</td>
<td>Refer to Bacterial Meningitis Guideline in Medical Guidelines</td>
</tr>
<tr>
<td></td>
<td>Meningococcal sepsis</td>
<td>Age &gt; 15 days - 11 years (body weight up to 50kg)</td>
<td>IV infusion over</td>
<td>at least 30 minutes if &gt; 1 month of age</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Acute epiglottitis</td>
<td>&gt;50kgs or 12-17 years: 4g once daily</td>
<td>IV infusion over at least 30 minutes if &gt; 1 month of age</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Meningitis prophylaxis</td>
<td>Adult : 250 mg single dose</td>
<td>IM (Adult prophylaxis only)</td>
<td></td>
<td>Prophylaxis in pregnant contacts</td>
</tr>
</tbody>
</table>

---

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Medical Guidelines for Paediatric Medicine
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</thead>
</table>
| **Cefuroxime** | UTI, Peritonitis, Pneumonia, Orbital & periorbital cellulitis, Osteomyelitis & septic arthritis (Age >3 months) | **Age < 7 days** 30 mg/kg twice daily  
**Age 7 - 20 days** 30 mg/kg three times daily  
**Age 21-28 days** 30 mg/kg four times a day  
**Age > 1 month** 30 mg/kg three times daily  
Do not exceed adult dose (1.5g three times a day) | Slow IV bolus | | Consider 50mg/kg in osteomyelitis, septic arthritis, severe pneumonia and other severe infections. |
| **Chloramphenicol** | Bacterial conjunctivitis | 1 drop / application of ointment 4 - 6 times a day | Topical | Continue for 48 hours after eyes clear | Available preparations: 0.5% eye drops 1% eye ointment |
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</tr>
</thead>
<tbody>
<tr>
<td>Ciprofloxacin</td>
<td>Meningococcal prophylaxis</td>
<td>1 month – 5 years: 125mg single dose&lt;br&gt;Children 5-12 years (only if able to swallow tablets): 250mg single dose&lt;br&gt;Adults and children &gt;12 yrs: 500mg single dose</td>
<td>Oral</td>
<td>Single dose</td>
<td>Ciprofloxacin 250mg tabs.&lt;br&gt;250mg in 5ml Suspension&lt;br&gt;NB suspension not normally dispensed for meningitis prophylaxis. Please see Rifampicin if liquid preparation needed for prophylaxis</td>
</tr>
<tr>
<td>Shigella &amp; Salmonella</td>
<td>Neonate 15mg/kg twice daily&lt;br&gt;1 month – 18 years 20mg/kg (max 750mg) twice daily</td>
<td>Oral</td>
<td>7 days</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Severe animal &amp; human bites in patients allergic to penicillin</td>
<td>Neonate 15mg/kg twice daily&lt;br&gt;1 month – 18 years 20mg/kg (max 750mg) twice daily</td>
<td>Oral</td>
<td>10 – 14 days</td>
<td></td>
<td></td>
</tr>
</tbody>
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<tbody>
<tr>
<td>Clarithromycin</td>
<td>Pneumonia</td>
<td>Intravenous infusion</td>
<td>IV infusion</td>
<td>Pertussis 7 days</td>
<td>Consider switch to oral preparation as soon as enteral absorption is satisfactory</td>
</tr>
<tr>
<td></td>
<td>URTI</td>
<td>1 month – 12 years 7.5mg/kg (max 500mg) twice daily</td>
<td>IV infusion over 60 mins</td>
<td>Pneumonia (atypical) 7 days</td>
<td>Avail. oral preparations: 250mg &amp; 500mg tablets 125mg in 5ml suspension 250mg in 5ml suspension</td>
</tr>
<tr>
<td></td>
<td>Campylobacter enteritis</td>
<td>12-18 years 500mg twice a day</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Skin infections</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Chlamydial conjunctivitis</td>
<td>Oral</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>&lt;8kg</td>
<td>7.5mg/kg twice daily</td>
<td>Oral</td>
<td>Skin infections 7-14 days</td>
<td></td>
</tr>
<tr>
<td></td>
<td>8-11kg</td>
<td>62.5mg twice daily</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>12-19kg</td>
<td>125mg twice daily</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>20-29kg</td>
<td>187.5mg twice</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>30-40kg</td>
<td>250mg</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>12-18 years</td>
<td>500mg twice daily</td>
<td></td>
<td></td>
<td></td>
</tr>
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</tr>
</thead>
</table>
| Clindamycin      | Compound fractures Severe human/animal bites (in combination) in patients allergic to penicillin | Enteral dose:  
- <14 days: 3-6mg/kg three times a day  
- 14 – 28 days: 3-6 mg/kg four times a day  
- 1 mth – 18 yrs: 3-6 mg/kg (max 450mg) four times a day  
IV dose:  
- 1 mth – 18 yrs: 3.75-6.25mg/kg four times a day | Oral                      |                      | Avail. oral preparations:  
75mg & 150mg capsules  
75mg/5ml liquid  
Maximum IV dose:  
10mg/kg four times a day (4.8g daily) |
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<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Co-amoxiclav</td>
<td>Human &amp; animal bites Peritonitis (oral switch) Peri-orbital / Orbital cellulitis Bacterial chest infection Pneumonia Compound fractures Skin infections Osteomyelitis &amp; septic arthritis (oral switch)</td>
<td>Birth -1 year 0.25ml/kg of the 125/31 suspension three times daily 1-6 years 5ml of the 125/31 suspension three times daily 7-12 years 5ml of the 250/62 suspension three times daily 13-18 years 1 tablet (500/125) or 10ml of the 250mg/62 suspension three times daily Birth – 3months 30mg/kg every 12 hours 3 month- 18 years 30mg/kg (max 1.2g) every eight hours</td>
<td>Oral</td>
<td>Human &amp; animal bites: Prophylaxis 3 days Treatment 10-14 days Other conditions: Length of treatment depends on clinical condition</td>
<td>Avail. oral preparations: Co-amoxiclav syrup 125/31mg in 5 ml syrup 250/62 mg in 5 ml syrup Co-amoxiclav 250/125mg &amp; 500/125mg tablets Co-amoxiclav IV preparations: 600mg and 1.2g. (Dosage based on co-amoxiclav content)</td>
</tr>
</tbody>
</table>
## 2.3 ANTIBIOTIC DOSES

This guidance does not cover the treatment of line infections, haematology / oncology patients, patients with Tuberculosis, or patients with Cystic Fibrosis - please refer to separate guidelines.

<table>
<thead>
<tr>
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<th>Length of treatment</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Co-trimoxazole</td>
<td>Human/animal bites (recent and no signs of infection) in patients allergic to penicillin</td>
<td>6 weeks – 6 months a day</td>
<td>120mg twice</td>
<td>Oral Prophylaxis for 3 days</td>
<td>Avail. Oral preparations: 240mg/5ml liquid 480mg/5ml liquid 480mg &amp; 960mg tablets</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6 months – 6 years a day</td>
<td>240mg twice</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>6-12 years a day</td>
<td>480mg twice</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>12-18 years a day</td>
<td>960mg twice</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## 2.3 ANTIBIOTIC DOSES

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<th>Method of administration</th>
<th>Length of treatment</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flucloxacillin</td>
<td>Skin infections</td>
<td>Age &lt;7 days</td>
<td>25-50mg/kg</td>
<td>Slow IV bolus</td>
<td>NB Adult IV dose up to 2g four times daily</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Age 8–21 days</td>
<td>25-50mg/kg three times a day</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Age 22 - 28 days</td>
<td>25-50mg/kg four times a day</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Age 1 month-18 years</td>
<td>25-50mg/kg</td>
<td></td>
<td>Adult oral dose 500mg four times a day</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Age &lt; 7 days</td>
<td>25mg/kg twice a day</td>
<td>Oral</td>
<td>Avail. oral preparations:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Age 8-21 days</td>
<td>25mg /kg three times a day</td>
<td></td>
<td>Flucloxacillin syrup</td>
</tr>
<tr>
<td></td>
<td></td>
<td>22-28 days</td>
<td>25mg/kg four times a day</td>
<td></td>
<td>125mg in 5 ml suspension</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 month-2 years</td>
<td>62.5mg-125mg four times daily</td>
<td></td>
<td>250mg in 5 ml suspension</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2-10 years</td>
<td>125mg-250mg four times daily</td>
<td></td>
<td>250mg &amp; 500mg capsules</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&gt; 10 years</td>
<td>250mg-500mg four times daily</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## 2.3 ANTIBIOTIC DOSES

This guidance does not cover the treatment of line infections, haematology / oncology patients, patients with Tuberculosis, or patients with Cystic Fibrosis - please refer to separate guidelines.

<table>
<thead>
<tr>
<th>Antibiotic</th>
<th>Type of infection</th>
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<th>Method of administration</th>
<th>Length of treatment</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fusidic acid</strong></td>
<td>Bacterial conjunctivitis</td>
<td>1 drop in affected eye twice daily</td>
<td>Topical</td>
<td></td>
<td>Fusidic acid 1% eye drops</td>
</tr>
<tr>
<td></td>
<td>If recommended by Microbiologist (&amp; in combination with second antibiotic agent)</td>
<td>&lt; 1 month  15mg/kg three times a day</td>
<td>Oral</td>
<td>Continue for 48 hours after eyes clear</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 month - 1 year  15mg/kg three times a day</td>
<td></td>
<td>Prolonged treatment required</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 year - 5 years  250mg three times a day</td>
<td></td>
<td></td>
<td>Avail. oral preparations: 250mg in 5 ml fusidic acid suspension</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5 -12 years  500mg three times daily</td>
<td></td>
<td></td>
<td>250 mg sodium fusidate tablets</td>
</tr>
<tr>
<td></td>
<td></td>
<td>12 - 18 years: 750mg three times a day fusidic acid or 500mg</td>
<td></td>
<td></td>
<td>(500mg sodium fusidate is equivalent to 750mg fusidic acid)</td>
</tr>
<tr>
<td><strong>Gentamicin</strong></td>
<td>Serious Gram negative infections</td>
<td>“Guidelines for Once Daily Gentamicin in Infants &amp; Children” available on SC(NHS)T Intranet site – ‘Trust Approved Guidelines’ and the Laboratory Handbook page 63</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
2.3 ANTIBIOTIC DOSES

This guidance does not cover the treatment of line infections, haematology / oncology patients, patients with Tuberculosis, or patients with Cystic Fibrosis - please refer to separate guidelines.

<table>
<thead>
<tr>
<th>Antibiotic</th>
<th>Type of infection</th>
<th>Dose</th>
<th>Method of administration</th>
<th>Length of treatment</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meropenem</td>
<td>Serious aerobic and anaerobic Gram positive gram positive and Gram negative infections. Infections caused by Extended Spectrum Beta Lactamase (ESBL) producing bacteria</td>
<td>Birth to 7 days 20 mg/kg every 12 hours 7 – 28 days 20 mg/kg every 8 hours 1 month - 12 years and under 50 kg 20 mg/kg every 8 hours 12-18 years or over 50 kg 1g every 8 hours</td>
<td>IV bolus (40mg/kg &amp; 2g doses should be given by IV infusion)</td>
<td></td>
<td>Dose doubled where meningitis cover is required</td>
</tr>
</tbody>
</table>
### 2.3 ANTIBIOTIC DOSES

This guidance does not cover the treatment of line infections, haematology / oncology patients, patients with Tuberculosis, or patients with Cystic Fibrosis - please refer to separate guidelines.

<table>
<thead>
<tr>
<th>Antibiotic</th>
<th>Type of infection</th>
<th>Dose</th>
<th>Method of administration</th>
<th>Length of treatment</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metronidazole</td>
<td>Peritonitis</td>
<td>Birth (&gt;34 weeks) – 2 months 7.5mg/kg three times a daily</td>
<td>IV infusion over 20-30 minutes</td>
<td></td>
<td>Maximum IV dose 500mg Maximum oral dose 400mg</td>
</tr>
<tr>
<td></td>
<td>Peri-orbital or Orbital cellulitis</td>
<td>2 months - 18 years 7.5mg/kg (max 500mg) three times daily</td>
<td></td>
<td>Oral</td>
<td>C.difficile : 14days Dental infection : 7 days</td>
</tr>
<tr>
<td></td>
<td><em>Clostridium difficile</em> diarrhea</td>
<td>1 month – 2 months 7.5mg/kg twice a day</td>
<td></td>
<td></td>
<td>Metronidazole : Avail. oral preparations: 200mg tablets 200mg in 5 ml suspension</td>
</tr>
<tr>
<td></td>
<td>Dental abscess</td>
<td>2 mth – 12 yrs 7.5mg/kg (max 400mg) three times a day</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>12 – 18 years 400mg three times a day</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>or in dental infections</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1-3 years</td>
<td>50 mg three times a day</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3-7 years</td>
<td>100mg twice a day</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>7-10 years</td>
<td>100 mg three times a day</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>10-18 years</td>
<td>200mg three times a day</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### 2.3 ANTIBIOTIC DOSES

This guidance does not cover the treatment of line infections, haematology / oncology patients, patients with Tuberculosis, or patients with Cystic Fibrosis - please refer to separate guidelines.

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<thead>
<tr>
<th>Antibiotic</th>
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<th>Dose</th>
<th>Method of administration</th>
<th>Length of treatment</th>
<th>Comments</th>
</tr>
</thead>
</table>
| **Nitrofurantoin** | UTI               | **TREATMENT:**
>3 mths – 12 yrs 750 microgram/kg four times a day
12 – 18 years 50mg four times daily
**PROPHYLAXIS:**
Age > 3 months 1mg/kg at night
12 18 years 50-100mg at night | Oral                | 7 days                                                               | Adult dose 50mg four times daily
Avail. oral preparations:
Nitrofurantoin 50mg tablet
Nitrofurantoin suspension 25mg in 5 ml suspension |
| **Penicillin V**    | Tonsillitis       | Age 1 month - 1 year 62.5mg four times daily
1-5years daily 125mg four times daily
6-12 years daily 250mg four times daily
> 12 years daily 500mg four times daily | Oral                | Tonsillitis: 10 days
Please note: not suitable for treatment of streptococcal infection in any other body sites | Avail. oral preparations: Severe infection may require IV therapy
Penicillin V syrup 125mg in 5 ml syrup
250mg in 5 ml syrup
Penicillin V tabs 250mg tablets |
## 2.3 ANTIBIOTIC DOSES

This guidance does not cover the treatment of line infections, haematology / oncology patients, patients with Tuberculosis, or patients with Cystic Fibrosis - please refer to separate guidelines.

<table>
<thead>
<tr>
<th>Antibiotic</th>
<th>Type of infection</th>
<th>Dose</th>
<th>Method of administration</th>
<th>Length of treatment</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rifampicin</td>
<td>Meningitis: Prophylaxis: - Contacts</td>
<td>Birth- 1 year &gt; 1 year</td>
<td>5mg/kg twice a day</td>
<td>Oral</td>
<td>Meningococcus: 2 days</td>
</tr>
<tr>
<td></td>
<td>- Nasal eradication in index case, :</td>
<td>or 1-2 years</td>
<td>10mg/kg twice a day</td>
<td></td>
<td>Rifampicin can colour body fluids orange/red</td>
</tr>
<tr>
<td></td>
<td>Meningococcal and nasal eradication in index case</td>
<td>3-4 years</td>
<td>100mg twice a day</td>
<td></td>
<td>Avoid with soft contact lenses</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5-6 years</td>
<td>150mg twice a day</td>
<td></td>
<td>NB: Numerous drug interactions. Check BNFc</td>
</tr>
<tr>
<td></td>
<td></td>
<td>7-12 years</td>
<td>200mg twice a day</td>
<td></td>
<td>Avail. oral preparations:       Rifampicin syrup</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Adults and children &gt; 12 years</td>
<td>300mg twice a day</td>
<td></td>
<td>100mg in 5 ml syrup Rifampicin 150mg &amp; 300mg capsules</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Age 1 month - 18 years</td>
<td>10mg/kg (max 600mg) twice a day</td>
<td>Oral</td>
<td>Prolonged therapy required</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(max 600mg)</td>
<td></td>
<td></td>
<td>In combination with second antibiotic agent</td>
</tr>
</tbody>
</table>

Severe staphylococcal infection
Osteomyelitis
Septic arthritis
2.3 ANTIBIOTIC DOSES

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<table>
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<th>Dose</th>
<th>Method of administration</th>
<th>Length of treatment</th>
<th>Comments</th>
</tr>
</thead>
</table>
| Teicoplanin  | Severe staphylococcal infection                        | 10mg/kg (max 400mg) every 12 hours for 3 doses then either 10mg/kg (max 400mg) once daily for line infections, neutropenia, or severe infections OR 6mg/kg once daily (max 400mg) | IV                       |                     | Requires use of Baxa filters (green -5 micron) and Braun lubricant free syringes (green) available from pharmacy
Antibiotic levels required if used for invasive *Staph aureus* infection – discuss with Microbiology |
### 2.3 ANTIBIOTIC DOSES

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<thead>
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<th>Length of treatment</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trimethoprim</td>
<td>UTI</td>
<td><strong>TREATMENT:</strong></td>
<td>Oral</td>
<td>7 days</td>
<td>Avail. oral preparations: Trimethoprim 100mg &amp; 200mg tablets 50mg in 5ml suspension</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Birth – 1 month</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Initially 3mg/kg single dose followed by</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>2mg/kg twice daily</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 month -12 yrs 4mg/kg (max 200mg) twice daily</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>12 – 18 years 200mg twice daily</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>PROPHYLAXIS:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Birth-1 month 2mg/kg at night</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 mth – 12 yrs 2mg/kg at night</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(max 100mg)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>12 – 18 years 100mg at night</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
2.3 ANTIBIOTIC DOSES

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<th>Dose</th>
<th>Method of administration</th>
<th>Length of treatment</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vancomycin</td>
<td>Clostridium difficile</td>
<td>1 month - 5 years 5mg/kg four times a day</td>
<td>Oral</td>
<td>14 days</td>
<td>Not significantly absorbed</td>
</tr>
<tr>
<td></td>
<td>Diarrhoea</td>
<td>5-12 years 62.5mg four times a day</td>
<td></td>
<td></td>
<td>Avail. oral preparations:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>12-18 years 125mg four times a day</td>
<td></td>
<td></td>
<td>125mg capsules Injection can be given orally</td>
</tr>
<tr>
<td></td>
<td>Consult Microbiologist</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### 2.3 ANTIBIOTIC DOSES

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<th>Method of administration</th>
<th>Length of treatment</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vancomycin</td>
<td>Serious Gram positive infections</td>
<td>15mg/kg every 8 hours adjusted according to vancomycin concentration</td>
<td>IV infusion</td>
<td>14 days</td>
<td>Follow dilution guidelines and give over at least an hour. Regular vancomycin concentration monitoring required. Trough before 4th dose (in 8 hourly dosing). Target trough level is 10-15mg/L in most circumstances – discuss with Microbiology if further advice required.</td>
</tr>
</tbody>
</table>

(Section 2.3 reviewed By Dr J Gilchrist & S Thompson, January 2020)
(Updated by Gill Hinson, April 2018)
(Section 2.3 reviewed by Dr P Fenton, April 2013)
2.4 PARENTERAL NUTRITION SEPSIS GUIDE

Empirical Antibiotic Treatment of Sepsis in Patients Receiving Parenteral Nutrition

Patients on parenteral nutrition at home are provided with a letter to present to their admitting team when unwell. This outlines the empirical antibiotic regimen appropriate for that patient (based upon their previous isolates) and should be followed.

<table>
<thead>
<tr>
<th>Clinical scenario</th>
<th>Suggested first line antimicrobials</th>
</tr>
</thead>
<tbody>
<tr>
<td>No previous resistant organisms isolated</td>
<td>Cefuroxime and teicoplanin</td>
</tr>
<tr>
<td>Previous cefuroxime resistant Gram negative organisms isolated from any body site</td>
<td>CHANGE cefuroxime to meropenem</td>
</tr>
<tr>
<td>Including but not limited to:</td>
<td></td>
</tr>
<tr>
<td>• Extended spectrum beta-lactam (ESBL) producing organisms</td>
<td></td>
</tr>
<tr>
<td>• AmpC producing organisms</td>
<td></td>
</tr>
<tr>
<td>• Enterobacter spp., Serratia spp., Citrobacter freundii</td>
<td></td>
</tr>
<tr>
<td>Previous teicoplanin resistant organism isolated from blood cultures</td>
<td>CHANGE teicoplanin to vancomycin</td>
</tr>
<tr>
<td>Previous Candida isolated from blood cultures or other sterile site e.g. peritoneal fluid, in/out catheter or SPA urine sample</td>
<td>ADD TO ABOVE CHOICE Fluconazole if sensitive. Liposomal amphotericin (Ambisome) if resistant to fluconazole</td>
</tr>
<tr>
<td>Conspicuous abdominal symptoms</td>
<td>ADD metronidazole</td>
</tr>
</tbody>
</table>

Doses suitable for severe infection/septicaemia should be used as specified local guidelines and BNFc.

All line sepsis should be treated by antibiotics given through the line. Removal of the line is not usually necessary but should be considered in severe sepsis and/or failure to respond to optimal antibiotic therapy.

Duration of antibiotic therapy

<table>
<thead>
<tr>
<th>Septicaemia</th>
<th>7 days/discuss with microbiologist</th>
</tr>
</thead>
<tbody>
<tr>
<td>NEC</td>
<td>10 days</td>
</tr>
<tr>
<td>Meningitis</td>
<td>Discuss with medical team/microbiologist</td>
</tr>
<tr>
<td>Others</td>
<td>Review after 48 hours when cultures are available. If cultures are negative, and clinical suspicion of infection had not been high then stop antibiotics</td>
</tr>
</tbody>
</table>

(Section 2.4 reviewed by Dr S. Thompson & Dr J Gilchrist, April 2020)
(Section 2.4 written by Dr P Fenton, May 2012)
2.5 ANALGESIA FOR CHILDREN - DRUG DOSES

A. MILD / MODERATE PAIN
B. SEVERE PAIN
C. INTRANASAL DIAMORPHINE
D. INTRANASAL FENTANYL
E. INTRANASAL ALFENTANIL
F. INTRANASAL KETAMINE

As with all drugs, modification of the recommended dosage must be considered in the presence of organ dysfunction.

The following information is intended for your guidance. Please consult a senior ED colleague if you are unsure about your prescription.

**NB** The prescription should include the maximum dose to be given in a 24 hour period.

<table>
<thead>
<tr>
<th>Abbreviations Used:</th>
</tr>
</thead>
<tbody>
<tr>
<td>e.c. - enteric coated</td>
</tr>
<tr>
<td>hrs - hours</td>
</tr>
<tr>
<td>IM - intramuscular</td>
</tr>
<tr>
<td>IV - intravenous</td>
</tr>
<tr>
<td>kg - kilogram</td>
</tr>
</tbody>
</table>
### 2.5 ANALGESIA FOR CHILDREN - DRUG DOSES

#### A. ORAL ANALGESIA FOR MILD/MODERATE PAIN:

<table>
<thead>
<tr>
<th>Drug</th>
<th>Dose</th>
<th>Standardised Doses/Age &amp; Weight</th>
<th>Frequency</th>
<th>Maximum dose</th>
<th>Preparations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Paracetamol</strong></td>
<td>15 – 18mg/kg</td>
<td>3mths – 6 yrs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Oral suspension 120mg/5ml</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>5.0-6.9 kg - 84mg(3.5ml)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>7.0-9.9 kg - 120mg(5ml)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>10.0-12.9kg -180mg(7.5ml)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>13.0-16.9kg - 240mg (10ml)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>17.0-19.9kg - 300mg(12.5ml)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>20.0-24.9kg – 360mg(15ml)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>as 120mg/5ml</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>6 – 12 years</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Oral suspension 250mg/5ml</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>14-16.9kg -250mg(5ml)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>17.0-19.9kg-300mg(6ml)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>20.0-26.9kg–375mg(7.5ml)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>27.0– 33.9kg - 500mg(10ml)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>34.0-39.9kg– 625mg(12.5ml)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>40.0-53.9kg – 750mg(15ml)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>&gt;54kg - 1g(20ml) or 2 tablets</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>as 250mg/5ml</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>75mg/kg/24 hours</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>up to 4g/24 hours</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| **Ibuprofen** | 5-7.5mg/kg | 1 – 3 months                   |                    | 6 to 8 hourly when required | 20mg/kg/24 hours |
|               |            | 5mg/kg                         |                    |                          | Oral suspension (sugar free) 100mg/5ml |

| **Ibuprofen** | 5-7.5mg/kg | 3 months – 12 years            |                    | 6 to 8 hourly when required | 30mg/kg/24 hours |
|               |            | > 12 years                     |                    |                          | up to 2.4g/24 hours |
|               |            | 4 – 6kg - 30mg                 |                    | 200mg – 600mg            | Melts 200mg |
|               |            | 7 – 8kg - 40mg                 |                    |                          | Tablets 200mg, 400mg |
|               |            | 9 – 10kg - 50mg                |                    |                          |                     |
|               |            | 11 – 12kg - 60mg               |                    |                          |                     |
|               |            | > 31kg - 200mg                 |                    |                          |                     |

[Info leaflets available – No. 39 Paracetamol and its use, & No. 141 Ibuprofen]
## 2.5 ANALGESIA FOR CHILDREN - DRUG DOSES

<table>
<thead>
<tr>
<th>Drug</th>
<th>Dose</th>
<th>Standardised Doses/Age &amp; Weight</th>
<th>Frequency</th>
<th>Maximum dose</th>
<th>Preparations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diclofenac</td>
<td>1mg/kg</td>
<td>&gt; 6 months – 18 years&lt;br&gt;5 - 9kg - 5mg&lt;br&gt;10 – 14kg - 10mg&lt;br&gt;15 – 19kg - 15mg&lt;br&gt;20 – 24kg - 20mg&lt;br&gt;25 – 29kg - 25mg</td>
<td>THREE times a day when required</td>
<td>3mg/kg/24 hours&lt;br&gt;up to 150mg/24 hours</td>
<td>Tablets (ec)&lt;br&gt;25mg, 50mg&lt;br&gt;Dispersible tablets 50mg&lt;br&gt;Oral solution 50mg/5ml</td>
</tr>
</tbody>
</table>

### ORAL ANALGESIA FOR MODERATE/SEVERE PAIN

| Oral Morphine | 50 – 200 micrograms/kg | 3 – 6 months - 50micrograms/kg<br>6 months – 2 years – 100micrograms/kg<br>2 – 18 years – 100-200micrograms/kg | 6 hourly. Max 4 doses/24 hours | Max dose 5mg<br>Following major surgery or more prolonged inpatient stay some patients may need to be discharged on their higher inpatient dose | Supply 3 days at regular dosing plus 7 days for when required usage. |
2.5 ANALGESIA FOR CHILDREN - DRUG DOSES

B. INTRAVENOUS OPIATES – FOR SEVERE PAIN
- If severe pain is anticipated, early adequate pre-emptive treatment is better than attempting to control pain once it has started.
- Opiates are respiratory depressants - Monitoring of respiratory rate, level of sedation and oxygenation are important. Supplementary oxygen may be indicated.
- Beware of drug interactions with other sedatives (i.e. Diazepam).
- Young infants are highly sensitive to the respiratory depressant effects of opiates *. Seek guidance if you intend to prescribe to an infant
- If in doubt discuss with a senior ED colleague.
- ED experience is that higher than generally reported doses of IV opiates are required to control acute pain from conditions such as femoral fractures or burns so the starting dose is 0.2mg/kg (200 micrograms/kg) IV.
- Be careful in the prescribing of opiates if you think there is a reasonable likelihood of ketamine sedation being required as the use of opiates and ketamine together is a relative contra-indication to sedation in the ED

Note: IV Morphine and Diamorphine are controlled drugs and CD regulations apply to prescribing, administration and disposal of these drugs.

<table>
<thead>
<tr>
<th>Drug</th>
<th>Dose</th>
<th>Preparations</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Morphine Sulphate</td>
<td>0.2mg/kg (200 micrograms/kg) IV bolus</td>
<td>Injection: 10mg/ml, 30mg/ml.</td>
<td>Titrate slowly until analgesia achieved</td>
</tr>
<tr>
<td></td>
<td>May be repeated after 20-30 mins if continued pain.</td>
<td>* See above for neonates and young infants *</td>
<td></td>
</tr>
</tbody>
</table>

C. INTRANASAL DIAMORPHINE  (See also 2.7)

D. NB – there are often issues with the supply of diamorphine for use intra-nasally. Consider the use of intra-nasal fentanyl, alfentanil or ketamine as alternatives. See sections D, E and F below

Indications:
Severe pain. Weight >10kg.
Onset of action 5-10 mins
Duration of analgesia 45 mins

Dose:
100 microgram/kg. See Tables

Administration:
- Reconstitute a 5mg vial of diamorphine with 0.5ml water for injection in a 1ml syringe.
- Calculate the dose and discard the excess volume (see table below) from the syringe.
- Attach the syringe to the mucosal atomization device firmly.
- Spray the solution into the clearer nostril.
- Larger doses can be split between 2 nostrils

Record pain score before and after intervention.
2.5 ANALGESIA FOR CHILDREN - DRUG DOSES

The spray should be directed at the nasal side wall (lateral nasal wall) rather than straight up the nose. It is recommended that the patient sits in a semi-recumbent position at about 45 degrees when the nasal spray is being administered.

The patient should then be monitored for at least 30 minutes following administration.

**Note:** For small volumes it is worthwhile trapping a bubble of air between the plunger of the syringe and drug to act as a flush to clear the dead space of the atomizer. Speed of onset is usually around five minutes. The same cautions/contraindications apply to nasal administration as for other routes of opiates administration.

<table>
<thead>
<tr>
<th>Weight (kg)</th>
<th>Discarded volume (ml)</th>
<th>Administered volume (ml)</th>
<th>Dose of diamorphine (mg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>0.4</td>
<td>0.1</td>
<td>1</td>
</tr>
<tr>
<td>15</td>
<td>0.35</td>
<td>0.15</td>
<td>1.5</td>
</tr>
<tr>
<td>20</td>
<td>0.3</td>
<td>0.2</td>
<td>2</td>
</tr>
<tr>
<td>25</td>
<td>0.25</td>
<td>0.25</td>
<td>2.5</td>
</tr>
<tr>
<td>30</td>
<td>0.2</td>
<td>0.3</td>
<td>3</td>
</tr>
<tr>
<td>35</td>
<td>0.15</td>
<td>0.35</td>
<td>3.5</td>
</tr>
<tr>
<td>40</td>
<td>0.1</td>
<td>0.4</td>
<td>4</td>
</tr>
<tr>
<td>45</td>
<td>0.05</td>
<td>0.45</td>
<td>4.5</td>
</tr>
<tr>
<td>50</td>
<td>0</td>
<td>0.5</td>
<td>5</td>
</tr>
</tbody>
</table>

The dose should not be repeated.

**E. INTRANASAL FENTANYL**

**Indications:**
Severe pain. Weight >10kg. Onset of action within 5 mins. Duration of analgesia 30-60 minutes

**Dose:**
1.5 microgram/kg. See Dosing Table.

**Administration:**
- Using Fentanyl 100 microgram/2ml and draw up required amount of fentanyl
- Attach the syringe to the mucosal atomization device firmly.
- Spray the solution into the clearer nostril.
- Larger doses can be split between 2 nostrils

Record pain score before and after intervention.

The spray should be directed at the nasal side wall (lateral nasal wall) rather than straight up the nose. It is recommended that the patient sits in a semi-recumbent position at about 45 degrees when the nasal spray is being administered.

The patient should then be monitored for at least 30 minutes following administration.

**Note:** For small volumes it is worthwhile trapping a bubble of air between the plunger of the syringe and drug to act as a flush to clear the dead space of the atomizer. Speed of onset is usually around five minutes. The same cautions/contraindications apply to nasal administration as for other routes of opiates administration.
2.5 ANALGESIA FOR CHILDREN - DRUG DOSES

F. INTRANASAL ALFENTANIL

Indications:
Severe pain. Can be used for first line opioid analgesia. Weight >10kg.
Ideal for shorter analgesia for example- splinting, burns dressing
Onset 5-10 minutes., Duration 30 minutes

Dose:
0.01 mg/kg (10micrograms/kg) alfentanil HCl.

Administration:
- Dilute 5mg/1ml vial of alfentanil, to specified volume (see dilution chart below) with 0.9% NaCl.
- Draw up 0.2 mls of the diluted solution in a 1ml syringe. (0.01 mg/kg in 0.2 mls)
- Attach the syringe to the mucosal atomization device firmly.
- Spray the solution into the clearer nostril. 0.1 ml may be used up each nostril if easier
- Dose may be repeated after 20-30 minutes if necessary.
- Record pain score before and after intervention.

The spray should be directed at the nasal side wall (lateral nasal wall) rather than straight up the nose. It is recommended that the patient sits in a semi-recumbent position at about 45 degrees when the nasal spray is being administered.

<table>
<thead>
<tr>
<th>Weight (kg)</th>
<th>Volume of fentanyl (100 microgram in 2ml)</th>
<th>Dose of fentanyl (microgram)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>0.3</td>
<td>15</td>
</tr>
<tr>
<td>15</td>
<td>0.45</td>
<td>22.5</td>
</tr>
<tr>
<td>20</td>
<td>0.6</td>
<td>30</td>
</tr>
<tr>
<td>25</td>
<td>0.75</td>
<td>37.5</td>
</tr>
<tr>
<td>30</td>
<td>0.9</td>
<td>45</td>
</tr>
<tr>
<td>35</td>
<td>1.05</td>
<td>52.5</td>
</tr>
<tr>
<td>40</td>
<td>0.2</td>
<td>60</td>
</tr>
<tr>
<td>45</td>
<td>1.35</td>
<td>67.5</td>
</tr>
<tr>
<td>50</td>
<td>1.5</td>
<td>75</td>
</tr>
<tr>
<td>55</td>
<td>1.65</td>
<td>82.5</td>
</tr>
<tr>
<td>60</td>
<td>1.8</td>
<td>90</td>
</tr>
</tbody>
</table>
2.5 ANALGESIA FOR CHILDREN - DRUG DOSES

The patient should then be monitored for at least 30 minutes following administration

Note: For small volumes it is worthwhile trapping a bubble of air between the plunger of the syringe and drug to act as a flush to clear the dead space of the atomizer. Speed of onset is usually around five minutes. The same cautions/contraindications apply to nasal administration as for other routes of opiates administration.

<table>
<thead>
<tr>
<th>Weight (kg)</th>
<th>Volume of alfentanil 5mg in 1 ml</th>
<th>Volume of Sodium Chloride 0.9%</th>
<th>Total volume</th>
<th>Dose of alfentanil in 0.2ml diluted solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>1ml</td>
<td>9mls</td>
<td>10mls</td>
<td>0.1mg</td>
</tr>
<tr>
<td>15</td>
<td>1ml</td>
<td>5.5mls</td>
<td>6.5mls</td>
<td>0.15mg</td>
</tr>
<tr>
<td>20</td>
<td>1ml</td>
<td>4mls</td>
<td>5mls</td>
<td>0.2mg</td>
</tr>
<tr>
<td>25</td>
<td>1ml</td>
<td>3mls</td>
<td>4mls</td>
<td>0.25mg</td>
</tr>
<tr>
<td>30</td>
<td>1ml</td>
<td>2.4mls</td>
<td>3.4mls</td>
<td>0.3mg</td>
</tr>
<tr>
<td>35</td>
<td>1ml</td>
<td>1.9mls</td>
<td>2.9mls</td>
<td>0.35mg</td>
</tr>
<tr>
<td>40</td>
<td>1ml</td>
<td>1.5mls</td>
<td>2.5mls</td>
<td>0.4mg</td>
</tr>
<tr>
<td>45</td>
<td>1ml</td>
<td>1.2mls</td>
<td>2.2mls</td>
<td>0.45mg</td>
</tr>
<tr>
<td>50</td>
<td>1ml</td>
<td>1ml</td>
<td>2mls</td>
<td>0.5mg</td>
</tr>
<tr>
<td>55</td>
<td>1ml</td>
<td>0.8ml</td>
<td>1.8ml</td>
<td>0.55mg</td>
</tr>
<tr>
<td>60</td>
<td>1ml</td>
<td>0.7ml</td>
<td>1.7ml</td>
<td>0.6mg</td>
</tr>
</tbody>
</table>

Record pain score before and after intervention.

G. INTRANASAL KETAMINE

Indications:
Severe pain. Longer acting indications. Weight >10kg.
Onset of action 10 mins. Duration up to 60 minutes

Dose:
1mg/kg. Can give another 0.5mg/kg as a top up dose

Administration:
- Using 500mg in 10 ml ketamine- Draw up required amount
- Attach the syringe to the mucosal atomization device firmly.
- Spray the solution into the clearer nostril. Larger doses can be split between nostrils
- A top of dose of 0.5mg/kg can be given
2.5 ANALGESIA FOR CHILDREN - DRUG DOSES

Record pain score before and after intervention.

The spray should be directed at the nasal side wall (lateral nasal wall) rather than straight up the nose. It is recommended that the patient sits in a semi-recumbent position at about 45 degrees when the nasal spray is being administered.

The patient should then be monitored for at least 30 minutes following administration.

Note: For small volumes it is worthwhile trapping a bubble of air between the plunger of the syringe and drug to act as a flush to clear the dead space of the atomizer. Speed of onset is usually around five minutes. The same cautions/contraindications apply to nasal administration as for other routes of opiates administration.

<table>
<thead>
<tr>
<th>Weight</th>
<th>Volume of ketamine 500mg/10mls (mL)</th>
<th>Does of Ketamine (mg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 kg</td>
<td>0.2</td>
<td>10</td>
</tr>
<tr>
<td>15 kg</td>
<td>0.3</td>
<td>15</td>
</tr>
<tr>
<td>20 kg</td>
<td>0.4</td>
<td>20</td>
</tr>
<tr>
<td>25 kg</td>
<td>0.5</td>
<td>25</td>
</tr>
<tr>
<td>30 kg</td>
<td>0.6</td>
<td>30</td>
</tr>
<tr>
<td>35 kg</td>
<td>0.7</td>
<td>35</td>
</tr>
<tr>
<td>40 kg</td>
<td>0.8</td>
<td>40</td>
</tr>
<tr>
<td>45 kg</td>
<td>0.9</td>
<td>45</td>
</tr>
<tr>
<td>50 kg</td>
<td>1</td>
<td>50</td>
</tr>
<tr>
<td>55 kg</td>
<td>1.1</td>
<td>55</td>
</tr>
<tr>
<td>60 kg</td>
<td>1.2</td>
<td>60</td>
</tr>
</tbody>
</table>

(Section 2.5 updated by Mr C Fitzsimmons, June 2020)
(Section A written by K Bourne [Pharmacy Dept], Aug 2006)
(Section B adapted for the ED by Dr A Smith from SC(NHS)T Pain Team Protocol, Feb 2005)
(Section E written by Dr S Ramlakhan, May 2006)
(Section F & G written by Dr S Ramlakhan, Dr L Evans and L Godden [Pharmacy] June 2020)
### 2.6 LOCAL ANAESTHETICS

#### A. TOPICAL
  - (i) Skin
  - (ii) Eye

#### B. INFILTRATED

##### A. TOPICAL:
  - (i) Skin

<table>
<thead>
<tr>
<th>NOTES</th>
<th>SUGGESTED USE</th>
</tr>
</thead>
</table>
| **EMLA** | - Eutectic Mixture of Local Anaesthetics.  
- Use under occlusive dressing.  
- Allow 60 mins to be effective.  
- NOT licensed: under 1 year or on broken skin.  
- Anaesthesia persists for 1 hour post removal of cream.  
✓ Cannulation.  
✓ Other skin procedures.  
✓ Prior to local anaesthetic infiltration.  
✓ Prior to IM injection of ketamine for procedural sedation |
| **Ametop** | - Use under occlusive dressing.  
- Allow 30-45 mins to be effective.  
- Use in child 1 month - 1 year.  
- Anaesthesia persists for 4-6 hours post removal of gel.  
- May cause local vasodilatation + erythema; if excessive, remove gel and wash with cool water. | ✓ Personal preference |
| **Ethyl Chloride spray** | - Spray onto skin.  
- No real anaesthetic properties. | ✓ Suturing wounds  
✓ Wound exploration  
✓ Wound cleaning  
✓ Wound debridement |
| **LAT Gel**  
4% Lidocaine  
0.1% Adrenaline  
0.5% Tetracaine | - Anaesthetic gel which can be applied onto and into wounds  
- Contains adrenaline and thus avoids systemic absorption  
- Can be used as an alternative to LA infiltration or prior to LA infiltration  
- Use in child of 1 year and over  
- Particularly useful for facial and scalp wounds  
- Wound should be less than 5 cm length and less than 8 hours old  
- Remember that LAT gel contains | ✓ USE ALONE or WITH supplemented infiltrated Lidocaine  
May reduce the need for sedation/referral for GA if used in conjunction with distraction techniques |
2.6 LOCAL ANAESTHETICS

ADRENALINE so DO NOT USE - if wound on or near mucous membrane including eye, nose, mouth
- if wound to nasal alae
- on wounds where there is concern re tissue viability e.g. crush, bite or flap wounds
- on wounds involving cartilage, bone, joint, tendon, nerves, blood vessels
Do not use if previous reaction to LA

DOSE of LAT Gel
0.5 ml - 1.0 ml per cm of wound length up to the maximum allowed.
Maximum dose depends on age
Age 1-3 yrs   2 ml
Age > 3 yrs   3 ml

Each bottle is single patient use only and should be discarded within 24 hours of opening.

APPLICATION
Always wear gloves when handling LAT Gel
Gently clean wound
Apply half dose of gel directly into/onto wound using a syringe
Apply the other half dose onto a piece of gauze cut to the size of the wound and place over wound
Apply light pressure over the gauze either with an occlusive non absorbent dressing or with a parent’s gloved hand
Check the wound edge for anaesthesia after 30 mins (there may be blanching of the wound edge)
Irrigate the wound to remove LAT Gel
Suturing must be completed within 30 mins after removal of Gel
Supplemented infiltrated LA may be used

(ii) Eye

<table>
<thead>
<tr>
<th>NOTES</th>
<th>SUGGESTED USE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Proxymetacaine</strong></td>
<td>✓ Prior to eye irrigation.</td>
</tr>
<tr>
<td>- Causes less initial stinging than other</td>
<td>✓ To allow better eye examination</td>
</tr>
<tr>
<td>topical anaesthetics.</td>
<td></td>
</tr>
<tr>
<td>- Should be avoided in preterm neonates.</td>
<td>✓ Prior to attempted_FB removal</td>
</tr>
</tbody>
</table>
### LOCAL ANAESTHETICS

#### B. INFILTRATED:

<table>
<thead>
<tr>
<th>Lidocaine (Lignocaine)</th>
<th>NOTES</th>
<th>SUGGESTED USE</th>
</tr>
</thead>
<tbody>
<tr>
<td>- 1%+2% without adrenaline as stock (avoids inadvertent use at contraindicated sites).</td>
<td></td>
<td>Consider use of LAT gel prior to LA infiltration</td>
</tr>
<tr>
<td>- MAX DOSE = 3mg/kg.</td>
<td></td>
<td>✓ Suturing.</td>
</tr>
<tr>
<td>- 1% = 10mg/ml; 2% = 20mg/ml.</td>
<td></td>
<td>✓ Removal of FB.</td>
</tr>
<tr>
<td>- Dental syringes are available (fine needle / more control); contain adrenaline, thus only for circumoral anaesthesia.</td>
<td></td>
<td>✓ Digital nerve blocks.</td>
</tr>
</tbody>
</table>

**Notes for successful local anaesthesia:**

This requires the gaining and keeping of confidence: it is predominantly achieved by adequate explanation, continued verbal contact and reassurance.

Points worth explaining include:

- **Initial needle ‘scratch’ then ‘sting’ of injection:** wears off quickly. (Use fine needle / inject slowly / topical anaesthesia prior to infiltration).

- **Touch and pressure sensation are frequently preserved despite adequate pain block:** this does not represent inadequate anaesthesia but may be an unsettling surprise to a patient who is not prepared.

**NB Infiltration of local anaesthetic is unreliable at sites of infection** and is therefore not generally recommended. Seek senior advice if unsure.

<table>
<thead>
<tr>
<th>Levo-bupivacaine (0.5%)</th>
<th>NOTES</th>
<th>SUGGESTED USE</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Use 0.5% (5mg/ml) without adrenaline for femoral nerve block.</td>
<td></td>
<td>✓ Nerve blocks. (See femoral nerve block section 4.12)</td>
</tr>
<tr>
<td>- Single use.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Max dose = 0.4ml/kg.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(Section 2.6 updated by Mr C Fitzsimmons, June 2020)
(Written by Dr J Dawson, Aug 2002)
# Methods of Sedation and Analgesia

## A. Entonox

- Potent analgesic.
- Rapid onset of action (2 - 3 mins).
- Rapid offset (5 mins).
- Self administered (gives child control).
- Side effects are few and self limiting (drowsy = drop mask = wake up).
- Allows child to co-operate and communicate throughout procedure.
- Use with mouthpiece or mask AND a filter.

### Contraindications:
- Significant head injury.
- Intoxication.
- Pneumothorax.
- Possibility of intracranial air.
- In the first trimester of pregnancy.

### Suggested Use
- Suture removal.
- Re/dressings.
- Burns.
- POPs
- Movement of limb during X-ray.

### Notes
- Entonox *
- 50:50 mixture of oxygen and nitrous oxide.
- Use with mouthpiece or mask.

## B. Ketamine

- IV administration preferred (See 2.9)

### Only Senior Trained Staff to Use
- Co-operative child.
- Short procedure.
- Cannulation.
- Venepuncture.
- L A infiltration.

### Notes
- Ketamine**
- Can be used intranasally for analgesia also – see 2.6

### Suggested Use
- Any painful or distressing procedure likely to last less than 30 min.
- Suturing face, lips, head.
- Removal of FBs.
- Reducing paraphimosis.
- Reducing fractures.
- Eye irrigation.
- Avoids GA.

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[*Info leaflet available - No. 132 – Entonox]*
[**Info leaflets no 368 / 369 / 370 – Ketamine (general, procedure and discharge)]

(Section 2.7 reviewed by Mr C Fitzsimmons, June 2020)
(Written by Dr J Dawson, Aug 2002)
2.8 PROCEDURAL SEDATION WITH I.V. KETAMINE

A. DEFINITIONS

Minimal sedation is a drug induced state during which patients are awake and calm, and respond normally to verbal commands. Although cognitive function and co-ordination may be impaired, ventilatory and cardiovascular functions are unaffected.

Moderate sedation is a drug induced depression of consciousness during which patients are sleepy but respond purposefully to verbal commands (also known as conscious sedation). No interventions are required to maintain a patent airway. Spontaneous ventilation is adequate. Cardiovascular function is usually maintained.

In the ED the aim is to produce a state of minimal-moderate sedation for the purposes of performing procedures. By definition, loss of verbal contact (with appropriate stimuli) by the patient constitutes ‘deep sedation’ or even general anaesthesia, so verbal contact must be maintained.

B. BACKGROUND

Procedural Sedation is an increasingly used method of facilitating minor procedures in the ED, especially those that may be painful or frightening. It is not general anaesthesia, but can be used in conjunction with other techniques, (e.g. local anaesthesia), in place of general anaesthetic. The use of procedural sedation in the ED is approved by the Royal College of Emergency Medicine (RCEM). This guideline is written in line with the 2014 Trust policy on sedation which is in turn written in line with the NICE Clinical Guideline (CG112) on Sedation in Children and Young People.

Procedural sedation is used for “elective” or “semi-elective procedures” and has no role in the emergency management of patients with life-threatening complaints. Other priorities, especially attention to Airway, Breathing and Circulation must take precedence. It may be used however, when balanced against risks of starvation status, in limb-threatening trauma.

The preferred option in the ED is to give ketamine I.V as it has

- a quicker onset of action
- a more reliable titration to effect if a second supplemental dose is required
- a faster recovery time

NOTE - Current NICE guidance recommends the presence of I.V. access prior to the administering of all procedural sedation therefore I.V. administration of ketamine is the preferred choice over IM.
2.8 PROCEDURAL SEDATION WITH I.V. KETAMINE

I.M. can be administered if I.V. access is problematic. The initial I.M dose is 3mg/kg. It would then be advisable to secure an I.V. cannula once sedated.

The remainder of this guidance refers solely to I.V. use of ketamine.

Note:
Procedural sedation in the ED is currently carried out by **ED senior doctors only**.

Ideally, three practitioners would be present, one to perform sedation and manage the airway, another to perform the procedure and a third person (nursing) to support and monitor the patient and support the parents. A minimum of two practitioners **must** be present, both of whom are certified in BLS and one of whom must be certified in EPLS / APLS. Departmental training is available, and necessary to practice procedural sedation in the ED.

C. INDICATIONS

- Wound management (exploration / cleaning / suturing)
- Burns dressings
- Abscess I&D
- Removal of more difficult FBs
- Reduction of paraphimosis
- Eye wash out / examination in smaller children if urgent eg alkali burns contact
- Other conditions eg. MUA fractures / joint relocations - at the clinician’s discretion
- Suitably fasted according to 2-4-6 rule (see below)
- Aged over two years. (1-2 years performed by consultant only, increased risk of laryngospasm)
- ASA grade 1 or 2 (see definitions below).
- This is not an exhaustive list

ASA Classification:

<table>
<thead>
<tr>
<th>ASA</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASA 1</td>
<td>No organic, physiological, biochemical or psychiatric disturbance.</td>
</tr>
<tr>
<td>ASA 2</td>
<td>Mild to moderate systemic disturbance, not disabling e.g. mild diabetes, moderate anaemia, well-controlled asthma.</td>
</tr>
<tr>
<td>ASA 3</td>
<td>Severe systemic disease, which is disabling, e.g. severe diabetes with vascular, fluid or electrolyte complications, severe pulmonary or cardiac insufficiency.</td>
</tr>
<tr>
<td>ASA 4</td>
<td>Severe systemic disorders which are already life-threatening.</td>
</tr>
<tr>
<td>ASA 5</td>
<td>The moribund patient who has little chance of survival with or without operative intervention.</td>
</tr>
</tbody>
</table>

- Give the parents of suitable children info leaflet no. 368 explaining the use of ketamine and its indications/alternatives, eg GA, LA etc and discuss this with them
- Allow them to decide if they wish their child to be sedated. If they are happy, give info leaflet no 369 explaining the procedure fully and the consent process. Discuss all potential side effects / possible complications.
- Obtain verbal consent from the parents at this stage, both for the sedation and for the procedure. **NICE** guidance is clear that **verbal consent** is adequate for minimal and moderate sedation. Document on the ED card.
### 2.8 PROCEDURAL SEDATION WITH I.V. KETAMINE

- A high dependency area must be available for the procedure and in the ED this means the procedure room or the resuscitation room.

### D. CONTRAINDICATIONS - are:

- Not suitably fasted
- A high risk of laryngospasm (active respiratory infection, active asthma, age less than one year).
- Patients with severe psychological problems such as cognitive or motor delay or severe behavioural problems, including learning difficulties and autism.
- Significant cardiac disease (angina, heart failure, malignant hypertension).
- Intracranial hypertension with CSF obstruction.
- Intra-ocular pathology (glaucoma, penetrating injury).
- Abnormal airway e.g. post tracheal surgery or tracheal stenosis.
- Active upper or lower respiratory tract infection.
- Significant recent head injury.
- Uncontrolled epilepsy.
- Previous psychotic illness.
- Hyperthyroidism or thyroid medication.
- Porphyria.
- Prior adverse reaction to ketamine.

### E. PROCEDURE (See algorithm [H])

- Weigh the child
- Be sure the patient is fasted according to the 2-4 rule = 2 hours for clear fluids, 4 hours for breast milk and solids. (6 hours fasting for solids with ketamine is not necessary.)
- For IV injection prepare the dorsum of the hands +/- antecubital fossae with EMLA/AMETOP.
- Gain IV access.
- Have and use monitoring in the resuscitation / procedure room. ECG / pulse oximetry and blood pressure monitoring are mandatory. ETCO2 is optional via nasal prongs which are available. Suction equipment, O\_2 and a defibrillator must be nearby. Calculate doses / have nearby all drugs that may be required during the procedure.
- Use procedure/sedation sheet and record; staff involved, pre-sedation assessment, drug dosage and timing, sequential heart rate and saturation, ETCO2 as well as a measure of sedation (AVPU or formal sedation score).
- Allow parents to be present but be careful to explain what they will see, including the detail of the proposed procedure.
- Use an initial dose of ketamine IV of 1mg/kg, given slowly over 1 minute.
- A supplementary dose of 0.5mg/kg IV may be given after 1-2 minutes, if necessary.
- With IV administration, after 1-2 minutes the patient will be sedated which will be assessed by level of responsiveness, glazed eyes and nystagmus. This condition will last for a maximum of 30 minutes.
- If suturing, also inject local anaesthetic to the area to be treated.
- Continue recording observations during the procedure.
- **Place a copy of the sedation record in the grey audit folder in resus – ongoing audit**
2.8 PROCEDURAL SEDATION WITH I.V. KETAMINE

F. RECOVERY

- Once the procedure is finished the patient should remain in a dedicated and quiet monitoring area where minimal stimulation (including monitoring) should be allowed, so as to prevent emergence phenomena. Consequently, monitoring should include pulse oximetry but not blood pressure monitoring, unless indicated.
- The child should be monitored by staff trained in the management of sedated children.
- Observations should be continued and recorded until recovery is deemed complete.
- Recovery should be complete within 90 minutes. Patient can move to AAU at this stage if not yet safe to go home e.g. vomiting, unsteady on feet.
- Allow home with carer when able to walk and patient is back to their pre-sedation state.
- This includes having normal observations, being fully awake and having nausea, vomiting and pain adequately managed.
- Written discharge information should be issued and explained - give the parents info leaflet no. 370 explaining the discharge process

G. MANAGEMENT OF POTENTIAL COMPLICATIONS

- Noisy breathing is usually due to airway mal-position and occurs at an incidence of <1%. This can normally be corrected by routine airway position management.
- In rare cases mild laryngospasm may occur (0.3%). The reported incidence of intubation for laryngospasm is 0.02%. Intubation equipment must be to hand.
- Vomiting: Up to 10% incidence. Often occurs during recovery and may delay discharge.
- Lacrimation and salivation: <10% and can be reduced with atropine pre-medication.
- Transient rash 10%.
- Transient clonic movements <5%.
- Emergence phenomena <5%. (much less than reported in adults).
- Failure <2%. Consider other alternatives e.g. GA

H. ALGORITHM – See over

Refs:
RCEM guideline
https://www.rcem.ac.uk/docs/College%20Guidelines/RCEM%20Guideline%20for%20Ketamine%20sedation%20of%20children%20in%20EDs%20Sep%202009%20(Updated%20Oct%202016).pdf
NICE CG 112 Sedation in children and young people, December 2010
SCH(NHS)FT Trust Sedation Policy
(Reviewed by Mr C Fitzsimmons, June 2020)
(Written in line with NICE CG 112 and Trust Sedation policy by Mr C FitzSimmons, May 2014)
(Written by Dr R Dalton and Mr C FitzSimmons, Feb 2006, with consensus agreement from the ED Medical Guidelines Review Group and in association with E Cawthorne [clinical governance pharmacist])

[Info leaflets available No. 368 Ketamine Sedation – General information
No. 369 Ketamine Sedation – Consent and Procedure
No. 370 Ketamine Sedation – Discharge]
2.8 PROCEDURAL SEDATION WITH I.V. KETAMINE

H. ALGORITHM

1. OBTAIN VERBAL CONSENT
   - Pre procedure checks and weigh child

2. Record baseline observations prior to procedure and commence monitoring

3. Give IV ketamine
   - Note time on sedation sheet
   - EMLA hands and elbows
   - Dose = 1mg/kg slowly

4. CONTINUE MONITORING
   - ECG, Pulse oximetry, Saturations +/- O2 supplementation if airway maintenance is needed

5. ASSESS SEDATION
   - (eye glazing & nystagmus)

6. SEDATION ADEQUATE?
   - NO
     - Give supplemental dose of IV ketamine (0.5mg/kg)
   - YES
     - Inject LA to treatment area
     - Maximum procedure time 30 mins
     - RECOVERY POSITION
     - Quiet, appropriately staffed observation area
     - Continue monitoring (pulse oximetry)

7. RECOVERY POSITION
   - Quiet, appropriately staffed observation area
   - Continue monitoring (pulse oximetry)
   - HOME
   - When 'street-fit' and walking unaided (normally 90 mins)
   - Information leaflet to parents

8. SEDATION STILL INADEQUATE
   - Stop procedure
   - Need to change to general anaesthetic

NB – I.V. is the preferred route of administration
3. MEDICAL EMERGENCIES

3.1 Paediatric basic life support
3.2 Choking child/foreign body airway obstruction
3.3 Paediatric advanced life support
3.4 Supraventricular Tachycardia – management of
3.5 Brief resolved unexplained episodes (BRUE)
3.6 Coni – (care of next of kin)
3.7 Allergic reactions – management of
3.8 Convulsions and status epilepticus
3.9 Children on steroids / adrenal suppression
3.10 Obese children
3.11 Hypoglycaemia (non-diabetic) in children – Emergency investigations and management of
3.12 Diabetic patients – general management of
3.13 Diabetic ketoacidosis – management of
3.14 Diabetic hypoglycaemia – management of
3.15 Febrile child under 5 years without a focus – management of in the ED
3.16 Recognition and treatment of sepsis
3.17 Petechial rashes
3.18 HSP (Henloch Schonlein Purpura) – management in ED
3.19 Acute meningococcal disease
3.20 Headache – management of
3.21 Management of a child with a reduced conscious level
3.22 Chickenpox and herpes zoster guidance
3.23 Hypothermia
3.24 Drowning
3.25 Poisons/ingestions/alcohol/illicit substances/deliberate self harm
3.26 Paracetamol overdose
3.27 Asthma
3.28 Viral Induced Wheeze
3.29 Pneumothorax – ED management of
3.30 Acute Stridor and Croup
3.31 Inhaled foreign bodies
3.32 Acute Bronchiolitis
3.33 Pneumonia – community acquired
3.34 Diarrhoea & vomiting
3.35 Urinary tract infection (UTI)
3.36 Constipation & soiling – guidelines for the management of
3.37 Haematological problems
3.38 Atopic eczema – management of
3.39 Neonatal skin conditions
3.40 Scabies
3.41 Impetigo, common fungal infections, tinea capitis
3.42 Immunisations & Immunisation Schedule
3.43 Notifiable diseases
3.44 Venous Thrombo-Embolism
3.45 Chest Pain
3.1 PAEDIATRIC BASIC LIFE SUPPORT

Call cardiac arrest team on 2222

Do not request individual members, the full team should attend.

- Unresponsive
  - Shout for help
  - Open Airway
  - Not Breathing Normally
    - 5 Rescue Breaths
    - No Signs of Life
      - 15 Chest compressions
      - 2 Rescue breaths
        - 15 Chest compressions
        - Call Resus Team if not done
          - 1 min CPR first, if alone

As per Resusitation Council (UK) (last updated by resus council 2015)
(Section 3.1 updated by Dr S Gibbs, April 2019)
(Section 3.1 reviewed by Dr E Snelson, April 2015)
3.2 CHOKING CHILD / FOREIGN BODY AIRWAY OBSTRUCTION

**Chest thrusts for infants:**
- Turn the infant into a head-downwards supine position. This is achieved safely by placing your free arm along the infant’s back and encircling the occiput with your hand.
- Support the infant down your arm, which is placed down (or across) your thigh.
- Identify the landmark for chest compression (lower sternum approximately a finger’s breadth above the xiphisternum).
- Deliver up to 5 chest thrusts. These are similar to chest compressions, but sharper in nature and delivered at a slower rate.
- The aim is to relieve the obstruction with each thrust rather than to give all 5.

**Abdominal thrusts for children over 1 year:**
- Stand or kneel behind the child. Place your arms under the child’s arms and encircle his torso.
- Clench your fist and place it between the umbilicus and xiphisternum.
- Grasp this hand with your other hand and pull sharply inwards and upwards.
- Repeat up to 4 more times.
3.2 CHOKING CHILD / FOREIGN BODY AIRWAY OBSTRUCTION

- Ensure that pressure is not applied to the xiphoid process or the lower rib cage as this may cause abdominal trauma.
- The aim is to relieve the obstruction with each thrust rather than to give all 5.

As per Resuscitation Council 2015
(Section 3.2 reviewed by Dr S Gibbs May 2019)
(Section 3.2 reviewed by Dr J Cumberland, July 2016)
3.3 PAEDIATRIC ADVANCED LIFE SUPPORT

CALL CARDIAC ARREST TEAM - 2222
Do not request individual members.
The full team attends.

(Unresponsive
Not breathing or only occasional gasps)

Call cardiac arrest team 2222
(1 min CPR first if alone)

CPR
(S/initial breaths then 15:2)
Oxygen / ventilate
Attach defibrillator/monitor
Minimise interruptions

Assess rhythm

Shockable
(VF / pulseless VT)

1 shock 4J/kg

Immediately resume CPR for 2 mins minimise interruptions

During CPR:
* Ensure High quality CPR - think:
  Rate, depth, recoil
plan actions before interrupting CPR
Give uninterrupted compressions
when advanced airway in place
  * Correct reversible causes *
  * Check electrode position and contact
    * Vascular Access IV/IO
    - For Asystole/PEA Give IV/IO
    - For VF/pulseless VT Give IV/IO
    Adrenaline 10mcg/kg after 3rd shock
    and then every alternate shock. Give IV/IO
    Amiodarone 5mg/kg after 3rd
    and 5th shock only.

Non shockable (PEA / asystole)

Immediately resume CPR 15:2 for 2 mins

*Reversible Causes
Hypoxia
Hypovolaemia
Hyper/hypokalaemia, metabolic
Hypothermia
Thrombosis (coronary or pulmonary)
Tension pneumothorax
Tamponade (cardiac)
Toxic/therapeutic disturbances

If signs of life check rhythm, if perfusable rhythm, check pulse.

(Section 3.3 reviewed & updated by Dr S Gibbs, May 2019
(Section 3.3 reviewed & updated by Dr J Cumberland, July 2016
As per Resuscitation Council Guidelines 2019
3.4 SUPRAVENTRICULAR TACHYCARDIA - MANAGEMENT OF

**Shock present?**

- **YES**
  - Vagal manoeuvres (if no delay)
  - Establishing vascular access quicker than obtaining defibrillator?
    - **YES**
      - Synchronous DC shock 1 J/kg
      - Seek advice from cardiologist
      - Synchronous DC shock 2 J/kg
      - Consider Amiodarone
    - **NO**
  - IV/IO Adenosine See below for age related dose
    - 2 minutes

- **NO**
  - Vagal manoeuvres
  - IV/IO Adenosine See below for age related dose
    - 2 minutes
  - IV/IO Adenosine See below for age related dose
    - Consider IV/IO Adenosine Synchronous DC shock Amiodarone Or other antiarrhythmics (seek advice from cardiologist)
### 3.4 SUPRAVENTRICULAR TACHYCARDIA - MANAGEMENT OF

#### Dose of Adenosine by age:

<table>
<thead>
<tr>
<th>Age</th>
<th>Dosage</th>
<th>Procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Birth to 1 month</td>
<td>150 micrograms/kg IV/O</td>
<td>If necessary repeat every 1-2 minutes increasing dose by 50-100 micrograms/kg until tachycardia terminates or max. single dose of 300 micrograms/kg given.</td>
</tr>
<tr>
<td>Child 1 month – 1 year</td>
<td>150 micrograms/kg IV/O</td>
<td>If necessary repeat every 1-2 minutes increasing dose by 50-100 micrograms/kg until tachycardia terminates or max. single dose of 500 micrograms/kg given. (Maximum dose 12mg)</td>
</tr>
<tr>
<td>Child 1 – 12 years</td>
<td>100 micrograms/kg IV/O</td>
<td>If necessary repeat every 1-2 minutes increasing dose by 50-100 micrograms/kg until tachycardia terminates or max. single dose of 500 micrograms/kg given. (Maximum dose 12mg)</td>
</tr>
<tr>
<td>Adolescent &gt; 12 years</td>
<td>3 mg IV/O</td>
<td>Followed by 6mg after 1-2 minutes if necessary, and then by 12mg after a further 1-2 minutes if necessary</td>
</tr>
</tbody>
</table>

#### Note:
Adenosine is a very short-acting drug and should be given into a relatively large / proximal vein over 2 seconds followed by a rapid 0.9% Sodium Chloride flush. You should warn the patient of the transient but unpleasant side effects.

Contraindications: Asthma, decompensated heart failure, long QT syndrome, second- or third-degree AV block and sick sinus syndrome (unless pacemaker fitted); severe hypotension. Children with a heart transplant are very sensitive to the effects of Adenosine and should not receive higher initial doses. In children receiving Dipyridamole reduce dose to a quarter usual dose of adenosine.

For dose of Amiodarone please see the resus handbook formulary.

(Section 3.4 reviewed by Dr H Stewart July 2020)  
as per 6th edition of APLS (2016)
3.5 BRIEF RESOLVED UNEXPLAINED EPISODE (BRUE)

A. BACKGROUND

The definition BRUE (Brief Resolved Unexplained Episode) has superseded ALTE (Acute Life-Threatening Event). Many events considered ALTE were not life-threatening in nature but benign manifestations of normal infant physiology. BRUE removes the ‘life threatening’ association of ALTE. Although a broad range of disorders could manifest as an ALTE (child abuse, metabolic conditions, congenital abnormalities, epilepsy, infections), the actual risk of an underlying disorder or recurrent event remained low. To use the phrase ‘life-threatening’ can be misunderstood that the event was more serious than it often was.

The American Academy of Paediatrics has published a BRUE guideline. The aim of this is to help clinicians use evidence-based management recommendations in evaluating the risk of future similar events for ‘low risk’ patients where history and examination are normal. It does not extend to managing more complex ‘high risk’ patients where history and/or examination indicate a more severe pathology for which specific guidelines (local or National) exist. For example, choking or gagging events are not included in the BRUE definition because other causes of vomiting will need to be explored; such as reflux, infection or central nervous disease.

BRUEs also have a strict age limit. Despite an appropriate history and physical examination, they remain unexplained. BRUE takes into account clinicians’ objective evaluation of events; however, still considering the caregivers’ perception. It is more specific in terms of addressing whether there had been cyanosis or pallor; not just ‘colour change’, absent or reduced breathing; not just ‘apnoea’, hypo or hypertonia; not just ‘change in tone’. Altered level of consciousness is now considered. The differential diagnoses to consider in BRUE remains broad and includes:

- laryngospasm, gagging, inhaled foreign body
- Inflicted injury
- Infection
- Airway obstruction
- Abdominal pathology (intussusception, herniae, testicular torsion)
- Metabolic (hypoglycaemia/calcaemia/kalaemia, inborn errors of metabolism)
- Cardiac (congenital, arrhythmias, vascular ring, prolonged QT)
- Toxins, drugs
- Neurological – head injury, seizures, cerebral malformations

The new guideline makes identifying low risk from high risk patients in terms of recurrence easier.

A BRUE in an infant under 12 months old has been classified as an event which:

- Lasts <1 minute duration (typically 20-30 seconds)
- Accompanied by a return to baseline state
- Not explained by medical conditions
- Characterised by ≥ 1 of the following event criteria*:
  - Central cyanosis, pallor
3.5 BRIEF RESOLVED UNEXPLAINED EPISODE (BRUE)

- Absent / reduced or irregular breathing
- Marked change in tone (hyper/hypotonia)
- Altered level of consciousness

B. ASSESSMENT

Try to determine the cause of the event and assess for risk factors for recurrence. Obtain a History:

- Description of event -
  - Choking, gagging
  - Breathing - abnormal breathing patterns
  - Colour - normal / cyanosis / pallor
  - Conscious state - AVPU
  - Movement - eye movements, purposeful movement, flaccid

- Circumstances surrounding event -
  - Position, awake / asleep, prone / supine / side
  - History of vomiting, relation to feeds
  - Who was with child at the time?
  - Environment - sleeping arrangement, temperature, bedding
  - Potential for accidental ingestion
  - Illness in preceding days?

- End of Event -
  - Duration of event
  - Cessation - self resolved / repositioned / CPR
  - Recovery - gradual or rapid
  - Residual symptoms

- Other factors -
  - Previous events?
  - Sick contacts
  - Family Hx sudden death, apnoea, cardiac problems
  - Birth hx - perinatal insults
  - Medication
  - Trauma

Examination should be thorough, bearing in mind the differential diagnosis. Look for bruises and petechiae, including in the mouth. Where NAI is suspected referral for a full child protection medical should be carried out after discussion with ED senior.
3.5 BRIEF RESOLVED UNEXPLAINED EPISODE (BRUE)

Flow diagram to aid diagnosis\textsuperscript{1,2}

Risk Stratification\textsuperscript{*}

Low risk BRUEs
- Occur in children >60 days of age
- Born \( \geq \) 32 weeks and corrected gestational age \( \geq \) 45 weeks
- No CPR required (by a trained medical provider e.g. paramedic, GP)
- Last < 1 minute First event

C. INVESTIGATIONS

Investigations for a low risk BRUE should be kept to a minimum; mainly an ECG and blood sugar. Depending on clinical suspicion, an NPA, urinalysis and capillary blood gas could be considered.
3.5 BRIEF RESOLVED UNEXPLAINED EPISODE (BRUE)

Further investigations should not be performed on low risk patients.¹

D. MANAGEMENT

Evidence based recommendations for management of low risk patients should include the education of caregivers about BRUE. Infants being discharged and stratified as ‘low risk’ should have at least 2 normal observations; on triage and assessment. They should be discussed with a senior doctor before discharge and a BRUE information leaflet (no x) and safety netting advice given.

Infants who have a High Risk BRUE, or a more significant event that doesn’t meet the BRUE definition, must be referred to the medical team for admission. They will require a period of continuous pulse-oximetry and investigations guided by the history and examination findings and relevant guidelines.

References


2. Royal Melbourne Children’s Hospital clinical guideline

   www.rcg.org.au,clinicalguideline,guideline_index,Apparent_life_threatening_Event_ALTE

   (Section 3.5 reviewed by Dr J Gilchrist April 2019)
   (Section 3.5 written by Dr F Blyth, Dr D Pallot and Dr J Gilchrist March 2018)
3.6 CONI - (Care Of Next Infant)

A. BACKGROUND
CONI (Care Of Next Infant)
The CONI programme helps parents who have been affected by Sudden Infant Death Syndrome (SIDS) (previously known as cot death) who go on to have another baby. CONI is run in hospitals and community health services. The majority of the work is carried out by the Paediatric Liaison team and health visitors.

The CONI scheme provides support and practical help, such as co-ordinating regular HV checks, equipment (e.g. MR10 movement alarms) and advice on safe sleeping, smoking cessation and any new evidence based research i.e. the use of dummies. The CONI team can also provide support for parents who have a baby that has experienced a High Risk BRUE or an unexplained significant event (see section 3.5 BRUE) or a SUDI (Sudden Unexpected Death in Infancy) where a cause of death has been found via the CONI-plus scheme. Close relatives of a child that has died from SIDS can also be supported via the CONI-plus scheme.

B. MANAGEMENT
All infants who suffer a High Risk BRUE should be referred to the medical team. Follow up using CONI plus is by Consultant referral only.

Babies on CONI may be brought to ED with alarm problems or acute illness. There may be occasions where admission is not indicated. If in any doubt about whether discharge is appropriate, discuss with senior ED doctor.

C. FOLLOW UP
Any child who attends ED who is currently on the CONI scheme should be referred to the local CONI co-ordinator.

How to contact the local CONI co-ordinator:
- A confidential voicemail service is available 24hrs a day on ext 14273 and messages can be left for Diane Shahlavi, Professional Lead Paediatric Liaison
- For non-urgent referrals in patients who attend out-of-hours (if in doubt about the necessity for admission, ask), fill in the Health Visitor liaison referral in Medway, which will automatically alert the Paediatric Liaison Team and will normally be dealt with on the next working day.
- If the referral is urgent, refer to the medical team as usual.

Points to remember:
Parents of a child previously lost to SIDS will understandably show a high level of anxiety, particularly if their current child is around the age at which the previous sibling died. It is therefore important to take a thorough history and examine fully, and provide adequate reassurance and explanations. If in doubt, ask for help.
3.6 CONI - (Care Of Next Infant)

At present there is no recommendation that CONI children are automatically seen in ED more quickly. Children will be triaged in the normal way, and seen in order of CLINICAL need. Parents/children on the CONI scheme may carry a ‘passport’ allowing paediatric review. If it seems appropriate then the paediatric team can be contacted direct from triage but it should be stressed that no other special priority is given to CONI families. This pathway is discussed on the enrolment visit at the family home, usually when the mum is 34 weeks pregnant.

(Section 3.6 reviewed by Dr J Gilchrist, May 2019)
(Written by Dr S Russ in consultation with the Sheffield CONI team, Aug 2005)
A. DEFINITION
Allergy may be defined as a state of altered reactivity to a particular substance mediated by an immunological response to that specific allergen. The reaction is usually reproducible.

**Anaphylaxis** is a severe, life-threatening, generalised or systemic hypersensitivity reaction, which must be treated urgently.

B. BACKGROUND
- The allergen may have been ingested, inhaled, or come into contact with skin or mucous membranes. It can cause a spectrum of severity of allergic reaction from mild – rash etc. – to life threatening anaphylaxis.
- The commonest allergens encountered in children are cow’s milk, peanuts, eggs, wasp and bee stings. Do not forget latex allergy as a cause, especially in the child who seems to deteriorate despite treatment. Call for the latex free treatment box.
- Most suspected reactions to drugs are viral rashes (including urticaria due to viral illness) rather than allergy. Unless there is good evidence of a reaction which is presumed to be due to a medication, do not label a child as allergic to a drug.

C. DIAGNOSTIC FEATURES
History:
- a. Previous reaction.
- b. Contact with common allergen.
- c. History of atopy.

Do not stop to take a detailed history in suspected anaphylaxis.
3.7 ALLERGIC REACTIONS - MANAGEMENT OF

<table>
<thead>
<tr>
<th>SYMPTOMS</th>
<th>SIGNS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MILD</strong></td>
<td></td>
</tr>
<tr>
<td>Burning sensation in mouth</td>
<td>Urticarial rash</td>
</tr>
<tr>
<td>Itching of lips, mouth, throat</td>
<td></td>
</tr>
<tr>
<td>Feeling of warmth</td>
<td></td>
</tr>
<tr>
<td>Nausea</td>
<td></td>
</tr>
<tr>
<td>Abdominal pain</td>
<td></td>
</tr>
<tr>
<td><strong>PLUS</strong></td>
<td><strong>PLUS</strong></td>
</tr>
<tr>
<td><strong>MODERATE</strong></td>
<td></td>
</tr>
<tr>
<td>Coughing/wheezing</td>
<td>Bronchospasm</td>
</tr>
<tr>
<td>Loose bowel motions</td>
<td>Tachycardia</td>
</tr>
<tr>
<td>Sweating</td>
<td>Pallor</td>
</tr>
<tr>
<td>Irritability</td>
<td>Respiratory distress</td>
</tr>
<tr>
<td><strong>PLUS</strong></td>
<td><strong>PLUS</strong></td>
</tr>
<tr>
<td><strong>SEVERE</strong></td>
<td></td>
</tr>
<tr>
<td>Sudden onset and rapid progression of symptoms</td>
<td>Laryngeal oedema</td>
</tr>
<tr>
<td>Difficulty breathing</td>
<td>Shock</td>
</tr>
<tr>
<td>Collapse</td>
<td>Respiratory arrest</td>
</tr>
<tr>
<td>Vomiting</td>
<td>Cardiac arrest</td>
</tr>
<tr>
<td>Uncontrolled defecation</td>
<td></td>
</tr>
</tbody>
</table>

D. EMERGENCY MANAGEMENT OF ANAPHYLAXIS
Anaphylaxis is likely when all of the following 3 criteria are met:
- Sudden onset and rapid progression of symptoms
- Life-threatening problems:
  - Airway: swelling, hoarseness, stridor
  - Breathing: tachypnoea, wheeze, fatigue, cyanosis, SpO2< 92%, confusion
  - Circulation: pale, clammy, hypotension, faintness, decreased consciousness
- Skin and/or mucosal changes (flushing, urticaria, angioedema)

Remember:
- Skin or mucosal changes alone are not a sign of an anaphylactic reaction
- Skin and mucosal changes can be subtle or absent in up to 20% of reactions (some patients can have only a decrease in blood pressure i.e. a circulation problem)
- There can also be gastrointestinal symptoms (e.g. vomiting, abdominal pain, incontinence)

NOTE – the INTRAMUSCULAR ROUTE is the preferred route for administration of adrenaline. Intravenous adrenaline should be reserved for children with cardiac arrest / life-threatening shock where the I.M. route has been ineffective. Monitor carefully.

Investigations
All children who are treated with adrenaline (IM/nebulised/IO/IV) should have a serum tryptase level tested at the time. This requires a 1ml sample of venous blood in a green bottle and must be obtained as soon as possible.
3.7 ALLERGIC REACTIONS - MANAGEMENT OF ANAPHYLAXIS

**Resuscitation Council (UK)**

### Anaphylaxis algorithm

- **Anaphylactic reaction?**

#### Airway, Breathing, Circulation, Disability, Exposure

- **Diagnosis** - look for:
  - Acute onset of illness
  - Life-threatening Airway and/or Breathing and/or Circulation problems
  - And usually skin changes

- **Call for help**
  - Lie patient flat
  - Raise patient’s legs

- **Adrenaline**

#### When skills and equipment available:

- Establish airway
- High flow oxygen
- IV fluid challenge
- Chlorphenamine
- Hydrocortisone

#### Monitor:
- Pulse oximetry
- ECG
- Blood pressure

---

**1 Life-threatening problems:**

- **Airway:** swelling, hoarseness, stridor
- **Breathing:** rapid breathing, wheeze, fatigue, cyanosis, $\text{SpO}_2 < 92\%$, confusion
- **Circulation:** pale, clammy, low blood pressure, faintness, drowsy/coma

**2 Adrenaline (give IM unless experienced with IV adrenaline)**

- IM doses of 1:1000 adrenaline (repeat after 5 min if no better)
  - Adult: 500 micrograms IM (0.5 mL)
  - Child more than 12 years: 500 micrograms IM (0.5 mL)
  - Child 6 - 12 years: 300 micrograms IM (0.3 mL)
  - Child less than 6 years: 150 micrograms IM (0.15 mL)

**Adrenaline IV to be given only by experienced specialists**

**Titrate:** Adults 50 micrograms; Children 1 microgram/kg

**3 IV fluid challenge:**

- Adult: 500 – 1000 mL
- Child: crystalloid 20 mL/kg

Stop IV colloid if this might be the cause of anaphylaxis

**4 Chlorphenamine**

- (IM or slow IV)
  - Adult or child more than 12 years: 10 mg
  - Child 6 - 12 years: 5 mg
  - Child 6 months to 6 years: 2.5 mg
  - Child less than 6 months: 250 micrograms/kg

**5 Hydrocortisone**

- (IM or slow IV)
  - 200 mg
  - 100 mg
  - 50 mg
  - 25 mg
Other Medication as indicated:
- Nebulised Adrenaline  400 micrograms/kg, 0.4 ml/kg of 1:1000
- Nebulised Salbutamol             -   2.5 - 5mg (2.5mg for under 5 yr, 5mg for over 5 years)
- I.V adrenaline ( in cardiac arrest) as per APLS guidelines

 Patients on Beta blockers
Children on beta blockers may present with anaphylaxis which is refractory to usual treatment. They should initially be treated following the above algorithm, however, should there be a failure to respond to this then treatment with Glucagon or Vasopressin should be considered.

- Glucagon dosing 20 to 30 micrograms/kg (maximum 1 mg) slow IV bolus over five minutes. May be followed by an infusion of 5 to 15 micrograms/minute titrated to effect (ie, not weight-based).
- Glucagon is available in fridges in the following locations;

- Vasopressin (Argipressin) is only available on PCCU, the PCCU inotrope infusion guideline is available on the intranet, If needed contact PCCU and ask a member of staff to make up the infusion. If you are managing refractory anaphylaxis a 2222 call should be considered

E. FURTHER MANAGEMENT
Any child who has required adrenaline should be referred to the medical team for a minimum 12 hour period of observation, as rebound symptoms may occur. Ideally, children who have had an anaphylaxis should be seen by the allergy nurse specialist prior to discharge. All adverse drug reactions causing anaphylaxis should be reported via the yellow card system – contact pharmacy. An anaphylaxis referral form should be completed on Medway for any child who had a reaction to food on commercial premises.

F. MANAGEMENT OF MILD ALLERGIC REACTIONS
- REMOVE ALLERGEN

Children who experience milder symptoms / signs including isolated urticaria / angioedema should be given a dose of oral chlorphenamine. (doses in table below).

<table>
<thead>
<tr>
<th>Chlorphenamine</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1 month - 2 years</td>
<td>1mg</td>
</tr>
<tr>
<td>2 - 5 years</td>
<td>1 - 2 mg</td>
</tr>
<tr>
<td>6 - 12 years</td>
<td>2 - 4 mg</td>
</tr>
<tr>
<td>&gt; 12 years</td>
<td>4 - 8 mg</td>
</tr>
</tbody>
</table>

- Observe over at least 2 hours IN THE DEPARTMENT.
- Discharge once no further symptoms.
- Prescribe chlorphenamine (dose frequency in BNFC) or cetirizine (table below) to take home.
  Advise carer to administer until symptoms subside.

SC(NHS)FT    Implemented Aug 2019    Review August 2022 (do not use after this date) Page 149 of 492
3.7 ALLERGIC REACTIONS - MANAGEMENT OF

<table>
<thead>
<tr>
<th>Cetirizine</th>
<th>(Not recommended under 10 kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 – 2 years (over 10kg)</td>
<td>2.5mg bd twice daily</td>
</tr>
<tr>
<td>2 – 6 years</td>
<td>2.5 mg twice daily</td>
</tr>
<tr>
<td>6 – 12 years</td>
<td>5 mg twice daily</td>
</tr>
<tr>
<td>12 – 16 years</td>
<td>10 mg once daily</td>
</tr>
</tbody>
</table>

G. REFERRAL TO THE ALLERGY SERVICE

- Referral to allergy clinic
  - Presentation with anaphylaxis
  - Food precipitants of reaction that brought them to ED
  - Discharge diagnosis of drug allergy (see ‘Background’ section above.)
  - Chronic Urticaria (occurring regularly for >6 weeks)
- Attendance with new nut allergy and known asthmatic: consider prescription of epipen prior to clinic review (contact allergy nurse in working hours, prescribe from ED out of hours). Give information leaflet 129 – Advice for Nut Avoidance
- Uncontrolled asthma significantly increases the risk of a severe reaction to food allergens therefore if concerns re poor asthma control, refer to asthma nurse and allergy team.
- For any advice the allergy team (including allergy specialist nurse) are available during normal working hours via switch board.

Ref: APLS 6th edition

(Section 3.7 reviewed and updated By Dr A Rawnsley, May 2019)
(Section 3.7 reviewed by Dr A Rawnsley, July 2016)
(Section 3.7 rewritten and updated by Dr J.Cumberland, May 2009)
3.8 CONVULSIONS AND STATUS EPILEPTICUS

A. DEFINITION

B. ASSESSMENT

C. DIFFERENTIAL DIAGNOSIS

D. INVESTIGATION

E. MANAGEMENT (a) STATUS - ALGORITHM with NOTES
   (b) FEBRILE CONVULSION
   (c) AFEBRILE CONVULSION

F. NEONATAL SEIZURE

A. DEFINITION

(a) STATUS EPILEPTICUS - continuous or recurrent generalised convulsion lasting 30 minutes or longer or when successive convulsions occur without recovery over a 30 minute period
   - Outcome is mainly determined by cause
   - Cerebral damage is more likely if the seizure is prolonged

(b) SIMPLE FEBRILE CONVULSION - seizure occurring in a child aged from 6 months to 5 years, precipitated by a fever arising from infection OUTSIDE the nervous system in a child who is neurologically normal and without complex features

(c) COMPLEX FEBRILE CONVULSION - duration greater than 15 minutes, multiple (ie. more than 1 convulsion per episode of fever), partial or focal

B. ASSESSMENT

(a) HISTORY
   - Important to obtain and document an eye witness account of episode if possible
   - Include - possible precipitating factors
     - prodromal phase
     - ? fever
     - abnormal movements
     - colour changes
   - Recent history of
     - minor illness
     - HI
     - possible access to drugs/toxins
     - change in medication/compliance if known epileptic
   - PMH - especially epilepsy or previous seizure
     - any disease known to predispose to seizures
   - FHX - especially epilepsy or febrile convulsions

(b) EXAMINATION
   - ABC / - Temperature / AVPU (and description of seizure if ongoing), BM
   - blood pressure
   - look for - signs of infection especially petechiae, meningism, ENT, urine
     - signs of HI/NAI
     - signs of cardiovascular/metabolic abnormality
     - signs of ingestion
3.8 CONVULSIONS AND STATUS EPILEPTICUS

- abnormal neurological signs

Consider measuring the head circumference in children under 1 year

C. DIFFERENTIAL DIAGNOSIS

It is better to allow uncertainty about the nature of the episode than to make a firm but wrong diagnosis which will mislead parents and other clinicians. If in doubt, give a possible diagnosis or even a descriptive diagnosis (eg ‘a five minute unresponsive episode with shaking of limbs and wandering eyes’).

Differentiate from
- rigors
- vasovagal syncope and other causes of collapse
- pseudo seizures

D. INVESTIGATION

- BM on all children
- otherwise dictated by clinical findings. For children who have stopped fitting, it is usually the responsibility of the medical team to decide which tests should be performed and to obtain samples. Emergency Department clinicians should only be routinely undertaking tests that are needed immediately or which affect the ED management of the child.
- Tests may include
  - FBC
  - Septic screen
  - U&E, calcium, Mg
  - Toxicology
  - drug levels (if recent change or non compliance suspected)
  - CT if Head Injury / NAI suspected cause
- An ECG should be done in all first convulsive episodes. This should also be done in children presenting with vasovagal syncope, collapse or breath-holding attacks and reflex anoxic seizures.

E. MANAGEMENT

- commence anticonvulsive treatment when the episode has lasted 5 minutes or more. This feels like a very long time!
- remember that seeing a child having a seizure is extremely frightening for the family/carers

(a) STATUS - see algorithm and notes

(b) FEBRILE CONVULSION - if still febrile, give anti-pyretics

ALL FIRST SIMPLE FEBRILE CONVULSIONS Should be D/W an ED senior. If the child is > 18 months old AND has fully recovered within an hour AND you are sure of the diagnosis AND the source of the fever they could be discharged with appropriate safety netting if the parents are happy to go. Give relevant leaflets (febrile convulsions, The febrile child, paracetamol and ibuprofen) and first aid advice for if the seizure recurs as well as advice on managing pyrexia. All other first febrile convulsions should be referred to the medical team.

RECURRENT FEBRILE CONVULSIONS - only discharge if they are back to normal AND you are sure of diagnosis AND of source of fever. Otherwise refer.

Give parents information leaflet no 15 – febrile convulsions
3.8 CONVULSIONS AND STATUS EPILEPTICUS

(c) AFEBRILE CONVULSION

FIRST SEIZURE in YOUNG CHILD should be referred to medical team.

FIRST SEIZURE in OLDER CHILD MUST BE DISCUSSED with ED senior or REFERRED at night. These children may subsequently be discharged IF back to normal AND normal neurology AND no other concerning features in history or examination. Paediatric OPD follow up must be arranged if discharged. Give them a ‘first fit’ advice leaflet.

SEIZURE IN CHILDREN KNOWN TO HAVE EPILEPSY – Look on edms. Occasionally special instructions exist from Consultant in charge of care. May not require admission particularly if the seizure was usual for them, now back to normal and parents happy. Discuss with ED senior.

In all children who have had a seizure – check for any injuries that may have been sustained during the seizure. Think about head injuries / toxins / drugs / infections / intercurrent illness / pregnancy that may be important factors.

It is sometimes appropriate to discuss with Epilepsy liaison nurses via switch or Neurology Registrar depending on the circumstances. If a child is already under Neurology. Please email the consultant in charge of their care to inform them of the ED attendance – their ED notes will be on edms for reference.

NOTES ON STATUS EPILEPTICUS ALGORITHM (see opposite page)

GENERAL

- CALL SENIOR help early – a full crash team is likely to be needed if the fit continues despite two doses of benzodiazepine as a rapid sequence induction will be needed if there is no response to Phenytoin.
- The algorithm includes pre-hospital treatment ie in the emergency management phase, include any medication that has been given at home or by the paramedics.
- Timings are taken from the start of the seizure NOT the time hospital management commences.
- Protocol is stepwise. Wait for the correct amount of time before commencing next drug (but start preparing the next drug early as it takes time)
- treat hypoglycaemia as per hypoglycaemia guidelines
- give antibiotics if any suspicion of meningitis, encephalitis or sepsis
- remember that many of the drugs used, particularly the benzodiazepines, may cause respiratory depression and hypotension
- reassess ABC regularly, occasionally removing face mask O₂ to assess adequacy of breathing (O₂ sats will drop in air if hypoventilating)
3.8 CONVULSIONS AND STATUS EPILEPTICUS

- Some children known to have epilepsy may only respond to certain drugs and will have written instructions for management (parents should have these but check edms too). If in doubt proceed with the status algorithm until notes become available.

DRUGS
- MIDAZOLAM - buccal. Administer from pre-filled oral syringe and administer to buccal area. Thought to be more effective than rectal diazepam. Both cause similar degree of respiratory depression. NB Buccal midazolam should not be used in infants < 3 months of age – use rectal diazepam for this group.
- LORAZEPAM - IV/IO. Avoid small veins as it is irritant. The ampoule is 4 milligram /ml. Dilute up to 2ml with saline to make solution of 2milligram / ml. See table over for doses. If IV lorazepam unavailable use IV diazepam.

| Lorazepam ampoules = 4 milligram / ml |
| Diluted 1:1 with NaCl = 2 milligram / ml |
| Dose = 0.1 milligram / kg: |

<table>
<thead>
<tr>
<th>Weight</th>
<th>Dose</th>
<th>Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>10kg</td>
<td>1.0mg= 0.5ml</td>
<td></td>
</tr>
<tr>
<td>12kg</td>
<td>1.2mg= 0.6ml</td>
<td></td>
</tr>
<tr>
<td>14kg</td>
<td>1.4mg= 0.7ml</td>
<td></td>
</tr>
<tr>
<td>16kg</td>
<td>1.6mg= 0.8ml</td>
<td></td>
</tr>
<tr>
<td>18kg</td>
<td>1.8mg= 0.9ml</td>
<td></td>
</tr>
<tr>
<td>20kg</td>
<td>2.0mg= 1.0ml</td>
<td></td>
</tr>
<tr>
<td>30kg</td>
<td>3.0mg= 1.5ml</td>
<td></td>
</tr>
<tr>
<td>40kg</td>
<td>4.0mg= 2.0ml</td>
<td></td>
</tr>
</tbody>
</table>

Buccal Midazolam (BUCCOLAM®) is supplied in 4 age-specific, pre-filled oral syringes. Syringes are colour-coded according to the prescribed dose for a particular age range.

<table>
<thead>
<tr>
<th>Age range</th>
<th>Dose</th>
<th>Label colour</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 to 6 months hospital setting</td>
<td>2.5mg</td>
<td>Yellow</td>
</tr>
<tr>
<td>&gt;6 months to &lt;1 year</td>
<td>2.5mg</td>
<td>Yellow</td>
</tr>
<tr>
<td>1 year to &lt;5 years</td>
<td>5mg</td>
<td>Blue</td>
</tr>
<tr>
<td>5 years to &lt;10 years</td>
<td>7.5mg</td>
<td>Purple</td>
</tr>
<tr>
<td>10 years to &lt;18 years</td>
<td>10mg</td>
<td>Orange</td>
</tr>
</tbody>
</table>

Rectal diazepam should be used in children under 3 months of age.
### 3.8 CONVULSIONS AND STATUS EPILEPTICUS

**Guidelines for the management of acute tonic-clonic convulsions including status epilepticus in a child more than one month of age**

**MAX OF 2 DOSES OF BENZODIAZEPINE ALLOWED** (including any prehospital drug)

0 minutes

- **NO**
  - Obtain Vascular access?
    - **NO**
      - Midazolam (buccal)
        - 3 months - 1 yr: 2.5mg
        - 1yr – 4 yrs: 5mg
        - 5yrs – 9yrs: 7.5mg
        - 10yrs or older: 10mg
        - If <3 months use rectal diazepam: 2.5mg
    - **YES**
      - Lorazepam 0.1mg/kg IV over 60 seconds and 5ml saline flush (max 4mg) OR if Lorazepam unavailable

5 minutes

- **Vascular access?**
  - **YES**
    - **Only give this 2nd dose if NO pre-hospital drug given**
      - Lorazepam 0.1mg/kg IV over 60 seconds and 5ml saline flush OR if Lorazepam unavailable
      - Diazepam 0.3mg/kg IV if age <12 years. 10mg IV age >12 years
      - Given over 3-5 mins and 5 ml saline flush
  - **NO**
    - **Only give this 2nd dose if NO pre-hospital drug given**
      - Get IO access then give IO Lorazepam 0.1mg/kg or IO Diazepam if Lorazepam unavailable (see notes on doses opposite)
      - If IO unavailable buccal midazolam or PR diazepam can be repeated

15 minutes

- **Vascular access?**
  - **YES**
    - Call for senior help NOW (ED SpR/Con and or Med SpR)
  - **NO**
    - Start to prepare the Phenytoin infusion and reconfirm it is an epileptic seizure
      - Phenytoin 20 mg/kg IV/IO over 20 min max dose 2g (cardiac monitor essential)
      - OR
        - Levetiracetam 40mg /kg IV/IO over 5 minutes (max dose 2.5g)
        - OR
        - Phenobarbital 20mg/kg IV/IO over 20 min (if already on phenytoin)
        - THEN
          - Paraldehyde and oil mixture rectally 0.8ml/kg (max dose 20mls)

25 minutes

- **Put out 2222 call if not already**

45 minutes

- RSI thiopental 4 mg/kg IV/IO and transfer to ICU
3.8 CONVULSIONS AND STATUS EPILEPTICUS

- PARALDEHYDE - rectal. Provided as a mixture 50:50 with olive oil. The dose in the algorithm is for the MIXTURE. Avoid in liver disease. Do not leave in a plastic syringe for longer than a few minutes
  NB – Do not delay administration of IV phenytoin in favour of rectal paraldehyde. Paraldehyde should only be used after the start of IV phenytoin infusion.
- PHENYTOIN - IV/IO. Takes a while to prepare so start making up early. Do not start if seizure stopped before commencing but complete infusion even if seizure stops during infusion.
  Phenytoin ampoule is 50milligram / ml. Dilute with 50-100 mls normal saline to a concentration not exceeding 10milligrams / ml (see SCH guidelines re IV administration / filtering). Dose is 20 milligram / kg. Give over 20-30 mins at a rate no greater than 1 milligram / kg / min using syringe driver. Side effects are arrhythmias and hypotension. ECG monitoring and regular BP measurements for the duration of the infusion are essential.

- PHENOBARBITAL - IV/IO 20 milligram / kg. If child already on phenytoin. Maximum dose is 1 gram.
- PYRIDOXINE IV - consider if child under 3 years after discussion with a senior medic

F. NEONATAL SEIZURES

Seizures in neonates are treated differently from those in older children. Their presentation may be subtle. INVOLVE SENIOR help early.

Causes - metabolic, infective, cerebrovascular, structural, specific neonatal syndromes.

Management
- ABC
- Do a BM
- PHENOBARBITAL 20milligram / kg over 20 minutes

Treat hypoglycaemia and give antibiotics if infection is likely

References:
NICE (CG137) Protocol for treating convulsive status epilepticus in children 2011

(Section 3.8 Updated by Dr C Rimmer May 2019)
(Original algorithm and notes for section 3.8 written by Dr P Baxter, Dr CD Rittey and Dr J Cumberland July 2000)
3.9 CHILDREN ON STEROIDS / ADRENAL SUPPRESSION

A. BACKGROUND

Children with adrenal suppression for whatever reason (central, adrenal, or the administration of long term steroids) are unable to mount an endogenous response to trauma or illness and must therefore be covered by additional exogenous steroids.

Most of these children carry a steroid card with their usual dose and what to do in an emergency. They may also be wearing a steroid identification tag (bracelet or necklace). Alternatively the patients / parents are often knowledgeable regarding steroid dose and management. Please do not ignore the patient or parents if they tell you that there child is on steroids for adrenal insufficiency and ensure that you act quickly to prevent complications. Patients are also registered with the ambulance service who may have already given extra steroids so you need to check with the paramedics or parents. There is no evidence base for how long the dose should be increased for in minor illness/injury and a degree of common sense can be employed. **If in doubt you will do no harm by giving more.** It is better to give too much than too little.

B. MANAGEMENT

As a general guideline:

|Minor illness| Double oral steroids for 48hrs.  
|             | If illness persists d/w Endocrine Team |
|Temperature > 38º C:| Treble oral steroids and refer to on call paediatrics |
|Minor fracture:| Treble oral steroids for 24 hrs or while in significant pain– Parents are instructed to give IM steroids if they believe that their child has sustained a fracture. You may need to explain that we can differentiate minor from major fractures but laymen can’t immediately after injury and it is better to give too much than too little steroid. |
|Major fracture, e.g. isolated fractured femur| Give IM / IV steroids. |
|MAJOR TRAUMA / SERIOUSLY UNWELL / SHOCK:| 100mg hydrocortisone bolus, preferably IV but this can also be given IM in cases of difficult IV access. |
|If unable to tolerate fluids/vomiting / NBM:| IV hydrocortisone qds  
|             | <1yr  25mg qds  
|             | 1 - 5yr  50mg qds  
|             | >5yr  100mg qds |
3.9 CHILDREN ON STEROIDS / ADRENAL SUPPRESSION

C. CONCURRENT DIABETES INSIPIDUS
If the child has a central cause for their adrenal insufficiency and has concurrent diabetes insipidus **do not** give DDAVP after additional hydrocortisone without discussion with a paediatric endocrinologist as there is a risk of severe hyponatraemia.

D. CHICKENPOX IN CHILDREN ON STEROIDS
These children are at significant risk of fulminating chickenpox and encephalitis. All children presenting with chickenpox who are on steroid replacement therapy or steroid treatment will need I.V. Acyclovir and should treble their standard steroid dose until they have recovered from their illness. Please discuss any child with chickenpox and on steroids with the on call medical team. (See full protocol in paediatric medicine guidelines handbook at nurse’s station).

If there is any doubt about steroid replacement in children and young people with adrenal insufficiency, please call a member of the Endocrine team during working hours, or the Medical Registrar out of hours

(Section 3.9 reviewed by Dr C Rimmer, May 2019)
(Written by Dr J Cumberland, Feb 2003)
3.10 OBESE CHILDREN

A. BACKGROUND

All children and young people should be weighed as part of their clinical assessment and if there are significant concerns their BMI should be calculated.

- Obesity can only be quantified by measurement of BMI and comparison to UK standards (Child Growth Foundation Charts).
- BMI = weight (kg) / height (m)\(^2\). BMI varies with age and so does not conform to adult standards – to determine age and sex specific BMI, please use the UK BMI reference centiles.

The majority of obese children seen in ED are overweight due to diet and lifestyle. There are, however, a few significant medical conditions which may present with obesity.

B. WHO TO REFER TO SCH ENDOCRINE CLINIC

Patients with a potential medical cause for their obesity can be referred to the Paediatric Endocrinology Clinic at SCH. It is important to explain to the parents / patients that this is NOT an Obesity Clinic.

The following children can be referred:
- Any child with a body mass index (BMI) > 99.6\(^{th}\) percentile where there is a real clinical possibility of Cushing’s syndrome, growth hormone deficiency or hypothyroidism.
- Any Asian child with a BMI > 99.6\(^{th}\) % and a strong family history of type II diabetes (e.g. both parents), or acanthosis nigricans.
- Any girl with a BMI > 99.6\(^{th}\) %, acanthosis nigricans or features of polycystic ovary disease, e.g. hirsutism, menstrual irregularities / secondary amenorrhoea.
- Any child with severe obesity and severe headaches or other neurological symptoms or signs suggestive of intracranial hypertension

Please discuss with Middle-grade before referral

C. OTHER COMMUNITY SERVICES FOR OBESE CHILDREN

Other services are available in the community for obese children and families. See Medical Obesity guideline for further information on the HENRY (self-referral) and Alive and Kicking (health professional referral) Programmes


(Signed by Dr J Gilchrist, May 2019)
(Written by Dr J Cumberland, Aug 2004)
3.11 HYPOGLYCAEMIA (NON DIABETIC) IN CHILDREN – 
EMERGENCY INVESTIGATIONS & MANAGEMENT OF

A. DEFINITION
Hypoglycaemia may be the presenting complaint for a serious metabolic condition. Hypoglycaemia in the non-diabetic child is considered as a blood glucose reading on the Accu-chek meter of less than or equal to 3.1 mmols/L [see 3.11 - F – notes.]
Note – please test blood ketones at bedside if the blood glucose is low. See below for notes.
Diarrhoea and vomiting is not necessarily an explanation for hypoglycaemia. Children with D&V and mildly low sugars may be on the increase due to the availability of sugar free drinks, but it is often the stress of an intercurrent illness that reveals an underlying metabolic problem. All children must be investigated even if they have D&V.

B. EMERGENCY MANAGEMENT

1. Obtain intravenous access and take bloods (see below) before giving glucose.

2. Give bolus of 10% glucose 0.2g/kg (2ml/kg) over 2 - 3 minutes.
   [If the child is well and absorbing orally, they can be given oral feed e.g. glucose drink, non-diet fizzy drinks, ordinary Ribena, etc. Milk is NOT a good option as the fat content delays absorption.]
   **DO NOT USE STRONGER IV DEXTROSE SOLUTION.**

3. Following a dextrose bolus give an infusion containing glucose, eg 5ml/kg/hour of 10% glucose with 0.9% sodium chloride.

4. Repeat blood glucose after 3 - 4 minutes: see below for further management.

C. INVESTIGATION

1. Take a history of alcohol or drug ingestion, either accidental or possibly factitious.
   This should include all steroid medication, even inhaled.
2. **Before giving glucose** draw blood for -
   a) Glucose, β-OH butyrate, Free Fatty Acids, Lactate
      Ideally 2mls and absolute minimum 1ml in fluoride bottle (“little” yellow bottle)
   b) Insulin, Cortisol, Growth hormone
      Ideally 2- 5mls, absolute minimum 2mls in lithium heparin bottle (“big” orange bottle)
   c) Amino acids, acylcarnitine
      Ideally full, min 1ml lithium heparin bottle (little orange bottle).
   d) NB If blood sugar is low test blood at the bedside for ketones – using the ketostix and hand held ketone meter in ED. This can either be taken at the same time as a BM strip test or when the bloods are taken for the hypoglycaemia screen.
Blood ketones are usually high as an expected response to hypoglycaemia. If there is not a ketotic response this raises the likelihood of an underlying metabolic disorder. If blood samples have not been obtained before giving glucose, obtain them as soon as possible afterwards and record that glucose was given and how long after the sample was taken.

Note - There is a drop down option on the Medway investigations page which will generate all the necessary request forms for the above tests.

3. Collect first urine sample passed for ketones, reducing sugars, organic acids and toxicology screen (10mls of urine is sufficient). (Toxicology only analysed if suspicion of factitious illness or drug ingestion is high).

D. FURTHER MANAGEMENT

1. Repeat blood glucose after 3 - 4 minutes:
   - If <4mmols, repeat i.v. glucose 10% bolus (if child has had only oral feed so far, then give i.v. glucose 10% bolus followed by infusion).
   - If >4mmols, but no improvement in symptoms, WAIT - then - if after 4 - 5 mins no further improvement give i.v. bolus of hydrocortisone 5mg/kg ONLY IF BLOOD SAMPLES HAVE BEEN OBTAINED for cortisol and ACTH. (ACTH not needed if hydrocortisone not given). ACTH 5ml EDTA (1 ml min) ring / bleep lab before collection as this needs to be processed within 4 hrs
   - If >4mmols, and clinical improvement, ADMIT - then - monitor hourly blood glucose for ~ 4 hrs, followed by pre-feed glucose, or 2 hourly if fed intravenously.
2. If I.V. access is lost use Glucagon IM – this may increase sugar levels temporarily in an emergency in some circumstances but cannot be relied upon (glycogen stores may be depleted or absent). An effect should be seen within five minutes and if there is not response, I.V. glucose must be given.
3. Refer to paediatrics on call.

E. MANAGEMENT OF NEWBORN

In babies less than 72 hours of age who have yet to establish feeding, it is reasonable to give a single feed to see if the blood sugar comes up before initiating the above investigations. We don’t want to over investigate normal infants but we do not wish to miss underlying disorders. Babies who do not respond to a single feed, in whom underlying disease is suspected or in whom sugars are repeatedly low, should have the above investigations. Bear in mind that poor feeding, although common, can be a manifestation of metabolic disease, sepsis etc.

F. NOTES

Please note: the threshold for investigating is 3.1 mmol/l or below on near patient testing, which is all you have to go on prior to treatment. At this low range the meters are at their least accurate. A true glucose is therefore imperative. You cannot take meaningful investigations once the blood sugar has been corrected. Not doing the right investigations before correcting the hypoglycaemia may compromise patient management.

(Section 3.11 reviewed by Dr S Gibbs June 2019)
(Reviewed by Dr C Rimmer, Prof P Dimitri, & Dr D O’Donnell July 2016)
(Written by Drs Wright, Sharrard & Cumberland, Feb 2003)
3.12 DIABETIC PATIENTS - GENERAL MANAGEMENT OF

A. NURSING CONTACTS

B. MEDICAL CONTACTS

C. WHO TO INFORM THE DIABETIC TEAM ABOUT

D. SICK DAY RULES / THE INSULIN PUMP

A. NURSING
There are 2 paediatric specialist nurses in diabetes available during "working hours". They are contactable on extension 17320 or mobile via switchboard. Remember to use them for advice, referral etc.

B. MEDICAL
Senior medical help is always available. There is a diabetic team consultant rota separate to the on-call Paediatric consultant for the day. Switchboard will be able to give information as to which Consultant or specialist registrar is on-call. After midnight the paediatric registrar should be your first port of call. They will discuss with the diabetic team if necessary.

C. WHO TO INFORM THE DIABETIC TEAM ABOUT
THE DIABETIC TEAM WOULD LIKE TO BE INFORMED OF ANY ATTENDANCE OF DIABETIC PATIENTS EVEN IF THIS IS WITH A NON-DIABETIC PROBLEM. Even relatively minor injuries can cause problems secondary to infection or destabilisation of diabetes. During day time hours please try to contact the diabetic nurse specialists while the patient is still in the department. This can prove to be an extremely useful "opportunistic" contact for taking HbA1c / yearly checks for some of the more “reticent” diabetics. Out of hours, if the problem is not related to / affecting the diabetes, then please leave a message on 17320 answer machine. As a general rule, unless urgent, please do not take blood for investigations during the day prior to liaising with the diabetic team and asking for advice.

D. SICK DAY RULES / THE INSULIN PUMP
All diabetic patients should have instructions for managing intercurrent illness. These vary slightly depending on whether the child is on regular injections or a pump. There are comprehensive guidelines for managing these children in the medical guidelines.

(Section 3.12 amended by Dr C O’Connell, March 2019)
(Section 3.12 amended by Dr A Soni, March 2018)
(Updated by Drs J Cumberland & N Wright, Aug 2004)
3.13 DIABETIC KETOACIDOSIS - MANAGEMENT OF

A. THE NEWLY DIAGNOSED DIABETIC PATIENT
Not all patients who attend with the first presentation of diabetes attend in DKA. Some children present hyperglycaemic but well. Children who are <5% dehydrated and are not clinically unwell usually tolerate oral rehydration and subcutaneous insulin. You should not follow this guidance if the child is not in DKA. Check for ketones and a blood gas for acidosis. If normal, discuss further management with the Diabetes Team and Senior doctors in ED. Please also refer to the guideline ‘The newly diagnosed diabetic patient’ in the Medical guidelines handbook – section 8.4.

B. Diagnose DKA in children and young people who have
- Acidosis (indicated by blood pH below 7.3 or plasma bicarbonate below 15 mmol/litre)
- ketonaemia (indicated by finger prick blood ketones above 3 mmol/litre)
- Blood glucose levels are generally high (above 11 mmol/l) but children and young people with known diabetes may develop DKA with normal blood glucose levels.

C. GENERAL DKA MANAGEMENT
Remember: Children can die from DKA.
They die from: Hypokalaemia, Cerebral oedema, Shock
Always consult with a more senior doctor on-call as soon as you suspect DKA even if you feel confident of your management. In the first instance the patient should be referred to the on call medical team, but should subsequently be discussed with the diabetes team. There is always a Paediatric Consultant or middle grade on call for diabetes in Sheffield. CONTACT THE DIABETES TEAM ON DUTY IN OR OUT OF HOURS Please note – after midnight your first port of call is the paediatric registrar. They may then discuss with the diabetes team if necessary.
Keep Thinking: frequent detailed reassessment of the child's requirements is essential.
These guidelines are intended for the management of the sick child ie those who meet the diagnostic criteria for DKA of pH below 7.3, bicarb below 15 and ketones above 3 (see Section B above) and/or drowsy/vomiting.

Emergency management should be commenced in ED while waiting for the Diabetes Team.
Further management is usually undertaken by the Medical on call or Diabetes Team. However, if there is a delay before the medical team get to the ED it is reasonable to start fluids and then insulin after fluids have been running for one hour.
3.13 DIABETIC KETOACIDOSIS - MANAGEMENT OF

A brief account of further management is given in these ED guidelines, but more detail can be found in the Medical guidelines section 8.3

D. EMERGENCY MANAGEMENT OF DKA

HISTORY – polydipsia, polyuria, abdominal pain.

EXAMINATION - Acidotic respiration, dehydration, drowsiness, vomiting. Conscious level.

TESTS - High Blood glucose on finger-prick test (>11mmol/l).

(It is not always as high as you might expect in DKA – DKA can be present at modestly elevated glucose levels)

pH < 7.3 and /or HCO₃ < 15mmol/l

Finger prick ketones > 3 mmol/l

(Ketones & glucose in urine.)

Children and young people with a pH 7.2- 7.29 &/or bicarb < 15 have **MILD DKA. Assume 5% dehydration**

Children and young people with a pH less than 7.1-7.19 &/or bicarb < 10 have **MODERATE DKA. Assume 7% dehydration**

Children and young people with a pH less than 7.1 &/or bicarb < 5 have **SEVERE DKA. Assume 10% dehydration**

**IMPORTANT NOTES – PLEASE READ**

Children who are alert, not clinically dehydrated, not nauseated or vomiting, do not always require IV fluids, even if their ketone levels are high. They usually tolerate oral rehydration and subcutaneous insulin but do require monitoring regularly to ensure that they are improving and their ketone levels are falling.

2. If a child is hyperosmolar with a very high BG level (>30 mmol/l), with little or no acidosis or ketones, this is a **Hyperosmolar Hyperglycaemic State** and requires **DIFFERENT treatment**. Discuss this with the senior doctor; these children can be very difficult to manage. There are starting instructions in Appendix 5.

**Discuss both groups of children and young people with the responsible senior Paediatrician**

**WEIGH THE CHILD.** This can help in the assessment of dehydration. Compare with most recent clinic weight. Wherever possible the patient’s actual weight on admission should be used rather than an estimated weight or approximation. Maintenance fluids should be based on the actual weight not an estimate of the likely weight following rehydration.

To avoid excessive amounts of fluid in overweight and obese children it is recommended that consideration be given to using a maximum weight of 80kg or 97th centile weight for age (whichever is lower) when calculating both deficit and maintenance requirements.

**Call for senior assistance**
### 3.13 DIABETIC KETOACIDOSIS - MANAGEMENT OF

<table>
<thead>
<tr>
<th>Airway</th>
<th>Ensure that the airway is patent and if the child is comatose, insert an airway. If comatose or recurrent vomiting, insert N/G tube, aspirate and leave on open drainage.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breathing</td>
<td>Give 100% oxygen.</td>
</tr>
<tr>
<td>Circulation</td>
<td>Insert I.V. cannula and take blood samples (see below). Shocked patients require adequate fluid volume resuscitation. If shocked (tachycardia, poor capillary filling, poor peripheral pulses, hypotension) give 20ml/kg of 0.9% sodium chloride as a bolus. (Please note 0.9% Sodium Chloride for bolus has no added potassium in it) Following the initial 20 ml/kg bolus shocked patients should be reassessed and further boluses of 10 ml/kg may be given if required to restore adequate circulation up to a total of 40 ml/kg at which stage inotropes should be considered Shacked patients will require high dependency care and should be discussed with the most senior paediatrician or intensivist available at the earliest opportunity. All children and young people with mild, moderate or severe DKA who are not shocked and are felt to require IV fluids should receive a 10 ml/kg 0.9% sodium chloride bolus over 60 minutes. Whilst excessive fluid should be avoided because of the risk of cerebral oedema it is important to ensure that the circulation is adequate and fluid should be given to support this. Cerebral perfusion is dependent on both perfusion pressure and intracranial pressure and hypotension will exacerbate the risk of brain injury.</td>
</tr>
<tr>
<td>Disability</td>
<td>Check GCS. Cerebral oedema is of particular and immediate importance. Confusion, irritability, headache or a minor reduction in conscious level can be the earliest sign of cerebral oedema. Cerebral oedema management should only be instituted after discussion with the responsible senior clinician. If signs of cerebral oedema are present initially or developing the Diabetes Team should be informed immediately.</td>
</tr>
</tbody>
</table>
3.13 DIABETIC KETOACIDOSIS - MANAGEMENT OF

INITIAL INVESTIGATIONS:

- Blood Glucose, Urea and electrolytes and Bicarbonate
- Ketones - Near patient blood ketones (beta-hydroxybutyrate) testing should be used.
- Arterial blood gases only if conscious level decreased, venous blood gas gives very similar information
- PCV and Full blood count
- Blood culture
- urinalysis, culture and sensitivity
- Set up cardiac monitor to observe T waves (hypokalaemia can cause cardiac dysrhythmias).
- + other investigations if indicated, e.g. chest X-ray, throat swab, clotting screen, etc

- If newly diagnosed, consider taking blood for antithyroid antibodies, TSH, tissue transglutaminase antibodies, C-peptide, anti-GAD antibodies and islet cell antibodies. (One green and an orange top bottle should be enough for these tests).

D. FURTHER MANAGEMENT

Further management consists of full examination, fluid replacement, insulin infusion and close monitoring.

Full Examination
Looking particularly for cerebral oedema, infection and ileus.
DKA may be precipitated by sepsis, and fever is not part of DKA

Fluid Replacement:
The mainstay management of DKA is fluid replacement with potassium. Volumes are worked out depending on the degree of dehydration.

Degree of Dehydration

<table>
<thead>
<tr>
<th>Degree of Dehydration</th>
<th>Type of Fluid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assume a 5% fluid deficit in children and young people in mild DKA (indicated by a blood pH 7.2-7.29 &amp;/or bicarbonate &lt;15)</td>
<td>0.9% sodium chloride + 20 mmol potassium Chloride per 500ml bag (unless contraindicated – see below) until blood glucose &lt; 14 mmol/l. Readymade potassium bags should be used. Please refer to Protocol for Concentrated Potassium Containing Injection Solutions for information on various potassium containing fluids available in the trust and their location. Once the blood glucose is ≤ 14mmol/l, change the fluid to contain 5% glucose (generally 0.9% Sodium chloride with 5% glucose and 20 mmol potassium chloride per 500 ml). These fluid is available from AAU, A and E, ICU, Ward 3, Ward 4, and Ward 6. See medical guidelines for change in fluid.</td>
</tr>
<tr>
<td>Assume a 7% fluid deficit in children and young people in moderate DKA (indicated by a blood pH of 7.1-7.19 &amp;/or bicarbonate &lt;10)</td>
<td>Hypokalaemia is a serious complication- this is preventable if you are careful.</td>
</tr>
<tr>
<td>Assume a 10% fluid deficit in children and young people in severe DKA (indicated by a blood pH &lt;7.1 &amp;/or bicarbonate &lt;5)</td>
<td></td>
</tr>
</tbody>
</table>
3.13 DIABETIC KETOACIDOSIS - MANAGEMENT OF

Potassium containing fluid (0.9% Sodium Chloride with 20mmol of potassium chloride) should be commenced **immediately** after bolus has been given unless anuria is suspected or there are peaked T waves on the ECG. Potassium is mainly an intracellular ion, and there is always massive depletion of total body potassium although initial plasma levels may be low, normal or even high. Levels in the blood will fall once insulin is commenced.

The pre-mixed bags of 10mmol potassium chloride per 500 mls are insufficient. The potassium solution containing 20 mmol of potassium chloride per 500 mls are Available from ICU, HDU, Ward 3, Ward 4 and Ward 6 or Pharmacy in hours.

Outside normal pharmacy opening hours, if a patient requires concentrated potassium adding to an IV fluid, this will be carried out by ICU staff on ICU, only if a readymade bag is not available. – Please refer to Protocol for Concentrated Potassium Containing Injection Solutions

Children with severe dehydration, acidosis, vomiting or impaired conscious level should be **nil by mouth**, and they may need a nasogastric tube to drain stomach contents.

See section E for calculation of amounts of fluid

**Bicarbonate**

Do not give intravenous sodium bicarbonate to children and young people with DKA. Only consider bicarbonate if there is life threatening hyperkalaemia or in severe acidosis with impaired myocardial contractility. It is anticipated that this would only ever be done following discussion with an Intensivist.

**Close Monitoring**

- An accurate fluid balance record is essential
- Hourly capillary blood glucose
- Hourly basic observations including BP and GCS
- U&Es must be rechecked 2 hours after starting fluids
- Cardiac monitoring to observe for T wave changes: -
  - Flat = hypokalaemia
  - Peaked = hyperkalaemia

**E. FLUIDS – AMOUNTS AND FLUID BALANCE**

The rationale behind fluid replacement is the restoration of circulatory volume and avoidance of Cerebral oedema. Cerebral Oedema is unpredictable, occurs more frequently in younger children and newly diagnosed patients and has a mortality of around 25%. The causes are not known, but this protocol aims to minimise the risk by producing a **slow** correction of the metabolic abnormalities over 48hrs.

Note: In **very young children or those with sodium levels >155** the rehydration time should be increased to 72 hours and must be discussed with a senior member of staff. There is a greater risk of cerebral oedema.

**It is essential that all fluids given are documented carefully**, including oral fluids, particularly those given in the ED and on the way to the ward, as these may be recorded on a different sheet.
3.13 DIABETIC KETOACIDOSIS - MANAGEMENT OF

**Resuscitation fluid:**

The volume of any fluid boluses given for resuscitation in children with shock should **NOT** be subtracted from the estimated fluid deficit.

The initial **10ml/kg bolus of 0.9% Sodium chloride** given to all non-shocked patients requiring IV fluids **SHOULD be subtracted** from total calculated fluid deficit

**Fluid Requirement = Maintenance + Deficit**

**Maintenance:**

Maintenance fluid volumes should be calculated using the Holliday – Segar formula (the traditional method of calculating fluid volume in children in the UK)

**Maintenance Fluids:**
- 100 ml/kg/day for the first 10 kg of body weight
- 50 ml/kg/day for the next 10 to 20 kg
- 20 ml/kg/day for each additional kilogram above 20 kg

N.B. Neonatal DKA will require special consideration and larger volumes of fluid than those quoted may be required, usually 100-150 ml/kg/24 hours)

**Deficit Fluids:**

Calculate the fluid deficit (either 5%, 7% or 10% dehydration depending on whether the patient has mild, moderate or severe DKA), subtract the initial 10ml/kg bolus then divide this over 48 hours and add to the hourly rate of maintenance fluid volume, giving the total volume evenly over the next 48 hours. i.e.

Hourly rate = ((Deficit – initial bolus) / 48hr) + Maintenance per hour

Please remember that fluid boluses given for resuscitation to children with shock should **NOT** be subtracted from estimated fluid deficit

**Example of how to work out deficit fluids:**

A 20 kg 6 year old boy without shock, who has a pH of 7.15 (Moderate DKA => 7% Dehydrated) will receive a 10ml/kg bolus (200mls fluid) over 60 minutes as part of his initial management. His ongoing fluids will comprise:

| Deficit 7 % x 20 kg | = 7 x 10 x 20 = 1400 ml |
| Subtract initial bolus | = 1400-200 = 1200ml to be replaced over 48 hours |
| = 25 ml/hr |
| Maintenance | = 10 x 100 = 1000 ml per day for 1st 10 kg |
| = 10 x 50 = 500ml per day for next 10 kg (weighs 20kg) |
| = 1500 ml per day total (over 24 hours) |
| = 62 ml/hour |
| Total fluid | = 25ml/hour - Deficit of 7 % minus bolus over 48 hours |
| + 62 ml/hr – Maintenance fluids |
| = 87 ml/hour |
### 3.13 DIABETIC KETOACIDOSIS - MANAGEMENT OF

A 60 kg 15 year old girl with a pH of 6.9 who was shocked at presentation has received 30ml/kg of 0.9% Sodium Chloride for resuscitation. These boluses are not subtracted from ongoing maintenance fluids. Her ongoing fluids will comprise:

<table>
<thead>
<tr>
<th>Fluid</th>
<th>Calculation</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deficit 10 % x 60 kg</td>
<td>$10 \times 10 \times 60 = 6000$ ml to be replaced over 48 hours</td>
<td>6000 ml</td>
</tr>
<tr>
<td>Maintenance</td>
<td>$10 \times 100 = 1000$ ml per day for 1st 10 kg</td>
<td>1000 ml per day</td>
</tr>
<tr>
<td></td>
<td>$10 \times 50 = 500$ ml per day for next 10 kg (10-20kg)</td>
<td>500 ml per day</td>
</tr>
<tr>
<td></td>
<td>$40 \times 20 = 800$ ml per day for next 40kg</td>
<td>800 ml per day</td>
</tr>
<tr>
<td></td>
<td>$2300$ ml per day total (over 24 hours)</td>
<td>2300 ml per day</td>
</tr>
<tr>
<td></td>
<td>$96$ ml/hour</td>
<td>96 ml/hour</td>
</tr>
<tr>
<td>Total fluid</td>
<td>$125$ ml/hour - Deficit of 10 % over 48 hours</td>
<td>125 ml/hour - Deficit of 10 % over 48 hours</td>
</tr>
<tr>
<td></td>
<td>+ $96$ ml/hr – Maintenance fluids</td>
<td>221 ml/hour</td>
</tr>
</tbody>
</table>

An online fluid calculator which can be printed out for the child’s medical records is being developed by BSPED and will be coming soon – It will link to the BSPED audit which will capture data for ongoing audit of outcomes in DKA in children and young people. The link to the calculator should be available by early March 2020

**Fluid Output**

Documentation of fluid balance is of paramount importance. All urine needs to be measured accurately and tested. Urinary catheterisation should be avoided, but is useful in the child with impaired consciousness.

**F. INSULIN**

Once fluids and potassium are running, the insulin infusion rates can be calculated, since blood glucose will already be falling.

There is some evidence that cerebral oedema is more likely if insulin is started early. **Therefore, DO NOT start insulin until intravenous fluids have been running for at least an hour.**

Continuous low-dose intravenous infusion is the preferred method. Do not give bolus doses of intravenous insulin.

Pharmacy have pre-filled pre-prepared syringes to avoid errors. If this is not available, make up a solution of 1 unit per ml of human soluble insulin (e.g. Actrapid). 50units of insulin (0.5ml) is then made up to 50ml of 0.9% sodium chloride in a syringe pump. Attach this using a Y-connector to the I.V. fluid already running. Do not add insulin directly to the fluid bags.

The solution should run at **0.1 units/kg/hour** (0.1ml/kg/hour).

Think about the infusion rate, as follows –
3.13 DIABETIC KETOACIDOSIS - MANAGEMENT OF

Once the blood glucose level falls to 14mmol/l,

- Change the fluid to contain 5% glucose (generally 0.9% Sodium Chloride with 5% glucose and 20 mmol potassium per 500 mls), as this sodium concentration is usually continued for at least the first 12 hours). Pre-made bags are stock on Ward 3, AAU and ICU

**Insulin must not be stopped.** The insulin is needed to switch off ketogenesis and if necessary higher concentrations of glucose can be used to maintain blood glucose with the insulin infusion - see medical guidelines.

**If ketone levels are less than 3 mmol/l**

- Reduce to or maintain at an insulin infusion rate of 0.05units/kg/hr after changing fluids.

**If ketone levels are above 3mmol/l**

- Maintain the infusion rate at 0.1 units/kg/hour to switch off ketogenesis
- Change the fluid to contain 10% glucose rather than 5% glucose, in order to prevent hypoglycaemia when the higher dose of insulin is continued i.e (0.9% Sodium Chloride with 10% dextrose and 20 mmol potassium per 500 ml)

Blood glucose, biochemistry, pH should be checked 2 hours after the start of resuscitation – hopefully the child should be admitted by then.

For children on continuous subcutaneous insulin infusion (CSII) pump therapy, stop the pump when starting DKA treatment.

**For further management see medical guidelines (8.3)**

G. COMPLICATIONS: CEREBRAL OEDEMA

Risk factors include:

Young age, new diagnosis, rapidly falling Na⁺ on treatment (can be caused by too much fluid), low pCO₂, high urea, low pH

The signs and symptoms of cerebral oedema include:

- Headache, confusion, irritability, reduced conscious level, small pupils, increasing BP, slowing pulse, papilloedema (late), possibly respiratory impairment, abnormal posturing.

**Hourly neuro obs should be recorded on all patients irrespective of initial GCS**

If cerebral oedema is suspected exclude hypoglycaemia and inform senior staff immediately.

**For management see Paediatric Medicine guidelines 8.3 (kept at nurses station).**
3.13 DIABETIC KETOACIDOSIS - MANAGEMENT OF

Appendix 1: Algorithm for the management of Diabetic Ketoacidosis

[Diagram of the algorithm for managing Diabetic Ketoacidosis]

- Clinical History
  - polyuria
  - polydipsia
  - weight loss
  - abdominal pain
  - weakness
  - vomiting
  - confusion

- Clinical Signs
  - assess dehydration
  - deep sighing respiration (Kussmaul)
  - smell of ketones
  - lethargy, drowsiness

- Biochemistry
  - elevated blood glucose (>11mmol/l)
  - acidemia (pH<7.3)
  - ketones in blood >2mmol/L
  - perform other investigations if indicated

Confirm Diagnosis

Diabetic Ketoacidosis
Call Senior Staff

Shock
Reduced peripheral pulse
Reduced conscious level, coma

Resuscitation
- Airway + N/G tube
- Breathing (100% O2)
- Circulation (20ml/kg 0.9% sodium chloride. Repeated 10ml/kg boluses until circulation restored, max 40 ml/kg dose before discussion with senior doctor)

pH < 7.3 = Mild DKA (5% dehydration)
pH < 7.2 = Mod DKA (7% dehydration)
pH < 7.1 = Severe DKA (10% dehydration)

Intravenous therapy
- Give 10ml/kg fluid bolus over 60 mins (UNLESS HAS ALREADY HAD BOLUS FOR SHOCK)
- calculate fluid requirements - correct deficit over 48 hours
- use 0.9% sodium chloride with 20 mmol KCl in every 500 ml (check serum potassium normal and ensure urine output first)
- insulin 0.05 or 0.1units/kg/hr by infusion 1-2 hours after starting IV fluids

Observations
- hourly blood glucose
- neurological status at least hourly
- hourly fluid input/output
- electrolytes 2 hours after start of IV-therapy, then 4-hourly
- 1-2 hourly blood ketone levels

When blood glucose < 14 mmol/L

Intravenous therapy
1. Once blood glucose <14mmol add
   - add 5% glucose to 0.9% sodium chloride with 20 mmol KCl per 500 ml.
   - reduce insulin infusion to 0.05 units/kg/hr
2. If continuing with 0.1 units/kg/hr
   - add 10% glucose to 0.9% sodium chloride with 20 mmol KCl per 500 ml

Continue monitoring as above

Insulin
- start subcutaneous insulin then stop intravenous insulin 1 hour later

Resolution of DKA
- clinically well, drinking well, tolerating food
- blood ketones <1.0 mmol/l or pH normal
- urine ketones may still be positive

Appendix 2: Initial Management of Hyperosmolar Hyperglycaemic State (HHS)
3.13 DIABETIC KETOACIDOSIS - MANAGEMENT OF

Definition
Features which differentiate it from other hyperglycaemic states such as DKA are:
- Hypovolemia
- Marked hyperglycaemia (40mmol/L or more)
- No significant hyperketonaemia (<3mmol/l) or acidosis(pH>7.3, bicarbonate >15mmol/L)
- Osmolality usually 320mosmol/kg or more
- Often altered consciousness

This picture usually occurs in Type 2 diabetes, especially where there are learning difficulties or other factors preventing proper hydration. It has a high mortality rate.

Goals of treatment
The goals of treatment of HHS are to treat the underlying cause and to gradually and safely:
- Normalise the osmolality
- Replace the fluid and electrolyte losses
- Normalise blood glucose

Other goals include prevention of arterial or venous thrombosis and other potential complications e.g. cerebral oedema/ central pontine myelinolysis

Fluid therapy
The goal of initial fluid therapy is to expand the intra and extravascular volume and restore normal renal perfusion. The rate of fluid replacement should be more rapid than is recommended for DKA.
- Give an initial bolus of 20ml/kg of 0.9% Sodium Chloride.
- Assume a fluid deficit of approximately 12-15% of body weight.
- Additional fluid boluses should be given, if necessary, to restore peripheral perfusion.
- Thereafter, 0.45-0.75% sodium chloride with potassium should be administered to replace the deficit over 24-48 hours.
- The goal is to promote a gradual decline in serum sodium concentration and osmolality.

Insulin Therapy
- Blood glucose levels will fall with fluid alone and insulin is NOT required early in treatment.
- Insulin administration should be initiated when serum glucose concentration is no longer declining at a rate of at least 3mmol/l per hour with fluid administration alone.

Potassium
Patients with HHS also have extreme potassium deficits; a rapid insulin-induced shift of potassium to the intracellular space can trigger an arrhythmia. Therefore, Potassium Must be included in all fluids.

For further information see the Medical guidelines section 8.3
Ref Working party of the British Society for Paediatric Endocrinology and Diabetes – interim guideline for the management of children and young people under the age of 18 years with Diabetic Ketoacidosis – January 2020
http://www.bsped.org.uk/professional/guidelines/docs/DKAGuideline.

(Section 3.13 updated by Dr A Soni and reviewed by Dr S Gibbs, Jan 2020)
### 3.14 DIABETIC HYPOGLYCAEMIA - MANAGEMENT OF

(See Paediatric Medicine Guidelines for comprehensive management)

---

**A. BACKGROUND**

The term ‘hypoglycaemia’ (or hypo) is used to describe the situation when the blood sugar level drops below the level of 4mmol/l in children. (This nationally accepted ‘4 is the floor’ in diabetes provides a safety margin. It should not be confused with the lower level of 3.1mmol/l (handheld glucose monitor) used for patients without diabetes.) Untreated progressive hypoglycaemia can lead to loss of consciousness, convulsions and cerebral damage.

Note that if the child’s diabetes has not been well controlled, they may experience the earlier signs of a hypo at a higher blood sugar level, e.g. between 4 and 11 mmol/l. They may feel unwell at this point but will not become unconscious at these levels. Treatment is not required.

Parents are given Dextrogel for emergency resuscitation and also Glucagon for intramuscular administration prior to transfer to hospital. Some ambulances also have this and the paramedics may have given it – ask. If this has not been given, give Glucagon whilst establishing an intravenous access for Dextrose infusion. NEVER give stronger glucose solution that 10% and always ask for advice after the initial resuscitation.

**B. EMERGENCY MANAGEMENT**

- **Signs and symptoms of hypoglycaemia** (‘hypo’) vary between individuals and may change with age. A child/adolescent may exhibit some of the symptoms below, while others may have no symptoms.

Symptoms and signs can be classified into 3 groups: autonomic, neuroglycopaenic and behavioural. (The list is not exhaustive and if you suspect a child/adolescent is experiencing a ‘hypo’ their capillary blood glucose MUST still be checked.)

<table>
<thead>
<tr>
<th>Autonomic</th>
<th>Neuroglycopaenic</th>
<th>Behavioural</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pale</td>
<td>Headache</td>
<td>Irritability</td>
</tr>
<tr>
<td>Sweating/clammy</td>
<td>Confusion</td>
<td>Mood change</td>
</tr>
<tr>
<td>Hungry</td>
<td>Weakness, lethargy</td>
<td>Erratic behaviour</td>
</tr>
<tr>
<td>Tremor</td>
<td>Glazed expression</td>
<td>Nausea</td>
</tr>
<tr>
<td>Restlessness</td>
<td>Visual/speech disturbances</td>
<td>Combative behaviour</td>
</tr>
<tr>
<td></td>
<td>Seizures</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Unconsciousness</td>
<td></td>
</tr>
</tbody>
</table>

- It is important to explain to young people with type 1 diabetes the effects of alcohol consumption on blood glucose levels, in particular the increased risk of hypoglycaemia including hypoglycaemia whilst sleeping.

**Stages of hypoglycaemia:**

The severity of hypoglycaemia can be categorised as mild, moderate or severe. Mild and moderate hypos should receive the same treatment as there is little clinical research to suggest they are separate entities.
3.14 DIABETIC HYPOGLYCAEMIA - MANAGEMENT OF 
(See Paediatric Medicine Guidelines for comprehensive management)

Mild or Moderate Hypoglycaemia: child able to tolerate oral fluids / Dextrogel.

Severe Hypoglycaemia Unconscious or fitting child requires parenteral therapy (IM glucagon or IV glucose)

Also remember:
- Do not leave a child/adolescent with hypoglycaemia alone.
- Inform Paediatric Diabetes Nurse Specialists of any patients with diabetes presenting with hypoglycaemia to the ED, even if not admitted (extension 17320 – you can leave a message).

B. EMERGENCY MANAGEMENT
Patient blood glucose < 4 mmol/l on blood glucose meter. Confirm with venous sample if clinically appropriate (do not wait for result before treating).

Chocolates, biscuits, milk, crisps and other foods are not recommended as first-line treatments for a hypo. This is because their fat content means that the sugar is absorbed more slowly.
3.14 DIABETIC HYPOGLYCAEMIA - MANAGEMENT OF
(See Paediatric Medicine Guidelines for comprehensive management)

**Treatment of Mild to Moderate Hypoglycaemia**

1. Follow this box if child is co-operative and able to tolerate oral fluids
   Give 10-20g of fast acting oral carbohydrate such as:
   - 3-4 glucose tablets
   - Glucojuice 60ml bottle
   - 200 ml (~ ½ cup) sugary drink (not diet) such as cola (20g). Note Lucozade energy (100ml=15g )

   **NB** Chocolate or milk WILL NOT bring glucose levels up quickly enough

2. Follow this box if child refuses to drink, is uncooperative, but is conscious
   Give Dextrogel® (formerly known as Hypostop®). This is a fast acting sugary gel, in an easy twist top tube.
   Each tube contains 10g glucose.
   Squirt tube contents in the side of each cheek (buccal) evenly and massage gently from outside enabling glucose to be swallowed and absorbed quickly.

**After 15 minutes recheck blood glucose:**
1. If still low (<4 mmol/l) and able to take oral fluids repeat Box 1 above (once)
2. If still low (<4 mmol/l), refuses to take oral but is conscious, follow Box 2 above (once)
3. If deteriorated after first run through above or not responded after having administered 2nd dose of above then proceed to the treatment of SEVERE HYPO
4. If better and blood glucose > 4.0 mmol/L follow Box 3 (see below)

**Treatment of SEVERE HYPO**

**UNCONSCIOUS** – May be screaming, twitching and unable to co-operate with oral medication – **DO NOT** attempt to give anything by mouth.

After treatment inform diabetes specialist nurses (ext.17320) or if at a weekend or Bank Holiday contact consultant on-call for diabetes for further advice on management (via switchboard).

**TREATMENT**

**GLUCAGON (GLUCAGEN®) IF NOT ALREADY BEEN GIVEN** – I.M. Injection see below
   Dose – 0.5mg if <8yrs age or body weight <25 kgs
   1mg if >8yrs age or body weight >25 kgs

**WAIT 10 MINUTES** – during this time gain I.V. access. Repeat blood glucose at 10 min.

If still clinically hypoglycaemic and / or blood sugar not rising:

**I.V. 10 % GLUCOSE 2ml/kg.**

**Repeat blood sugar after 15 min**
When conscious, give sugary fluid followed by longer acting carbohydrate.
3.14 DIABETIC HYPOGLYCAEMIA - MANAGEMENT OF
(See Paediatric Medicine Guidelines for comprehensive management)

C. USING GLUCAGON
- In orange box in fridge.
- Inject the liquid from the syringe into the bottle containing the glucagon powder, mix until the powder has dissolved and draw back into the syringe.
- Inject into the upper thigh or buttocks
- Dose is 0.5mg if <8yrs age and 1mg if >8yrs age.
- Glucagon should work within 10 minutes. This should be followed by glucose tablets/sugary drink. When feeling better they should then have a larger snack of longer acting carbohydrate e.g. sandwich, toast, bowl of cereal.
- Glucagon can sometimes cause nausea, vomiting and headaches in children.

D. FURTHER MANAGEMENT

Mild to moderate hypo
If feeling better and blood glucose level >4.0mmol/L, give 10 -15g slow acting carbohydrate snack (or normal meal if it is meal time) such as:
- One slice of toast
- One piece of fresh fruit (not banana)
- A cereal bar (max 15g CHO)
- One plain digestive or hobnob biscuit
- Glass of milk (200ml)

Retest 20-30 minutes later to confirm target glucose (>4.0 mmol/L) is maintained.

Treatment of hypoglycaemia should increase the blood glucose approximately 3–4 mmol/L. If hypo is just before a meal time (when insulin is usually given) the hypo should be treated first and once the blood glucose is >4.0 mmol/L the insulin should be given as usual. DO NOT OMIT INSULIN, especially important with an early morning hypo.

Severe hypo
- Check blood glucose after, 15 minutes and then half hourly until BG stable above 5.6 mmol/l. Continue to monitor baseline observations: oxygen saturation, pulse, blood pressure, temperature.
- Inform diabetes team if during the day. If concerns out of hours, inform on-call consultant for diabetes.
- Do not omit normal insulin unless instructed to do so by diabetes team. If child is on insulin pump, pump could be stopped for 30-60 mins.

If blood glucose >4.0 mmol/l and child able to tolerate oral fluids:
- Offer clear fluids, and once tolerating clear fluids offer complex carbohydrates, such as toast, crackers
- Try to identify the cause of hypoglycaemia and discuss this with the patient/family

After a severe hypo the child will have depleted liver stores of glycogen. They are therefore at increased risk of further severe hypoglycaemia in the next few days. Warning symptoms of early hypoglycaemia are also blunted after a severe hypo. Parents / carers should be warned of this. It is always sensible therefore to reduce subsequent insulin doses for at least the next 48 hours in conjunction with the diabetic team.
3.14 DIABETIC HYPOGLYCAEMIA - MANAGEMENT OF
(See Paediatric Medicine Guidelines for comprehensive management)

Always contact the Diabetes Team following a hypo.
Minor hypo – contact the team on ext. 17320 and leave a message.
Major hypo- if referred to medical team, medical registrar to inform diabetes team.

References:
1. NICE (2015) Diabetes (type 1 and type 2) in children and young people. NICE guideline NG18 www.nice.org.uk/guidance/ng18

(Section 3.14 amended by Dr C O’Connell, March 2019)
(Section 3.14 amended by Dr A Soni, March 2018)
(Adapted for ED by Dr J Cumberland Aug 2004)
(Written by M Denial (diabetic specialist nurse) Feb 2003)
### 3.15 FEBRILE CHILD UNDER 5 YEARS WITHOUT A FOCUS

#### A. BACKGROUND
Pre school children can present with serious infections with non-specific symptoms and signs. This is particularly so in the younger age group under 12 months of age and more so in young infants under 3 months. There are no single tests that can give a definite immediate microbiological diagnosis, apart from on some occasions a CSF or urine sample. Assessing febrile children can only be done with a combination of physical examination, recorded observations, simple investigations and clinical skill, which only comes with experience. If you are concerned about a febrile child ask somebody more senior to review them, including, if necessary the intensive care team.

The following guideline, (based on the current NICE guidance) should be followed to assess and initially manage any febrile child under 5 years without an obvious focus. It should be followed until a clinical diagnosis of the underlying condition has been made, at which point other local or national guidance should be followed.

#### B. ASSESSMENT OF A CHILD WITH FEVER

(See also Section 3.16 Recognition and Treatment of Sepsis), there is also a Sepsis bundle available in the ED to assist in the assessment of febrile children.

Check ABCD for immediate life threatening features of compromise and manage according to APLS guidelines and section E (emergency treatment)

<table>
<thead>
<tr>
<th>MEASURE, RECORD and REPEAT as necessary</th>
<th>ASSESS / EXAMINE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature</td>
<td>Colour and Temp of skin</td>
</tr>
<tr>
<td>Heart rate</td>
<td>Level of activity / social cues</td>
</tr>
<tr>
<td>Respiratory rate</td>
<td>Pulse for strength and character</td>
</tr>
<tr>
<td>Sao2</td>
<td>Respiratory exam / pattern of breathing / Work of breathing</td>
</tr>
<tr>
<td>Capillary Refill time</td>
<td>Hydration status / skin turgor</td>
</tr>
<tr>
<td>BP if signs of circulatory compromise</td>
<td></td>
</tr>
</tbody>
</table>

As a minimum, ALL the observations should be repeated at least once after triage. And repeated as often as necessary if abnormal. Please do not discharge a child with abnormal physiology without discussion with a senior.

#### NOTES
- Children under 1 year should have fever measured by electronic axillary thermometer
- Children aged 1 year to 5 years should have fever measured by tympanic or axillary thermometer.
3.15 FEBRILE CHILD UNDER 5 YEARS WITHOUT A FOCUS

- Reported parental perception of fever should be taken seriously.
- Infants with sepsis may present with hypothermia.
- Duration and height of fever alone do not predict serious illness.
- An unexplained tachycardia may indicate serious illness e.g. septic shock.
- Check for symptoms and signs in Traffic Light System (table 1.) When assessing children with learning disabilities take the individual child’s learning disability into account
- Look for fever source and check for symptoms and signs of specific diseases (table 2).
- Consider Imported Infection if child has returned from abroad.

C. Table 1. Traffic Light System to Identify Serious Illness

<table>
<thead>
<tr>
<th>Colour</th>
<th>GREEN</th>
<th>AMBER</th>
<th>RED</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Normal colour of skin, lips and tongue</td>
<td>Pallor reported by Parent/ carer</td>
<td>Pale/ mottled/ ashen/ blue</td>
</tr>
<tr>
<td>Activity</td>
<td>Responds normally to social cues.</td>
<td>Not responding normally to social cues.</td>
<td>No response to social cues.</td>
</tr>
<tr>
<td></td>
<td>Content/smiles.</td>
<td>Wakes only with prolonged stimulation</td>
<td>Appears ill to health professional.</td>
</tr>
<tr>
<td></td>
<td>Stays awake or awake quickly.</td>
<td>Decreased activity.</td>
<td>Unable to rouse or if roused does not</td>
</tr>
<tr>
<td></td>
<td>Strong normal cry/not crying</td>
<td>No smile.</td>
<td>stay awake.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Weak, high-pitched or continuous cry</td>
</tr>
<tr>
<td>Respiratory</td>
<td>Nasal flaring.</td>
<td></td>
<td>Grunting</td>
</tr>
<tr>
<td></td>
<td>Tachypnoea; RR &gt;50 BPM (6-12 months)</td>
<td></td>
<td>Tachypnoea RR &gt;60 BPM</td>
</tr>
<tr>
<td></td>
<td>RR &gt;40 BPM (&gt;12 months)</td>
<td></td>
<td>Moderate or severe chest indrawing</td>
</tr>
<tr>
<td></td>
<td>Oxygen saturation &lt;95% in air, crackles</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Circulation and hydration</td>
<td>Normal skin and eyes.</td>
<td>Tachycardia: &gt;160 beats / min, age &lt; 12 months</td>
<td>Reduced skin turgor</td>
</tr>
<tr>
<td></td>
<td>Moist mucous membranes</td>
<td>&gt;150 beats / min, age 12–24 months</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>&gt;140 beats/ minute, age 2–5 years, Dry</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>mucous membranes.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Poor feeding in infants. CRT &gt; 3 sec.</td>
<td></td>
</tr>
</tbody>
</table>
### 3.15 FEBRILE CHILD UNDER 5 YEARS WITHOUT A FOCUS

<table>
<thead>
<tr>
<th>Other</th>
<th>Reduced urine OP</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>No AMBER or RED</td>
<td>Fever &gt;5 days</td>
<td>Age 0-3 months &amp; temp&gt;38</td>
</tr>
<tr>
<td>symptoms or signs</td>
<td>Rigors</td>
<td>Age 3-6 months &amp; temp&gt;39</td>
</tr>
<tr>
<td></td>
<td>Swelling of limb or joint.</td>
<td>Non blanching rash. Bulging fontanelle.</td>
</tr>
</tbody>
</table>

CRT: capillary refill time  RR: respiratory rate  BPM: breaths per minute

### D. Table 2 Symptoms and signs suggestive of specific diseases

<table>
<thead>
<tr>
<th>DIAGNOSIS TO BE CONSIDERED</th>
<th>SYMPTOMS &amp; SIGNS WITH FEVER</th>
</tr>
</thead>
<tbody>
<tr>
<td>MENINGOCCAL DISEASE</td>
<td>Non blanching rash, particularly with an ill looking child</td>
</tr>
<tr>
<td></td>
<td>Lesions&gt;2mm diameter (purpura)</td>
</tr>
<tr>
<td></td>
<td>CRT &gt;3 sec</td>
</tr>
<tr>
<td></td>
<td>Neck stiffness</td>
</tr>
<tr>
<td>MENINGITIS</td>
<td>Neck stiffness</td>
</tr>
<tr>
<td>Classical signs often absent in infants</td>
<td>Bulging fontanelle</td>
</tr>
<tr>
<td></td>
<td>Decreased conscious level</td>
</tr>
<tr>
<td></td>
<td>Convulsive status epilepticus</td>
</tr>
<tr>
<td>HERPES ENCEPHALITIS</td>
<td>Focal neurological signs</td>
</tr>
<tr>
<td></td>
<td>Focal seizures</td>
</tr>
<tr>
<td></td>
<td>Decreased conscious level</td>
</tr>
<tr>
<td>PNEUMONIA</td>
<td>Tachypnoea: 0- 5 months – RR&gt;60</td>
</tr>
<tr>
<td></td>
<td>6-12 months – RR &gt;50</td>
</tr>
<tr>
<td></td>
<td>&gt;12 months - RR &gt;40</td>
</tr>
<tr>
<td></td>
<td>Crackles in chest</td>
</tr>
<tr>
<td></td>
<td>Nasal flaring</td>
</tr>
<tr>
<td></td>
<td>Chest indrawing</td>
</tr>
<tr>
<td></td>
<td>Cyanosis</td>
</tr>
<tr>
<td></td>
<td>Oxygen saturation &lt; 95%</td>
</tr>
<tr>
<td>URINARY TRACT INFECTION</td>
<td>Vomiting</td>
</tr>
<tr>
<td>Should be considered in any infant &lt; 3 months. Symptoms/signs may help in older infant/child</td>
<td>Poor Feeding</td>
</tr>
<tr>
<td></td>
<td>Lethargy</td>
</tr>
<tr>
<td></td>
<td>Irritability</td>
</tr>
<tr>
<td></td>
<td>Abdominal pain or tenderness</td>
</tr>
<tr>
<td></td>
<td>Urinary frequency or dysuria</td>
</tr>
<tr>
<td></td>
<td>Offensive urine or haematuria</td>
</tr>
<tr>
<td>SEPTIC ARTHRITIS/ OSTEOMYELITIS</td>
<td>Swelling of a limb or joint</td>
</tr>
<tr>
<td></td>
<td>Not using an extremity</td>
</tr>
<tr>
<td></td>
<td>Non-weight bearing</td>
</tr>
</tbody>
</table>
3.15  FEBRILE CHILD UNDER 5 YEARS WITHOUT A FOCUS

| Kawasaki’s Disease | Fever lasting > 5 days and 4 of following:  
|--------------------|---------------------------------------------|
| In rare cases incomplete/atypical Kawasaki may be diagnosed with fewer features | Bilateral conjunctival injection  
| See Guidance for Paediatric multisystem inflammatory syndrome temporally associated with Covid-19  
| The national recommendation is that any child with possible or probable PIMSTaC should be discussed with Paediatric Infectious Diseases/Immunology in addition to using the RCPCH guideline. Please discuss early after senior review. | Change in extremities: oedema, erythema, desquamation  
| | Polymorphous rash  
| | Cervical lymphadenopathy |

**E. EMERGENCY TREATMENT OF A CHILD WITH FEVER**

(See also section 3.16 Recognition of Treatment of Sepsis)

- Give oxygen if signs of shock, Sao2 < 92% or clinically indicated
- Children with shock give immediate bolus of 0.9% NaCl (20ml/kg)
- Child with fever, shock and/or signs of meningococcal disease call for senior help early.
  - Urgent referral to paediatric registrar and inform PICU.
- GIVE IMMEDIATE* IV ANTIBIOTICS
  - Cefotaxime (+ high dose amoxicillin if under 3 months) if:
    - Signs of Shock
    - Unrousable
    - Younger than 1 month
    - 1-3 months who looks unwell
    - 1-3 months with peripheral WBC < 5 or > 15
    - Suspected meningococcal disease / meningitis or herpes simplex encephalitis

* If at all possible do take blood cultures before antibiotics are given
* If an LP is carried out by the medical team this should generally occur before giving IV antibiotics hence early referral important.
- Consider antibiotics and Acyclovir if decreased conscious level or focal seizure
- Give IV Aiclovir to children with fever and symptoms suggestive of herpes simplex encephalitis
3.15 FEBRILE CHILD UNDER 5 YEARS WITHOUT A FOCUS

F. MANAGEMENT ALGORITHM

In general blood tests are organised by the admitting team. However it is important that urgent treatment or management decisions are not delayed. Hence when necessary, cooperative working between teams will ensure optimal patient care. (See medical guideline for investigations)

Recent travel abroad and local resistance patterns may have implications for possible antibacterial resistance and antibiotic choice.
3.15 FEBRILE CHILD UNDER 5 YEARS WITHOUT A FOCUS

Children with Fever and proven viral resp illness e.g. RSV, influenza also need to be assessed for possible serious illness including UTI.

ALL febrile children under 1 year who re-attend within 72 hours of their initial presentation must be assessed by a senior doctor (ST4+ or Consultant), it may be necessary to make a referral to the Medical team for the paediatric registrar to make this review (if the ED night doctor is at CT3 level).

G. ANTIPYRETICS

Do not over or under dress a child.
Consider paracetamol OR ibuprofen if child is distressed or unwell. DO NOT give both simultaneously but consider the alternative agent if the child’s distress is not alleviated.
Do not give antipyretics with the sole aim of reducing the temperature.
Continue with antipyretics only as long as the child appears distressed.
Do not rely on response of fever to antipyretics to differentiate serious and non-serious illness. An afebrile child who continues to look unwell is a concern.
Antipyretics do not prevent febrile convulsion but can be given to provide symptomatic relief.

H. ADMISSION TO HOSPITAL

Children under 3 months with any fever or reported fever, or under 6 months with fever >39 presenting to ED should be referred to the medical team on call.
Children with one or more RED features presenting to ED should be referred to the medical team on call.
Children with RED and orange features should have senior review.

When deciding to admit a child over 3 months consider:
Clinical condition
Social and family circumstances
Illness that other family members have
Parent/carers anxiety/instinct
Contact with other people with serious infectious diseases
Parent/carer’s concern causing repeated reattendance for help
Recent travel abroad
Previous family experience of serious illness or death through febrile illness
Child’s fever has no obvious cause but is lasting longer than would be expected for self-limiting illness
Children over 3 months may be observed in hospital with or without investigation to help differentiate serious and non-serious febrile illness.

I. SAFETY NET

If child is > 3 months old and felt to be well enough to go home but no diagnosis reached a safety net should be provided:
Give carers verbal and written information on warning symptoms and how further health care can be accessed (see feverish child information leaflet no 439)

ADVISE PARENTS / CARERS:
About antipyretic interventions
Offer and encourage regular fluids.
3.15  FEBRILE CHILD UNDER 5 YEARS WITHOUT A FOCUS

Look for signs of dehydration
How to identify a non blanching rash
To check the child during the night
To keep child away from school/nursery while unwell
ADVISE PARENTS / CARERS TO SEEK ADVICE IF:
Child has seizure
Develops non blanching rash
They feel child is getting worse
They are more worried than they were when last reviewed
Fever lasts > 5 days
If they show signs of dehydration
They are distressed or concerned they cannot look after their child.

References
NICE CG160 Feverish illness in children: Assessment and initial management in children under 5 years. May 2013

(Section 3.15 reviewed by Dr A Rawnsley May 2019)
(Section 3.15 reviewed by Dr J Gilchrist May 2016)
(Section 3.15 up-dated by Dr F Shackley & Dr J Gilchrist following multidisciplinary consultation, Aug 2008)
3.16 RECOGNITION AND TREATMENT OF SEPSIS

A. INTRODUCTION
This guideline is intended to aid the clinician in the recognition and treatment of sepsis, severe sepsis and septic shock. All febrile, unwell children should be assessed with the intention of ruling out or ruling in sepsis. Early recognition and appropriate treatment improves outcomes. See also Emergency Department guideline '3.15 FEBRILE CHILD UNDER 5 YEARS WITHOUT A FOCUS' which includes the NICE febrile child traffic light system for improving recognition of serious bacterial infection and covers the circumstances in which it is likely that a febrile child can safely be discharged.

B. THE DEFINITION OF SEPSIS
The third international consensus definition for severe sepsis is a 'life-threatening organ dysfunction caused by a dysregulated host response to infection'. In the early stages it may be difficult to differentiate a child with severe sepsis from a child with a benign infection (especially in babies). This is because a child with a fever can often demonstrate abnormal physiological parameters due to the fever alone. Most children who present febrile with deranged physiology do not have serious infections BUT may act very similar to those with early severe sepsis.

C. RECOGNITION OF SEPSIS
When a child has an infection and signs of shock, profoundly altered physiology, altered conscious level or is unwell despite simple antipyretics then sepsis can be presumed to be present.
If a child demonstrates clear signs of wellness such as playing, being cheerful or ambulatory, sepsis is very unlikely.
If there is uncertainty, then the traffic light system is helpful (for the appropriate age) along with the involvement of an experienced senior clinician. In some cases it may be appropriate to observe for a period of time.
It is important that significantly unwell children have a full set of observations documented including BP and level of consciousness and that these observations continue to be monitored frequently until they are normal or an appropriate clinician decides that sepsis can be safely ruled out.
There is a Sepsis bundle available in the ED to be used in conjunction with this guideline.
3.16 RECOGNITION AND TREATMENT OF SEPSIS

For any unwell febrile child ask; could this child have sepsis? (Remember that temp <35 in an unwell child can also represent sepsis)

Is the child at high risk? If so have a low threshold for suspecting sepsis – involve a senior clinician and if in doubt treat as severe sepsis. (See section 3)

Indwelling catheter
Post-operative
<6 months old
Comorbidity that makes activity/communication difficult to assess
VP shunt
Immunodeficiency
Burns

Febrile child

Does the child have normal skin colour & temp and normal capillary refill time? Normal respiratory rate? A reassuring activity level?

Yes

>1 of these abnormal AND tachycardic

Only one of these is abnormal AND they have a normal HR

Give antipyretics
Measure blood pressure
Involve a senior clinician
Repeat vitals at least within 1 hr
Observe to rule out

If yes, are there any high risk factors (see box above)

Yes

Senior review to consider sepsis

No

Sepsis is considered very unlikely

No

Consider Treatment for sepsis (see section below)

If sepsis can be presumed based on clinical presentation, treat for sepsis without delay. Inform a senior clinician that you are doing this.

Document the time of decision to treat and ensure that appropriate antibiotics are given ASAP. Antibiotics must always be given within an hour of recognition of sepsis.

If sepsis is possible but uncertain then involved a senior doctor immediately.

See Guidance for Paediatric multisystem inflammatory syndrome temporally associated with Covid-19

The national recommendation is that any child with possible or probable PIMSTaC should be discussed with Paediatric Infectious Diseases/Immunology in addition to using the RCPCH guideline. Please discuss early after senior review.
### 3.16 RECOGNITION AND TREATMENT OF SEPSIS

**D. MANAGEMENT**

Management of sepsis in children depends on the severity of the sepsis. In all cases, broad spectrum antibiotics given as early as possible are needed. Refer to the SCH trust antibiotic guidelines. In severe sepsis and septic shock it is also essential to ensure that good circulation is maintained and the child is nursed in an appropriate environment for the severity of their illness. In the case of septic shock, escalation to a senior clinician must take place immediately.

---

**Does the child have severe sepsis or septic shock?**

Features of circulatory and respiratory insufficiency are:

1. **Tachypnoea** and/or desaturation in air

<table>
<thead>
<tr>
<th>Age</th>
<th>&lt; 1 year</th>
<th>1 – 2 yrs</th>
<th>3 – 5 yrs</th>
<th>6 – 12 yrs</th>
<th>&gt; 12 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>RR</td>
<td>&gt; 41</td>
<td>&gt; 36</td>
<td>&gt; 31</td>
<td>&gt; 26</td>
<td>&gt; 21</td>
</tr>
</tbody>
</table>

2. **Tachycardia**

<table>
<thead>
<tr>
<th>Age</th>
<th>&lt; 1 year</th>
<th>1 – 2 yrs</th>
<th>3 – 5 yrs</th>
<th>6 – 12 yrs</th>
<th>&gt; 12 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>HR</td>
<td>&gt; 161</td>
<td>&gt; 141</td>
<td>&gt; 121</td>
<td>&gt; 121</td>
<td>&gt; 101</td>
</tr>
</tbody>
</table>

3. **Poor peripheral perfusion** (cool extremities with prolonged capillary refill time i.e. greater than 2 seconds) and/or weak pulses

4. **Increasing or decreasing Systolic to Diastolic difference** (BP is the last thing to fall when a child is sick so don’t be reassured by a normal blood pressure)
   - Normal systolic (50th centile) BP = 85 + (age in years x2)

5. **Alteration in conscious state** e.g. confusion, agitation, floppy or unusually compliant AVPU

6. **Metabolic acidosis**

---

**Does the child have two or more of the above features?**

**YES**

**CALL FOR HELP**

- Ask for an urgent senior review
- Record PEWS score

**NO**

- Record PEWS score and act accordingly
3.16 RECOGNITION AND TREATMENT OF SEPSIS

The child showing signs of severe sepsis or septic shock require the following within the first hour:

1. Give high flow oxygen
2. Obtain IV/IO access & take blood tests
   a. Blood cultures
   b. Blood glucose- treat low blood glucose
   c. Blood gas, FBC, clotting, CRP, Biochemistry
3. Give IV/IO broad spectrum antibiotics (see trust antibiotic guidelines)
4. Give 20ml/kg fluid resuscitation
5. Involve senior clinicians early
6. Consider inotropic support early
   - If normal physiological parameters are not restored after ≥ 40ml/kg fluids
   - NB adrenaline or dopamine may be given via peripheral IV/IO access

Document clearly the response to the initial fluid resuscitation. If the child is not responding to initial resuscitation this must be escalated to senior clinicians and PICU team (if not already)

Document any reasons for variation from the above management.

Ensure full set of observations are repeated frequently (as directed by senior clinician)

Identify the source.

References:
1. CG160 “Fever in the Under 5’s”, National Institute for Clinical Excellence
2. The Third International Consensus Definitions for Sepsis
3. Paediatric Sepsis 6, The UK Sepsis Trust
   (Reviewed and updated by Dr Anne Rawnsley May 2020)
   (Section 3.16 written by Drs Rachel Riddell, Judith Gilchrist Catherine Rimmer, Edward Snelson, Guru Venkatesha, November 2016)
3.17 PETECHIAL RASHES DURING COVID 19 – INTERIM GUIDELINE

A. DEFINITION
Petechiae: Non-blanching spots < 2mm, Purpura: Non-blanching spots >2mm

B. BACKGROUND
Many children will present with fever and a petechial rash that does not blanch. The majority will not have Meningococcal disease. If a child with fever and a petechial/purpuric rash does have meningococcal disease, treatment is time critical (see section 3.16 of ED guidelines). Good history taking, examination and the involvement of experienced decision makers are key in ensuring both appropriate treatment and the avoidance of overtreatment.

C. EMERGENCY MANAGEMENT
If you deem the child to be unwell, urgent action is needed. See ED section 3.19.

Indicators of an unwell child are:
- The child who subjectively looks sick.
- Inappropriate tachycardia
- Tachypnoea +/- desaturation.
- Signs of poor tissue perfusion – cold extremities, prolonged capillary refill time.
- Reduced responsiveness / irritability/ lethargy.
- Purpura is more likely to indicate Meningococcal disease than petechiae.
- See also guideline 3.15 (Febrile child under 5) for the specifics of individual age groups.

D. DIFFERENTIAL DIAGNOSIS
Many illnesses can cause petechiae such as:
- Viral infection
- Bacteria e.g. Meningococcus, Streptococcus.
- HSP – See ED section 3.18.
- Haematological problems e.g. leukaemia, ITP.
- Mechanical causes e.g. coughing /vomiting may cause petechiae in SVC distribution i.e. above nipple line.

E. INVESTIGATIONS
Investigations are not needed if the child is well or you can clearly identify a mechanical cause for their rash (i.e. trauma/coughing / vomiting).
Unwell children should have those listed in ED section 3.19.
If they are needed, investigations should include FBC + Blood film, Clotting profile, CRP and urine dipstick. Use the sepsis group test on Medway.
3.17 PETECHIAL RASHES DURING COVID 19 – INTERIM GUIDELINE

F. MANAGEMENT AND REFERRAL (See algorithm on the following page.)

When a child attends the ED having been given pre-hospital antibiotics for presumed Meningococcal disease, this has the potential to make the ruling out of sepsis more difficult. It may still be possible to discharge the child who is very well in this scenario; however pre-hospital antibiotics may lower the threshold for observation or referral.

A well child with petechiae can be discharged if:
- There are no purpura
- There are no high risk features (e.g. neurodisability)
- An ED/Paeds Middle Grade/Consultant has reviewed the patient
- The carers are happy with the situation; they must be able to competently observe the child at home and return if there are any further problems.

If a child has abnormal observations but is not assessed as having probable sepsis, they may be given antipyretic medication, observed and reassessed.

If a child is assessed to be well, with no indication of sepsis or other significant pathology (i.e. cause is assessed as mechanical or viral) they may be immediately discharged if deemed appropriate by an ED consultant or middle grade doctor.
3.17 PETECHIAL RASHES DURING COVID 19 – INTERIM GUIDELINE

Discuss all infants (age <1) with an ED Senior

Non-blanching rash

Prehospital treatment with antibiotics

Well i.e. normal obs, looks well

History of fever

No fever

Meningococcal protocol (section 3.18) and refer medics

Sick (i.e abnormal obs, RR, HR, looks very unwell)

Rash not SVC distribution or spreading or purpuric

Refer medics unless reviewed by ED senior and considered fit for discharge

Rash in SVC distribution only

Consider other diagnoses e.g. mechanical, HSP, haematological. Investigate as appropriate. ED middle grade/consultant review

No evidence of sepsis or other significant pathology

Consider for home with appropriate safety net advice and febrile child leaflet

Assessed as probable sepsis

Meningococcal protocol section 3.18 and refer to medics

- If investigations suggest a haematological cause for the rash, (Leukaemia / ITP), the child should be referred to the Haematologists / Medical team.
- A clinical diagnosis of Henoch-Schonlein Purpura (HSP) should be managed as per guideline section 3.18

(Section 3.17 reviewed by Dr E Snelson July 2020, Peer review by Lucie Monfredi)
3.18 HSP (HENOCH SCHONLEIN PURPURA)  
- MANAGEMENT IN ED

A. DEFINITION/ PATHOPHYSIOLOGY
Henoch-Schonlein Purpura (HSP) is the most common childhood vasculitis, affecting the small arterioles of the skin, joints, GI tract and kidneys. The exact cause remains unknown. 20-60% will have renal involvement and 80% of these present within the first 4 weeks and the majority by 12 weeks. Initial urinalysis can therefore be normal but routine follow up of all children is warranted (see section F)

B. BACKGROUND / EPIDEMIOLOGY
HSP may follow an illness (e.g. URTI) or have no obvious precipitant. It characteristically affects children aged 2 – 11. The incidence in boys is twice that of girls and affects about 20 per 100,000 children per year.

C. DIAGNOSIS
Purpura, arthritis and abdominal pain are known as the classical triad of HSP. Purpura occurs in all cases, joint pains and arthritis in 80%, and abdominal pain in 60%.
- Purpuric or petechial rash- classically affecting buttocks / extensor surfaces of limbs, but not limited to these areas.
- Arthralgia +/- joint swelling - generally of the larger joints lasting 24 - 48 hours.
- Abdominal pain - can be severe, mimicking several acute intra-abdominal pathologies.
- Renal involvement (20-60%) (glomerulonephritis causing haematuria, proteinuria, hypertension)
- Gastrointestinal manifestations- nausea, vomiting, constipation or diarrhoea. There may be blood or mucus in the stools.
- Less commonly, it may present with oedema of the hands, feet, scrotum or sacrum.
HSP recurs in one third of children (below the age of ten years) within the first 4 months.

D. EMERGENCY MANAGEMENT
If the child is unwell (especially with an atypical rash), consider meningococcal illness and treat appropriately see ED guideline 3.19.

Further emergency management is essentially that of the complications:
- GI bleeding, (upper and lower).
- Intussusception.
- Bowel perforation.
- Pancreatitis.
- Testicular pain (may mimic torsion of the testes.)
- CNS and pulmonary complications (rare.)
Resuscitate and refer promptly if these exist.
E. INVESTIGATION
If sure of a diagnosis of HSP, blood tests may not be necessary. However all patients should have the following tested:
- Visual inspection of urine for macroscopic haematuria
- Urine dipstick-if positive for blood, send for microscopy to quantify RBC count.
- Blood pressure. See the Tables in the Medical Guideline CG1567 or Table 4 (boys) and 5 (girls) in Pediatrics.

Further investigations (see below) may be warranted if:
- The diagnosis is uncertain.
- The child is systemically unwell.
- The child has abnormal urinalysis / hypertension.
- The child has significant HSP symptoms such as abdominal pain / severe joint involvement.

Discuss with the ED senior before arranging further tests. These may comprise:
- FBC, Clotting profile.
- U&E, Serum Albumin.
- Bone profile.
- Urine protein / creatinine ratio.
- Meningococcal tests as per ED guideline 3.19

F. DISCHARGE / REFERRAL
The majority of patients will have minimal symptoms and be suitable for follow up by their GP. If the child is well, with minimal symptoms and only a trace of haematuria on dipstick, they may be discharged with GP follow-up of urine dipstick and BP measurement at 1, 4, 8, 12 weeks, 6 & 12 months. An information sheet must be given to the parents which includes a hand held record allowing the GP to have the information about the child’s presenting symptoms, BP and urine dipstick.

Patients who are well enough for discharge but have positive urine dipsticks, BP above the 90th centile or moderate symptoms should be referred to the on-call medical team in order to allow them to manage appropriately and arrange early follow-up. They will not necessarily be admitted.

Possible indications for admission are:
- Macroscopic haematuria, (or more than a trace of microscopic haematuria on dipstick.)
- Marked proteinuria.
- Hypertension (≥95th centile – measure 3 times).
- Painful oedema.
- Severe joint pains / inability to weight bear after analgesia.
- Severe Abdominal pain or any GI complications

Symptomatic relief can be treated with paracetamol or ibuprofen. In HSP with possible renal involvement, exercise caution in prescribing NSAIDs. **If in doubt, ask senior ED / medical staff for advice.**

(Section 3.18 reviewed by Dr Shammi Ramlakhan May 2019)
3.19 ACUTE MENINGOCOCCAL DISEASE

A. BACKGROUND

Meningococcal disease can present as meningitis (15% cases), septicaemia (25%) or both (60%). The epidemiology in the UK has changed dramatically in the past two decades following the introduction of vaccines to H Infl. type b (1992), sero group C Meningococcus (1999) and Pneumococcal disease (2006). Sero group B Meningococcus was the commonest cause in children > 3 months old and the Men B vaccine was introduced in 2015. Serotype Men W has been on the increase and has a very variable clinical presentation. There has been a catch up vaccine campaign in adolescents for Serotypes Men ACWY since 2015.

B. PRESENTATION

Symptoms and signs can be very non specific especially in very young children or Meningococcal W cases.

It can present with any of fever, malaise, myalgia, arthralgia, nausea, vomiting, headaches, fits and reduced conscious level. In infants fever, poor feeding, apnoeas, irritability, high-pitched cry or listlessness may be present with or without a bulging fontanelle. Petechiae or purpura are present in most but not all cases. There may be a maculopapular rash or no rash. Don't forget to check within skin creases and to uncover head to toe. Older children may present with more classical neck stiffness, fever, photophobia and headache.

Kernig’s and Brudinski’s sign may be negative in children with the disease.

Remember to look for a non blanching rash on the soles, palms and conjunctivae of children with darker skin tones.

Look for signs of shock and raised intracranial pressure.

C. EMERGENCY MANAGEMENT

See algorithm on the next page.

Cefotaxime is the first line antibiotic at SCH (as opposed to Ceftriaxone recommended in the NICE CG102 guideline), which has been agreed by a SCH joint working party committee. This is predominantly because of the interaction between Ceftriaxone and calcium containing solutions which are commonly required.
3.19 ACUTE MENINGOCOCCAL DISEASE

Meningococcal disease suspected?

ABC + O2

Call for help early (ED/Paeds senior)

IV / IO access + BM

Blood tests if possible (see text) but don't delay treatment of

**CEFOTAXIME 100mg / kg initial bolus (max 2g)**

Add **Amoxycillin 100mg /kg if < 3/12 old** (cover Listeria)

**YES**

Signs of shock?

20ml / kg fluid bolus**

Reassess response

Repeat 20mls/kg fluid if still shocked **

Reassess response

Call PCCU (if not already). Needs intubation and inotropes if still shocked after 40mls /kg plus further fluids as necessary

**NO**

LP (by medical team) if no CI***

Consider 0.15mg / kg Dexamethasone (max 10mg) depending on results of LP. See medical guideline 6.5 (Can be given upto 12hrs after the 1st dose of antibiotics but ideally within 4 hrs whenever possible

Notes:

* Chloramphenicol 25mg / kg initial dose (max 1g) if significant cephalosporin allergy
** Sodium chloride 0.9%
*** CI to LP see medical guideline 6.5

Watch for raised intracranial pressure (RICP), hypoglycaemia, acidosis, electrolyte imbalance, coagulopathy.

Signs of RICP: Altered conscious level, ↓pulse ↑BP, focal neurology, Abnormal posture, unequal pupils, papilloedema
3.19 ACUTE MENINGOCOCCAL DISEASE

Consider HSV Encephalitis (focal seizures / focal neurology / recent contact) may need IV acyclovir. D/W senior.

If TB meningitis possible D/W Infectious Diseases or Microbiology

D. INVESTIGATIONS

NB – Use the option on the Medway Investigations Clinical Note “Print meningococcal investigation forms”
(Prioritise blood culture if only small amount of blood obtained)

2. FBC and diff.
3. Meningococcal PCR [EDTA, pink top, 1ml, NGH Microbiology].
4. Clotting studies.
5. U&Es.
6. CRP.
7. Calcium, magnesium, phosphate, glucose.
9. Throat swabs for C&S- culture for *N. meningitidis* only performed if specifically requested or ‘meningococcal disease’ entered in clinical details section on form
10. Urine (not currently included in the button)

Consider CT (D/W Senior ED/Paeds) AND only if patient stable and transferred with a clinician who can manage the airway.

Indications for a CT:
- to rule out alternative diagnoses
- Reduced conscious level / fluctuating conscious level
- Focal neurological signs

CT is not useful to decide whether lumbar puncture is safe or not. That must be guided by clinical signs.

E. NOTIFICATION OF MENINGOCOCCAL DISEASE

Meningococcal septicaemia and meningitis are legally notifiable diseases. The local Health Protection Team (HPT) should be informed about all clinically suspected cases of meningococcal septicaemia and meningitis that are being treated as such. Notification should be undertaken urgently - as soon as is practicable.

Notification is the responsibility of the admitting medical team.

More details re notification are in the full medical guideline 6.5. The ascertainment of ‘at risk’ individuals, the organisation of chemoprophylaxis and all decisions regarding who should receive it, are the responsibility of the local HPT.

ED frequently receives enquiries from worried parents of children who have been in contact with a suspected case. These enquiries should be redirected to Public health (0114 271 1257 daytime) or asked to telephone 111.

Reference: NICE Guideline CG102 Meningococcal disease and meningitis 2015

(Section 3.19 reviewed by Dr S Ramlakhan May 2019)
Guideline rewritten after MDT consultation 2011
(Written by Dr J Gilchrist & Dr F Shackley Consultant Immunologist], Aug 2004)
3.20 HEADACHE – MANAGEMENT OF IN THE ED

A. BACKGROUND
Headache is a common symptom in children, affecting 80-90% by the age of 15 years. The vast majority of causes are not sinister and can safely be managed within/from the ED. About 500 children and young adults are diagnosed with brain tumour each year in the UK. There are multiple factors affecting the time taken to reach a diagnosis; however, there is evidence that some children and young people with brain tumours are seen by healthcare professionals multiple times with symptoms and signs that occur with brain tumours and are not appropriately referred or investigated. See also medical guideline 1.12

B. DIFFERENTIAL DIAGNOSIS

Common causes
- systemic illness with fever including URTIs
- local ENT problems including sinusitis
- migraine
- tension headache
- meningitis, viral or bacterial

Rarer causes (but need to be considered)
- Raised intracranial pressure (ICP)
- subarachnoid haemorrhage
- tumour
- complications of sinusitis extension
  - externally (Pott's Puffy Tumour – neurosurgical emergency with osteomyelitis of the frontal bone and sub periosteal reaction)
  - internally (intracerebral abscesses)
- CO poisoning – check with CO sats probe (found in resus 1) or perform a capillary gas. If CO on monitor is >2, you must also do a gas.
- Benign intracranial hypertension

The initial symptoms of brain tumours often mimic those of more common and less serious childhood conditions and illnesses.
The conditions not to miss are tumour or an intracerebral abscess. Be aware many children with brain tumours may not present with headache at all, but nearly all will have red flag symptoms such as
- Dizziness
- Ataxia
3.20 HEADACHE – MANAGEMENT OF IN THE ED

- Clumsiness
- Falls
- Systemic features – e.g. tachycardia/brady, tachypnoea/hypopnoea
- Vomiting
- Abnormal head position or eye movements in infants

An intracerebral abscess can extend from soft tissue and sinusitis infections, often frontally. If this occurs there may be preceding symptoms of sinusitis, often sub-acute or chronic. Always check carefully for forehead soft tissue swelling, known as ‘Pott’s puffy tumour’. This is rare but pathognomonic of underlying sinus infection extension/spread.

Consider referral to the medical team and/or further investigations in children who present with headache and

- Sudden-onset
- Fever and a headache that is worsening
- Obvious forehead swelling with no history of trauma
- New-onset neurological deficit NB watch for nystagmus in babies.
- Change in personality or behaviour
- Impaired level of consciousness
- Recent head trauma and headache that is worsening despite analgesia
- Headache that changes with posture
- Unexplained weight loss
- Diabetes insipidus (polyuria and polydypsia)
- Immuno-compromise or on immuno-suppressive medication
- History of malignancy
- Vomiting without other obvious cause
- Delayed puberty

C. HISTORY

Detailed history including headache onset, duration, severity, progression over time, exacerbating factors and associated symptoms. It may be useful to classify headache as acute or recurrent. Be particularly wary of the recurrent attender with headache. The following list gives the causes and key features to help make a diagnosis, based on careful history and examination:

**Acute**
- Systemic with fever - general illness (e.g. flu, pneumonia, septicaemia)
- Local - sinusitis, dental caries, otitis media
- Trauma - head injury
- Meningitis - reduced conscious level, toxicity, photophobia, neck stiffness
- SAH or AVM bleed - sudden onset, severe occipital pain; possible reduced conscious level, neck stiffness

**Recurrent**
- Migraine - aura, nausea, vomiting, pallor, family history
- Tension - throbbing pain (involving neck muscles) at end of day
- Behavioural - family/social/school problems (may be difficult to identify)
3.20 HEADACHE – MANAGEMENT OF IN THE ED

- Raised ICP - morning headaches +/- vomiting, worse on or coughing/sneezing/bending, progressively worsening, personality or behavioural changes, focal neurological symptoms
- Pott’s puffy tumour – reported forehead swelling with an atraumatic headache; discuss with ED senior to consider CT head
- Others - Benign intracranial hypertension, systemic hypertension, uraemia, recurrent hypoglycaemia, recurrent seizures, lead or CO poisoning

Diary monitoring can be useful to aid diagnoses and to assess treatments.

D. EXAMINATION

As part of the examination it is important to document the following:

- ABC - blood pressure, respiratory rate, heart rate, temperature
- General – toxic, unwell, temperature, rash
- Neurology - conscious level, cranial nerves including fundi and visual fields, visual acuity, cerebellar signs, neurocutaneous stigmata, neck stiffness, cranial bruits.
- Local causes - cervical lymphadenopathy, teeth, TMJs, sinuses, ears, forehead swelling.
- Head circumference in younger children and weight.

E. INVESTIGATIONS

In the acute situation, the two most important questions to answer are:

1. Does the child need a CT scan of the head?
2. Should a lumbar puncture (LP) be performed?

- If the child has altered consciousness, focal neurological signs, raised blood pressure, or papilloedema, there is a need for urgent assessment with consideration of CT scan of head +/- acute management of raised ICP. (discuss with ED senior).
- If there is a convincing history of focal neurological signs, even if completely resolved by the time seen, there is still a need for urgent assessment with consideration of CT scan of head +/- acute management of raised ICP. (discuss with ED senior).
- If there is a suspicion of underlying sinusitis associated with swelling to the head (often subtle) e.g. frontally, then arrange CT scan of the head to assess sinuses and to exclude intracerebral extension.
- Refer to the medical team for LP (in the absence of the contraindications) if concerned about meningitis, SAH or bleeding AVM. May need CT scan first (discuss with ED senior).
- If there are no symptoms and signs suggesting raised ICP/SAH/meningitis and the story is suggestive of migraine then treat symptomatically (see below).
- Hemiplegic migraine is a rare diagnosis in children and therefore a CT scan should be considered before making this diagnosis.
- If other causes apparent consider appropriate investigations. (e.g. septic screen, urea, carboxyhaemoglobin etc.)
3.20 HEADACHE – MANAGEMENT OF IN THE ED

F. MANAGEMENT
Maximise analgesia. If there is a specific diagnosis such as meningitis, AVM, tumour, systemic infection or local ENT/sinus/dental infection, then treat as appropriate. See sections 3.19 for meningococcal disease. See section 5.8 for ENT problems and section 4.34 for facial and dental infections.
Most recurrent headaches can be managed by the GP, who may later elect to refer to a general paediatric clinic. They do not need to be referred to a neurologist.

G. DISCHARGE
Most cases of headache presenting to the ED can safely be discharged with advice. Give a provisional diagnosis and advise follow up with GP in 1 week if recurrent or not improving. If symptoms worsen or new symptoms (especially neurological ones) develop then the patient should return urgently to ED for further assessment.

H. REFERENCES

1: WWW.HEADSMART.ORG.UK
2: NICE cg 150 Headache guideline

(Section 3.20 reviewed by Dr J Terris, April 2019)
(Section 3.20 written by Mr C FitzSimmons, May 2012)
3.21 MANAGEMENT OF A CHILD WITH A REDUCED CONSCIOUS LEVEL

A. DEFINITION
Any child with a GCS <15 or less than A on the AVPU scale.

B. BACKGROUND
The initial assessment, management and diagnosis (in that order) of the child with decreased conscious level can be challenging to the ED doctor. In most cases a full history, examination and baseline investigations give a clue to the diagnosis. Management then follows the guidance in the relevant section of the guidelines book.

C. DIAGNOSIS
A wide differential must be considered in all patients presenting with a decreased or altered conscious level. The most common causes include sepsis, hypoglycaemia, convulsions or post-ictal state and head trauma. Don’t forget about ingestions and poisonings, either deliberate or accidental in all age groups. Less common causes would include metabolic diseases, raised intracranial pressure, respiratory failure, cardiac, anaphylaxis, NAI and hypothermia. This list is not exhaustive but should help direct the clinician in what to ask in the history and what to look for in the examination to gain clues to the underlying cause.

D. EMERGENCY MANAGEMENT
See algorithm on the following page.
Initial management is common to all no matter what the underlying cause. Often the diagnosis is not clear in the ED initially. What is important is to attend to the ABC’s as per APLS guidance. A diagnosis is helpful but shouldn’t distract from the initial resuscitation and stabilisation of your patient.
Look for signs of raised intracranial pressure and seek advice from seniors for the management of this if suspected.
Constantly reassess your patient and monitor them closely.
If sepsis / meningitis is a possibility then have a low threshold for treating with IV cefotaxime and consider the use of acyclovir, once baseline investigations have been obtained.

G. INVESTIGATION
See algorithm for guidance on what investigations should be performed.
There are some basic investigations common to all. More specialised investigations may be warranted if the diagnosis is unclear (D/W senior ED/Paeds) or when the diagnosis is suspected and tailored to that specific diagnosis.
References:
APLS 6th Edition
Nottingham guideline: The management of a child with a decreased conscious level.

(Section 3.21 reviewed by Dr T Saunders, June 2019)
(Section 3.21 written by Mr D Burke, Dr C Rimmer May 2011)
3.21 MANAGEMENT OF A CHILD WITH A REDUCED CONSCIOUS LEVEL

Decreased Conscious Level Algorithm

A (with c-spine control if needed)
B (with supplemental Oxygen)
C (and give fluids if necessary)
D (AVPU or GCS) and pupils

GCS < 15
AVPU < A
Behaving Oddly

AMPLE
Recent trauma
Drug/Alcohol ingestion
Exposure to infectious disease
(e.g. meningococcal, HSV)
Foreign travel

Full History
Full Examination (consider c-spine injury)
See full text
Bedside glucose
Pulse Rate
Respiratory Rate
Temperature
SpO2
ECG
Blood Pressure
Dipstick Urine

Diagnosis: see following guidelines

3.1 BLS
3.3 ALS
3.4 SVT
3.5 ALTE
3.8 Allergic reaction
3.9 Convulsion and Status
3.12 Hypoglycaemia non-diabetic
3.14 DKA (Diabetic Ketoacidosis)
3.15 Hypoglycaemia diabetic
3.16 Febrile child
3.19 Acute meningococcal disease
3.22 Hypothermia
3.23 Drowning
3.24 Poisoning, Ingestions, Deliberate self harm, Alcohol, Illicit substances
3.30 Inhaled Foreign Body
4.3 Multiple or severe trauma
4.6 Cervical spine injury
4.7 Head injury

See also TOXBASE for toxic plants and animals
http://www.toxbase.org/
user name h123
password meadow

No diagnosis:
Refer to medical team. If venous access obtained take blood for the following:

FBC, ESR, CRP
U&E, Creatinine
Metabolic Screen (including ammonia and Urine)
LFTs
Meningococcal Screen (incl blood gas)
Blood cultures
Paracetamol/Salicylate levels

Hold clotted sample (1-2 mls) and urine (10 mls) for Toxicology screen if required

Other tests (paeds)
Consider CT Scan (Ensure airway is protected and the patient is haemodynamically stable before transfer)
Consider LP (contra-indicated if suspicion of raised ICP)
3.22 CHICKENPOX AND HERPES ZOSTER GUIDANCE

A. BACKGROUND

Chickenpox is highly contagious, infecting up to 90% of people who come into contact with the disease. Transmission is through direct person to person contact, airborne droplet infection or through contact with infected articles such as clothing and bedding. The incubation period (time from becoming infected to when symptoms first appear) is 10 to 21 days. The most infectious period is from 1 to 2 days before the rash appears but infectivity continues until all the lesions have crusted over (commonly about 5 to 6 days after onset of illness).

B. EMERGENCY MANAGEMENT

- Treatment is symptomatic.
- Calamine lotion and oral antihistamines may reduce the intensity of the itch.
- Paracetamol should be used for fever / pain. (see notes below on NSAIs)
- Aciclovir is not currently recommended for immunocompetent children.
- Children with shingles: oral Aciclovir can reduce pain and duration of symptoms if started within 72hrs of onset of rash, however, it is not currently recommended for immunocompetent children. If considering treatment – discuss with senior or virologist.

C. SPECIAL CASES

1. Immunodeficient children:
   a. Congenital e.g. SCID
   b. Acquired e.g. HIV
   c. Prolonged systemic steroid use (see section 3.10) or within 3 months of discontinuing steroid therapy
   d. Children on chemotherapy or within 6 months of stopping.

   These children need expert opinion both in the case of
   - EXPOSURE to VZV, where they may require Varicella Zoster immunoglobulin if VZ antibody negative or oral Aciclovir if VZ positive.
   - If they present with chicken pox or shingles RASH where they may require oral or IV Aciclovir. In both circumstances refer to paediatrics.

2. Neonates / pregnant women
   a. Neonates of mothers who develop or have been exposed to chickenpox within +/-7 days of delivery – refer paediatrics.
   b. Mothers exposed during pregnancy (esp. < 20 weeks or near to term) need to see their GP or obstetrician to establish whether they are immune.
3.22 CHICKENPOX AND HERPES ZOSTER GUIDANCE

3. Antiviral treatment is generally recommended in children with severe chronic illness e.g. severe cardiovascular / respiratory disease or chronic skin disorder.

4. Eye involvement: Remember to check visual acuity
   a. Lesions on eyelid- no additional measures required
   b. Lesions on lid margin- commence on aciclovir eye ointment
   c. Lesions on eyeball- refer to ophthalmology (systemic anti-viral treatment likely).

D. INDICATIONS FOR REFERRAL

1. Neonates < 7 days with exposure to chickenpox – refer paediatrics.
2. Neonates < 4 weeks with chickenpox rash – refer paediatrics
3. Children with immunodeficiency (see above) or on steroids with exposure or rash – refer paediatrics
5. Severe systemic disease / complications – refer paediatrics.

E. WARNING: IBUPROFEN & OTHER NSAIDS AND SEVERE COMPLICATIONS

The complications of VZV infections are rare but there is a known association of NSAI use in VZV + herpes zoster infection with an increased risk of invasive streptococcal infections. This may occur 2-3 weeks after the initial infection.

Avoid NSAIDs wherever possible.
The HPA recommends that the child should be kept from school, nursery or childminders until all vesicles are crusted.

References:

- Guidelines on Chickenpox - (Varicella); Public Health England (formerly HPA)
- Guidance on Infection Control in Schools and other Childcare Settings, Health Protection Agency (September 2014)
- Immunisation against infectious disease - the Green Book; Dept of Health (latest edition)
- Feverish illness in children - Assessment and initial management in children younger than 5 years; NICE Guideline (May 2013)

(Section 3.22 reviewed by Dr D Turner, April 2019)
(Section 3.22 written by Dr N Jay August 2008)
### A. DEFINITION

Core temperature (rectal or oesophageal) <35°C. Children are more susceptible to hypothermia than adults because they have larger surface area to volume ratio, inferior thermoregulation and reduced capacity for heat production.

### B. DIAGNOSTIC FEATURES

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Severe</td>
<td>&lt;28°C.</td>
<td>Unresponsive. Fixed pupils. No atrial activity. Spontaneous VF.</td>
</tr>
</tbody>
</table>

### C. EMERGENCY MANAGEMENT

**ABCDE**
- Remove wet garments & dry patient
- Prevent further heat loss and commence rewarming
- Keep horizontal

**Pulse or breathing absent**
- Start CPR
- Follow APLS
- If VF/pulseless VT defibrillation should be limited to three shocks 2 mins apart
- Inotropic or antiarrhythmic drugs should not be given (APLS 5th edition)
- If pulse or breathing absent

**Pulse or breathing present**
- Mild
  - Protect from further heat loss
  - Allow to rewarm passively
  - Give carbohydrate orally (if possible) to fuel shivering

**>30°C**
- Continue CPR
- Withhold cardiac drugs and further defibrillation until temp > 30°C
- If pulse or breathing present

**<30°C**
- Follow standard resuscitation guidelines however the dose interval for resuscitation drugs is doubled between 30°C and 35°C. (APLS 6th edition)
- Treat as severe
  - Peritoneal lavage
  - Pleural lavage
  - Bladder lavage
  - Gastric lavage*

**Continue rewarming until core temperature >35°C.**
  - Resuscitation should be continued until the core temperature is at least 32°C or cannot be raised despite active measures (APLS 6th Edition)
  - Prolonged resuscitation if inability to raise temperature
  - Refractory arrest

**Moderate**
- Nil by mouth
- Warmed IV fluids - max 40ml/kg
- Forced air external warming - Bair hugger at 40°C
- Heated gel pads

**Severe**
- As for moderate PLUS
  - Consider invasive techniques
  - Peritoneal lavage
  - Pleural lavage
  - Bladder lavage
  - Gastric lavage*
3.23 HYPOTHERMIA

D. INVESTIGATIONS
Dictated case by case – consider:
- Check blood sugar at bedside
- FBC & coagulation screen (coagulopathy & platelet dysfunction common).
- U&Es, lab glucose, CK, Amylase, blood gas analysis.
- Blood cultures depending on the reason for hypothermia.
- CXR.
- ECG

E. DISPOSAL
All but the mildest cases with complete, rapid recovery should be admitted. ARDS, rhabdomyolysis and pancreatitis are recognized complications. Discuss with a senior doctor.

F. IMPORTANT POINTS
- Watch for rewarming shock. A large after-drop in core temperature, collapse of arterial or central venous pressure, or rapid biochemical changes e.g. pH may all precipitate VF.

- Rewarming strategies (see box) depend on the core temperature and signs of circulation. External rewarming including a warm air system is usually sufficient if the core temperature is above 30°C. Active core rewarming should be added in patients with a core temperature of less than 30°C. Extracorporeal warming is the preferred method in circulatory arrest.

- The temperature is generally allowed to rise by 0.25-0.5°C per hour to reduce haemodynamic instability. Most hypothermic patients are hypovolaemic. During warming vasodilatation occurs resulting in hypotension requiring large quantities of warmed intravenous fluids while avoiding overfilling and pulmonary oedema. Continuous haemodynamic monitoring is essential.

Therapeutic hypothermia (32-34°C) for at least 24 hours has been shown to improve neurological outcome in some patients and may be of benefit in children who remain comatose following VF arrest.

- When using the bair-hugger, piling extra blankets over the device negates its effect, as does repeatedly removing it to check the patient.

- Resist central lines if possible – there are several cases of line insertion precipitating refractory VF.

- Consider possibility of trauma, drug overdose or sepsis.

(Section 3.23 reviewed by Dr O Liddle, May 2019)
(Section 3.23 reviewed by Dr S Gibbs, May 2016)
(Reviewed and up-dated by Dr P Williams, Aug 2004)
3.24 DROWNING

A. DEFINITIONS
The new uniform definition of drowning - “the process of experiencing respiratory impairment from submersion / immersion in liquid” was agreed upon during the first World Congress on Drowning in 2002.
The term “near-drowning” is no longer an official term, mainly because it has had different usages worldwide, and thus is ambiguous. It is therefore best avoided, and the term “drowning” used in its place, with severity and degree of recovery (if any) explicitly stated.

B. DIAGNOSTIC FEATURES
Usually obvious from the history.
Always suspect concealed injuries; especially cervical spine after diving accidents.
Consider reason for the event; ? collapse related to medical causes e.g. long QT syndrome or seizure, alcohol, drugs…
Domestic drowning, especially bathtub events, are strongly associated with maltreatment and neglect. Always consider NAI.

C. EMERGENCY MANAGEMENT
1. ABCDE – remember c-spine.
2. Resuscitate following the standard resuscitation council guidelines.
3. Treat hypothermia appropriately – see relevant guideline (Hypothermia, guideline 3.22).
4. Give high flow oxygen via a non-rebreathing mask.
5. Consider naso-gastric tube insertion; basal skull fracture and severe facial trauma being contraindications. Near drowning victims will have swallowed large volumes of fluid, this will splint the diaphragm and pose a risk of aspiration.

D. FURTHER MANAGEMENT
Complete a secondary survey if possible in ED. Identify and treat obvious injuries. Expect occult injuries as suggested by the exact mechanism e.g. cervical spine injuries from diving.
Unless there is clear evidence of airway obstruction there is no benefit in attempting to clear the airway of fluid, “empty the lungs”, or using the Heimlich manoeuvre.

Prophylactic antibiotics or corticosteroids do not affect the outcome and are therefore not recommended routinely.

E. INVESTIGATIONS
- Core temperature.
- Arterial or capillary blood gas.
- Blood glucose
3.24 DROWNING

- CXR.
- ECG.
- Baseline bloods including U&E, clotting screen.
- Others as dictated by the individual patient.

F. PROGNOSTIC INDICATORS

Poor prognostic indicators include:

- Immersion for > 10 minutes
- > 3 minutes to first respiratory effort after the start of CPR
- Absence of hypothermia. A core temperature of <33 degrees may have a protective effect.
- GCS <5
- Arterial pH <7.1
- Arterial PO2 <8

G. DISPOSAL

Well children with a brief history of submersion, which did not require resuscitation, may be discharged after 6-8 hours observation, if there is no evidence of aspiration or a need for supplemental oxygen. Respiratory deterioration can be delayed for 4-6 hours after submersion. This can be on AAU or if not available the child is to be admitted. Safety net – SOB, cough, fever needs review. Any patient with a history of apnoea, cyanosis, or has respiratory changes should be observed for >24 hours as late onset pulmonary oedema may develop.

Local swimming pools occasionally send children “to be checked” following trivial submersion episodes which are not “drowning” events. If truly trivial and the child is well he may be discharged otherwise observe as above.

If unsure ask.

References:

   (Section 3.24 reviewed by Dr O Liddle, May 2019)
   (Section 3.24 reviewed by Dr S Gibbs, May 2016)
   (Reviewed and updated by Dr P Williams, Aug 2004)
3.25 POISONS / INGESTIONS / DELIBERATE SELF-HARM / ALCOHOL / ILLICIT SUBSTANCES

A. INGESTIONS

In younger children this is usually inadvertent. In older children it may be inadvertent or an act of deliberate self-harm (see section C below).

Substances ingested may include:
- children's own medicine
- parents/grandparents medicines
- household products
- garden products
- plant material

The most common is paracetamol ingestion (see 3.26).
With all inadvertent ingestion it is important to explore the social circumstances surrounding the event. There may be concerns regarding household safety or child supervision that require the input of other healthcare professionals, e.g. the health visitor. If so then please complete a referral to the paediatric liaison service using Medway.

Diagnostic Features:
This will depend on the substance ingested.
Consult TOXBASE® for specific features and management.

Management:

Attend to ABCs first

Treat specific features as dictated by TOXBASE®.

Gut Decontamination: is rarely indicated. It may be considered if:
- moderate to severe toxicity predicted
- patient seen within 1hr of ingestion
- airway protected (patient fully conscious or intubated)

Method of gut decontamination:
Activated charcoal (1g/kg, up to 50g max.) can be used but is ineffective for iron, lithium, mercury, potassium, lead, ethanol, organic solvents, acids and alkalis.
Information on Ingested Substance:
3.25 POISONS / INGESTIONS / DELIBERATE SELF-HARM /
ALCOHOL / ILLICIT SUBSTANCES

- TOXBASE® is found at the web address http://www.toxbase.org/. Further information may be obtained from the National Poisons Information Service (NPIS) on 0344 892 0111
- The cBNF gives further advice on the emergency treatment of poisoning.
- The Sheffield University Animal and Plant Sciences Department can be contacted to help identify plant material that has been ingested provided a sample is available. Contact the departmental office in working hours on (22)20123

B. ESSENTIAL OILS
These are highly toxic, even in small amounts.
Undiluted oil in the eye can cause intense irritation and corneal damage.
Volatile oils can be aspirated into the lungs causing pulmonary complications.
Ingestion can cause gastrointestinal or CNS symptoms.
Seek a senior opinion after consulting TOXBASE® (see above).

C. DELIBERATE SELF HARM
Aetiology:
Deliberate self-harm in children and adolescents is unfortunately on the increase. Historically, drug ingestion was the usual method of deliberate self-harm. Increasingly, cutting, particularly of forearms, is seen in children and adolescents. Anyone who has a past history of deliberate self-harm is likely to have repeat attempts and is at increased risk of suicide in the future.

Management:

Attend to ABCs first

Assessment should address both the medical and the psychiatric aspects of the episode.
1. For poisoning use the advice given by TOXBASE® (see information on ingested substance above).
2. For wounds – assess as you would any other accidental wound.
3. Psychiatric assessment:
   - Circumstances of the event – why was it done, was it planned or spur of the moment, was a note left, did they take steps to avoid being discovered, do they think the event should have lead to death.
   - Current circumstances, including the background to the problem.
   - Any PHX or FHX of psychiatric illness or events.
   - Present affect especially clinical depression and persistent suicidal thoughts during the assessment.
   - Clinical evidence of psychosis.
   - Social support and patients own coping mechanisms.
You may need to interview both the patient and any relatives individually in order to fully assess the above.

Disposal:
During the day (9:00-19:00), if a child or teenager is physically well enough, they may be referred to the STAR team for review. The STAR team may be contacted by the nursing team direct from triage, or by the doctor assessing the child after triage. From the hours of 9:00-17:00, STAR may be contacted on extension 53106, and after 17:00 via switchboard.
3.25 POISONS / INGESTIONS / DELIBERATE SELF-HARM / ALCOHOL / ILLICIT SUBSTANCES

All children and teenagers up to their 16th birthday who are suspected of having harmed themselves deliberately, and where the STAR team are not available, should be admitted to the paediatric medical ward, from where they will be referred to the deliberate self harm team when they are physically well enough to be discharged. This is in accordance with guidance from the Royal College of Psychiatrists.

Occasionally patients will refuse admission and require direct referral to psychiatry from ED. The 1st on-call for child psychiatry can be contacted via the Children’s Hospital switchboard 2717000. Ask for “child & adolescent 1st on-call SHO / SpR”.

D. ALCOHOL INGESTION

This can be inadvertent in younger children but is increasingly seen from recreational use in older children. Remember that alcohol may be part of a bigger issue. In the history look for evidence that this is an ongoing problem and/or is associated with other high risk behaviours. It is good practice to ask where the young person obtained their alcohol as this may unmask social issues with parents, the young person’s peer group or the ‘grooming’ of the young person for child sexual exploitation.

Sheffield Council as part of the Hidden Harm Agenda will address illegal sales of alcohol to minors. If on questioning the young person discloses that they have bought the alcohol themselves then details of the vendor should be reported to the Licensing Manager at Sheffield Children Safeguarding Partnership.

Phone: 0114 273 6753; Email: Julie.Hague@sheffield.gov.uk

Management:

**Attend to ABCs first**

- Examine the patient fully for trauma and any other medical conditions.
- If a head injury is present do not assume alcohol to be the cause of a depressed GCS.
- Monitor SpO2 and blood sugar (young children are particularly at risk of hypoglycaemia and onset may be delayed).
- Blood ethanol levels are not indicated.
- Gut decontamination is not indicated.
- Patients should be observed until they are able to mobilise safely and can be discharged to the care of a responsible adult. This may require admission under the medical team.
- Obtain a detailed history of their alcohol use and explore for any underlying social or psychiatric problems.
- If there is a reason to believe that there is a significant risk of ongoing alcohol-related harm to the patient (physical, psychological or social) consider referral to child and adolescent mental health services (see section 16.5 in the Medical Handbook) and/or referral to social care (see ED guideline 6.4).
- For specific support treatment and/or advice as appropriate and available for alcohol problems consider referral to:-
  - the young people’s substance misuse service “The Corner” (see below).¹
  - the community youth team via ‘Early Help’ (see ED guideline 6.4)
“The Corner” (https://www.changegrowlive.org/young-people/corner_sheffield) is Sheffield’s young people’s substance misuse service. The young person can referred to “The Corner” if they are in agreement and would like help with their alcohol use. Alternatively the young person can refer themselves directly to The Corner their parent or carer can refer them, or another health or social care professional can refer them.

Referrals can be made by telephone to The Corner on 0114 2752051. Details of the young person’s alcohol use will be required.

In addition The Corner runs a drop in service for young people from Monday to Friday, 13:00 – 17:00hrs.

E. ILLICIT SUBSTANCE MISUSE

Remember that this may be part of a bigger issue. In the history look for evidence that this is an ongoing problem and/or is associated with other high risk behaviours.

It is good practice to ask where the young person obtained the substance(s) as this may unmask social issues with parents, the young person’s peer group or the ‘grooming’ of the young person for child sexual exploitation.

Diagnostic Features

This will depend on the substance ingested.

Consult TOXBASE® for specific features and management.

Management:

- Attend to ABCs first

Consult TOXBASE® for specific features and management. (see information on ingested substance above).

The young person can also be referred to “The Corner”, the young people’s substance misuse service if they are in agreement and would like help with their substance misuse. The young person can be referred to The Corner via the same process outlined above.

All cases of ingestion of controlled drugs should be reported to the Trust Responsible Officer for controlled drugs.

Any child who presents with an ingestion of a methadone type drug MUST have the Prescribing Service form sent, the Trust responsible officer informed and a PLN referral. They are also likely to need a social care safe-guarding referral.

Any child who presents with an ingestion of a different controlled substance must be notified to the Trust the responsible officer and have a PLN referral. They will most likely warrant a social care safe-guarding referral.
Any child who presents with an ingestion of another prescription medication MUST have a paediatric liaison referral (PLN) sent and consider whether social care referral is warranted. Discuss the case with the ED senior.

The PLN can be informed via Medway forms. The Prescribing Service and Responsible Officer should be informed using the form available at the ED staff bay.

F. DISPOSAL OF CONTROLLED DRUGS (C.D.)

We occasionally see young children who have ingested opiates or other controlled drugs C.D. These may be prescribed (most commonly methadone) or obtained illegally (street drugs). Drugs which fall into this category include:
- Methadone
- Buprenorphine (Subatex, Suboxone)
- Most benzodiazepines
- Any illegal Street Drug

If these drugs are brought in with the child they should be treated like any hospital C.D. and be appropriately recorded, locked in the C.D. cupboard while in the department. They should be destroyed according to hospital policy and not transported to another ward.

(Section 3.25 updated by Dr A Smith and Dr D Turner, July 2020)

References
1. Alcohol-use disorders: preventing the development of hazardous and harmful drinking. NICE Feb 2011 (reviewed by NICE July 2019 with no changes in recommendations)
3.26 PARACETAMOL OVERDOSE

A. DEFINITION
Taking more than the recommended amount of paracetamol.
All ingestions >75mg/kg in 24 hours are significant.
Definition of a staggered overdose is where the ingestion of an overdose of paracetamol has
taken place over a period greater than one hour.

B. BACKGROUND
All ingestions > 75mg/kg in 24 hours are significant.
In children under 6, where there is absolute certainty
that the amount ingested is under 75 mg/kg, blood testing can be reasonably considered unnecessary and the child discharged.
All patients who have a timed plasma paracetamol level plotted on or above the line
drawn between 100 mg/L at 4 hours and 15 mg/L at 15 hours after ingestion should receive
acetylcysteine.
If there is any doubt about the timing of the ingestion (including a staggered overdose over
one hour or more), acetylcysteine should be given without delay. There is no need to refer to
the treatment nomogram.
Previous allergic reactions to N-acetylcysteine are now no longer a contraindication to its
administration.

Accidental or deliberate overdose of paracetamol is common. In young children, it is usually
accidental ingestion of liquid paracetamol and not usually significant. In older children,
significant amounts of paracetamol may be ingested, often deliberately. In overdose, normal
paracetamol metabolism is saturated; glutathione is depleted and a toxic metabolite is
produced. The major potential effect of the toxic metabolite is hepatic necrosis. The
commonest antidote, N-acetylcysteine (NAC) is entirely effective if given within 8 hours
(see cBNF).
Children under the age of 6 years seem to fare better after paracetamol poisoning, perhaps
due to a greater capacity to conjugate with sulfate, enhanced detoxification of NAPQI or
greater glutathione stores.

Any patient who has taken a deliberate overdose of any quantity must be admitted to the
medical team for referral to CAMHS as part of their management.

Accidental ingestions should be highlighted to Paediatric Liaison and the health visitor using
Medway forms.
C. EARLY MANAGEMENT
Take an accurate history, as the quantity and timing of the overdose are crucial. Clinical judgement is important, as the history may be inaccurate. If in doubt when blood levels are available and close to the appropriate treatment line, err on the side of safety and treat.

Follow the management steps on TOXBASE. Any unusual cases can be discussed with the poison information service 0344 892 0111

Presentation Less Than 1 Hour Post Ingestion:
Consider activated charcoal) if the patient presents within 1 hour of ingesting more than 150 mg/kg of paracetamol. Doses below:

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Child 1 month – 1 year</td>
<td>1g/kg</td>
</tr>
<tr>
<td>1 – 12 years</td>
<td>25 – 50g</td>
</tr>
<tr>
<td>12 – 18 years</td>
<td>50 – 100g</td>
</tr>
</tbody>
</table>

However, many children, especially younger ones, will not take activated charcoal. Do not fight with the child if administration is difficult. Continue management as for presentation 1-4 hours post ingestion.

Presentation 1 - 4 Hours Post Ingestion:
Check paracetamol levels at 4 hours, not before as absorption continues, making paracetamol levels before 4 hours unreliable. See below for full investigation list. Treat with NAC if on or above appropriate treatment line.

Presentation 4 - 8 Hours Post Ingestion:
Check paracetamol levels; they need to be processed urgently if presentation is close to 8 hours. See below for full investigation list. Treat with NAC if on or above appropriate treatment line for time of blood test.

Note - There is normally no indication to start acetylcysteine without a paracetamol blood concentration provided the result can be obtained and acted upon within 8 hours of ingestion. If there is going to be undue delay in obtaining the paracetamol concentration, treatment should be started if more than 150 mg/kg paracetamol has been ingested.

Presentation 8 - 24 Hours Post Ingestion:
Urgent action is needed because efficacy of NAC declines after 8 hours post ingestion. Give acetylcysteine immediately to all patients if it is thought that more than 150 mg/kg body weight paracetamol has been ingested as an acute overdose (i.e. all doses taken within one hour). If the patient has ingested less than 150 mg/kg, wait for blood results before considering treatment with acetylcysteine. Check paracetamol level, PT, LFT’s and U&E’s. Only discontinue NAC if paracetamol level is below treatment line, PT, LFT’s and U&E’s are normal, the patient is asymptomatic and there is no doubt over the timing of the overdose.
3.26 PARACETAMOL OVERDOSE

Presentation Over 24 hours Post Ingestion:
Check PT, plasma paracetamol, LFT’s and U&E’s and venous / capillary bicarbonate or ABG. Seek expert advice (toxbase), NAC treatment will often be advised even in late presentation.

Staggered overdose
These patients require careful assessment. Risk assessment is based on the history of staggered dose and timing of paracetamol ingestion, the presence or absence of clinical features suggestive of paracetamol toxicity, and the results of blood tests.
For patients who have taken a staggered overdose (i.e. over more than one hour), the recommendations are that treatment with acetylcysteine should be given. See toxbase for further guidance.

D. INVESTIGATIONS

- Paracetamol level 4 hours post-ingestion, or as soon as the patient arrives if time of overdose is greater than 4 hours.
- U&E, creatinine - to look for renal failure and have a baseline.
- LFTs: may be normal if the patient presents early but may rise to ALT >1000 IU/L.
- Glucose: hypoglycaemia is common in hepatic necrosis and capillary blood glucose should be checked hourly.
- Clotting screen: prothrombin time is the best indicator of severity of liver failure and the INR should be checked 12-hourly.
- ABG (only with significant paracetamol levels or if the child has a depressed conscious level) acidosis can occur at a very early stage, even when the patient is asymptomatic. It is seen in up to 10% of patients with ALF.
- FBC and salicylate levels are not routinely required.
3.26 PARACETAMOL OVERDOSE

E. TREATMENT

Children are treated with the same doses and regimen as adults. However, the quantity of intravenous fluid used has been modified to take into account age and weight, as fluid overload is a potential danger.

Doses should be administered sequentially using an appropriate infusion pump.

Calculating doses in obese children: NPIS advises that the child's actual weight should be used for calculating both the toxic dose and acetylcysteine dose, up to a maximum of 110 kg.

Preparation and administration of paediatric infusions (use TOXBASE)

- Weigh the child to determine the correct weight band.
- Read off the table the total infusion volume required for each dose according to the weight of the child and make up the solutions according to the directions below.
3.26 PARACETAMOL OVERDOSE

<table>
<thead>
<tr>
<th>Paediatric acetylcysteine prescription (each ampoule = 200mg/ml acetylcysteine)</th>
<th>Please circle appropriate weight and volume.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regimen</td>
<td>First Infusion</td>
</tr>
<tr>
<td>Infusion</td>
<td>50mg/ml for 1 hour</td>
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<tr>
<td>Infusion rate</td>
<td>3mL/kg/h</td>
</tr>
<tr>
<td>Patient Weight</td>
<td>Total Infusion Volume</td>
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<tr>
<td>kg</td>
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<td>98</td>
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<tr>
<td>35-39</td>
<td>113</td>
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</tbody>
</table>

For example for a child weighing 12 kg, the first infusion would be 38 mL infused at 38 mL/h over 1 hour, the second infusion would be 100 mL infused at 25 mL/h over 4 hours and the third infusion is 208 mL infused at 13 mL/h over 16 hours.

Weights >39 kg use adult dose regimen. (see TOXBASE)

F. References

1. National Poisons Information Service / TOXBASE
   (Section 3.26 reviewed by Dr D Turner, May 2019)
   (Section 3.26 written by Dr O Oladipo, based on MHRS guidance 2012, May 2013)
3.27 ACUTE ASTHMA

A. DIAGNOSIS
Usually obvious. Consider foreign body if history of choking on food, or very asymmetrical signs, particularly in first attack.
Consider the possibility of anaphylaxis if additional signs suggest this diagnosis or previous history of anaphylaxis.
Differentiate between atopic asthma and viral wheeze in pre-school children (see guideline 3.28) as management does differ slightly between these 2 groups.

- Other differential diagnoses:
  - hyperventilation
  - paroxysmal vocal cord dysfunction
  - atypical e.g. mycoplasma infection

B. INVESTIGATIONS
NONE OBLIGATORY

CXR rarely needed (indications: unresponsive to treatment, obvious persisting asymmetrical signs, or real doubt about diagnosis). Fever/coarse crackles are not automatic indications for CXR.

C. ASSESSMENT
Most children with severe asthma are hypoxic.
Assess severity of attack (see flow chart): level of activity, speech and colour, work of breathing, respiratory rate, use of accessory muscles, chest movement, air entry and degree of wheeze
Also note: pulse rate, BP, pulsus paradoxus, measure SaO₂, (and peak flow if >6 years of age).

LIFE THREATENING SIGNS:

- Cyanosis
- Agitation / confusion or decreased level of consciousness
- Inability to talk
- Exhaustion
- Silent chest

CALL FOR HELP EARLY

HIGH RISK PATIENTS

- Previous ICU admission / endotracheal intubation
- Sudden rapid worsening of respiratory signs
- Failure to recognise the severity of the attack
- Poor compliance to treatment / denial of symptoms
- Multiple allergies
- Seizures/ syncope

REASSESS FREQUENTLY AND ESCALATE TREATMENT AS INDICATED
3.27 ACUTE ASTHMA

D. TREATMENT

See flow chart and drug information table, plus additional notes below

**OXYGEN:** Start oxygen while setting up the bronchodilator treatment.
A mild degree of hypoxia is not uncommon. Once started aim to keep saturations above 94%. In the recovery stage of acute asthma, clinical status is more important than oximetry.

**BRONCHODILATOR:** An inhaled Beta 2 agonist should generally be given by metered dose inhaler and large volume spacer for mild-moderate asthma or if SpO$_2$ >92% in air. Give 10 single puffs, allowing the child time to inspire each puff adequately before giving the next. The use of a spacer as rescue treatment encourages the parents in subsequent home management (see below).
If a nebuliser is used for a child requiring oxygen therapy, oxygen at 8 litres/min should be given as the driving gas.

**ORAL STEROIDS:** Most school-age children who have a moderate or severe attack should be given oral Prednisolone 1 mg/kg/day for 3-5 days (max 40mg), stopping after symptoms have subsided. Steroids should ideally be given within the first hour of presentation. Tapering is unnecessary. Recent evidence suggests that pre-school children with a clear viral aetiology for their wheeze and mild to moderate wheezing are less likely to gain benefit from steroid treatment.\(^2\). It is therefore reasonable to reserve prednisolone for pre-school children that have severe symptoms, or have not improved within 8-12 hours of admission.

**INTRAVENOUS AGENTS:** Salbutamol is the first line intravenous drug for severe or refractory asthma. Aminophylline and Magnesium are possible second line treatments. Cardiac monitoring should be started when intravenous drugs are being given, regardless of where the patient is being managed.
The PEW warning tool should be used to construct warning signs of deterioration based on heart rate, respiratory rate and effort, oxygen saturations and level of consciousness, to enable nursing staff to promptly request medical reviews.

**INDICATIONS FOR ADMISSION:**
- Oxygen saturation 92% or less in air.
- Peak flow <50% usual or predicted.
- Little or no improvement after 2 doses of bronchodilator.
- Initial response to bronchodilator but then rapid deterioration.
- Return to ED within 4 hours of discharge.
- Parents unable to cope.

**STRATEGY FOR HOME MANAGEMENT:**
Not all children with acute asthma need admission. Every time we admit an asthmatic child unnecessarily we are giving the wrong message to the child and parents.
If they can cope at home, then they should be allowed to do so.

- Discuss with parents whether home management is appropriate.
- In school age children, prescribe Prednisolone if indicated (see above), and give a supply for home use.
- Give a valved spacer device (Volumatic / Nebuhaler) and MDI of \(\beta_2\)-agonist. Tell the parents to give 2 - 4 puffs (given with a breathing interval between each puff) every 3 - 4 hours. A rescue dose of 10 puffs can be used in an emergency, but stress that if this is needed, further help should be sought.
3.27 ACUTE ASTHMA

- Tell them of the danger signs which should make them seek help immediately - (inability to talk, poor colour, exhaustion).
- Asthma information / leaflets given including written asthma plan
- Device technique assessed.
- Peak flow meter given if appropriate.
- Advised to attend their GP or asthma nurse for review within 48 hours.
- Don’t forget a smoking history and cessation advise

The SC(NHS)FT asthma nurses, run asthma clinics every Monday and Friday (NGH outpatients 2) with acute spaces for children who need a specialist review within a few days. These can be booked via ED reception

Refs: NICE Technology Appraisals No. 10 & No. 38, applicable to the ED
3.27 ACUTE ASTHMA

NB If a child has signs and symptoms across the categories, always treat according to the most severe feature. If a child deteriorates during treatment, move to the appropriate severity level after re-assessment.

- **Mild exacerbation**
  - SaO₂ >95%
  - Able to talk in sentences
  - No respiratory distress

- **Moderate exacerbation**
  - SaO₂ 92-95%
  - Use of accessory muscles
  - Increased work of breathing

- **Severe exacerbation**
  - SaO₂ <92%
  - Too breathless to talk
  - Marked respiratory effort

- **Life threatening exacerbation**
  - SaO₂ <92%
  - Cyanosis
  - Silent chest
  - Poor respiratory effort
  - Altered consciousness/Agitation/confusion

- **Poor response**
  - 1 dose of salbutamol
  - Reassess in 15 minutes

- **Good response**
  - Fit for discharge
  - Continue salbutamol 4 puffs 4 hourly for 24 hours, then pm
  - Consider prednisolone course
  - Review regular treatment
  - Check inhaler technique
  - Provide written management plan
  - Arrange follow up (GP + SCT)

- **Poor response**
  - 10 puffs of salbutamol every 20 minutes given three times
  - Start oral prednisolone
  - If a response is seen, reassess at 1 hour
  - If worsening or failing to respond, treat as severe

- **Good response**
  - Oxygen by face mask or nasal cannulae to keep SaO₂ >94%
  - Nebulised salbutamol with Nebulised ipratropium bromide and
  - Consider adding nebul magnesium sulphate in the first hour
  - Start oral prednisolone
  - Requires admission regardless of response

- **Life threatening exacerbation response**
  - Call for senior help, consider 2222 resuscitation team call
  - Oxygen by face mask / nasal cannulae to keep SaO₂ >94-98%
  - Nebulised salbutamol and ipratropium
  - Consider adding nebul magnesium sulphate in the first hour
  - Contact PCCU if not done already
  - Establish intravenous access
  - Give IV Hydrocortisone
  - Add drugs stepwise if not improving:
    - 1. IV Salbutamol bolus
    - 2. IV Magnesium sulphate bolus
    - 3. IV Aminophylline loading dose
  - If poor response add continuous IV salbutamol infusion +/- aminophylline
  - Admit to PCCU, do not delay treatment while waiting for PCCU

**Indications for endotracheal intubation:**
- SaO₂ <90% with oxygen and bronchodilators
- Respiratory arrest/bradynoea
- Exhaustion/cannot speak
- Altered consciousness

- **Fit for discharge**
  - If initially moderate but respiratory distress has resolved, consider discharging home
  - If further salbutamol is needed, arrange admission
  - Continue salbutamol doses hourly until stable on 4 hourly treatment (see note re spacing below)
  - If worsening or failing to respond, treat as severe

- **Arrangement admission**
  - Nebulised salbutamol every 20-30 minutes
  - Consider ‘life threatening’ management if deteriorating

- **Poor response**
  - Nebulised salbutamol every 20-30 minutes
  - Consider ‘life threatening’ management if deteriorating

- **Good response**
  - Nebulised salbutamol every 20-30 minutes
  - Consider ‘life threatening’ management if deteriorating

- **Life threatening exacerbation**
  - Nebulised salbutamol every 20-30 minutes
  - Consider ‘life threatening’ management if deteriorating
### 3.27 ACUTE ASTHMA

<table>
<thead>
<tr>
<th>Drug doses and mode of administration</th>
<th>Side effects and comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Salbutamol</strong>&lt;br&gt;Nebulised: via oxygen 8L/min 2-5 yr: 2.5mg, &gt; 5 yr: 5 mg&lt;br&gt;IV bolus: &lt;2 yr: 5microgram/kg over 5 minutes&lt;br&gt; &gt;2yr: 15 microgram/kg (max 250microgram) over 5 minutes&lt;br&gt;Continuous IV infusion: 1-5 microgram/kg/min&lt;br&gt;Not much benefit in exceeding 2 micrograms/kg/min</td>
<td>Hypokalemia, tachycardia, tremor, nausea, vomiting, agitation, headache, palpitations, hyperglycaemia, lactic acidosis, hypoxia&lt;br&gt;&lt;br&gt;Monitor: U &amp; E 12 hourly, glucose 6 hourly&lt;br&gt;ECG if continuous IV infusion</td>
</tr>
<tr>
<td><strong>Ipratropium bromide</strong>&lt;br&gt;Nebulised 250micrograms via oxygen 8L/min&lt;br&gt;Avoid getting in the eyes</td>
<td>Dry mouth, cough, headache, palpitations, tachycardia, nausea, vomiting, diarrhea, constipation</td>
</tr>
<tr>
<td><strong>Magnesium sulphate</strong>&lt;br&gt;Nebulised: 150 mg via oxygen 8L/min&lt;br&gt;(1.5mL of 10% injection)&lt;br&gt;Add to salbutamol / ipratropium nebulizer solution</td>
<td>Vasodilatation, hypocalcaemia, bradycardia.&lt;br&gt;Hypermagnesaemia may cause respiratory depression, flushing, sweating, arrhythmia, CNS depression, nausea vomiting, muscle weakness&lt;br&gt;Monitor blood pressure</td>
</tr>
<tr>
<td>IV bolus: 40 mg/kg (max 2g) - over 20 min</td>
<td></td>
</tr>
<tr>
<td><strong>Aminophylline</strong>&lt;br&gt;IV load with 5mg/kg (max 500mg) over 20 min&lt;br&gt;Omit if oral theophylline / aminophylline in previous 24 hours&lt;br&gt;Continuous infusion:&lt;br&gt;&lt;12 yr : 1mg/kg/ hr&lt;br&gt;12yr /500-700micrograms/kg/hour</td>
<td>Nausea, headache seizures, tremor, anxiety, hypotension, arrhythmia, diuresis, increases gastric secretion. Increase levels with macrolides.&lt;br&gt;Narrow therapeutic index. Continuous ECG monitoring.&lt;br&gt;Serum drug levels (4-6h after starting, then daily)</td>
</tr>
<tr>
<td><strong>Hydrocortisone</strong>&lt;br&gt;IV 4mg/kg (max 100mg) 6 hourly&lt;br&gt;Prednisolone&lt;br&gt;Oral: &lt;2yr: 10mg, 2-5yrs: 20 mg, &gt;5 yrs: 30-40mg</td>
<td>Headache, hyperglycaemia, increased appetite, nausea, petechiae, potassium loss, sodium retention, water retention</td>
</tr>
</tbody>
</table>
3.27 ACUTE ASTHMA

NOTES
- Antibiotics are rarely indicated in asthma.
- Fever is common if the attack is triggered by a viral illness.
- Coarse crepitations may be present due to retained secretions, and do not necessarily indicate infection.
- Never call the attack a "chest infection".

[Info leaflets available
- No 43 – My Asthma Plan
- No. 674 – Plan for treating my wheeze

References:

1. BTS/SIGN British guideline on the management of asthma 2016 (www.brit-thoracic.org.uk)
4. APLS 2016
5. Electronic Medicines Compendium
6. SCH Guideline Use of Dornase Alpha in intubated patients on PICU, 2015 (886v4)
7. SCH Guideline Administration of drugs on PICU for the treatment of severe asthma, 2015 (921v4)

(Section 3.27 reviewed & updated by Dr E Snelson April 2019)
3.28 VIRAL-INDUCED WHEEZE

ACUTE EPISODES
A) DIAGNOSIS
B) INVESTIGATIONS
C) ASSESSMENT
D) TREATMENT

A) DIAGNOSIS
Episodes of wheezing that are induced by viral infections of the upper respiratory tract are distinct from persistent atopic asthma. These episodes are common in children under the age of six years. One in three children has at least one episode of wheeze before their third birthday. The majority of these children have few or no interval symptoms between viral illnesses and their propensity to wheeze often resolves by school age.
The history should assess the pattern and severity of symptoms, the presence of interval symptoms, personal or family history of atopy, trigger factors particularly smoking and exclude any other diagnosis.
Differential diagnoses include bronchiolitis, atypical lower respiratory tract infections, inhaled foreign body, asthma, Cystic Fibrosis, gastro-oesophageal reflux and structural airway problems.
Care should be taken to ensure the airway noise is a true wheeze i.e. a continuous high-pitched sound with a musical quality on expiration.

B) INVESTIGATIONS
In the majority of cases no investigations are required as this diagnosis is made by history and examination alone.
A chest X-ray is only required if there is obvious and persistent asymmetry on auscultation or if the patient is unresponsive to treatment. Coarse crepitations may be due to retained secretions and do not necessarily indicate infection.
Other investigations will only be needed if the symptoms are present from birth or if the history or examination points towards an alternative diagnosis.

C) ASSESSMENT
The severity of the attack should be assessed including the level of activity, speech, colour, work of breathing, respiratory rate, chest movement, air entry and degree of wheeze and oxygen saturations.
Ominous signs include cyanosis, agitation, reduced GCS, inability to talk, exhaustion or silent chest.
The clinical markers of severity are the same as for asthma (see guideline 3.27).

D) TREATMENT
OXYGEN: Use as per the acute asthma protocol, (see guideline 3.27)
BRONCHODILATOR: Salbutamol: Use as per the acute asthma protocol, (see guideline 3.27)
Iпатroprium Bromide: If the episode is severe or life threatening, use as per the acute asthma protocol, (see guideline 3.27).
In children below 18 months, if not responding to salbutamol, consider the possibility that the diagnosis is bronchiolitis. If this is the case, bronchodilators will be ineffective.
ORAL STEROIDS: Oral steroids are NOT required for mild-moderate wheezing episodes as recent evidence has shown no benefit from this. Prednisolone at a dose of 1mg/kg (maximum 40mg) for 3 days should be commenced if the episode is severe or if the child is not improving within 8-12 hours of their admission.
INTRAVENOUS AGENTS: If the episode is severe or life threatening, use treatment as per the acute asthma protocol, (see guideline 3.27)
ADMISSION: Not all children with viral induced wheeze require admission. If the child only has a mild or moderate exacerbation and is able to tolerate 4 hourly inhalers then they can safely be
3.28 VIRAL-INDUCED WHEEZE

discharged. The family should be advised to continue 4-6 puffs salbutamol for the next 1-2 days and then to use as required. They should be made aware of how to recognise signs of deterioration and when to bring their child back to hospital.

RECURRENT EPISODES
Pre-school children can have recurrent episodes (4 or more per year) of wheeze and these are mostly related to viral respiratory infections. However, it can be difficult to distinguish recurrent viral induced wheezing from early asthma which makes diagnosis and management of these patients difficult.
To aid management decisions, these patients should, if possible, be classified into having either episodic viral wheeze or multi-trigger wheeze.
EPISODIC VIRAL WHEEZE: The wheezing occurs during discrete time periods, often in association with clinical evidence of a viral upper respiratory tract infection, with absence of wheeze between episodes.
MULTI-TRIGGER WHEEZE: This is discrete exacerbations of wheezing but there are also symptoms between episodes e.g. in response to allergens, emotions, activity. A trial of inhaled steroids should be considered*.
It is therefore important to advise the patient to see their GP within 1 week for a possible trial of additional therapy,. (*See Medical guidelines for full recurrent wheeze guidance). These patients can also be referred to the nurse led ‘asthma clinic’ (see Asthma guideline 3.27).
Info leaflet available no 674 – Plan for Treating my Wheeze

(Section 3.28 reviewed and updated by Dr E Snelson, April 2019)
(Section 3.28 Written by Dr L Flemons, Dr K Ugonna and Dr J. Gilchrist June 2014)
3.29 PNEUMOTHORAX – ED MANAGEMENT OF

A. BACKGROUND

B. DEFINITIONS & AETIOLOGY

C. TENSION PNEUMOTHORAX
   i) DIAGNOSIS
   ii) MANAGEMENT

D. SIMPLE PNEUMOTHORAX
   i) DIAGNOSIS
   ii) MANAGEMENT
   iii) SAFE DISCHARGE

E. INTERCOSTAL DRAIN INSERTION

F. NOTES

A. BACKGROUND

The overall incidence of pneumothorax is 5-10 per 100,000 across all age groups, with a peak incidence in 15-24 year olds; pneumothoraces are uncommon in children. Tall, slim males are at higher risk of developing primary spontaneous pneumothoraces and may present in their early teenage years. Children with underlying lung conditions are at risk of developing secondary spontaneous pneumothoraces, and may present to the ED. In a 10 year period from 2000-2010 there were approximately 50 presentations to SCH of children with pneumothorax of all aetiologies.

B. DEFINITIONS & AETIOLOGY

Pneumothorax: the presence of gas in the pleural space

Pneumothoraces may be classified depending on whether the gas is able to move in and out of the pleural space or not:

Simple pneumothorax: the gas in the pleural space can move in both directions via the communication between the lung and pleural cavity, meaning that surrounding structures are not dangerously compressed.

Tension pneumothorax: a one-way valve is created between the airway and the pleural space meaning that the expanding volume of gas accumulating in the pleural space causes compression on the mediastinal structures and heart as well as the lungs. Cardiac filling and output are compromised leading to rapid death if left untreated. Tension pneumothoraces are usually of traumatic origin, but occasionally spontaneous pneumothoraces can come under tension.

Open pneumothorax: a penetrating injury causes a communication between the exterior world and the pleural space. This is a life threatening condition and must be sealed off using a 3 sided dressing that allows air to escape from the pleural cavity but not to enter; a chest drain must also be inserted.

C. TENSION PNEUMOTHORAX

Tension pneumothorax is a life-threatening condition and must be treated immediately.

i) Diagnosis:
Clinical examination should alert you to the diagnosis before getting a CXR
   - severe dyspnoea, hypoxia and signs of shock
   - reduced chest wall movement, hyper-resonant percussion note and absent breath sounds
     on affected side
   - trachea may be pushed to opposite side
   - distended neck veins may be seen

ii) Management:
High flow oxygen and immediate needle thoracocentesis with a large-bore cannula on the affected side (2nd intercostal space, mid-clavicular line) are indicated, along with urgent senior support. This should be followed by iv access and chest drain insertion. Only then should a CXR be performed (ideally an erect CXR). The surgical team should be involved if possible but any delay to chest drain...
3.29 PNEUMOTHORAX – ED MANAGEMENT OF

insertion should be avoided; a chest drain should be inserted in the resuscitation room by an emergency physician or a surgeon (see section F).

D. SIMPLE PNEUMOTHORAX

Local evidence has shown that children who develop spontaneous pneumothoraces almost always have underlying lung pathology, even if this is not known at their initial presentation. Therefore we will assume that spontaneous pneumothoraces in children are ‘secondary’ in origin. Because of this, and the high failure rate, there is no role for aspirating simple pneumothoraces in children.

i) Diagnosis:

Chest pain or shortness of breath, or both, are by far the most common presenting symptoms. Examination may reveal reduced expansion and air entry on the affected side, but the signs can be quite subtle and the observations may be entirely normal. Consider the diagnosis in patients with pleuritic chest pain in the absence of chest wall tenderness or in those with dyspnoea not explained by other obvious findings, especially if they have an underlying respiratory condition or if they have a high risk body habitus.

An ERECT PA CXR is indicated in any patient where you suspect a simple pneumothorax and will confirm the diagnosis. Please note that many of the younger children will routinely have a supine CXR unless specified and so a pneumothorax may be easily missed - discuss this with the radiographer to ensure you get an erect CXR.

ii) Management:

If the pneumothorax is small (<50% hemithorax) and the patient is not dyspnoeic then they could be considered for discharge with careful follow up. If the pneumothorax is large (>50% hemithorax) or the patient is dyspnoeic, insertion of a small bore intercostal drain using a Seldinger technique is indicated (8-14F size).

Estimating the size of pneumothorax: there is no evidence-based method of estimating this in children. The ‘2cm rule’ is widely used in adults and can also applied to the paediatric population, although may be less accurate depending on the size of the child. The principle is outlined in the diagram below, where a rim of air between the lateral lung edge and thoracic cage of >2cm indicates a pneumothorax volume of >50% of the hemithorax. NOTE: this only applies to erect PA CXR films. Always discuss the sizing of a pneumothorax with a senior, and if in any doubt discuss it with a radiologist.

Small pneumothorax = <2cm rim of air (ie. <50% of hemithorax volume)
Large pneumothorax = >2cm rim of air (ie. >50% of hemithorax volume)

Algorithm for management of simple pneumothorax:
3.29 PNEUMOTHORAX – ED MANAGEMENT OF

Simple Pneumothorax on erect CXR

<2cm rim and no dyspnoea

Known respiratory disease?

YES

NO

>2cm rim and / or dyspnoeic

Discuss with medical team:
- Low threshold for admission for observation
- Refer for respiratory follow up if discharged from ED

Consider discharge home:
- Discharge observations recorded
- Give verbal advice about red flag symptoms, and the implications for diving and flying
- Give written advice leaflet
- Prescribe TTO analgesia if appropriate
- Arrange ED review the next day (including weekend) for a repeat CXR
- Refer for follow up with Mr Marven in the surgical outpatient clinic
- Document in the notes that all of the above has been done

Intercostal chest drain insertion:
- Surgical team involvement
- ICD insertion in ED resus by either emergency physician or surgeon
- Local anaesthetic or ketamine sedation may be used depending on age and co-operation of the child
- Consent should be obtained prior to ICD insertion
- The patient should then be admitted under the surgeons
- Give verbal advice about implications for diving and flying
- Give written advice leaflet

E. INTERCOSTAL DRAIN INSERTION

Setting: ED resus room, IV access established, high flow oxygen, full monitoring

Personnel: senior ED doctor (or surgical senior) competent in the procedure, 2 nurses, second senior ED doctor or anaesthetist if sedation is being used

Consent: verbal consent from parents and patient is adequate for ICD; written consent if sedation used (as per ketamine guideline). Inform them about risks of bleeding, infection, failure and damage to organs.

Comfort: older children should tolerate this procedure under local anaesthetic. Sedation with ketamine may be necessary and an experienced clinician should administer this as per the guideline.

DO NOT USE NITROUS OXIDE (ENTONOX) at any point as it will cause expansion of the gas and can lead to a tension pneumothorax.

Equipment: sterile gloves & gown, sterile drape, gauze swabs, antiseptic solution (e.g. chlorhexidine or iodine), lignocaine LA, needles and syringe for LA, Seldinger chest drain pack (which will include the introducer needle, syringe, wire, scalpel, dilator, chest tube and connector), suture (e.g. 1-0 silk), closed drainage system (with sterile water for underwater seal) and a dressing. An 8-14F size drain is usually appropriate and should be selected depending on the size of the child.

Position & landmark: patient on a trolley sat up at 45° angle, with arm on affected side raised behind head (ideally with an assistant to help hold the arm). Identify and mark the landmark before starting the procedure. Insertion should be in the “safe
3.29 PNEUMOTHORAX – ED MANAGEMENT OF

triangle” - this is the triangle bordered by the anterior border of the latissimus dorsi, the lateral border of the pectoralis major muscle, a line superior to the horizontal level of the nipple, and an apex below the axilla. Aim for the 4th or 5th intercostal space.

Procedure: aseptic technique should be used throughout. Clean the skin with aseptic solution and drape the area. Infiltrate lignocaine at the skin and down to the pleura and wait for it to work. Insert the introducer needle (bevelled end upwards) with a syringe attached, pulling back the plunger until you aspirate air easily; remember to insert the needle over the upper border of the lower rib to avoid the neurovascular bundle. Then remove the syringe and insert the guidewire through the introducer needle; stop if you feel resistance. Remove the needle, leaving the wire in situ, make a small incision in the skin at the site of the wire and pass the dilator a small way to enlarge the insertion site. Remove the dilator and pass the chest tube over the wire (having removed the stylet); insert 8-12cm of the chest tube depending on the size of the child. Remove the wire and check that the tube is misting; attach the connector and tubing to connect to the underwater seal (which should stay at a level below the patient). The water should be bubbling and swinging if the placement is correct and air is draining. Suture the tube securely using an anchoring suture and wrapping it firmly along the tube (‘closure’ or ‘purse string’ sutures are not advised). Use some gauze to protect the site and cover with an appropriate dressing.

Post-procedure: repeat the CXR to confirm the drain position and evaluate change to the pneumothorax. The patient may find it uncomfortable as the lung re-expands and may cough; analgesia is advised. Document the procedure in the notes.

F. DISCHARGE NOTES

Verbal and written advice (info leaflet 616 pneumothorax) to be given to all patients and parents:

- To return immediately to the ED if the breathlessness gets worse, or with any other concerns

- The child is NOT to fly until they have been told it is safe to do so by the doctor; this is only advisable when the pneumothorax has completely resolved, which may take several weeks.

- The child must NEVER go scuba diving unless they undergo a surgical procedure to prevent a pneumothorax happening again. The surgeons can discuss this further with the family as an outpatient.

BTS guidelines state that:

“Air travel should be avoided until full resolution of the pneumothorax. Diving should be permanently avoided unless the patient has undergone bilateral surgical pleurectomy and has normal lung function and chest CT scan postoperatively.” (BTS guidelines: Management of Spontaneous Pneumothorax . MacDuff A, Arnold A, Harvey J. Thorax 2010; 65: 18-31)

(Section 3.29 reviewed by Dr E Snelson, April 2019)
(Written by Dr C.Ginnis, April 2012)
3.30 ACUTE STRIDOR AND CROUP

A. DEFINITION
Stridor is a harsh inspiratory noise, produced from narrowing / obstruction of the upper airway and by definition indicates an extra-thoracic airway problem i.e. at laryngeal or upper tracheal level.

B. BACKGROUND
- The causes of acute stridor are often life threatening so take this symptom very seriously.
- It may be loud and unmistakable or soft and more easily missed.
- With very severe obstruction the stridor may become apparent on expiration.
- Note that loudness of the stridor is not a good guide to the severity of obstruction as stridor may decrease as a child tires and progresses towards a ‘silent chest’.

C. EMERGENCY MANAGEMENT

<table>
<thead>
<tr>
<th>ABC approach</th>
</tr>
</thead>
<tbody>
<tr>
<td>Get senior help early</td>
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<tr>
<td>A – Airway:</td>
</tr>
<tr>
<td>- Any suspicions of an imminent airway obstruction call 2222.</td>
</tr>
<tr>
<td>- Nurse in the most comfortable position for the child.</td>
</tr>
<tr>
<td>- Avoid further distressing procedures.</td>
</tr>
<tr>
<td>- Open and maintain airway if needed.</td>
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<tr>
<td>- High flow oxygen by facemask / blow-by.</td>
</tr>
<tr>
<td>- At first assessment <strong>DO NOT</strong> examine the mouth / throat, take blood, gain I.V. access or X-ray the neck.</td>
</tr>
<tr>
<td>B – Breathing:</td>
</tr>
<tr>
<td>- Note respiratory rate / recessions / efficacy (chest expansion).</td>
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<tr>
<td>- Saturation &gt;95% in air is acceptable.</td>
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<tr>
<td>- Saturation &lt;90% in air or any cyanosis needs urgent treatment.</td>
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<tr>
<td>- Consider nebulised adrenaline 1:1000 0.4 ml/kg to a maximum dose of 5mls (via oxygen) and call PICU early. (note this is only a temporary measure may get rebound deterioration). The dose can be repeated.</td>
</tr>
<tr>
<td>C – Circulation:</td>
</tr>
<tr>
<td>- Heart rate generally increases with increasing obstruction and work of breathing.</td>
</tr>
<tr>
<td>- A tachycardia is usual, bradycardia is very serious.</td>
</tr>
<tr>
<td>D – Mental state:</td>
</tr>
<tr>
<td>- Alters with increasing hypoxia.</td>
</tr>
<tr>
<td>- Alert / irritable or restless / drowsy / unconscious.</td>
</tr>
</tbody>
</table>

Can the child swallow saliva or are they drooling? May be indicative of pain e.g. in retropharyngeal abscess or epiglottitis. Pre-terminal signs include silent chest / gasping respirations / bradycardia.
3.30 ACUTE STRIDOR AND CROUP

D. AETIOLOGY / DIAGNOSTIC FEATURES

<table>
<thead>
<tr>
<th>Causes</th>
<th>Features suggestive</th>
</tr>
</thead>
</table>
| Common | - viral laryngotraceobronchitis (croup)  
- recurrent ‘spasmodic’ croup | URTI symptoms, fever, not unwell |
| Uncommon | - laryngomalacia  
- bacterial tracheitis  
- retropharyngeal abscess  
- inhaled foreign body | - young babies, worse with feeding, crying  
- fever, toxic,  
- fever, toxic, dysphagia  
- sudden onset +/- history of choking |
| Rare | - anaphylaxis  
- inhalation burns  
- diphtheria  
- epiglottitis  
- trauma  
- mediastinal mass  
- vascular ring  
- haemangiomas/ cysts etc  
- tetany | - sudden onset, urticaria, angioedema  
- history, obvious signs soot/burns  
- fever, toxic, unimmunised, membrane  
- fever, toxic, drooling  
- history / signs of neck trauma / strangulation  
- signs of SVC obstruction  
- cardiac signs  
-- other signs of hypocalaemia |

The commonest diagnosis in the child presenting with stridor is viral croup. Less common causes of stridor should always be considered,
An upper respiratory infection may make a mild chronic stridor worse (eg laryngomalacia)

E. MANAGEMENT
- Stridor is a symptom.
- From the history and examination deduce the most likely cause and determine the plan of treatment accordingly. See airway burns (4.28), and inhaled foreign body (3.31) for specific management plans. Croup (see section G)
- If unsure, seek senior help.
- If there is any suspicion of imminent airway obstruction see EMERGENCY MANAGEMENT

F. REFERRAL
Admit all children who:
- look unwell,
- are cyanosed,
- have severe stridor or respiratory distress.

Only children with mild viral croup should really be considered for discharge. No child with stridor should be discharged unless you are confident of the diagnosis.

G. CROUP
Croup refers to a clinical syndrome of a characteristic barking cough, inspiratory stridor and hoarseness of voice. As its other name (laryngotraceobronchitis) suggests, it results from (usually viral) inflammation of the upper airways. Symptoms are often worse at night and peak at around the second or third day of illness. There may be a fever of up to 40 deg.
3.30 ACUTE STRIDOR AND CROUP

General management

- Most attacks of croup are mild and self-limiting. However there is evidence from a Cochrane Review that all levels of severity of croup benefit from treatment with a single dose of steroid (see below). Milder forms of croup can be prevented from escalating to moderate or severe forms and treatment can help prevent re-attendance.
- Moderate – severe croup may require additional treatment.
- An assessment of croup severity is therefore first required and can be made during initial assessment of the child - use the Croup score below.
- Note that many croup scores have been developed and have a use in monitoring for improvement or deterioration but should not replace good clinical assessment and judgement.

CROUP SEVERITY SCORING

The Westley Modified Croup Score.

<table>
<thead>
<tr>
<th>Clinical Feature</th>
<th>Degree</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stridor</td>
<td>None</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>With agitation</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>At rest</td>
<td>2</td>
</tr>
<tr>
<td>Recession</td>
<td>None</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Mild</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Moderate</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Severe</td>
<td>3</td>
</tr>
<tr>
<td>Air entry</td>
<td>Normal</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Decreased</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Severely decreased</td>
<td>2</td>
</tr>
<tr>
<td>Cyanosis</td>
<td>None</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>With agitation</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>At rest</td>
<td>5</td>
</tr>
<tr>
<td>Consciousness level</td>
<td>Normal (including asleep)</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Altered / disorientated</td>
<td>5</td>
</tr>
</tbody>
</table>

Possible score 0 - 17

0 - 3 = mild
4 - 6 = moderate
7 - 17 = severe
3.30 ACUTE STRIDOR AND CROUP

Mild croup (score 0 - 3):  
- Administer oral steroids, 0.15mg/kg of dexamethasone (max dose of 10mg) or 2mg/kg of prednisolone (max dose of 40mg). If prednisolone given consider giving a second dose if residual symptoms of stridor are still present the following day as prednisolone is less effective than dexamethasone.  
- These children can safely be discharged from the ED with appropriate instructions.

Moderate croup (score 4 - 6):  
- Moderate croup may warrant admission or discharge depending on likely progress.  
- Administer oral steroids as above. If unable to administer steroids orally give budesonide 2mg nebulised.  
- Observe for a short period and reassess.  
- Reassessment is to determine if there is deterioration or improvement.  
- If improving, then discharge with advice and no further treatment.  
- If deteriorating, treatment is as for severe croup.  
- If still in doubt, err on the side of caution and admit (croup scores are not 100% clinically reliable)  
- Consider a further dose of steroid if the child is re-attending.

Observe moderate croup to see if the child is stabilising or deteriorating. If in doubt, admit, especially if child has a history of severe obstruction, or previous severe croup, or known structural upper airways abnormalities (e.g. laryngomalacia, tracheomalacia, vascular ring, Down’s syndrome).

Severe croup (score 7 - 17):  
SEE EMERGENCY MANAGEMENT

On discharge 
When planning to discharge also consider: time of day, parental concerns / compliance, access to GP review / other emergency services, availability of transport.

Give a detailed explanation and a croup advice sheet to the parents and reinforce the need to re-attend if there are any concerns. [Info leaflet available – No. 47 – Croup]. Document that this has been discussed.

Refs:  
RHSC Glasgow Croup guideline  

(Updated by Dr J Gilchrist April 2019)  
(Adapted for the ED by Mr C FitzSimmons & Dr A Smith May 2004, from Medical original)
3.31 INHALED FOREIGN BODIES
(See also 5.7 swallowed foreign bodies)

A. DEFINITION
The impaction of any foreign body in the upper or lower airways producing a variety of
symptoms and signs largely dependent upon the site of the impaction.

B. BACKGROUND / DIFFERENTIAL DIAGNOSIS
- Many objects can be inhaled.
- Common objects are plastic, toys and food.
- Toys with small parts should be avoided in all children under the age of 3 years.
- No child under the age of 15 months should be offered food such as popcorn, peas,
lollies, raw carrot or raw apple.
- Children under the age of 4 years should not be offered peanuts.

Differential diagnosis includes all causes of wheeze, cough and respiratory compromise.
Consider:
- asthma
- bronchiolitis
- wheeze associated viral illness
- pneumonias.

The history of a sudden onset in an otherwise well child +/- a choking episode is usually key.

C. EMERGENCY MANAGEMENT OF UPPER AIRWAY OBSTRUCTION

Call for senior ED, Anaesthetic and ENT help immediately
See section 3.2 “The choking child”.

D. GENERAL MANAGEMENT
The possibility of an inhaled foreign body should always be borne in mind in young children
(age 6 months - 4 years are most at risk) who present having had:
- an episode of choking
- an episode of cyanosis,
- an episode of stridor,
- altered consciousness,
- a persistent cough or wheeze
- dyspnoea,
- fever

An index of suspicion is required. Remember that many episodes are unwitnessed and the
history may be vague.
3.31 INHALED FOREIGN BODIES
(See also 5.7 swallowed foreign bodies)

Give oxygen if hypoxia

Record oxygen saturation, respiratory rate and heart rate. Look for:
- Asymmetrical chest movements.
- Tracheal deviation.
- Decreased breath sounds, wheeze, crackles.
- Examination may be entirely normal, especially early on.

Arrange a CXR (Look for:
- An opaque foreign body.
- Segmental or lobar collapse.
- Localised or asymmetric hyperinflation due to a ball-valve obstruction effect. (If this is seen request an expiratory film or, if child unable to cooperate, a lateral decubitus film with hyper inflated side down. This will make any asymmetry clearer.)
- The CXR may be completely normal.
- If symptoms are suggestive of foreign body in the upper airway an Xray of lateral soft tissues of the neck may be helpful, but should be discussed with an ED senior or ENT registrar and should not be done if there are any signs of airway compromise.

E. REFERRAL

All children with a significant history of choking / inhalation must be referred urgently to the ENT registrar on call – even if the child is now well with no clinical findings. Seek senior ED advice if unsure.

The child will usually be admitted for observation and probable bronchoscopy. Note: Foreign bodies in the nose (see section 5.7) have the potential to become inhaled foreign bodies. Although this is a rare complication children with nasal foreign bodies that cannot be removed in ED should also be referred to the ENT registrar on call.

(Section 3.31 reviewed by Dr J Gilchrist May 2019)
(Section 3.31 rewritten by Dr J Gilchrist, Aug 2008)
3.32 ACUTE BRONCHIOLITIS

A. AETIOLOGY
Respiratory syncytial virus (RSV) is the pathogen in 70 - 85% of cases. Other causes include parainfluenza, influenza, adenoviruses and human metapneumovirus.

B. DIAGNOSIS
Clinical features: Bronchiolitis generally occurs under 2 years and is most common in the under 1s, peaking between 3 and 6 months. Acute lower respiratory tract symptoms generally develop 2-3 days after a non-specific upper respiratory tract infection, typically in a young infant. Symptoms usually peak around day 3-5. The nasal discharge and cough are accompanied by increasing tachypnoea and respiratory distress, with or without audible wheeze and crackles, usually both. Leads to feeding difficulties, increasing respiratory distress, hypoxia and respiratory failure and exhaustion. Apnoea may be the presenting feature of RSV infection and this can be life threatening.

Examination: Infants develop a typical ‘moist’ cough, may be febrile (though high fever >39C is relatively uncommon) and have evidence of tachypnoea, tachycardia, sub & intercostal recession and head bobbing. Widespread fine inspiratory crepitations or wheeze (or both) develop on auscultation. In more severe cases hypoxia will be present, therefore monitor saturations – this can be difficult to detect clinically with cyanosis being uncommon. Exhaustion due to agitation and increased work of breathing may also develop. Younger children, especially under 6 weeks can present with apnoeas. Fever, usually <39C, occurs in 30%. Poor feeding is common, typically 3-5 days into the illness. Inadequate oral intake is <50% usual volume. Assess hydration status clinically.

NOTE: During the winter, RSV infection is so common that some infants with RSV infection will also have another potentially more serious condition such as congenital cardiac disease, UTI or meningitis. Always thoroughly assess all infants. If there is fever >39C or persistently focal crackles consider pneumonia.

Risk Factors for Severe Bronchiolitis
Age less than 6 weeks at presentation, preterm birth (particularly under 32 weeks) passive smoke in household Underlying disorders – chronic lung disease, congenital heart disease, neuromuscular disorders, immunodeficiency, multiple congenital abnormalities, severe neurological disease.
C. DIFFERENTIAL DIAGNOSES
Consider:
Viral pneumonia (often more unwell with a ‘clear chest’), ‘viral induced wheeze’, chlamydia pneumonia (typically a much more insidious onset at around 8-12 weeks), aspiration pneumonia; congenital lung disease (emphysema, cysts); cystic fibrosis; inhaled foreign body. Congenital heart disease with cardiac failure or obstructive such as TAPVD; septicaemia; severe metabolic acidosis.
Consider viral induced wheeze or early onset asthma in older children especially if there is wheeze without crackles, recurrent episodic wheeze, a strong personal or family history of atopy.

D. INVESTIGATIONS
Blood tests should not be performed routinely.
Capillary blood gas should not be performed routinely. Consider if severe worsening respiratory distress (O2 requirement >50%) or impending respiratory failure
CXR should not be performed routinely. Reserve for those with severe disease, underlying respiratory or cardiac disease, consider in those with persistent high pyrexia or atypical presentation or ahead of admission to HDU/PICU.
NPA (nasopharyngeal aspirate) can rapidly diagnose RSV by ELISA or fluorescent antibody techniques and should be performed in all those with suggestive history who are unwell enough to require admission (see below). Negative result does not exclude RSV. Even if the NPA is negative for RSV the infant will have another infective pathogen and represent an infection risk.
NB: There may be other concurrent bacterial infection and where the child has circulatory impairment or other signs compatible with septicaemia a ‘septic screen’ (+/- lumbar puncture) should be performed.

Routine Specimens (During RSV Season)
- Nursing staff will obtain the nasopharyngeal specimen and send to virology.
- A negative test does not exclude RSV infection and a repeat sample may be required in a patient with typical signs.

Urgent Specimens
- These are undertaken only if essential for the clinical management of the child or for infection control management, (e.g. a child being nursed in isolation anyway needs no test but a child placed in an RSV +ve bay needs to be tested as positive).
- This procedure will be reviewed each year.

• It is vital that all clinicians involved in the care of children with proven or likely RSV infection pay rigorous attention to basic infection control measures such as vigorous hand washing between all patients.

E. MANAGEMENT
1. Ensure adequate oxygenation. All children attending the ED with bronchiolitis require oxygen saturation measurement with pulse oximetry. Aim to keep saturations >90%.
2. Fluids. Restrict fluids to two thirds of requirements (danger of hyponatraemia in severe disease due to Inappropriate ADH. In moderately affected infants use nasogastric tube (remove if obviously causing an increase in respiratory distress) or give i.v fluids if severe
3.32 ACUTE BRONCHIOЛИTIS

disease. **Minimal handling.** Physiotherapy not of benefit and may be detrimental. (unless comorbidities e.g. spinal muscular atrophy)

3. **Corticosteroids and bronchodilators.** Do not use salbutamol, ipratropium, monteleukast or adrenaline in patients with acute bronchiolitis [Bronchodilators may be worth a *trial* in older infants if ‘viral wheeze’ is considered as a possible diagnosis].

4. **Antibiotics.** Antibiotics are not given routinely but should be considered for those with atypical disease, chest X-ray findings or progressive deterioration. Their main use is for the treatment of any co-morbidity, such as urinary tract infections.

5. **Respiratory support.** Some babies may require transfer to HDU / PICU for **CPAP** (continuous positive airway pressure) or **ventilation.** Consider CPAP in children with bronchiolitis who have impending respiratory failure, recurrent apnoeas, signs of exhaustion, and failure to maintain adequate oxygen sats (>90%) despite supplemental oxygen.

**High Flow Oxygen Therapy (HFOT)** is a form of ventilatory support for bronchiolitis. There is limited good quality evidence to show exactly when it should be used. It is likely that it is slightly more effective than low flow unhumidified oxygen (standard therapy) but not as effective as CPAP for respiratory failure.

HFOT comes with the additional practical difficulties of requiring specialised equipment if a patient is transferred on HFOT. SCH does not have this equipment. If the paediatric medical team assess a child and feel that they are a candidate for HFOT on the ward, they should discuss this with the ED nurse coordinator who will contact the bed manager to facilitate transfer to the ward ASAP. RSV status should not impede this fast-track process.

The only patients who should start HFOT in the ED are those that have been severe enough to need the PCCU unit team to physically review them. If the PCCU team feel that HFOT is the most appropriate intervention, it should be made clear that as a result, they must agree to transfer the patient to the ward / HDU using an anaesthetic circuit in order to provide PEEP during transfer.

6. **Suction**

Do not routinely perform upper airway suction but consider if feeding difficulty, respiratory distress or history of witnessed apnoeic spells
3.32 ACUTE BRONCHIOLOGIS

- **F. MANAGEMENT ALGORITHM**

<table>
<thead>
<tr>
<th>Minimal respiratory distress RR&lt;50</th>
<th>Mild-moderate resp distress RR 50-70</th>
<th>Moderate-severe resp distress RR&gt;70</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimal respiratory distress RR&lt;50</td>
<td>Minimal respiratory distress RR 50-70</td>
<td>Minimal respiratory distress RR&gt;70</td>
</tr>
<tr>
<td>O2 sats 92% or more in air Feeding well No risk factors* No social concerns Parents happy for discharge</td>
<td>O2 sats 90%-91% in air Parental anxiety</td>
<td>O2 sats &lt;90% Unwell/toxic Poor feeding Apnoea</td>
</tr>
</tbody>
</table>

**Mild bronchiolitis**
- Home
  - Advice to parents:
    - Small volume frequent feeds
    - Return if deterioration in symptoms (i.e: reduced feeds or working harder with resp.)
    - Explain increased respiratory rate, recession & grunting
  - Advise not to smoke at home
  - Follow up with GP if necessary or back to ED if acutely unwell
  - Give bronchiolitis leaflet no 26 / smoking cessation booklet
  - *If risk factors present, but mild symptoms, patient must be seen by ED senior before discharge

**Moderate bronchiolitis**
- Refer to medics
  - Will need period of assessment including O2 sats, feeding & respiratory distress
  - If improves & feeding OK may be discharged with same advice

**Severe bronchiolitis**
- Admit
  - NPA
  - Will need O2 +/- support with feeding
  - Consider prompt transfer to ward for HFOT
  - Consider use of CPAP in impending resp failure
3.32 ACUTE BRONCHIOILITIS

G. ADMISSION vs DISCHARGE

ADMIT from the ED to hospital any child with features of severe bronchiolitis: apnoea (observed or reported), persistent oxygen saturation of less than 90% when breathing air, inadequate oral fluid intake (<50% of usual volume, taking account of risk factors* and using clinical judgement), persisting severe respiratory distress, for example grunting, marked chest recession, or a respiratory rate of over 70 breaths/minute.

Risk factors - chronic lung disease (including bronchopulmonary dysplasia), haemodynamically significant congenital heart disease, age in young infants (under 6 weeks), premature birth, particularly under 32 weeks, neuromuscular disorders, immunodeficiency.

When deciding whether to admit a child, take into account factors that might affect a carer's ability to look after a child with bronchiolitis, for example: social circumstances, the skill and confidence of the carer in looking after a child with bronchiolitis at home, confidence in being able to spot red flag symptoms

REFER for further assessment children with features of moderate bronchiolitis

DISCHARGE patients with mild bronchiolitis

On discharge, provide key safety information for parents and carers to take away for reference for children who will be looked after at home. Give them ED Leaflet 26 'Bronchiolitis'.

This includes information on how to recognise developing 'red flag' symptoms.

Advise parents that people should not smoke in the child's home because it increases the risk of more severe symptoms in bronchiolitis

Note that on discharge it is worth informing parents that it may take up to 3 weeks for cough to resolve post infection. 10% last > 3 weeks.

For ongoing management see SC(NHS)FT Paediatric Medicine guidelines handbook online.

References

NICE 2015 Bronchiolitis in Children NG9
Oxygen saturation targets in infants with bronchiolitis (BIDS): a double-blind, randomised, equivalence trial, Cunningham S et al for the Bronchiolitis of Infancy Discharge Study (BIDS) group, vol 386, No. 9998, p1041-1048, 2015

Section 3.33 updated by Dr D O'Donnell and Dr J Liao July 2020
(Section 3.32 Updated by Dr J Gilchrist July 2019)
(Written by Dr M Everard, Aug 2002)

[Info leaflets available – No. 26 - Bronchiolitis]
3.32 ACUTE BRONCHIOLITIS

H. BRONCHIOLITIS OPERATIONAL POLICY

The bronchiolitis operational policy is shown. This is subject to an annual review and this seasons policy is displayed in the ED and AAU. (This is a Trust Operational Policy on RSV Management, Developed and agreed by the multi-speciality bronchiolitis group, and reviewed annually.

**Bronchiolitis operational policy**

<table>
<thead>
<tr>
<th>GP referral</th>
<th>Self referral</th>
</tr>
</thead>
<tbody>
<tr>
<td>Triage</td>
<td>Triage</td>
</tr>
<tr>
<td>AAU</td>
<td>AAU</td>
</tr>
<tr>
<td>Cat C,D+E</td>
<td>Cat A+B</td>
</tr>
<tr>
<td>AAU</td>
<td>All ED</td>
</tr>
<tr>
<td>Medical SHO to assess</td>
<td>ED</td>
</tr>
</tbody>
</table>

For discharge?  
NPA NOT required

For admission?  
Send off NPA (mark form "for admission") liaise with ward

If Admission time > 30 minutes contact 524 bleep holder

Admit to Ward  
(Use bronchiolitis sheet)  
NB - AAU now open 24 hours per day  
Assessed by nursing and medical staff

Very sick?  
ICU/HDU as appropriate

**Note:**

1. Patients admitted to the ward who are not high risk will initially be nursed together pending the result of the NPA when they will be separated according to their RSV status. This will likely occur the following day. There is **NO** need to wait for the NPA result to admit any patient (high risk or not).

2. If there are problems with transferring a patient to the ward this should be taken up with the bed manager or consultant in the ED **NOT** with the ward staff.

NB DO NOT AWAITS NPA RESULT IN ED OR AAU
3.33 PNEUMONIA - COMMUNITY ACQUIRED

A. DEFINITION
The British Thoracic Society defines this as “the presence of signs and symptoms of pneumonia in a previously healthy child due to an infection which has been acquired outside hospital.”

B. EMERGENCY MANAGEMENT
Immediate attention must be to assessing the airway, breathing and circulation. If respiratory distress +/- hypoxia (O2 sats ≤ 92%) give high flow O2 and call for senior ED/medical help.

C. CLINICAL FEATURES
Diagnosis may be difficult. Bacterial pneumonia should be considered in children when there is persistent or repetitive fever >38.5°C together with chest recession and a raised respiratory rate. In children older than 3 years a history of difficulty breathing is an additional valuable symptom. Other symptoms include cough, chest pain, wheeze, abdominal pain and headache. If wheeze is present in a pre-school child, bacterial pneumonia is unlikely.

D. INVESTIGATION
Chest X-ray should not be considered a routine investigation in children thought to have community acquired pneumonia. CXR should not be performed routinely in children with mild, uncomplicated acute lower respiratory tract infection, as there is a poor correlation between clinical signs & CXR findings. CXR should be carried out in the following situations:
- Significant hypoxia (when patient stabilised-consider portable CXR, although may be poorer quality than departmental film).
- Evidence of pleural effusion / empyema.

E. MANAGEMENT
Mild pneumonia may not justify admission and can be managed with oral antibiotics if the child can tolerate oral fluids.

Indications for admission to hospital include:
- SpO2 ≤ 92% on air or cyanosis.
- RR >70/min in infants, or >50/min in older children.
- Significant tachycardia
- Increased work of breathing
- Intermittent apnoea in infants or grunting in any age.
3.33 PNEUMONIA - COMMUNITY ACQUIRED

(Continued -)

- Poor feeding or signs of dehydration.
- Chronic heart or lung conditions
- Family not able to provide appropriate observation or supervision.

Neonates will probably all require admission as should rarely be considered to have a mild pneumonia.

E. MANAGEMENT

If safe to discharge home:
- Amoxicillin is the first line drug at any age if mild bacterial pneumonia is suspected.
- Give clarithromycin if penicillin allergic.

Consider adding clarithromycin if fever persists but still well enough to be managed in the community.

The child should be reviewed after 48hrs by GP / hospital if not improving

F. AETIOLOGY & EPIDEMIOLOGY

Pneumonia is uncommon, with an incidence around 0.5% per year in children aged 15yrs and under, being more common in the under 2’s. Age is a good predictor of likely pathogens:

<table>
<thead>
<tr>
<th>Age</th>
<th>Likely Pathogen(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NEONATAL</td>
<td>Group B Streptococcus, Listeria, Staph aureus, Gram -ve</td>
</tr>
<tr>
<td>1 MONTH – 2 YEARS</td>
<td>Viral common, Strep pneumoniae, Staph aureus, Gram –ve, Consider Chlamydia</td>
</tr>
<tr>
<td>2 - 5 YEARS</td>
<td>Viral common, Strep pneumoniae, Consider mycoplasma and chlamydia</td>
</tr>
<tr>
<td>&gt;5 YEARS</td>
<td>Strep pneumonia, Mycoplasma, Possibly still viral, Consider chlamydia</td>
</tr>
</tbody>
</table>


(Also see antibiotics – 2.2 – 2.4)

(Section 3.33 reviewed by Dr J Gilchrist, June 2019)
(Written by Dr S Ireland, Aug 2004)
3.34 DIARRHOEA & VOMITING

A. DEFINITION
When assessing a child with diarrhoea and vomiting it is essential to clarify how the terms are being used, as parental ‘definitions’ vary widely. Diarrhoea is the passage of frequent / loose stools with increased water content. Differentiate vomiting from possetting in infants.

B. ASSESSMENT
- Duration, frequency and magnitude of the symptoms. Feeding, foreign travel, contacts, respiratory symptoms (often with rotavirus), medications (including antibiotics), urine output. Ask about blood in either diarrhoea or vomit. Ask about fevers
- Ask specifically about bile stained (Green) or projectile vomiting (young infants) as this may indicate a surgical problem.
- **Record weight**, as this may help assess level of dehydration
- Assess for signs of dehydration. (see below)
- Beware hypernatraemic dehydration, where the child may be drowsy but other signs of dehydration are relatively masked. (Look for jittery movements, increased tone, convulsions)
- Assess for signs that would indicate an alternative diagnosis to gastroenteritis (NBR, bulging fontanelle, Abdominal distension / tenderness, altered conscious level etc)

<table>
<thead>
<tr>
<th>SYMPTOMS / SIGNS</th>
<th>NO CLINICALLY DETECTABLE DEHYDRATION</th>
<th>CLINICAL DEHYDRATION</th>
<th>CLINICAL SHOCK</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Appears well</td>
<td>*Appears to be unwell or deteriorating</td>
<td>Looks very unwell</td>
</tr>
<tr>
<td>Alert and responsive</td>
<td>*Altered responsiveness</td>
<td>Decreased conscious level</td>
<td></td>
</tr>
<tr>
<td>Normal urine output</td>
<td>Decreased urine output</td>
<td>Oliguric / Absent UO</td>
<td></td>
</tr>
<tr>
<td>Skin colour unchanged</td>
<td>Skin colour unchanged</td>
<td>Pale or mottled skin</td>
<td></td>
</tr>
<tr>
<td>Warm extremities</td>
<td>Warm extremities</td>
<td>Cold extremities</td>
<td></td>
</tr>
</tbody>
</table>

NO CLINICALLY DETECTABLE DEHYDRATION, CLINICAL DEHYDRATION, CLINICAL SHOCK
### 3.34 DIARRHOEA & VOMITING

<table>
<thead>
<tr>
<th>NO CLINICALLY DETECTABLE DEHYDRATION</th>
<th>CLINICAL DEHYDRATION</th>
<th>CLINICAL SHOCK</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SIGNS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eyes normal</td>
<td><em>Sunken eyes</em></td>
<td>-</td>
</tr>
<tr>
<td>Moist mucus membranes</td>
<td>Dry mucus membranes</td>
<td>-</td>
</tr>
<tr>
<td>Normal heart rate</td>
<td><em>Tachycardia</em></td>
<td>Tachycardia Bradycardia (late sign)</td>
</tr>
<tr>
<td>Normal breathing pattern</td>
<td><em>Tachypnoea</em></td>
<td>Tachypnoea</td>
</tr>
<tr>
<td>Normal peripheral pulse</td>
<td>Normal peripheral pulse</td>
<td>Weak peripheral pulse</td>
</tr>
<tr>
<td>Normal capillary refill</td>
<td>Normal capillary refill</td>
<td>Prolonged capillary refill</td>
</tr>
<tr>
<td>Normal skin turgor</td>
<td><em>Reduced skin turgor</em></td>
<td>-</td>
</tr>
<tr>
<td>Normal blood pressure</td>
<td>Normal blood pressure</td>
<td>Hypotension (decompensated shock)</td>
</tr>
</tbody>
</table>

* = red flag signs and symptoms

The following children are at increased risk of dehydration
- Infants, especially under 6 months
- Low birth weight infants
- Malnourished
- Already refusing fluids
- Infants who have stopped breastfeeding during the illness
- Profuse diarrhoea or vomiting

### C. DIFFERENTIAL DIAGNOSES

Whilst gastroenteritis is common, children may develop diarrhoea and vomiting for other reasons. It should not be assumed that the cause is a primary gastrointestinal problem, particularly if just vomiting and no diarrhoea. Consider:
- Other infections e.g. UTI, otitis media, pneumonia, meningitis, tropical, SEPSIS
- Surgical intestinal disease e.g. intussusception, appendicitis, small intestine obstruction.
- Poisoning (accidental / deliberate / NAI)
- Metabolic abnormality Especially Diabetic Ketoacidosis (DKA)
- Neurological (RICP, SOL)
- Pregnancy related

### D. INVESTIGATION

- Gastroenteritis is usually a mild self-limiting disease needing no investigation.
  Send stool sample if bloody diarrhoea, persistent diarrhoea ( > 7 days), suspected septicaemia, immunocompromised and consider in returning travellers. (See below).
3.34 DIARRHOEA & VOMITING

- Severely dehydrated children will need U&Es, glucose and capillary gas. Beware the unwell, pale, oliguric child. Send FBC and U&Es to exclude Haemolytic Uraemic Syndrome (HUS) and check Blood Pressure.
- Routine measurement of glucose is unnecessary unless you clinically suspect hypoglycaemia e.g. a drowsy infant.

F. MANAGEMENT

Diarrhoea & vomiting

Triage

signs of shock

IV access
Urgent U & Es, glucose and blood gas

call for help
Give 20mls/lg 0.9% sodium chloride
Reassess and repeat bolus if required

signs of dehydration
not shocked

1.0 mls/kg/5 mins ORS (dioralyte)

0.5 mls/kg/5 mins water or dilute juice or use ORS if at increased risk of dehydration (see notes above)

signs of shock

ED Dr assessment

No signs of dehydration

signs of dehydration
(not shocked)

Diagnosis in doubt.
Severe abdominal pain.
Less than 3/12.
High fever.
Parents unable to manage at home
Underlying disease.
Evidence of anaemia, thrombocytopenia, poor urine output or hypertension (HUS).

not tolerating ORS after 1 hour trial

consider NG/IV fluids as per SCH (NHS)FT medical guideline

tolerating ORS

continue ORS and monitor

No to any

Yes to any

Discuss with ED Senior or Medical SpR if overnight

Discharge with written and verbal advice (see below)

Refer

Always consider possible SEPSIS if the child is shocked!
Give IV / IO antibiotics without delay if Sepsis is likely

Consider notifying public health if you suspect an outbreak of gastroenteritis
3.34 DIARRHOEA & VOMITING

Discharge advice
- Parents should avoid giving fizzy drinks, fruit juices or sports drinks as these are usually electrolyte poor and high in glucose, which can worsen diarrhoea.
- **In infants advise to continue breastfeeding and other formula feeds.**
- Return to **NORMAL** diet as soon as possible; however, avoid foods high in fat or sugars. It is also better to avoid acidic foods (e.g. oranges) and spicy foods to begin with.
- Children should be kept from school/nursery until 48 hours after resolution of symptoms.
- Children should not swim in swimming pools for 2 weeks after the last episode of diarrhoea.
- All children with gastroenteritis should be advised to seek further medical advice if the diarrhoea recurs, or persists over 7 days (preferably GP). The stools should then be sent for culture and follow-up by GP arranged.

NOTES
- Anti-emetic and anti-diarrhoeal agents are not indicated.
- Antibiotics are rarely indicated in diarrhoea.
- Chronic diarrhoea requires referral back to GP to monitor weight and for consideration of outpatient referral for investigation.

References:
NICE Guideline 84: Diarrhoea and Vomiting in Children, April 2009
https://www.nice.org.uk/guidance/cg84

World Health Organisation

(Section 3.34 reviewed and updated by Dr C Rimmer May 2019)
[Info leaflet available – No. 16 - D&V]
3.35 URINARY TRACT INFECTION (UTI)

A. BACKGROUND
Urinary tract infection (UTI) is one of the most common bacterial infections. Making the diagnosis is particularly difficult in young children and infants because of non-specific clinical signs and the difficulty of urine collection in the non-toilet-trained. Although the vast majority of children who have a urine infection recover promptly and do not have any long-term complications, there is a small subgroup at risk of significant morbidity.

B. DEFINITION OF UTI
A UTI is a combination of clinical features together with a significant growth of bacteria in the urine.

Clinically, UTI may present with symptoms that suggest an upper or lower tract UTI. Upper UTI (pyelonephritis) presents principally with fever (≥ 38°C) and other symptoms indicative of systemic illness and in older children may include loin pain or tenderness.
Lower UTI (cystitis) presents with symptoms including dysuria, urinary frequency and lower abdominal pain.
There may be a mixture of symptoms therefore it is not possible from symptoms alone to be sure about the site of the UTI. Also, remember that these symptoms may (and often do) have other causes.

C. INVESTIGATION
Diagnosis requires consideration of the possibility of UTI, collection of urine and interpretation of the results of urinalysis including dipstick analysis and culture results.

a) When to collect a urine sample to look for UTI

1. Infants and children presenting with unexplained fever of 38°C or higher should have a urine sample tested

Infants and children with an alternative site of infection should not have a urine sample tested. When infants and children with an alternative site of infection remain unwell, urine testing should be considered after 24 hours at the latest.

GI symptoms including diarrhoea can be an associated symptom and do not dismiss the possibility of UTI because of diarrhoea unless there is clear history or evidence compatible with another cause for the diarrhoea. Also, don’t dismiss bacterial growth in urine as contamination when there is diarrhoea.

In an infant or child with a high risk of serious illness (see management of the feverish child guidelines, section 3.15) try collecting a urine sample. However; treatment should not be delayed if a urine sample is unobtainable.
3.35 URINARY TRACT INFECTION (UTI)

2. Infants and children with symptoms and signs suggestive of UTI should have a urine sample tested for infection.
The table below indicates the most usual presenting symptoms and signs in infants and children with UTI.

<table>
<thead>
<tr>
<th>Age group</th>
<th>Symptoms and signs</th>
<th>Most common</th>
<th>Least common</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infants younger than 3 months</td>
<td>Fever</td>
<td>Poor feeding</td>
<td>Abdominal pain</td>
</tr>
<tr>
<td></td>
<td>Vomiting</td>
<td>Failure to thrive</td>
<td>Jaundice</td>
</tr>
<tr>
<td></td>
<td>Lethargy</td>
<td></td>
<td>Haematuria</td>
</tr>
<tr>
<td></td>
<td>Irritability</td>
<td></td>
<td>Offensive urine</td>
</tr>
<tr>
<td>Infants and children, 3 months or older</td>
<td>Abdominal pain</td>
<td>Loin tenderness</td>
<td>Lethargy</td>
</tr>
<tr>
<td></td>
<td>Vomiting</td>
<td>Poor feeding</td>
<td>Irritability</td>
</tr>
<tr>
<td>Preverbal</td>
<td>Fever</td>
<td></td>
<td>Haematuria</td>
</tr>
<tr>
<td></td>
<td>Frequency</td>
<td>Dysfunctional voiding</td>
<td>Offensive urine</td>
</tr>
<tr>
<td>Verbal</td>
<td>Dysuria</td>
<td>Changes to continence</td>
<td>Fever</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Abdominal pain</td>
<td>Malaise</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Loin tenderness</td>
<td>Vomiting</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Haematuria</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Offensive urine</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Cloudy urine</td>
</tr>
</tbody>
</table>

b) How to collect a urine sample to look for UTI
1. A clean catch urine (CCU) sample is the recommended method for urine collection.
2. When it is not possible or practical to collect urine by non-invasive methods, try suprapubic aspiration (SPA) ideally with ultrasound guidance or catheter sample.

(Details of urine collecting techniques are given in the medical guidelines, section 8)

c) Urine testing
Dipstick and Microscopy – guides immediate management
Culture and Sensitivities – gives delayed but more definitive information

d) Requests for urine microscopy and culture, urine preservation and transport to laboratory
1. Always state the method of urine collection on the request form and in the notes
2. If there is any delay in transporting the urine to the laboratory, the urine must be placed in the sample fridge. Urine samples kept in this way overnight can be sent to the laboratory and give reliable results.
3. In usual laboratory hours, send urine for culture if indicated but if microscopy results are required urgently, contact the laboratory reception to request this (x13127).

4. Out of usual laboratory hours:
Contact the on call microbiology technician for all < 3 months for urgent microscopy if the result will alter clinical management overnight.
3.35 URINARY TRACT INFECTION (UTI)

D. DIAGNOSIS AND MANAGEMENT
Assess degree of severity of illness in conjunction with 3.15 FEBRILE CHILD UNDER 5 YEARS WITHOUT A FOCUS and 3.16 Recognition and Treatment of Sepsis. Set up for urine collection if not already done.

a) INFANTS < 3 months will need referral to the medics as additional investigations are likely to be required. Any baby < 3 months old with a fever > 38 MUST be referred to the medics. Any baby < 3 months old with a suspected UTI should be referred.

Send urine for an urgent microscopy and culture

Note: Dipstick testing in babies < 3 months old may be inaccurate. Positive bacterial culture is the gold standard and if the child is well enough, it is better to wait for a definitive result than to act on an equivocal microscopy or dipstick.

Notes: for all ages
- Lower levels of pyuria may simply be secondary to fever itself or infection elsewhere.
- The presence of squamous epithelial cells may suggest urine contamination as they are derived from the skin.
- The presence of RBCs is not uncommon in acute UTI in children. However, it is important to establish that the haematuria resolves with the treatment of any UTI, thus follow-up dipstick test should be arranged with the GP if haematuria present.

b) ED MANAGEMENT OF U.T.I. > 3 months OLD

![Flowchart Diagram]

* High risk groups (lower threshold for investigating)
- previous UTI
- recurrent PUOs
- antenatal diagnosis of renal abnormalities
- family history of vesico-ureteric reflux / renal disease
- enlarged bladder
- abdominal mass
- hypertension
- poor growth / FTT

CONSIDER

Collect clean catch urine sample for dipstick

See table below
### 3.35 URINARY TRACT INFECTION (UTI)

<table>
<thead>
<tr>
<th>Dipstick result</th>
<th>Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nitrite positive *LE positive</td>
<td>Commence antibiotics and ensure urine has been sent for culture</td>
</tr>
<tr>
<td>Nitrite positive *LE negative</td>
<td>If symptoms strongly suggest UTI give antibiotics. Otherwise await culture results</td>
</tr>
<tr>
<td>Nitrite negative *LE positive</td>
<td>Await culture results</td>
</tr>
<tr>
<td>Nitrite negative *LE negative</td>
<td>UTI very unlikely. Clinically re-evaluate patient / d/w ED senior</td>
</tr>
</tbody>
</table>

*LE = Leucocyte Esterase

**For all ages:** In addition to the degree of illness and the initial management it is important to gather and record the following information about risk factors for UTI and serious underlying pathology (NICE guideline):

- poor urine flow
- history suggesting previous UTI or confirmed previous UTI
- recurrent fever of uncertain origin
- antenatally diagnosed renal abnormality
- family history of vesicoureteric reflux (VUR) or renal disease
- constipation
- dysfunctional voiding
- enlarged bladder
- abdominal mass
- evidence of spinal lesion
- poor growth
- high blood pressure

**ALWAYS record BP, Height, Weight and Temperature**

**c) Antibiotic Treatment**

If > 3 months old and well enough for home, treat with oral Trimethoprim for 3 days if lower UTI suspected and 7 days if upper UTI suspected. Alternatives are cephalexin or co-amoxiclav. If no improvement in 24 - 48 hours advise to return for urgent review.

If on prophylactic antibiotics and UTI is likely, give an alternative antibiotic and NOT the therapeutic dose of the prophylactic antibiotic. Stop prophylactic antibiotics for the duration of the treatment course.

Prophylactic antibiotics are not recommended for **routine use** after first-time UTI

If treating a UTI, ensure that parents are given a UTI information leaflet.

**d) Advice to children, young people, and parents/carers**

- Advise parents that they will be contacted if culture results will change management.
- Ensure information is given about the need for treatment, the importance of completing any course of treatment and advice about prevention and possible long-term management.
3.35 URINARY TRACT INFECTION (UTI)

- Ensure they are aware of the possibility of a UTI recurring and understand the need to be vigilant and to seek prompt treatment for any suspected reinfection.

Preventing recurrence of UTI
- Address constipation
- Encouraging children to drink an adequate amount
- Emphasising the importance of not delaying voiding

E. MIDDLE GRADE REFERRAL FOR PAEDIATRIC FOLLOW-UP

Positive urine results are emailed to scn-tr.microbiology.reports@nhs.net daily. The responsibility for checking this report lies with the ED Middle Grade. Review the ED notes. A pure growth of $10^5$ organisms per ml represents a confirmed UTI in the presence of appropriate symptoms. However it is recognised that lower levels of bacterial growth, ie $10^4 - 10^5$ may represent UTI if there are very suggestive symptoms and clinical judgement is required in these cases.

Further information via telephone follow-up may help decide whether antibiotics are appropriate or whether samples need to be repeated. If confirmed UTI inform the parents of the confirmation of UTI, and advise them if there is a referral to paediatric outpatients (<6 months, atypical or recurrent UTI). There are standard referral letters available for this purpose. Please also ensure that the parents are given/sent a UTI leaflet and a renal ultrasound is requested if no previous renal scan on ICE.

The following children will need to be referred to Paediatric Outpatients and should have an ultrasound requested at referral.

- All children under 6 months
- Children over 6 months who clinically have had pyelonephritis, atypical infection, where there has been difficulty in treating UTI successfully, recurrent UTI or evidence of dysfunctional voiding (e.g. diurnal urinary incontinence or secondary nocturnal enuresis) and are not currently under a General Paediatrician

An “atypical” UTI as defined below may also suggest a higher risk of underlying abnormalities:

- failure to respond to treatment with suitable antibiotics within 48 hours
- infection with non-E. coli organisms.
- poor urine flow

Recurrent UTI is defined by NICE as:
- two or more episodes of UTI with acute pyelonephritis/upper urinary tract infection, or
- one episode of UTI with acute pyelonephritis/upper urinary tract infection plus one or more episode of UTI with cystitis/lower urinary tract infection, or
- three or more episodes of UTI with cystitis/lower urinary tract infection

Referral may not be needed for adolescent girls with recurrent cystitis alone, especially if sexually active. However, if there is clinical concern or other reason to investigate, refer. Asymptomatic bacteriuria is not an indication for follow-up.
3.35 URINARY TRACT INFECTION (UTI)

Prophylactic antibiotics are not recommended for routine use after first-time UTI. Consider use of prophylactic antibiotics (trimethoprim, nitrofurantoin or cephalexin) if recurrent UTI. Base choice on sensitivity pattern of infecting organism.

Infants and children who are asymptomatic following an episode of UTI should not routinely have their urine re-tested for infection.

References:

(Section 3.35 revised by Dr G. Ehidiamhen Jan 2020)
3.36 CONSTIPATION & SOILING

GUIDELINES FOR THE MANAGEMENT OF

A. DEFINITIONS

B. ORGANIC CAUSES OF CONSTIPATION

C. ASSESSMENT

D. MANAGEMENT

E. INDICATIONS FOR SPECIALIST CLINIC REFERRAL

NB for complete guideline see paediatric medicine guidelines on intranet

Constipation is a common problem in children. It can present in a variety of ways – most commonly pain or difficulty on defaecation, abdominal pain or soiling. It may be associated with urinary symptoms and/or behavioural and psychological problems. The keys to constipation management are early recognition and treatment, a long treatment course, education, close follow up and support.

A. DEFINITIONS

Constipation is the passage of hard or painful stool more infrequently than usual for two weeks or more. Some children may have regular bowel movements but evidence of incomplete evacuation e.g. abdominal distension, palpable faecal mass, soiling etc.

Soiling is the involuntary passage of stool. Constipation is the cause in 95% of cases when there is leakage of (usually) soft or liquid stool around retained stool in the rectum.

Encopresis is the passage of stool in inappropriate places.

B. ORGANIC CAUSES OF CONSTIPATION

The majority of constipation is idiopathic or “functional” but other causes should always be considered. In many toddlers the problem arises from “stool withholding” possibly as a result of previously painful defaecation.

Possible causes are: Dietary, drugs, cow’s milk protein intolerance, coeliac disease, Hirschsprung’s disease, structural defects, perianal disease, spinal cord defects, neuromuscular disorders, metabolic and endocrine disorders (e.g. hypercalcaemia, hypothyroidism), psychosocial, developmental / learning disorders.

C. ASSESSMENT

Careful history and examination will identify the problem in the majority of children

History

- Stool pattern
- Frequency
- Consistency (large hard stool / ‘rabbit droppings’ / overflow)
- Symptoms associated with defecation: anal pain and/or bleeding, abdominal pain, straining
- Timing of onset: Onset at birth (red flag) or after
- Precipitating factors: fissure, change of diet, timing of potty/toilet training or acute events such as infections, moving house, starting nursery/school, fears and phobias, major change in family, taking medicines
- Timing of passage of meconium (>48 hours after birth - red flag)
- General history including growth, weight loss, nausea & vomiting, neurological problems, family history, diet and meal routines, fluid intake, drugs (laxatives and other).
3.36 CONSTIPATION & SOILING
GUIDELINES FOR THE MANAGEMENT OF

Examination
- General.
- Abdomen: Distension, tenderness, masses, perineum (fissures, anal ectopia, abuse, fistulae, infection). PR is rarely necessary and should not be done in ED.
- Growth.
- Neurological status; particularly inspection of the spine and lower limb reflexes.

Investigation is only necessary in certain situations as a thorough history and examination usually indicates the cause.
- Do not use an AXR to diagnose idiopathic constipation.
- Refer to paediatrician if further investigation indicated.

D. MANAGEMENT
Early and adequate treatment is essential.

Education and advice: There are many misconceptions about constipation and soiling. It is essential that family and child understand the pathophysiology of the problem prior to starting treatment. Parents often have major concerns about laxative use but there is no evidence that long-term laxative use in children causes atonic bowel. A child who is soiling must be managed in a blame free environment and it is vital that all understand that the soiling is involuntary.

Diet and Fluids: Dietary interventions should not be used as sole therapy for constipation. Advise families that a balanced diet should include a) adequate fluid intake and b) adequate dietary fibre e.g. Fruit, vegetables, high fibre bread, baked beans, wholegrain breakfast cereals.

Laxatives:
Aim first to clear retained or impacted stool and then establish a normal bowel pattern (97% of normal children pass stool between 2 times a day and every 2 days).

Points to note regarding laxative treatment:
- The doses shown below are starting doses. Many children need considerably higher doses to achieve clearance of stool and maintain regular evacuation. Doses should be titrated against symptoms to achieve a regular, soft stool.
- Movicol Paediatric Plain is flavourless and can be mixed with squash, juice or milk. Each sachet needs to be mixed with at least 63mls of water
- A child may start to soil or have increased soiling when laxatives are first started. This is usually due to increased overflow but is often misinterpreted as over treatment and hence laxatives are stopped. In this situation continued or increased medication is required to clear the retained stools.
- Start with a small dose as indicated in the following table and slowly build up – this reduces soiling and abdominal pain. Many children experience abdominal pain when faecally loaded. This usually resolves once retained stools are cleared.
- Use laxatives in combination with behavioural therapy e.g. Ensure child and family understand pathophysiology, remove blame, encourage regular routine – e.g. sitting on toilet after meals; improve fluid intake; discourage holding on. Laxatives are often needed for many months/years and relapse rate is high. Ensure follow-up is arranged when a child is started on laxatives – usually with GP.
3.36 CONSTIPATION & SOILING
GUIDELINES FOR THE MANAGEMENT OF

D. MANAGEMENT

Laxative

<table>
<thead>
<tr>
<th>DRUG CLASS</th>
<th>DRUG</th>
<th>STARTING DOSE</th>
<th>NOTES</th>
</tr>
</thead>
<tbody>
<tr>
<td>MACROGOLS</td>
<td>Movicol</td>
<td>Maintenance therapy</td>
<td>Increase in 1 sachet stages.</td>
</tr>
<tr>
<td></td>
<td>Paediatric</td>
<td>&lt; 1 yr: ½–1 sachet od</td>
<td>(no need to use additional softener)</td>
</tr>
<tr>
<td></td>
<td>Plain</td>
<td>1–6 yrs: 1 sachet od</td>
<td>Maximum 4 sachets daily &gt;1 yr</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6–12 yrs: 2 sachets od</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Disimpaction regime</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>&lt; 1 yr: ½–1 sachet daily</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1–5 yrs: 2 sachets on 1st day, then 4</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>sachets daily for 2 days, then 6 sachets daily for 2 days, then 8 sachets daily</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>5–12 yrs: 4 sachets on 1st day, then increased in steps of 2 sachets daily to maximum of 12 sachets daily</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Maintenance: 1 – 2 sachets daily</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(other osmotic laxatives include Laxido and CosmoCol which patients may be on from the GP)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lactulose</td>
<td>&lt;1yr</td>
<td>2.5 ml bd</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1-5yrs</td>
<td>2.5 – 10 ml bd</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5-18yrs</td>
<td>5 – 20 ml bd</td>
</tr>
<tr>
<td>STIMULANTS</td>
<td>Sodium Picosulfate*</td>
<td>1/12 - 4yrs</td>
<td>2.5-10mls o.d</td>
</tr>
<tr>
<td></td>
<td>Sodium</td>
<td>4 - 18yrs</td>
<td>2.5-20mls o.d</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Increases in 1ml stages.</td>
<td>Increases in 2.5ml stages.</td>
</tr>
<tr>
<td></td>
<td>Docusate</td>
<td>6/12 – 2 yrs</td>
<td>12.5 mg tds</td>
</tr>
<tr>
<td></td>
<td>Sodium</td>
<td>2–12 yrs</td>
<td>12.5–25 mg tds</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&gt;12 yrs:</td>
<td>up to 500 mg daily in divided doses</td>
</tr>
<tr>
<td></td>
<td>Picolax</td>
<td>½ to 1 sachet (5-10mg) daily</td>
<td>Rapid and dramatic action.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Good for initial clearout.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>May be used as extra boost at weekends.</td>
</tr>
</tbody>
</table>

*NICE guidance recommended doses. Informed consent should be obtained for

SOFTENERS

<table>
<thead>
<tr>
<th>DRUG</th>
<th>STARTING DOSE</th>
<th>NOTES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lactulose</td>
<td>&lt;1yr</td>
<td>2.5 ml bd</td>
</tr>
<tr>
<td></td>
<td>1-5yrs</td>
<td>2.5 – 10 ml bd</td>
</tr>
<tr>
<td></td>
<td>5-18yrs</td>
<td>5 – 20 ml bd</td>
</tr>
<tr>
<td></td>
<td>Lactulose has a poor cost/benefit ratio. It is likely to cause overflow incontinence and is usually best avoided due to unpleasant side effects.</td>
<td></td>
</tr>
</tbody>
</table>

SUPPOSITORY IES

<table>
<thead>
<tr>
<th>DRUG</th>
<th>STARTING DOSE</th>
<th>NOTES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glycerol</td>
<td>1-11 months</td>
<td>1g</td>
</tr>
<tr>
<td></td>
<td>1-11 years</td>
<td>2g</td>
</tr>
<tr>
<td></td>
<td>12-17 years</td>
<td>4g</td>
</tr>
<tr>
<td>Bisacodyl (Dulco-lax)</td>
<td>2-17 years</td>
<td>5 – 10mg</td>
</tr>
<tr>
<td></td>
<td>Contra-indicated in acute abdomen</td>
<td></td>
</tr>
</tbody>
</table>

Treatment/doses not recommended by BNFc. See Medics guidelines (book kept at nurses station) for a more extensive choice of medication.
3.36 CONSTIPATION & SOILING
GUIDELINES FOR THE MANAGEMENT OF

D. MANAGEMENT OF CONSTIPATION +/- SOILING

Explanation and education
Diet and Fluid advice

Does child have faecal impaction?

YES

DISIMPACTION

- Use oral macrogols (Movicol) in an escalating dose regime as first line treatment
- Substitute a stimulant laxative singly or in combination with a softener if unable to tolerate Movicol (e.g. Sodium picosulphate or docusate with lactulose)
- Advise review within 1 week by GP
- Avoid enemas and suppositories if possible.

NO

MAINTENANCE THERAPY

- Use Movicol as first line treatment
- Titrate laxative dose to response (may need large doses).
- Add a stimulant laxative if Movicol does not work
- Substitute a combination of stimulant and softener if unable to tolerate Movicol.
- Continue maintenance treatment for several weeks after regular bowel habit is established. Warn family that this may take months or years.

Refer to general paediatric clinic if poor response after 3 months of adequate treatment

Standardised GP letter kept in the ED with information for both parents and GP. Complete front section and photocopy for parents. Send completed letter to GP.
### 3.36 CONSTIPATION & SOILING

GUIDELINES FOR THE MANAGEMENT OF

#### E. SEVERE ACUTE CONSTIPATION / FAECAL IMPACTION

(Severe pain / distress, vomiting, urinary retention)

**ADVISE SIMPLE MEASURES:**
- Warm bath
- Abdominal massage
- Analgesia

**Bowels Opened**

Follow constipation +/- soiling guideline

**Good Response**

**Bowels Not Opened**

Consider other causes of obstruction and investigate appropriately

Phosphate Enema (may need sedation). If very hard stool consider using arachis oil (if not peanut allergic) to soften stool prior to phosphate enema.

**Not tolerated or bowels not opened**

Refer to Surgeons for further management

#### F. INDICATIONS FOR REFERRAL TO SPECIALIST CONSTIPATION TEAM

- Long standing / relapsing constipation.
- Chronic soiling.
- No response to 3 months treatment with a softener and a stimulant in increasing doses.
- Substantial behavioural and psychological problems associated with constipation soiling or wetting.
- Excessive parental concern.
- Concern about organic causes.

**Specialist paediatric continence clinics:**
These clinics form part of the integrated continence service for children.
3.36  CONSTIPATION & SOILING
GUIDELINES FOR THE MANAGEMENT OF

Note: All referrals are read by Consultants concerned who will re-route referrals if appropriate.

Constipation and soiling:
Dr S Matthai Weekly constipation clinic at NGH, fortnightly at Centenary House

Day time wetting:
General Paediatrics Accepts referrals from children with predominantly urinary symptoms, such as daytime wetting and recurrent UTI.
Community Dr Nocturnal and daytime enuresis.
Open referral community clinic – details as above

Continence nursing team:
Only involved in the care of those referred to the specialist clinics but they are available for general telephone advice on 0114 2260502 from 09:00-17:00 hrs Monday - Friday.

References:
NICE Guideline 99: Constipation in Children and Young People, May 2010
https://www.nice.org.uk/guidance/cg99

(Section 3.36 reviewed by Dr J Stone, May 2019)
(Section 3.36 reviewed by Dr E Snelson May 2016)
3.37 HAEMATOLOGICAL PROBLEMS

A. BACKGROUND

At SC(NHS)FT we have 24hr cover from the Clinical and Laboratory Haematology departments for specialised haematology problems. There is usually a haematology SpR available for day time enquiries. Out of hours switchboard will know if the haematology SpR is on-call and, if not, which haematology consultant can be contacted for advice. The haematologists ask that queries are first discussed with a senior medic in ED to decide if specialist advice is required out of hours.

There are comprehensive Trust approved guidelines for haematological conditions available via the intranet which may be helpful to consult.

B. BLEEDING DISORDERS

Children known to have a bleeding disorder are provided open access to ward 6 and are asked to contact the ward or haemophilia.team directly for bleeding related problems. If, however, any child known to have haemophilia, a clotting factor deficiency, Von Willebrand’s disease or a platelet disorder presents to ED, even with minor trauma, they SHOULD NOT BE SENT HOME UNTIL A MEMBER OF THE HAEMATOLOGY TEAM HAS BEEN CONSULTED. This could be one of the haematology specialist nurses (Shaun Emmitt and Louise George) the haematology SpR or consultant.

Until advice has been obtained standard emergency management should be given for any injury, bearing in mind that there is a greater risk of complications e.g. compartment syndrome.

Children with a known bleeding disorder should have an alert on EDMS to indicate that they have diagnosis.

Related clinical guidelines
CG1871 Management of Haemophilia and Other Inherited Bleeding Disorders
CG1896 Management of Surgery and Dental Work in Patients with Inherited Bleeding Disorders

C. CHILDREN ON ANTICOAGULANTS

Advice from the haematology team will be required for children on anticoagulants and present with bleeding or trauma or require invasive procedures (e.g. Lumbar puncture or surgery). There are a range of anticoagulant drug used at SCH which include warfarin, heparin (e.g. enoxaparin, tinzaparin or dalteparin), or a direct oral anticoagulant drug (e.g. rivaroxaban or apixiban).

Related clinical guidelines
CG1333 Acute Venous Thrombosis
CG 1010 Warfarin and other outpatient anticoagulation
CG1020 Heparin Guideline
3.37 HAEMATOLOGICAL PROBLEMS

D. SICKLE CELL DISEASE

Any child with a known sickling disorder presenting to ED should not be sent home until a member of the haematology team has been consulted. Children who come with a problem related to their sickle cell disease should be transferred to ward 6 once the initial consultation has occurred, and those presenting with pain should be offered immediate appropriate analgesia before transfer aiming for pain relief within 30 minutes of presentation. In most cases, intranasal diamorphine will be the most appropriate intervention to achieve adequate and timely analgesia. All of the children know that they should contact ward 6 to inform the team of their problem prior to attendance so they can be directed to the correct department for review (Haematology Clinic within working hours and ED out of hours) but this can be forgotten in the heat of the moment. Clinic letters explaining their condition and problems can be found on EDMS. This will also provide a list of their current medication. Some children are being treated with Hydroxycarbamide which can cause Neutropenia and thrombocytopenia and so a FBC should be checked in any child with a fever and sickle cell disease or any bleeding symptoms.

See medical guidelines
1419 General management of children with sickle cell disease including pain and infection
1095 Acute chest syndrome in paediatric sickle cell disease
1093 Acute exacerbation of anaemia in sickle cell disease – management of sequestration and aplasia
1467 Stroke prevention and management in sickle cell disease
1466 Priapism in sickle cell disease
1097 Hydroxycarbamide use in paediatric sickle cell disease

E. SUSPECTED IDIOPATHIC THROMBOCYTOPENIC PURPURA (ITP)

Children with ITP can present with nose bleeds, impressive bruises and petechiae. They are otherwise well.

Most children recover spontaneously with no medication. Most children will not need to be admitted and can be followed up in haematology outpatients after appropriate advice and contact numbers have been given to the parents. The initial advice is to avoid potential significant trauma (e.g. not to go on a trampoline) and to re-attend if there is any spontaneous or excessive bleeding. It is worth explaining that ITP can last for weeks or months.

If the platelet count suggests ITP please discuss with the on-call haematology team before requesting further investigations or allowing home. An information leaflet is available via Haematology Out patients.

See shared care guideline
1410 Haemostasis and thrombosis (section 3)

(Section 3.37 reviewed by Dr J Stone, Dr J Welch and Dr E Astwood)
(Section 3.37 reviewed by Dr E Snelson May 2016)
(Section 3.37 reviewed by Dr J Cumberland and Dr J Welch 2010)
3.38 ATOPIC ECZEMA - MANAGEMENT OF

SC(NHS)FT Dermatology Team Approach

A. BACKGROUND
B. EMOLLIENT ADVICE
C. TOPICAL CORTICOSTEROIDS
D. TREATMENT OF INFECTED ECZEMA
E. MINIMIZING THE DEVELOPMENT OF TOPICAL ANTIBIOTIC RESISTANCE:
F. IRRITANT CONTACT REACTIONS
G. ALLERGIC CONTACT REACTIONS
H. ANTI-PRURITIC GUIDELINES

A. BACKGROUND
The most common problems presenting to the Emergency Department are an acute flare-up of eczema and infected eczema. Eczema Herpeticum needs aggressive inpatient management. Consider other diagnoses in unusual presentations, eg psoriasis, and scabies can present as a several week history of new onset ‘eczema’ unresponsive to treatment by the GP. The full atopic eczema management guidelines are available on the Intranet. Writing out the specific treatment instruction for your patient is very useful.

B. EMOLLIENT ADVICE
This is first line treatment for mild eczema.

Emollient tips:
- The best emollient is one which the child and parent prefer using, which may involve an element of trial and error. E45 is only suitable for non-inflamed dry skin or very mild eczema. Diprobase, Oilatum or Epaderm are good start-up emollients with similar price ranges. Urea-containing emollients such as Eucerin or Balneum should be avoided in the ED setting unless the patient is already using them. Likewise antimicrobial emollients like Dermol should be avoided unless active infection is present. Avoid aqueous cream.
- Encourage patient to use around 250-500g of their chosen emollient a week, increasing to 1000g or above should the child’s eczema become very dry and flaky. One large tub is 500g
- A moisturiser should be used in conjunction with an emollient soap substitute and emollient bath oil. E.g. Oilatum bath oil. Oilatum junior
- Emollients should be smoothed onto the skin, not rubbed in. Remind parents that emollients should be used more often and in larger quantities than other eczema treatments. Use ideally 3-4 times a day.
- Cream is a 50:50 oil/aqueous mixture. Ointment is an 80:20 oil/aqueous mix. Creams are less greasy, less occlusive and easier to apply but ointment is likely to ‘stay’ on the skin better. You must advise patients that ointment is flammable so they must be extra careful with candles and matches.
- Ointment must be decanted from its tub with a spoon onto a saucer and used from the saucer. Putting fingers into the tub can cause bacterial contamination which can drive the eczema.
- 50:50 white soft paraffin, Epaderm and Hydromol ointment are often preferred to creams by patients with Afro-Caribbean and Asian skin.
- If napkin dermatitis is present, try zinc paste mixed with 50:50 white soft paraffin / liquid paraffin, e.g. Metanium instead of Sudocrem, which contains more preservatives and fragrance. For cleansing the nappy area, one idea is to use the chosen emollient on a
3.38 ATOPIC ECZEMA - MANAGEMENT OF

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- cotton wool pad and wipe the bottom clean gently. Orabase is a thick barrier cream for irritant nappy rash, and does not have emollient properties.
- If cradle cap (scalp seborrhoeic dermatitis) is present, massage neat emollient bath oil into the scalp. Leave at least an hour or overnight. Wash out with a gentle shampoo.
- Patients need to continue their emollients even when the flare up has settled.

C. TOPICAL CORTICOSTEROIDS
Which topical steroid?
The weakest steroid should be chosen to control the disease effectively; this may include a temporary step up approach (less potent to more potent), or a step down approach (more potent to less potent).

Mild: 1% Hydrocortisone, once or twice a day (can be used on face)
Moderately Potent: Clobetasone butyrate 0.05% (Eumovate)
Potent: Mometasone furoate 0.1% (Elocon)
Betametasone 0.1% (Betnovate)

Potent steroids are usually only used in courses in children, e.g. once a day for 1-2 weeks and then stopped.

Very Potent: Clobetasol propionate 0.05% (Dermovate)

Very potent steroids should not be used in children with atopic eczema in primary care.
(NB the similar names ClobetaSONE and ClobetaSOL)

Check the potencies of steroids in combination creams.
- Fucidin H is fusidic acid plus a mild steroid, 1% hydrocortisone.
- FuciBET is fusidic acid plus betamethasone 0.1%, a potent steroid.

Advice to parents regarding topical steroids:
- Demonstrate how to apply topical steroids and the amount required. They should apply enough that the skin is shiny and tacky where the steroid is. Most patients use too little.
- Check that the parents/patients know which topical steroid goes where. A care plan may be useful for parents to refer to (printed out for SC(NHS)FT use, and on the intranet).
- If there is a poor response to topical steroids, check that parents are applying them to well-moisturised skin, as they are poorly absorbed through dry scaly skin. i.e emollient 20-30 mins BEFORE steroid; however this is practically much more difficult than steroid first, followed by emollient.
- Remind parents to rub steroid in until it is still sticky and glossy, not totally rubbed in. And to wash their own hands thoroughly afterwards.

D. TREATMENT OF INFECTED ECZEMA
For overtly infected eczema

1. For moderate – severe or widespread bacterial infection use an oral antibiotic for 7 – 14 days. Flucloxacinil should be used as first line. Be aware that compliance with liquid flucloxacinil may be poor due to the taste; a reasonable alternative is Co-amoxiclav.
2. If there is localised infection consider use of a topical antibiotic two or three times a day for up to fourteen days. e.g fucidin 2% or Fucidin H. Crusts should be gently cleaned off before applying creams.
3.38 ATOPIECZEMA - MANAGEMENT OF

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3. Add a topical steroid, or step up the strength of steroid if using one already.

4. Do not stop steroids in infected eczema.

5. Increase the quantity of emollient used.

6. If unresponsive to oral and/or topical antibiotics, swab for bacterial and viral culture.

Underlying Herpes simplex virus infection also needs to be considered.
See flow chart “When is infection or infestation causing a flare in atopic eczema” on the intranet.

E. MINIMIZING THE DEVELOPMENT OF TOPICAL ANTIBIOTIC RESISTANCE

1. Have only plain steroids on repeat prescription, not combinations.

2. Revert to a plain steroid after a 7 to 14 day course if a topical steroid / antibiotic combination has been used.

3. Tell patients to use topical antibiotics as a course for a maximum of fourteen days and not intermittently.

F. IRRITANT CONTACT REACTIONS

- Common, especially on broken skin, and may cause a stinging or burning sensation.

- Irritancy is not reliably demonstrable by patch testing, or by any other test. Diagnosis relies on detailed history, examination and exclusion of contact allergy.

- Treat with avoidance of triggers; add emollients and topical steroid if necessary.

G. ALLERGIC CONTACT REACTIONS

- Allergic contact dermatitis is uncommon in children.

- Medicaments are the most likely offenders, e.g. topical antibiotics, preservatives, steroids.

- Treat with avoidance of triggers; add emollients and topical steroid if necessary.

H. ANTI-PRURITIC GUIDELINES

Treating the eczema with a complete emollient regime plus topical steroids as required will generally help pruritis. Cutting nails short, cooling the emollients, wet-wraps/PB7 bandaging can be considered. The itch in eczema is largely not driven by histamine release therefore do not routinely use oral antihistamine. If an anti-histamine IS required, it can be prescribed for short episodic use eg Chlorphenamine or Hydroxyzine.

(Section 3.38 reviewed by Dr D O’Donnell, April 2019)

(Original guideline written by Dr C Holden [GPCA Dermatology] and Sr J Carr [Paediatric Dermatology Specialist Nurse], October 2004.

References

NICE CG57. Atopic Eczema in Under 12yr olds

For other references, please see “Atopic Eczema Guidelines” text on the Intranet.
3.39 NEONATAL SKIN CONDITIONS

A. BACKGROUND
Rashes may be a non specific sign of systemic disease in a neonate. It is important to take a thorough history and examine any baby presenting to the ED with a rash so that you can distinguish between a well and an unwell baby.

B. DIFFERENTIAL DIAGNOSIS
In a well neonate there are a few common dermatological conditions that may present to the ED. Those considered here are:
- Milia
- Nappy Rash
- Seborrhoeic Dermatitis
- Erythema Toxicum/ Neonatorum

Images of all these rashes are available online or in the atlas at the ED central desk (www.dermatlas.net, www.dermnetnz.org)

C. MILIA
Milia are common, benign, keratin-filled cysts that can occur at any age but are particularly common in the newborn. They are superficial, uniform, pearly white domed lesions measuring 1-2mm in diameter and typically occur on the face around the nose and eyes. They may also arise in mucous membranes (often the hard palate, gums or foreskin) when they are known as Epstein’s Pearls.

The clinical appearance is diagnostic. No investigation is needed. No treatment is needed – they tend to disappear spontaneously within the first three months of life as the surface layer wears away and the trapped keratin is lost. Advise parents not to interfere with lesions as this may cause infection and scarring.

D. NAPPY RASH (See also ED guideline 3.41 Fungal infections)
- This is usually an irritant contact dermatitis caused by stool and urine. The nappy area is red and oedematous although the flexures are usually spared.

The condition may be brought on by an episode of diarrhoea.

Skin care advice for parents should include:
- Fresh air: leave the nappy off as much as possible.
- Change nappies regularly to prevent contact between urine / faeces and the skin.
- Wash with water only (avoiding irritating soaps / detergents).
- Ensure bottom is properly dried.

The British Association of Dermatology has excellent resources for both patients and professionals. Feel free to recommend their website to families. www.bad.org.uk
3.39 NEONATAL SKIN CONDITIONS

- Avoid the use of powders such as talcum powder, as these may cause irritation.
- Apply a thin layer of neutral barrier cream just before putting the nappy on. Bepanthen or Metanium are good. If you need a stronger barrier Orabase paste is a good option.
- Avoid tight fitting plastic pants, as they will produce a warm moist environment, which will encourage the growth of Candida.

Differential Diagnosis:
Consider the following:
- Candida albicans – Overgrowth of yeast – classically involves the flexures with satellite lesions. Consider this in cases where nappy rash has been resistant to simple measures. The baby may need oral nystatin also if oropharynx is affected.
- Seborrhoeic dermatitis – See below, flexures also involved. Not especially itchy and baby is usually quite settled.
- Allergic contact dermatitis – Allergy to a component of the nappy itself – generally the elastic.

E. SEBORRHOEIC DERMATITIS
In infancy can affect the scalp (known as cradle cap) and groin area when it typically involves the flexures (unlike simple nappy rash). The cause is unclear but it is uncommon after 3 months of age. It may be related to hormones or a fungal infection.
For groin involvement, daily bathing and use of 2% ketoconazole cream should be advised. Occasionally 1% hydrocortisone cream is also necessary (e.g. combination cream Daktacort). Studies have shown equivalent results with either anti-fungal or steroid treatment.
For cradle cap, recommend regular washing of the scalp with baby shampoo and gentle brushing or washing to remove the scales. Olive oil can be used to soften the scales prior to removal.
To differentiate from infant eczema – seborrhoeic dermatitis tends not to be itchy (few scratch marks) and babies sleep well and are settled. Babies with eczema tend to be much more upset by their symptoms.

F. ERYTHEMA TOXICUM NEONATORUM
This is a benign, asymptomatic skin condition that only occurs during the neonatal period. It is an eruption characterised by small, sterile, erythematous papules and occasionally pustules. The lesions are usually surrounded by a distinctive diffuse, blotchy, erythematous halo. Individual lesions are transitory, disappearing within hours before new ones appear elsewhere on the body. It is thought to represent the immature immune system of the newborn’s response to the environment.
- As this is a benign condition parents usually simply require explanation and reassurance. They should be advised that the lesions will normally disappear completely within 2 weeks. There are usually no cutaneous sequelae and it is not contagious. Advise parents of the clinical features of the condition so that they can seek further advice if any atypical problems arise. This looks very similar to pustular melanosis which has similar lesions which leave small pigmented spots when the papules disappear. This is also a benign self-resolving condition.

(Section 3.39 reviewed by Dr D O'Donnell, April 2019)
(Written by Dr S Ireland. Aug 2005)
3.40 SCABIES

A. BACKGROUND
Scabies is an itchy condition of the skin caused by a tiny mite, 0.1 mm in diameter (Sarcoptes scabiei).
Images of all these rashes are available online or in the atlas at the ED central desk (www.dermatlas.net or www.dermnetnz.org)

The female mite burrows into the skin to lay eggs. Approximately three weeks later the eggs hatch and a new generation of mites are ready to reproduce.

The intense itching is due to an allergic reaction to the tiny mites, and is associated with a rash of red, raised spots. The itch is worse at night, and may often affect more than one family member.

Scabies is common in children. It is highly contagious and is spread by close physical contact, especially in overcrowded living conditions. There are sometimes outbreaks in schools. It is not associated with poor personal hygiene – it is important to reassure the parents and patient of this.

B. SYMPTOMS AND SIGNS
The scabies mite can burrow into any part of the skin, but is most commonly found around the hands, feet, (particularly the web spaces of the fingers and toes) and male genitalia. In children, other parts of the body are sometimes affected, including the face, scalp, palms, and soles of the feet, and the nappy area. It does not usually affect the neck and head, although it may in infants.

The symptoms of scabies begin to appear about 2 to 6 weeks after infestation
- The mites’ burrows can be seen as thin, silvery, wavy lines. Burrows can be between 2mm and 15mm long, and it is sometimes possible to see a dark speck at one end (the mite).
- Widespread itching will be experienced, particularly at night.
- A rash of raised, pinkish-red spots will appear, in the above distribution.

C. DIAGNOSIS
Diagnosis is a clinical one and is often made easier if more than one family member also has a similar itchy rash. Make sure to ask about other family members.

D. DIFFERENTIAL DIAGNOSIS
The scabies rash, especially when scratched due to the intense itch, may appear like eczema or impetigo but without the usual distribution of these. Confusion with eczema is particularly common because of the itching symptoms.
3.40 SCABIES

To complicate matters, scratching can cause superadded bacterial infection such as impetigo, which may make symptoms worse.

E. MANAGEMENT

There are two main types of treatment in use for scabies in the UK. These are applied to the whole body including the scalp, face, neck and ears. Special attention should be paid to skin between the toes and between the fingers, and under the nails. To prevent re-infestation, all people in close contact should be treated at the same time. This includes all members of the household, even if they are asymptomatic.

Symptomatic children and family members should be treated twice, one week apart, whichever medication is selected. Two treatments is considered routine by the dermatology team.

Scabies should be treated with either of these two medications. It is advised that you prescribe for the child seen in the ED, but tell the parents they will need to treat the entire family, and that further treatment can be purchased over the counter. Do not prescribe for the whole family.

- Malathion 0.5% lotion (Derbac-M). This should be washed off after twenty-four hours. A small brush may help with application.
- Permethrin 5% cream (Lyclear Dermal Cream – NOT Crème Rinse). It tends not to irritate the skin and should be left on for 8 to 12 hours, or overnight, before being washed off.

Advise the family not to apply the treatment straight after a bath or shower as this increases systemic absorption and reduces local effectiveness. If hands are washed during the period of treatment, then the cream or lotion should be reapplied.

To prevent becoming re-infested, all clothing, towels, and bed linen should be machine-washed (at 50 degrees Celsius or above) as the first treatment is applied. Eurax lotion can help relieve itching. Calamine lotion and cool showers or baths may also be helpful.

F. REFERRAL

Discharge with the above medication and advice is appropriate in all but the most severe cases. GP follow up is appropriate if there are treatment failures, i.e. ongoing infestation. Advise that itch may continue for 2-3 weeks as the allergic reaction settles and this does not represent failure. Severe crusted (Norwegian) scabies warrants referral to the dermatologists.

(Section 3.40 reviewed by Dr D O'Donnell 2019)
(Written by Mr C FitzSimmons, Aug 2005)
3.41 IMPETIGO, COMMON FUNGAL INFECTIONS, TINEA CAPITIS

A. IMPETIGO
B. COMMON FUNGAL INFECTIONS
C. TINEA CAPITIS

Images of all these rashes are available online or in the atlas at the ED central desk. (www.dermatlas.net, www.dermnetnz.org)

The British Association of Dermatology has excellent resources for both patients and professionals. Feel free to recommend their website to families. www.bad.org.uk

A. IMPETIGO

(i) Background
A bacterial infection of the skin, impetigo is the commonest skin infection of young children in the UK. The causative organism is usually Staphylococcus Aureus but Streptococcus Pyogenes is also a recognised cause, particularly in hot climates. Transmission is person to person, either directly or via fomites such as bedding or towels.

(ii) Diagnosis
The appearance is usually diagnostic. In the early stages it is characterised by groups of pus filled blisters which break down to give golden coloured crusting lesions. The commonest site is on the face, particularly around the mouth, followed by the hands. Lesions are usually small in number and patchy in distribution initially, but may become widespread and confluent. They can become bullous, with larger blister-like lesions.

(iii) Management
There are two components in the management of impetigo, eradication of the local infection and prevention of transmission. Failure to control transmission of infection to siblings or fomites is the commonest cause of recurrence.

Parents should be advised to use face cloths, towels, clothes only for the affected child, to prevent transfer to siblings.

Simple cleansing with soap and water with gentle removal of crusts, combined with the application of topical antibiotic cream (Fucidin) will result in rapid resolution in most cases. Oral antibiotics should be reserved for more widespread or severe cases or when topical treatment has failed. Remember liquid flucloxacillin has a horrible taste and patients are often non-compliant. Co-amoxiclav is a reasonable alternative as first choice. Do not prescribe Amoxicillin, as 96% of Staph Aureus are resistant.

Dermatology now using crystacide cream as opposed to Fucidin if resistance is a problem. Clarithromycin is the drug of choice in patients allergic to penicillin.

(iv) Advice for parents - should be:
- Wash hands after applying topical antibiotic cream.
- Avoid sharing towels, face cloths, etc.
- Wash clothing and bedding after treatment has been initiated.
- Avoid school until fresh blisters or crusts stop appearing.

Again emphasise that antibiotics (oral or topical) alone are unlikely to result in resolution without taking measures to prevent spread to siblings.
3.41 IMPETIGO, COMMON FUNGAL INFECTIONS, TINEA CAPITIS

B. COMMON FUNGAL INFECTIONS

Candida

Background
Candida (Thrush) is a yeast which causes a number of distinct infections. It is a common commensal of the mouth, skin and vagina and usually causes no problem until some change in the oral or vaginal mucosa favours the overgrowth of Candida, e.g. antibiotics, chemotherapy, diabetes, malnutrition or immunodeficiency. If recurrent episodes occur, consider excluding diabetes.

Oral Candidiasis
Characterised by white/cream/yellow coloured, slightly raised, spots or patches over the oral mucosa with a red base and which leave small bleeding areas if scraped off. They may be painless or cause a burning sensation in the mouth.
Treatment: Oral Candida responds well to the application of topical antifungal, e.g. Nystatin oral suspension or Miconazole gel (Daktarin oral gel).

Vaginal Thrush
Characterised by a creamy white or watery vaginal discharge. The vagina and vulva is usually red, itchy and painful.
Treatment: Topical Clotrimazole (Canesten) or Miconazole (Daktarin), either cream or by pessary (if appropriate age) is usually effective.

Candida Nappy Rash (see also ED guideline 3.40- neonatal skin conditions)
Nappy rash, commonly caused by a reaction to contact with urine and faeces, may become secondarily infected with Candida. The rash tends to be more florid in Candida infection and involves the skin creases which simple nappy rash tends to spare. Satellite lesions are characteristic of candida infection. In reality there is considerable overlap between the clinical features of both conditions and failed simple management of nappy rash should lead to the suspicion of a secondary Candida infection.
Treatment: Topical Clotrimazole or Miconazole cream in addition to the standard management of nappy rash:
- Fresh air: leave the nappy off as much as possible.
- Change nappies regularly to prevent contact between urine / faeces and the skin.
- Wash with water only (avoiding irritating soaps / detergents).
- Ensure bottom is properly dried.
- Avoid the use of powders such as talcum powder, as these may cause irritation.
- Apply a thin layer of neutral barrier cream just before putting the nappy on. Bepanthen or Metanium are good.
- Avoid tight fitting plastic pants, as they will produce a warm moist environment, which will encourage the growth of Candida.

C. TINEA CAPITIS

(i) Definition; This is infection of the scalp, hair follicles and surrounding skin by dermatophytic fungi (usually Microsporum or Trichophyton). It generally occurs in pre-adolescent children and commonly spreads amongst family members or classmates.
3.41 IMPETIGO, COMMON FUNGAL INFECTIONS, TINEA CAPITIS

(ii) Diagnosis
A number of patterns of clinical presentation are recognised, but the infection is so widespread that the diagnosis should be considered in any child over 3 months with scaly scalp, until disproved by negative mycology. The lesions may be inflammatory or non-inflammatory, and are usually associated with patch alopecia. Infection may also be associated with painful regional lymphadenopathy. A generalised eruption of itchy papules around the outer helix of the ear may occur as a reactive phenomenon (an “id” response).

<table>
<thead>
<tr>
<th>CLINICAL PATTERN</th>
<th>CLINICAL DESCRIPTION</th>
<th>DIFFERENTIAL DIAGNOSIS</th>
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<tbody>
<tr>
<td>Diffuse scale</td>
<td>Generalised, diffuse scaling of the scalp</td>
<td>Seborrhoeic and atopic dermatitis, psoriasis</td>
</tr>
<tr>
<td>Grey patch</td>
<td>Patchy, scaly alopecia</td>
<td>Seborrhoeic and atopic dermatitis, psoriasis</td>
</tr>
<tr>
<td>Black dot</td>
<td>Patches of alopecia studded with broken off hair stubs</td>
<td>Alopecia areata and trichotillomania (self inflicted hair pulling)</td>
</tr>
<tr>
<td>Diffuse pustular</td>
<td>Scattered pustules associated with alopecia, scaling +/- associated lymphadenopathy</td>
<td>Bacterial folliculitis, dissecting folliculitis</td>
</tr>
<tr>
<td>Kerion</td>
<td>Boggy mass studded with pustules +/- associated lymphadenopathy</td>
<td>Abscess, neoplasia</td>
</tr>
</tbody>
</table>

Kerions are often misdiagnosed as bacterial abscesses and the child may already have had several courses of antibiotics.

(iii) Management
Mycological confirmation should be sought to confirm the diagnosis. Affected areas should be scraped with a blunt scalpel. The scrapings should be transported in a folded square of paper fastened with a paper clip and placed in a plastic outer (lab transport) bag. These are freely available in Orange out patients if you cannot find one in ED.

Topical treatment (e.g. Selenium sulphide or ketoconazole shampoo twice weekly) alone is commonly ineffective and should be combined with oral treatment. Standard oral treatment is Griseofulvin 10 mg/kg/day for 6-12 weeks. Terbinafine is an alternative. Neither are available in suspension form. LFTS and FBC should be done at initiation of these medications. Because of the need to establish a diagnosis, the duration of treatment, the high rate of treatment failure, any child suspected of having Tinea Capitis should be referred to the Dermatology out-patients for follow-up. They may also need a short course of prednisolone if lesions are very inflamed. Dermatology want to see these fairly rapidly as scarring alopecia may develop. You can send a dermatology NURSE led clinic referral if the diagnosis is clear.

Refs:
The British Association of Dermatology website; www.bad.org.uk

(Section 3.41 reviewed by Dr D O'Donnell April 2019)
(Written by Mr D Burke, Feb 2006)
GENERAL GUIDELINES

3.42 IMMUNISATIONS & IMMUNISATION SCHEDULE

A. GENERAL

B. SIDE EFFECTS

C. TETANUS PRONE WOUNDS
   a) Definition
   b) Choice of vaccine
   c) Immunisation status

D. ROUTINE CHILDHOOD IMMUNISATION SCHEDULE –

E. ADDITIONAL IMMUNISATIONS FOR BABIES AT RISK

F. UN-IMMUNISED CHILDREN OUTSIDE THE UK SCHEDULE

G. GENERAL INFORMATION

H. CONTRAINDICATION FOR IMMUNISATIONS

A. GENERAL

For further information on any of the following guidelines please refer to the “Green Book” (Immunisation against infectious disease) Updated 2016, Department of Health

You should take the immunisation history of every child who attends and record it on the ED card. If appropriate the attendance can be used to update the immunisation programme.

If an immunisation is needed and the primary course is incomplete, give the appropriate immunisation for the primary course, whatever the time gap since the last immunisation.

Do not start the whole course again.

If you are unsure about the immunisation status of a patient, phone the Child Health Department (ext 62007) for information between 08:00 – 16:30 hrs, Monday to Friday.

After giving any immunisation ensure that the information is sent to the General Practitioner and the Child Health Department.

Doctors should:
- Record immunisation information on the QSM discharge letter to the GP.
- Complete an 'Immunisation' form and send to
  Child Health Dept.
  Centenary House
  55 Albert Terrace Road
  Sheffield S6 3BR
  0114 2262007
  (These forms are currently kept in the Emergency Dept. clean utility room)
- Record immunisation in Patient-Held Record, if available.

Some parents are concerned that their child is no longer being immunised against TB – please advise them to speak to public health.
GENERAL GUIDELINES

3.42 IMMUNISATIONS & IMMUNISATION SCHEDULE

B. SIDE EFFECTS
Remember to explain any potential side effects of the vaccine you are giving:

Diphtheria, Tetanus, Pertussis, Hib, Men C, pneumococcal and Polio
The child may be irritable and febrile during the following 48 hours. Local pain, swelling and redness may start within a few hours of the injection. Advise the use of Paracetamol if the child has these symptoms.

MMR
This is a live vaccine. As well as occasional rapid onset of local and systemic reactions (as previous), the side effects can also correspond to the incubation period i.e. 7-10 days afterwards, irritability, fever or a mild rash. 21 days afterwards 1% of children get mild parotid swelling.

C. TETANUS PRONE WOUNDS

Note - High risk is regarded as heavy contamination with material likely to contain tetanus spores and/or extensive devitalised tissue.

Tetanus-prone wounds include:

D. wounds or burns that require surgical intervention that is delayed for more than six hours
E. wounds or burns that show a significant degree of devitalised tissue eg severe crush injuries or extensive burns
F. wounds or burns in patients who have systemic sepsis..
G. puncture-type injury, particularly where there has been contact with soil or manure
H. wounds containing foreign bodies
I. compound fractures

Note that simple puncture wounds, e.g. ‘stood on nail’ are not included and that time to presentation alone is not relevant. For example, a simple clean wound older than 6 hours at presentation is not at increased risk for tetanus, and a wound heavily contaminated with soil presenting within 1 hour will be.

b) Choice of Vaccine

A total of 5 doses of tetanus-containing vaccine at appropriate intervals are usually enough to give long-term protection.
Tetanus vaccine is only available in combination with diphtheria and polio (IPV) (+ Hib for primary immunisation of children <10 years).
Low dose diphtheria-containing vaccine should be used in children 10 years and older.
The choice of tetanus-containing combined vaccine depends on:

1. Age of child.
2. Whether primary or booster.


<table>
<thead>
<tr>
<th>Scenario</th>
<th>Vaccine Selection</th>
</tr>
</thead>
<tbody>
<tr>
<td>For primary immunisation of children &lt;10 years</td>
<td>give DTaP/IPV/Hib (Pediacl).</td>
</tr>
<tr>
<td>For primary immunisation of children &gt;10 years</td>
<td>give Td/IPV. (Revaxis)</td>
</tr>
<tr>
<td>For booster of children &lt;10 years</td>
<td>give dTaP/IPV. (Repevax)</td>
</tr>
<tr>
<td>For booster of children &gt;10 years</td>
<td>give Td/IPV. (Revaxis)</td>
</tr>
</tbody>
</table>
## GENERAL GUIDELINES

### 3.42 IMMUNISATIONS & IMMUNISATION SCHEDULE

#### TETANUS PRONE WOUNDS

c) Immunisation Status

<table>
<thead>
<tr>
<th>IMMUNISATION STATUS</th>
<th>CLEAN WOUND</th>
<th>TETANUS-PRONE WOUND</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Vaccine</td>
<td>Vaccine</td>
</tr>
</tbody>
</table>

- **Fully immunised, i.e. has received a total of five doses of vaccine at appropriate intervals.**
  - None required.
  - None required.
  - Only if high risk (see text).

- **Primary immunisation complete, boosters incomplete but up to date.**
  - None required (unless next dose due soon and convenient to give now).
  - None required (unless next dose due soon and convenient to give now).
  - Only if high risk (see text).

- **Primary immunisation incomplete, or boosters not up to date.**
  - A reinforcing dose of vaccine and further doses as required to complete the recommended schedule (to ensure future immunity).
  - A reinforcing dose of vaccine and further doses as required to complete the recommended schedule (to ensure future immunity).
  - Yes: One dose of human tetanus immunoglobulin in a different site.

- **Not immunised or immunisation status not known or uncertain.**
  - An immediate dose of vaccine followed, if records confirm this is needed, by completion of a full 5-dose course to ensure future immunity.
  - An immediate dose of vaccine followed, if records confirm this is needed, by completion of a full 5-dose course to ensure future immunity.
  - Yes: One dose of human tetanus immunoglobulin in a different site.
# GENERAL GUIDELINES

## 3.42 IMMUNISATIONS & IMMUNISATION SCHEDULE

### D. ROUTINE CHILDHOOD IMMUNISATION SCHEDULE

<table>
<thead>
<tr>
<th>AGE</th>
<th>VACCINE</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 weeks</td>
<td>Diphtheria, Tetanus, acellular pertussis, polio, Hib (DTaP/IPV/Hib) (=Pediacl) Pneumococcal (PCV) Rotavirus Meningococcal group B (MenB)</td>
</tr>
<tr>
<td>12 weeks</td>
<td>Diphtheria, Tetanus, acellular pertussis, polio, Hib (DTaP/IPV/Hib) (=Pediacl) Rotavirus</td>
</tr>
<tr>
<td>16 weeks</td>
<td>Diphtheria, Tetanus, acellular pertussis, polio, Hib (DTaP/IPV/Hib) (=Pediacl) Pneumococcal (PCV) MenB</td>
</tr>
<tr>
<td>1 year</td>
<td>Hib/Men C (one injection) Pneumococcal (PCV) Measles / mumps / rubella (MMR) Men B</td>
</tr>
<tr>
<td>2 – 6 years old</td>
<td>Influenza (each year from September)</td>
</tr>
<tr>
<td>3 years 4 months</td>
<td>Diphtheria, Tetanus, acellular pertussis, polio (dTaP/IPV =Repevax or DTaP/IPV =Infanrix IPV) Measles / mumps / rubella (MMR)</td>
</tr>
<tr>
<td>Girls 12 – 13 years</td>
<td>Human papillomavirus (HPV) (2 doses 6-24 months apart))</td>
</tr>
<tr>
<td>13 - 15 years</td>
<td>Low dose diphtheria / tetanus / IPV (Td/IPV) (=Revaxis) Men A,C,W and Y</td>
</tr>
</tbody>
</table>

- Pediacel is for primary immunisation of children <10 years.
- Repevax is for booster immunisation of children <10 years.
- Revaxis is for primary and booster immunisation of children >10 years.
- MMR may be given by deep subcutaneous or intramuscular route.
- All combined tetanus-containing vaccines should be given by intramuscular route only.

### E. ADDITIONAL IMMUNISATIONS FOR BABIES AT RISK

<table>
<thead>
<tr>
<th>AGE</th>
<th>VACCINE</th>
</tr>
</thead>
<tbody>
<tr>
<td>At birth</td>
<td>Hepatitis B Bacillus-Calmette-Guérin (BCG &quot;SSI&quot;)</td>
</tr>
<tr>
<td>1 month</td>
<td>Hepatitis B</td>
</tr>
<tr>
<td>2 months</td>
<td>Hepatitis B</td>
</tr>
<tr>
<td>12 months</td>
<td>Hepatitis B</td>
</tr>
</tbody>
</table>
GENERAL GUIDELINES

3.42 IMMUNISATIONS & IMMUNISATION SCHEDULE

F. UN-IMMUNISED CHILDREN OUTSIDE UK SCHEDULE

Unless there is a reliable history of previous immunisation, individuals should be assumed to be un-immunised.

If an immunisation is needed and the primary course is incomplete, give the appropriate immunisation for the primary course, whatever the time gap since the last immunisation.

Do not start the whole course again. For up to date details of catch-up immunisation programmes see government immunisation website [https://www.gov.uk/government/collections/immunisation-against-infectious-disease-the-green-book](https://www.gov.uk/government/collections/immunisation-against-infectious-disease-the-green-book)

G. GENERAL INFORMATION

- Do not give intramuscular injections to patients with thrombocytopenia or bleeding disorders.
- In infants the antero-lateral aspect of the thigh or upper arm is recommended. In older children, adolescents and adults the deltoid region is preferred.

For intramuscular and subcutaneous administration a 25G needle and for the intradermal route a 26G needle is used

- All BCG “SSI” vaccine, including that administered to babies, must now be given intradermally using a syringe and needle. Intradermal injections should only be given by trained staff and if given beyond the first 3 months of life requires a prior negative heaf or mantoux test. Please note recommended dose has changed – see product literature for details.
- A Hepatitis B antibody test should be performed 2 months after completion of the Hepatitis B immunisation schedule.
- Concurrently administered vaccines should generally be given into different limbs. DTP / IPV / Hib combined vaccines may also be given in the same limb as other vaccines if at least 2.5cm apart.
- Record the site of injection for individual vaccines so that any local reactions can be attributed to the appropriate antigens.
- If giving MMR in combination with either Yellow Fever or Varicella/Zoster immunisation or Mantoux testing they should be given either simultaneously at different sites or with an interval of at least 4 weeks. Other live vaccines can be administered at any time before or after each other.
- Any of the Hib or DTP vaccines, which are licensed for the age range in question, can be used to complete a course started with any other brand.
- Primary immunisations started with DTwP (containing wholecell pertussis vaccine) can be completed with DTaP (containing acellular pertussis vaccine).
- Courses started with OPV can be completed with IPV and vice versa
GENERAL GUIDELINES

3.42 IMMUNISATIONS & IMMUNISATION SCHEDULE

H. CONTRAINDICATIONS FOR IMMUNISATIONS

Almost all individuals can be safely vaccinated with all vaccines. In very few individuals, vaccination is contraindicated or should be deferred. Where there is doubt, rather than withholding vaccine, advice should be sought - contact Immunology team for specialist advice

General contraindications:
- Confirmed anaphylactic reaction to previous dose.
- Confirmed anaphylactic reaction to neomycin / streptomycin or polymyxin B.

Precautions:
- If a child is suffering from an acute illness, immunisations should be postponed until the child has recovered. (This does not include minor illnesses without fever or systemic upset).
- Immunisation with Dip / Hib / Pertussis / Polio / Tetanus-containing vaccine should continue following a history of:
  - Fever, irrespective of its severity
  - Hypotonic-hyporesponsive episodes
  - Persistent crying or screaming for more than 3 hours
  - Severe local reaction, irrespective of extent

Vaccines other than combined vaccines containing Diphtheria, Hib, Pertussis, Polio and Tetanus – discuss with Senior before advising parents

Live vaccines:
A. Pregnancy.
B. Immunosuppression due to disease (e.g. impaired immunological mechanisms) or immunosuppressive treatment (e.g. general irradiation, chemotherapy, high dose steroid treatment or organ / bone marrow treatment).
C. Within 3 months of injection of immunoglobulin.

Specific contraindications:

**Influenza vaccine:**

Anaphylactic reaction to egg.

**Some viral vaccines:**

Anaphylactic reaction to antibiotic excipients (e.g. neomycin, polymixin B).

**MMR:**
Within 3 months of an immunoglobulin injection.

Precautions:
Children with severe (i.e. anaphylactic) allergy to egg, require MMR immunisation under hospital supervision.
3.42  IMMUNISATIONS & IMMUNISATION SCHEDULE

Children with mild anaphylactoid allergy to egg require MMR immunisation, followed by supervision in general practice.

References:


(Section 3.42 reviewed by Dr J Gilchrist, June 2016)
3.43 NOTIFIABLE DISEASES

A number of infectious diseases are by law notifiable to the Consultant for Communicable Disease Control (CCDC) who is based at the:

PHE South Yorkshire Health Protection Team,
Vulcan House Steel, 6 Millsands,
Sheffield,
S3 8NH

Telephone: 0114 321 1177
Out of Hours: 0114 304 9843

NOTIFICATIONS SHOULD BE MADE ON THE BASIS OF CLINICAL SUSPICION. LABORATORY CONFIRMATION IS NOT A PRE-REQUISITE

All urgent cases should be notified within 24 hours by PHONE as there is a critical time window. This should then be followed up with written notification within 3 working days.

All non–urgent cases should be notified within 3 working days.

<table>
<thead>
<tr>
<th>Disease</th>
<th>Urgent?</th>
<th>Disease</th>
<th>Urgent?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute encephalitis</td>
<td>No</td>
<td>Malaria</td>
<td>If UK acquired</td>
</tr>
<tr>
<td>Acute infectious hepatitis</td>
<td>Yes</td>
<td>Measles</td>
<td>Yes</td>
</tr>
<tr>
<td>Acute meningitis</td>
<td>Yes if bacterial suspected otherwise routine</td>
<td>Meningococcal septicaemia</td>
<td>Yes</td>
</tr>
<tr>
<td>Acute poliomyelitis</td>
<td>Yes</td>
<td>Mumps</td>
<td>No</td>
</tr>
<tr>
<td>Anthrax</td>
<td>Yes</td>
<td>Plague</td>
<td>Yes</td>
</tr>
<tr>
<td>Botulism</td>
<td>Yes</td>
<td>Rabies</td>
<td>Yes</td>
</tr>
<tr>
<td>Brucellosis</td>
<td>If UK acquired</td>
<td>Rubella</td>
<td>No</td>
</tr>
<tr>
<td>Cholera</td>
<td>Yes</td>
<td>SARS</td>
<td>Yes</td>
</tr>
<tr>
<td>Scarlet fever</td>
<td>No</td>
<td>Smallpox</td>
<td>Yes</td>
</tr>
<tr>
<td>Diphtheria</td>
<td>Yes</td>
<td>Tetanus</td>
<td>No</td>
</tr>
<tr>
<td>Enteric fever (typhoid or paratyphoid)</td>
<td>Yes</td>
<td>Tuberculosis (report multi drug resistant urgently)</td>
<td>No unless healthcare worker</td>
</tr>
<tr>
<td>Food poisoning</td>
<td>No -urgent if part of a cluster or outbreak</td>
<td>Typhus</td>
<td>No</td>
</tr>
<tr>
<td>Haemolytic Uraemic Syndrome (HUS)/vero toxin E. coli</td>
<td>Yes</td>
<td>Viral haemorrhagic fever (VHF)</td>
<td>Yes</td>
</tr>
<tr>
<td>Infectious bloody diarrhoea</td>
<td>Yes</td>
<td>Whooping cough</td>
<td>Yes if acute</td>
</tr>
<tr>
<td>Invasive Group A streptococcal disease</td>
<td>Yes</td>
<td>Yellow fever</td>
<td>No unless UK acquired</td>
</tr>
<tr>
<td>Legionnaires’ disease</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leprosy</td>
<td>No</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notification of diseases form is available behind reception. Please complete and Email PHE.southyorks@nhs.net (secretaries will send if form passed on to them)

(Section 3.43 reviewed by Dr L Brimfield, May 2019)
(Section 3.43 re-written by Dr Fenton, May 2010)
3.44 VENOUS THROMBO-EMBOLISM

A. BACKGROUND

VTE in children is something that remains a rare presentation (approximately 58 per 10,000 hospital admissions¹) but can have significant consequences when not identified and treated.

The aim of the guideline is to aid in the assessment and management of patients presenting with symptoms suggestive of VTE and the subsequent management.

Differential diagnoses to consider include:

- Pulmonary Embolism
  - Pneumonia
  - Sepsis
  - Congenital heart disease

- Deep vein thrombosis
  - Vasculitis and thrombophlebitis
  - Trauma
  - Cellulitis

B. ASSESSMENT

Assessing the patient requires an initial high degree of suspicion and history taking and examination needs to be focused once symptoms suggestive of VTE are recognised.

Symptoms can range from the clinically stable patient with subtle signs to being overtly unwell and peri-arrest.

Pulmonary Embolism – chest pain, shortness of breath, anxiety, light-headedness.

Deep vein thrombosis - unilateral limb swelling and pain without history of trauma.

Examination findings may include:

PE - Apprehension, sweaty/clammy, tachycardia, tachypnoea, hypotension, hypoxia. If any of the latter signs are present senior involvement and moving the patient to resus is recommended.

(Haemoptysis is seldom present in children but can be a sign in adolescents or adults).

DVT – Leg or arm oedema, erythema, increased warmth, palpable cord/vessel, tenderness.
3.44 VENOUS THROMBO-EMBOLISM

VTE is thought to be multifactorial in the adolescent population and so history taking should include looking for risk factors (see table 1) when VTE is thought to be a possibility.

**TABLE 1**

<table>
<thead>
<tr>
<th>RISK FACTORS</th>
<th>HYPERCOAGULABLE STATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Immobilization</td>
<td>SLE (Lupus)</td>
</tr>
<tr>
<td>Travel (≥ 4 hours in past 1 month)</td>
<td>Connective tissue disorders</td>
</tr>
<tr>
<td>Surgery (within past 3 months)</td>
<td>Nephrotic syndrome</td>
</tr>
<tr>
<td>Pregnancy (current or recent)</td>
<td>Factor V Leiden Mutation</td>
</tr>
<tr>
<td>OCP &amp; Oestrogen replacement (including soon after commencement)</td>
<td>Protein C, S Deficiency</td>
</tr>
<tr>
<td>Malignancy</td>
<td>Antithrombin Deficiency</td>
</tr>
<tr>
<td>Tobacco Use</td>
<td>Inflammatory bowel disease</td>
</tr>
<tr>
<td>Haemolytic anaemias (Sickle cell)</td>
<td>Hyperlipidaemias</td>
</tr>
<tr>
<td>Central Venous Instrumentation &lt; 3mo</td>
<td>Homocysteinaemia, homocystinuria</td>
</tr>
<tr>
<td>Central Venous Catheters</td>
<td></td>
</tr>
<tr>
<td>Intravenous Drug Use</td>
<td>MEDICATIONS</td>
</tr>
<tr>
<td>Stroke, paresis, paralysis</td>
<td>Warfarin within days of initiation</td>
</tr>
<tr>
<td>Heart failure</td>
<td>Phenothiazines</td>
</tr>
<tr>
<td>Varicose Veins &amp; Thrombophlebitis</td>
<td></td>
</tr>
<tr>
<td>Trauma: Lower Ext, Pelvis &lt; 3 month</td>
<td>Family history of VTE in a close relative especially at a young age</td>
</tr>
</tbody>
</table>

**C. INVESTIGATIONS**

Laboratory investigation of VTE (such as D-dimer) are not validated in children as the value may vary with age, therefore making it difficult to interpret. Further information can be found on the guideline (D-Dimers* in the Investigation of Venous Thromboembolism) available on the intranet.


In a post pubertal child who does not have active malignancy, a central line, known thrombophilia, strong family history of VTE or nephrotic syndrome with a pulmonary embolism rule-out criteria (PERC) score of zero then the risk of PE is very low (<2%) and imaging therefore may not be necessary but discussion with a senior clinician is still advised.
3.44 VENOUS THROMBO-EMBOLISM

- PERC criteria:
  - heart rate >100 beats per minute
  - peripheral oxygen saturations <94%
  - unilateral leg swelling
  - haemoptysis
  - previous venous thromboembolism
  - recent surgery or trauma
  - use of exogenous oestrogen

Investigations that would be required prior to contrast imaging or treatment in the situation of a proved VTE include: Full blood count, coagulation screen and urea & electrolytes.

Duplex ultrasonography is comparable to the adult population and is the primary investigation for limb DVT.

CT pulmonary-angiography for pulmonary embolism is recommended as the initial imaging investigation. Consideration of portable echo-cardiogram can help to identify right-heart strain or thrombus in the proximal pulmonary arteries for those too unwell for a CTPA.

Imaging will not be done out of hours unless there is a serious contra-indication to anticoagulation and requires discussion with the patients parent-teams consultant. In the instance of imaging delay till the morning, anti-coagulation should be commenced as below.

D. MANAGEMENT

Investigation of VTE in children requires discussion with a senior clinician prior to organising imaging investigations. Out of hours referral to the on-call medical team for imaging to be completed at the earliest opportunity (usually during the day).

Unless significant risk of bleeding, if a delay of >2 hours from presentation to imaging then the first dose of Low-Molecular Weight Heparin should be administered prior to referral.

In SC(NHS)FT enoxaparin (Clexane) is used, so to avoid confusion doses are only quoted for enoxaparin.

Dosing for enoxaparin (Clexane)

<table>
<thead>
<tr>
<th>Age &lt;2 months</th>
<th>Age &gt;2 months</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial treatment dose</td>
<td></td>
</tr>
<tr>
<td>1.5mg/kg/dose 12hrly subcutaneously.</td>
<td>1mg/kg/dose 12hrly subcutaneously.</td>
</tr>
</tbody>
</table>

Round the dose to the next full 1mG

Full guidance can be found on the guideline: Heparin (CG1020) ⁶.

http://staff.sch.nhs.uk/documents/12-ward-6/11-heparin-guideline-m3-patients
### 3.44 VENOUS THROMBO-EMBOLISM

A confirmed VTE requires anti-coagulation initially with LMWH before commencing vitamin K antagonist (warfarin). Detailed guidance on commencing warfarin can be found in the guideline: Warfarin and other outpatient anticoagulation (CG1010). Referral to the on-call medical team for in-patient management will be necessary.

http://staff.sch.nhs.uk/documents/12-ward-6/5-warfarin-and-other-outpatient-anticoagulation-for-m3-patients

#### References


2. Risk factors and co-morbidities in adolescent thromboembolism are different than those in younger children. Thromb Res. 2016; 141:178-82 (ISSN: 1879-2472)

3. BNFC [Accessed 2 July 2019]


(Section 3.44 written by Dr L Hickinbotham, Dr G Hartshorne & Dr J Gilchrist, July 2019)
3.45 CHEST PAIN

A. BACKGROUND

Chest pain is a relatively common presenting complaint in children that is often associated with significant parental, child and healthcare staff anxiety. Underlying cardiac pathology in children is however rare; the 2 largest studies reviewing paediatric emergency department attendances found that 0.6-1% of children presenting with chest pain had a cardiac cause. A chest pain history should therefore focus upon acknowledging these anxieties, a structured history and assessment to exclude rare or serious pathology and subsequent reassurance or targeted investigations.

Age is a consideration during assessment: younger children may interpret a wide range of chest symptoms as ‘pain’, whereas adolescents are more likely to characterise pain and have a musculoskeletal or psychogenic cause.

B. CAUSES

<table>
<thead>
<tr>
<th>Causes</th>
<th>Features suggestive</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Common</strong></td>
<td></td>
</tr>
<tr>
<td>MUSCULOSKELETAL</td>
<td>Well localised, reproducible with palpation, worse with movement/coughing/inspiration</td>
</tr>
<tr>
<td>ASTHMA</td>
<td>Chest tightness, wheeze, SOB, dry cough, diurnal variation</td>
</tr>
<tr>
<td>PNEUMONIA</td>
<td>Sharp, localised, worse with inspiration/coughing</td>
</tr>
<tr>
<td>PSYCHOCGENIC</td>
<td>Stressors, history of anxiety, hyperventilation</td>
</tr>
<tr>
<td>GASTROINTESTINAL</td>
<td>Retrosternal, epigastric, burning/sharp, exacerbated by eating/posture, associated heartburn/waterbrash/dysphagia</td>
</tr>
<tr>
<td>PRECORDIAL CATCH</td>
<td>Sudden sharp often left sided pain. Usually healthy teenagers/young adults. Cause unknown</td>
</tr>
<tr>
<td><strong>Uncommon</strong></td>
<td></td>
</tr>
<tr>
<td>PNEUMOTHORAX</td>
<td>Ipsilateral, upper anterior chest, shortness of breath, tall slender patient</td>
</tr>
<tr>
<td>CARDIAC</td>
<td></td>
</tr>
<tr>
<td>Inflammatory e.g. pericarditis</td>
<td>Central, may radiate to left arm/jaw. Crushing pain/heaviness. Associated autonomic symptoms such as sweatiness/nausea/pallor. Exertional chest pain/TLOC. Associated presyncope/syncope/palpitations</td>
</tr>
<tr>
<td>Arrhythmia i.e. pain with palpitations</td>
<td></td>
</tr>
<tr>
<td>Ischaemic</td>
<td></td>
</tr>
<tr>
<td>Structural e.g. HOCM/AS</td>
<td></td>
</tr>
<tr>
<td>PERICARDITIS</td>
<td>Known CTD, recent cardiac surgery, preceeding viral illness Sharp pain, worse on lying down.</td>
</tr>
<tr>
<td><strong>Rare</strong></td>
<td></td>
</tr>
<tr>
<td>PULMONARY EMBOLUS (PE)</td>
<td>Hypercoaguable states</td>
</tr>
</tbody>
</table>
3.45 CHEST PAIN

e.g. OCP, neoplasia, pregnancy, prolonged immobility, post-op, central venous catheters, CTD
PMH or FH of VTE
Typically pleuritic chest pain with associated SOB, haemoptysis, tachycardia.

| SICKLE CELL ACUTE CHEST CRISIS | Chest pain, hypoxia |
| SICKLE CELL ACUTE CHEST CRISIS | Chest pain, hypoxia |
| REFERRED PAIN | Consider surgical causes with shoulder tip pain e.g. cholecystitis, intestinal perforation, ruptured ectopic pregnancy |

### C: RISK FACTORS
- **CHEST WALL TRAUMA** – consider pneumothorax, haemo-thorax, cardiac or pulmonary contusions, mediastinal disruption
- **PRIOR CARDIAC DISEASE/SURGERY** – MI, arrhythmia, pericarditis, pericardial effusion
- **HYPERCOAGUABLE STATES** – Pulmonary embolus
- **SICKLE CELL DISEASE** – acute chest crisis
- **CHRONIC RESPIRATORY DISEASE** – pneumothorax
- **KAWASAKI DISEASE** – coronary artery aneurysms and myocardial ischaemia
- **FAMILIAL HYPERCHOLESTEROLAEMIA** – myocardial ischaemia
- **COCAINE/STIMULANT USE** – myocardial ischaemia through coronary vasospasm
- **CONNECTIVE TISSUE DISEASE** – pericarditis, pericardial effusion, aortic dissection

### D: RED FLAGS FOR CARDIAC DISEASE
Increased likelihood of cardiac cause for chest pain:
- **PERSONAL/FH of CONGENITAL/ACQUIRED CARDIAC DISEASE**
- **EXERTIONAL SYNCOPE/CHEST PAIN with PALPITATIONS**
- **HYPERCOAGUABILITY** e.g. Oral contraceptive pill
- **HYPERCHOLESTEROLAEMIA**
- **FH of:**
  - Sudden death <35 years of age
  - Young onset ischaemic disease
  - Inherited arrhythmias e.g. Brugada syndrome, long QT syndrome
- **IMPLANTABLE CARDIAC DEVICES**
- **CONNECTIVE TISSUE DISORDER**
- **AMPHETHAMINE/COCAINE USE or CHRONIC ALCOHOL EXCESS**

### E: EXAMINATION
A thorough physical examination will often aid a definitive diagnosis. It should include:
- **OBSERVATIONS** - full set of vital signs including BP
- **GENERAL APPEARANCE** - colour, AVPU, respiratory distress, signs of anxiety
- **PULSE** - volume, rate, character
- **ROM of arm to elicit if relates to pain**
- **INSPECTION** – bruising, asymmetry, swelling of the chest wall
- **PALPATION** – localised tenderness, heaves, thrills, crepitus
- **AUSCULTATION OF LUNGS** – lung fields for air entry, wheeze, crackles or pleural rub.
- **AUSCULTATION OF PRECORDIUM** – heart sounds, murmurs, pericardial rub, metallic valves
- **ABDOMEN** - for epigastric tenderness, trauma or hepatosplenomegaly
3.45 CHEST PAIN

- UPPER LIMBS – does ROM studies of arm trigger the pain
- LOWER LIMBS – is there an asymmetrically swollen tender calf i.e. a DVT

F: INVESTIGATION
Acknowledging the parental/patient anxiety after a thorough assessment is usually all that is needed. Further investigations should be utilised where the history or examination suggests a concerning underlying diagnosis:
- **CXR** – acute onset severe pain, pain waking from sleep, history of FB ingestion (section 5.7), cough/fever where pleural effusion suspected, chest wall trauma
- **ECG** – cardiac type chest pain, cardiac red flags, persistent tachycardia, overdose of cardiotoxic drugs, BRUE

G: FOLLOW UP
Most patients without risk factors or cardiac red flags can be discharged from ED with reassurance alongside specific treatments such as trial of anti-reflux medications for suspected reflux, or antibiotics for suspected pneumonia.
Refer to paediatric cardiology if known cardiac anomaly and/or high index of suspicion for cardiac cause of chest pain. Most other patients could be seen in a general paediatric clinic if follow up is required (often it isn't!).
3.45 CHEST PAIN

H: FLOWCHART FOR ASSESSMENT

Red flag cardiac disease?
\[ Y \]
\[ N \]
Risk factor PE?
\[ Y \]
\[ N \]
Resp symptoms/signs?
\[ Y \]
\[ N \]
Pain after eating/abdo tenderness?
\[ Y \]
\[ N \]
Drug/alcohol use?
Evidence of psychiatric disease?
\[ Y \]
\[ N \]
Movement/palpation reproduces pain?
\[ Y \]
\[ N \]
Undifferentiated chest pain?
\[ Y \]
\[ N \]

ECG, consider CXR
Discuss with cardiology
See guideline 3.44 – PE
CXR, consider CT scan
Discuss with respiratory
GI cause e.g. reflux, biliary disease
Home/discuss with surgeons
ECG if stimulant use, as per Toxbase
Discuss with STAR team as appropriate
MSK cause
Home, reassurance, safety-netting

NB – this is not a substitute for a thorough history, examination and senior advice!

I: ECG TIPS
Full ECG interpretation is beyond the scope of this guidance but for further learning, the Cardiology team’s ECG interpretation PowerPoint is available on the Shared G Drive.
Key things to look out for:

- RATE – is there an unexplained tachycardia?
- RHYTHM – is there an obvious rhythm disturbance e.g. heart block, SVT, ectopic beat
- ST SEGMENT – is there elevation?
  e.g. widespread slurred/saddle shaped ST elevation in pericarditis
  ST elevation and T wave inversion early MI (NB classic ‘tombstone’ is a late finding
- QT INTERVAL – is this prolonged?
  Normal 350-440 (upper limit depends on source)
  QT >500 correlates to higher risk of torsades/polymorphic VT
  Use Bazett’s formula to correct QTc
3.45 CHEST PAIN

If in doubt, discuss with a senior colleague.

REFERENCES
Collins SA, Griksaitis MJ, Legg JP
15-minute consultation: A structured approach to the assessment of chest pain in a child
Archives of Disease in Childhood - Education and Practice 2014;99:122-126.

Royal Children’s Hospital Melbourne
Clinical practise guidelines: Chest pain
https://www.rch.org.au/clinicalguide/guideline_index/Chest_pain/

(Section 3.45 written by Dr S Ramlakhan & Dr S Foster, June 2020)
4. ACUTE INJURY AND ORTHOPAEDIC

4.1 Pain management in the Paediatric Emergency Department
4.2 Potentially painful or distressing procedures
4.3 Multiple or severe trauma – management of
4.4 Massive blood loss
4.5 Cervical spine injuries
4.6 Head injuries – guidelines for the assessment & early management of
4.7 Fractures and dislocations – general principles
4.8 Orthopaedic emergencies
4.9 Compartment syndrome
4.10 Femoral fractures
4.11 Femoral nerve block for a fractured femur
4.12 Knee injuries
4.13 Ankle and foot injury guidelines
4.14 Clavicle fracture guidelines
4.15 Elbow injuries
4.16 Hand injuries
4.17 Forearm fracture – fast track admission policy
4.18 Buckle fractures of the distal radius – ald er hey splint
4.19 Limb fractures:
   A – Shoulder girdle (also see 4.14)
   B – Humerus
   C – Elbow (also see 4.15)
   D – Forearm
   E – Wrist (also see 4.18)
   F – Hand (also see 4.16)
   G – Femur (also see 4.10 & 4.11)
   H – Knee (also see 4.12)
   I – Lower leg
   J – Ankle (also see 4.13)
   K – Foot (also see 4.13)
4.20 Physiotherapy
4.21 Back pain
4.22 The limping or non-weight bearing child
4.23 Dressings available in the ED
4.24 Nurse led dressing clinics
4.25 Wounds
4.26 Trapped fingers & amputated finger tips
4.27 Burns
4.28 Mammalian bite – wound care
4.29 Needlestick injuries
4.30 Fractures of the facial skeleton
4.31 Dental injuries
4.32 Dental haemorrhage
4.33 Dental infections & acute infections of the face
4.34 Dental care – emergency access
ACUTE INJURY AND ORTHOPAEDIC

4.1 PAIN MANAGEMENT IN
THE PAEDIATRIC EMERGENCY DEPARTMENT

A. BACKGROUND

B. RECOGNITION AND ASSESSMENT

C. PAIN MANAGEMENT:  
1) Environment  
2) Preparation  
3) Supportive and distractive techniques  
4) Pharmacological agents

D. SUMMARY FLOW CHARTS OF PAIN MANAGEMENT

E. SPECIAL SITUATIONS AND NOTES

F. DISCHARGING CHILDREN HOME WITH ON-GOING PAINFUL CONDITIONS

A. BACKGROUND
Inadequate analgesia is unacceptable. There is no evidence that the experience of pain is any less in children than in adults. Pain is often under-estimated, under-treated and treatment may be delayed in children, especially in infants and neonates. Good analgesia:
- allows for proper assessment of the child,
- reduces the anxiety and fear of this and subsequent medical contacts,
- reduces the risk of bronchoconstriction and increased pulmonary vascular resistance (leading to hypoxia) in an already compromised unwell child.

It is easier to anticipate and prevent than to try to relieve established pain. There is some evidence that pain relief is related to patient satisfaction.

B. RECOGNITION AND ASSESSMENT OF PAIN IN CHILDREN

This is often more challenging than in adults. Reasons include difficulty in assessing severity, the child may not appear distressed or have difficulty describing / admitting to pain. Drug choice and dosage may also cause problems due to unfamiliarity. Even older children behave as though they are much younger when anxious and in pain. Like adults, different children respond to pain in varying ways depending on age, previous experience, and temperament.

Recognition
Can be made by:
- anticipation of pain e.g. fracture, burn or other significant trauma
- a description from the child or parent,
- crying, facial expression, protection of affected part, loss of interest in play,
- physiological factors such as pallor, tachycardia, tachypnoea, sweating.

Assessment
Try to establish degree of pain experienced. Various pain-scoring tools exist such as the ‘faces score’ and ‘pain ladder’. The pain scoring system used in this department is an amalgamation of a number of tools giving a score from 0 - 4 (none / mild / moderate / severe). All children presenting with a painful condition or trauma will receive a pain score at triage,
ACUTE INJURY AND ORTHOPAEDIC

4.1 PAIN MANAGEMENT IN

THE PAEDIATRIC EMERGENCY DEPARTMENT

which will also influence the triage category. Patients with moderate & severe pain should receive analgesia within 20 minutes of arrival in the ED. Effectiveness of the analgesia should be re assessed within 60 minutes in severe pain.

C. PAIN MANAGEMENT

C. (1) Environment

The Emergency Department is set up to be ‘child friendly’ with toys, pictures, television and books. Pay attention to the other factors distressing the child such as fear of the unfamiliar environment and people, parental distress, people in uniforms, needle avoidance, fear of injury severity etc. There is an adolescent room specifically to be used by older children. The presence of family members or a close friend is often helpful.

C. (2) Preparation

Except in obvious emergencies, take time to plan and discuss your plan of pain management with the child and parents in terms that both can understand. Remember that the parents will also be anxious and in an unfamiliar setting. They may need some guidance on how best to help the child. Anticipate what pain relief is likely to be needed. For example, a child with an obviously deformed arm should have a splint to immobilise the limb, could then be given entonox or intranasal analgesia whilst a cannula is sited for iv morphine.

Always be honest about what any procedure may involve, otherwise you will lose the confidence of both child and parents.

Prepare all equipment e.g. for venepuncture out of sight of the child.

C. (3) Supportive and distractive techniques

Splints and backslabs to immobilise fractures, elevation and sling in limb injuries, dressings, and cooling in burns help to reduce pain. Dressings also cover wounds that may be distressing for the child to see.

Distractive techniques add to the relief of pain by reducing fear and anxiety. Use techniques suited to the child’s age and interests; pop-up books, computer games, cartoon videos bubbles, noisy toys, reading, or storytelling using superhero or magical imagery to make the pain go away. Books are helpful to provide a screen when examining an injury.

Parents should be encouraged to comfort the child in their usual familiar way e.g. singing, nursery songs etc. Smaller children can be cuddled on a parent’s knee where at all possible. Consider use of dummies, comforters, feeding if not contraindicated.

C. (4) Pharmacological agents

Please refer to the charts of suggested drug doses of analgesics (section 2.5) produced by the hospital pain management team (at nurses’ station and on walls in doctor’s rooms). A more comprehensive list of side effects, etc. can be found in the BNF for children. BNF app is extremely
ACUTE INJURY AND ORTHOPAEDIC

4.1 PAIN MANAGEMENT IN

THE PAEDIATRIC EMERGENCY DEPARTMENT

useful and quick. Ask if the child has had any analgesics prior to attendance. Remember that parents often forget that ‘calpol’ contains paracetamol.

Match the analgesic to the pain score i.e. low score – mild analgesic.

Analgesics should be tried in logical sequence i.e. mild analgesic before stronger one unless pain is immediately severe (as in trauma).

Drugs of similar efficacy but with different complementary actions can be added or given together, e.g. ibuprofen and paracetamol.

Route of administration:

Oral:
- Remember delayed gastric emptying post trauma may impair absorption.
- An oral dose of analgesic does not affect subsequent GA.
- Ask about child’s preference for tablet, dispersible, syrup.

Rectal:
- Consider if vomiting.
- Absorption is less reliable.

Intravenous:
- Use topical anaesthetic (Ametop), entonox if possible, prior to cannulation.
- Remember to take any required bloods from cannula to avoid further venepuncture.

Intranasal: (see section 2.7)

Inhalational: Entonox gives rapid analgesia without the need for an injection.

Nerve Blocks: Digital nerve block is useful for painful finger injuries and wound exploration, whereas regional blocks like femoral or faciaca iliaca blocks are useful in femoral fractures before applying splint.
D. SUMMARY FLOW CHARTS OF PAIN MANAGEMENT

Attendance in the ED with a painful condition / trauma

Pain score at triage for all

Mild / moderate

Paracetamol PO/PR +/- ibuprofen PO (diclofenac PO)

Reassess pain score

Inadequate

Low dose oral morphine OR Morphine I.V.

Severe

Morphine I.V. (PO)
Or intranasal diamorphine
Or Fentanyl or Entonox
(see section 2.6)

Inadequate

Further morphine
Senior advice

Remember:
1. Temporary / definitive procedure, e.g. immobilisation of fractured limb in splint / POP, reducing a pulled elbow or trephining a subungual haematoma.
2. Distraction techniques play an important part even in the severely injured child.

E. SPECIAL SITUATIONS AND NOTES

Analgesics and head injury

A frequently voiced concern in head injury is that by giving opiates the side effects could mask signs and symptoms of rising intracranial pressure. However, giving adequate analgesia is beneficial since
4.1 PAIN MANAGEMENT IN THE PAEDIATRIC EMERGENCY DEPARTMENT

physiological response to pain can itself increase intracranial pressure. Non-opiate analgesics do not alter consciousness. Please involve a senior if opiates are required.

Use of non-steroidal anti-inflammatory drugs in asthmatics

NSAIDS are useful for their analgesic, anti-inflammatory and anti-pyretic actions. Since a high proportion of our patients have or have had wheezy episodes, the problem of NSAID use is a daily consideration. Studies have shown that

“A diagnosis of asthma is not a contraindication to the short-term use of NSAIDS in children. Practitioners should, however, remain alert to the possibility of an idiosyncratic reaction” - Anaesthesia, Vol 55(4) April 2000. 334-337.

In practice, as with all drugs, use with caution, observe for side effects and should a reaction occur, stop drug, treat symptoms e.g. salbutamol for wheeze.

F. DISCHARGING CHILDREN HOME WITH ON-GOING PAINFUL CONDITIONS

A significant number of children will be discharged from the ED with on-going pain.

Explain predicted length and degree of discomfort expected following discharge.

Suggest regular analgesics for about 48 hours followed by PRN so that any pain can be relieved before it becomes established.

Ask child and parents if they would prefer tablets, soluble, syrup, by oral syringe or spoon.

Approximate prescriptions to simplify drug administration.

Clear directions to parents and primary care physicians will support good pain management post discharge.

(See info leaflets 039 Paracetamol and 141 Ibuprofen)

(Section 4.1 reviewed by Dr S Perumal and Mr C Fitzsimmons, June 2020) (Written by Dr J Dawson, Aug 2002)

References:


4.2 POTENTIALLY PAINFUL OR DISTRESSING PROCEDURES

Always discuss your management plan with the parents and involve the child if appropriate; consider:
- Length of procedure.
- Anticipated pain and distress.
- Child’s age and temperament.

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Un co-operative / distressed child</td>
<td>Consider ketamine or early referral for GA</td>
</tr>
<tr>
<td>Potentially very painful procedure</td>
<td>Consider ketamine or early referral for GA.</td>
</tr>
<tr>
<td>Potentially long procedure</td>
<td>Consider early referral for GA.</td>
</tr>
</tbody>
</table>

Involve the Play Specialist early where possible. Prepare the Procedure room and equipment BEFORE the child comes into the room. Explain the procedure to the child and parents. Be honest about the procedure and what is involved. Encourage parents to be present and to comfort the child. Don’t forget the usefulness of distraction or not being able to see what the doctor is doing. An interesting (Where’s Wally) or noisy book / toy / bubbles can work wonders.

Non pharmacological measures also play an important role during potentially painful or distressing procedures on neonates and infants. If at all possible, encourage parents to cuddle the baby, Consider dummies +/- administration of sucrose solution onto the tongue.

Note on use of SUCROSE 24 % solution (taken from GOSH protocol 2007)
Use in infants< 3 months
Potentially painful procedures e.g. heel prick, venepuncture, cannulation
Single use
Drop onto tongue or inside cheek 2 mins before procedure
Onset action maximal at 2 mins. Lasts 5-10 mins. May be repeated
Action enhanced by non-nutritive sucking e.g. dummy

Also see 2.9- Procedural Sedation with ketamine.

(Reviewed by Mr C Fitzsimmons, June 2020)
(Written by Dr J Dawson, Aug 2002)
4.3 MAJOR TRAUMA - ED MANAGEMENT OF

A BACKGROUND

Sheffield Children’s Hospital is a designated children’s Major Trauma Centre (MTC) operating 7 days a week. A full trauma team is functional in response to all trauma calls that meet the triggering criteria. However, the Emergency Department does not always receive warning from Ambulance Control that a severely injured child is being brought to us. Up to 30% of all paediatric ‘major’ trauma arrives by private transport e.g. car. Put out a trauma call early. **(2222 and ask for ‘Trauma Team’).**

B DEFINITIONS

PRIMARY TRANSFERS

Primary transfer is any child with major trauma transported by emergency ambulance/helicopter directly from the scene to SCH. All major trauma primary transfers will be admitted into the Emergency Department resus room. This group will include Sheffield patients and patients from outside of the normal SCH catchment area who are by-passing local Trauma Units and EDs to come to the paediatric MTC.

SECONDARY TRANSFERS

Secondary transfer is any child with major trauma transported by emergency ambulance from the scene to a local Trauma Unit for immediate life saving interventions only and then transported onwards to SCH. It may also include under-triaged patients who on arrival at a Trauma Unit appear more severely injured than suspected and/or are unstable. All major trauma secondary transfers will be admitted into the SCH Emergency Department resus room.

TIME CRITICAL TRANSFERS IN

If a trauma patient in a Trauma Unit needs onward referral for interventions at SCH MTC, the referring hospital should use the Embrace call conferencing service to
4.3 MAJOR TRAUMA - ED MANAGEMENT

Contact the ED Consultant and to pass the details. These children will be accepted for transfer into SCH via the Emergency Department resus room. It will be usual for a 2222 Trauma Team call to be put out on arrival of such patients. This system is used to avoid unnecessary delays in waiting for a response from the specialty teams and to avoid possible bed management issues and ensure these children reach definitive care as soon as possible.

CRITICAL CARE / EMBRACE TRANSFERS

Children with major trauma who are initially managed in a peripheral hospital may be referred to SCH for ongoing PCCU care. It is anticipated that these children will be transferred by Embrace when available. On arrival at SCH the child will be taken directly to PCCU. Formal handover should be from Embrace to PCCU +/− SCH specialty team(s) on arrival in PCCU.

OTHER TRAUMA TRANSFERS

Children with injuries initially managed in a local trauma unit may be referred hours-days afterwards to SCH teams for ongoing management e.g. Orthopaedic, Neurosurgical. The accepting SCH team will arrange the admission and the child should be taken directly to the appropriate ward.

C. PRE-HOSPITAL COMMUNICATION

- An immediate response is required to the emergency ‘red’ phone. Ask if the case is ‘Medical or Trauma’.

- Ideally, the ED Consultant should answer the red phone. In the absence of a senior doctor, the nurse in charge can take the call. Trainee doctors should not answer the red phone. If the ED consultant is not available to take the call (e.g. overnight) then redirect the caller to contact the on call Consultant via their mobile phone.

- Record all details on the ‘ATMISTER’ trauma proforma located next to the red phone, including name of person answering the call and time of trauma team activation. This proforma should then BE FILED with the patient’s ED card.

The ATMISTER form records -

**Age of casualty**

**Time of incident**

**Mechanism of incident to include:**

- The gross mechanism of injury (e.g. motor vehicle crash or stab wound to the chest)

- Details of other factors known to be associated with major injuries e.g. entrapment, vehicle rollover, occupant ejected from vehicle.

Injuries suspected
4.3 MAJOR TRAUMA - ED MANAGEMENT OF

Signs:
- Vital signs including heart rate, blood pressure, respiratory rate, O₂ sats and conscious level e.g. AVPU or GCS
- An indication as to whether the physiological state of the patient has improved or deteriorated since first seen.

Treatment given

Estimated time of arrival

Resources required
- 2222 activated
- ED Consultant
- Relevant equipment – vacuum mattress, RSI kit, blood warmer, rapid infuser
- Blood – blood products, massive haemorrhage protocol, tranexamic acid

D. TRAUMA CALL TRIGGERS

It is important to note that ED do not get to decide if a trauma patient comes to SCH or not. The MT triage co-ordinator at YAS or EMAS ambulance control does this. It is not for discussion. Accept the patient and take the details.

Should the airway be compromised at any time or the patient is in cardiac arrest, the patient should be taken to the nearest trauma receiving Emergency Department.

The YAS or EMAS Major Trauma co-ordinator will trigger a trauma call to SCH ED in the following circumstances:

PRIORITY 1

Patient with likely multiple injuries (i.e. in the context of major trauma) AND ANY ONE of
- Glasgow Coma Score <14
- Respiratory rate, heart rate, BP out of the normal physiological range for the age of the child

PRIORITY 2

Patient with
- Chest injury with abnormal physiology
- Traumatic amputation proximal to wrist or ankle
- Penetrating trauma to neck, chest, abdomen, back or groin
- Suspected open and/or depressed skull fracture
- Suspected pelvic fracture
- Spinal trauma suggested by abnormal neurology
- Trauma with facial and/or circumferential burns
- Time critical burns (>20%)
4.3 MAJOR TRAUMA - ED MANAGEMENT OF

- Two or more long bone fractures
- Open ankle fractures

PRIORITY 3

- Mechanism of Injury
- Traumatic death in same passenger compartment
- Falls >20 feet
- Person trapped under vehicle
- Bulls eye to window and/or damage to the ‘A’ post of vehicle
- Pedestrian/cyclist vs motor vehicle, thrown or run over with significant impact
- Ejection from vehicle at speed

E. TRAUMA TEAM ACTIVATION

At the discretion of the Senior ED Clinician, when the YAS or EMAS Major Trauma co-ordinator triggers a trauma call to SCH ED activate the Trauma Team and prepare ED Team for patient arrival. Call 2222 and ask for ‘Trauma Team’.

As team members arrive, apply to their person the colour co-ordinated tabards available in the Resus room to show their speciality and written name.

Consider calling the following individuals before the patient arrives for specific injuries:

- Neurosurgical Registrar via switch
- Plastics Registrar via STH (77340)
- Orthopaedic Registrar bleep 146

**IF IN DOUBT, ACTIVATE THE TRAUMA TEAM – CALL 2222 AND ASK FOR ‘TRAUMA TEAM TO ED RESUS’**

F. TRAUMA TEAM COMPOSITION (08:00 – Midnight)

The trauma team consists of the following individuals.

Activated by 2222 call:

- Trauma team leader – ED Consultant
- Anaesthetist
- Operating department practitioner (ODP)
- Paediatric Registrar
- PCCU Registrar
- PCCU nurse
- General Surgical Registrar
- Scribe: Paediatric ST1-3
4.3 MAJOR TRAUMA - ED MANAGEMENT OF

- Communications: Surgical ST1-3
- Radiographer
- Porters

In department:
- ED junior doctor/middle grade x 1-2
- Lead nurse: ED nursing team leader
- ED nurse

In addition, the following will be informed of the trauma call but will not be expected to attend routinely:
- Radiologist (informed by radiographer)
- CT radiographer (informed by radiographer)
- Senior nurse covering site
- Labs
- Blood bank (informed by Trauma call)

Start documentation on the dedicated Trauma Card, available in the Resus room to include pre-hospital observations and information, once known.

TRAUMA TEAM COMPOSITION (Midnight – 08:00)

Activated by 2222 call
- Team leader – ED CT3-ST7 until arrival of the ED consultant*
- Anaesthetist
- ODP (activated by Anaesthetist if not on site)
- PCCU Registrar
- Surgical ST1-3
- Paediatric Registrar
- PCCU nurse
- Scribe / Communications: Paediatric ST 1-3
- Radiographer

In department
- ED doctor (CT3 or ST4+)
- Lead nurse: ED nursing team leader
- ED nurse

* The ED consultant will be called as part of the trauma team call. The consultant is expected to attend within 30 minutes of the call. In practice there is an ED Consultant present 08:00-MN at the weekends and after midnight they will attend ASAP. Specialists will be called in by the team leader as required by the nature of the injury as ascertained either on initial assessment or first call.

G. CONSULTANT INPUT

One of the core principles of improving outcomes in trauma is involvement of speciality consultants early in the management of the case. During normal working hours this
4.3 MAJOR TRAUMA - ED MANAGEMENT OF

should be routine and specialty doctors should be asked early if they have involved the
consultant on call for their specialty.

Emergency Department Consultants have primary responsibility for all trauma patients
in the Emergency Department until the patient has been formally handed over to the
appropriate team(s) for on-going and definitive care.

Named consultant:
All trauma patients will be admitted under a named consultant.
If the trauma involves a single system (e.g. isolated limb injury or head injury or burn)
the responsible specialty consultant (Trauma & Orthopaedics or Neurosurgery or Burns
& Plastics) will be the named trauma consultant for that patient.
PSU Surgeons – will be the named consultant for all other trauma patients.
Paediatric Critical Care Unit – Patients admitted to the PCCU will be admitted under the
existing shared care arrangement between critical care and specialty consultants.

Specialists on call for SCH include:

- PCCU Consultant
- Anaesthetic Consultant
- Radiology ST4+ / Consultant
- PSU Surgical ST4+ / Consultant
- Neurosurgical ST4+ / Consultant
- ENT ST4+ / Consultant
- Burns and plastics ST4+ / Consultant
- Orthopaedic ST4+ / Consultant

Specialities not present at SCH:

Currently, pathways exist (involving time critical YAS transfers) for the management
of children who require

- Interventional radiology – to Leeds General Infirmary
- Cardiothoracic expertise – to Leeds General Infirmary
- Vascular surgery input – to Leeds General Infirmary
- Burns Centre care (>35% BSA burned) – to Royal Manchester Children’s
  Hospital

For time critical transfers out to LGI for IR, vascular surgery or cardio-thoracic input,
DO NOT call the relevant LGI specialities. DO NOT call Embrace. Call the LGI ED
red phone (0113 245 9405) only. The LGI ED Consultant on call is always available
on 0113 392 8927 should this fail. On arrival of the patient at Leeds the LGI Trauma
Team cascade will ensure the arrival of the correct speciality team members, e.g.
vascular interventional radiologist. In parallel, arrange YAS priority 1 transport and a
team to take the patient (a minimum of senior SCH anaesthetist).
4.3 MAJOR TRAUMA - ED MANAGEMENT OF

In the case of Burns, all cases will require an early discussion with the relevant speciality doctors and Embrace to coordinate further care. Call 0845 147 2472.

(See the South Yorkshire Major Trauma Operational Delivery Network paediatric secondary transfer pathway. Embrace will coordinate this process for transfers in but for all time critical conditions transferring in or out, YAS will carry out the transfer.)

H. ACTIONS BEFORE PATIENT ARRIVAL

- ALL team members should identify themselves to the Trauma Team leader on arrival – this includes team members who arrive secondarily. Each team member will be given a colour coded tabard to clearly identify their role. The tabards are available in the resus room.
- Individuals should be assigned clear roles:
  - e.g. Airway doctor
  - Circulation doctor for IV access and bloods
  - IV access nurse
  - Monitoring/observations nurse
  - Scribe
- The role of a dedicated scribe cannot be underestimated. The ED middle grade or consultant will assign this role to one of the first doctors to arrive.
- It may be appropriate to alert speciality consultants as well as trauma team members at this stage.
- Team members should have ‘standard precautions’ which as a minimum should include gloves and a plastic gown.
- Inform ED reception that the patient will need rapidly booking in. They will come to Resus to assist with this. Consider using ‘unknown’ patient stickers early.
- If massive blood loss is suspected:
  - Inform blood bank
  - Follow the ‘massive blood loss – management of’ ED guideline; see section 4.4
- Team members without a specific role or not needed at a particular time should remain outside of the immediate patient ‘hot’ area marked by grey lines on the floor until asked to enter by the team leader.
- The trauma team are to remain in ED until the trauma team leader is happy they are not required at this stage but a call can be re-activated at any time.

I. RECEIVING THE PATIENT

- Promptly transfer the patient onto the ED trolley. Ideally this should have a vacuum mattress in place first.
- Unless active CPR is taking place, all team members should then step back from the patient to receive the ATMISTER handover. It represents good practice and courtesy that this should happen with all team members silent. The handover should be brief and concise, and documented both on the ATMISTER handover sheet which are available in resus, and on the dedicated white board by the nominated scribe.
4.3 MAJOR TRAUMA - ED MANAGEMENT OF

- Relatives may need to be directed to the relatives’ room initially and the resus nurses informed of this. It is OK for parents to remain with the child in resus if they wish to but they need to be assigned a nurse/HCA escort in order to support them and explain procedures to them.

J. PRIMARY SURVEY / INITIAL ASSESSMENT

- Ideally this should be done within 15 minutes and use an ABCDE approach. Allocation of roles will allow this list to occur in a horizontal rather than vertical fashion.
  
  A  Airway and cervical spine control  
  B  Breathing with high flow oxygen  
  C  Circulation and haemorrhage control  
  D  Disability with prevention of secondary injury  
  E  Exposure with temperature control

- Observations should be performed at least every 5 minutes and all team members should be made aware of these as well as them being documented.

Adjuncts to the primary survey.

- These occur once the ABCs of the primary survey have been stabilised. Consider all but only do what is necessary:
  
  o  CT scan – see guideline below for whole body CT/polytrauma CT. This is rarely indicated in paediatric major trauma.  
  o  CXR  
  o  Chest ultrasound (for haemothorax and pneumothorax) should be considered. There is no place for FAST scanning of the injured child in the resuscitation room by ED staff  
  o  Pelvic XRs if clinically indicated only – also rarely needed; do not routinely request  
  o  Do NOT waste time initially with a lateral C spine film  
  o  Arterial or venous/cap blood gas  
  o  Orogastric tube  
  o  Consider urinary catheter  
  o  Keep the patient warm.

- Until the ABC have been stabilised, do not spend time on non-critical matters such as limb trauma/fractures, lacerations etc. (unless these are contributing to the hypovolaemia)

1. Assessing the Trauma Patient: Key Points

   A: Airway with C spine control
4.3 MAJOR TRAUMA - ED MANAGEMENT OF

- Give high flow oxygen.
- Examine for signs of airway obstruction and use suction/jaw thrust/ simple airway adjuncts.
- If an advanced airway is required, recognise this early and discuss with the anaesthetist.
- Airway control will probably be easier with the C spine collar removed, but maintain control of the C spine at all times until the C spine can be cleared.
- Hard cervical collars are not necessary to immobilise the paediatric cervical spine and this can be achieved by either manual in-line immobilisation or blocks and tape alone.
- If however a cervical collar has already been applied by the paramedic team and it appears to be a good fit and is tolerated by the child it can be left in place until the cervical spine has been cleared.
- Examine the neck prior to formal immobilisation when possible (veins, trachea, wounds etc).
- See section 4.5 on C-spine injury assessment and need for imaging.

B: Breathing with high flow oxygen

- Examine the chest and measure all vital signs.
- Life threatening chest injuries must be treated immediately:

<table>
<thead>
<tr>
<th>Chest Injury</th>
<th>Initial Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Airway obstruction</td>
<td>• See above</td>
</tr>
<tr>
<td></td>
<td>• Early intubation may be required</td>
</tr>
<tr>
<td>Tension pneumothorax</td>
<td>• Finger thoracostomy</td>
</tr>
<tr>
<td></td>
<td>• Insert chest drain</td>
</tr>
<tr>
<td>Open pneumothorax</td>
<td>• Asherman chest seal or occlusive dressing</td>
</tr>
<tr>
<td></td>
<td>• Look for any exit wounds if gunshot</td>
</tr>
<tr>
<td></td>
<td>• Insert chest drain (not through the wound)</td>
</tr>
<tr>
<td>Massive haemothorax</td>
<td>• Confirm adequate IV access</td>
</tr>
<tr>
<td></td>
<td>• Insert chest drain and manage hypovolaemia</td>
</tr>
<tr>
<td>Flail chest</td>
<td>• Recognise early and give good analgesia</td>
</tr>
<tr>
<td></td>
<td>• Consider intubating as lung contusion will be significant and will aid patient comfort</td>
</tr>
<tr>
<td>Cardiac tamponade</td>
<td>• Diagnose on clinical grounds or ultrasound</td>
</tr>
<tr>
<td></td>
<td>• Definitive treatment is thoracotomy; only do this in the ED if the patient arrests with a penetrating wound near the heart within 5 minutes of arrival.</td>
</tr>
<tr>
<td></td>
<td>• Needle pericardiocentesis may help as a bridging measure prior to urgent cardiothoracic transfer.</td>
</tr>
</tbody>
</table>
4.3 MAJOR TRAUMA - ED MANAGEMENT OF

C: Circulation with haemorrhage control

- Check pulse, skin colour, level of consciousness.
- Record the patient’s blood pressure and capillary refill time.
- Attach cardiac monitoring leads.
- Insert 2 x large bore cannulae (size 16G or larger dependent on age of child) and take bloods for a minimum of FBC, U&E, Clotting, amylase, glucose, and most importantly a group and save or cross match.
- A rapid BHCG in adolescent females is best obtained on a urine sample.
- If peripheral IV access is difficult, the EZ-IO intraosseous drill is available in the resus room. Needles are also kept in the IV trolleys: pink for smaller children, blue for larger children/adolescents and yellow when larger access is needed. The tibial route is preferred as it is easier to avoid epiphyseal damage but the upper humeral route is an option and if necessary the lateral femoral condyle can be used.
- If resuscitation is needed, blood/products should be given. O negative blood is available from blood bank and can be urgently brought by the porters. Consider having O negative blood available before / shortly after the child arrives if massive haemorrhage likely. Blood bank may provide O positive blood for males; this can be safely transfused.
- Remember the need for analgesia; IV titrated morphine (0.1-0.2mg/kg) is the gold standard for trauma care.
- Assess for signs of occult blood loss – ‘On the floor and four more’
  - Chest
  - Abdomen
  - Pelvis
  - Long bones
- Infusing large volumes of crystalloid will be harmful in the patient who is actively bleeding with the source not controlled, as this disrupts existing clot and can contribute to hypothermia and dilution of clotting factors.
- Maintaining a radial pulse may be all that is required for initial resuscitation.
- Smaller boluses of blood are generally appropriate (10ml/kg).
- Any bleeding major trauma patient is at risk from coagulopathy.
- Any patient with significant blood loss should be considered for blood product replacement with not only packed red cells but also blood products such as FFP, platelets and cryoprecipitate.
- Any patient with significant blood loss should have tranexamic acid (TXA). A bolus of TXA must be followed up with an infusion. The trust has a massive transfusion protocol available on the wall in resus and on the intranet. See also section 4.5 of the ED guidelines book: ‘Management of Massive Blood Loss’.
- Involve the haematology staff early, and bear in mind that waiting for an abnormal clotting result prior to initiating treatment is too late.
- When a bleeding control surgical procedure is needed, discuss with the relevant surgical team and seek surgical consultant input.
- A profoundly shocked patient in whom CT is unsafe may mean that a laparotomy is the appropriate course of action.
4.3 MAJOR TRAUMA - ED MANAGEMENT OF

- Suspected pelvic fracture should be treated with a SAM pelvic binder, or a tied sheet in its absence. Alternatively, internally rotate the legs and tie the ankles together. In smaller children another alternative is a large BP cuff.
- Do NOT spring the pelvis to assess stability or allow specialty doctors to do so.
- Femoral fractures should be splinted promptly with a Thomas splint; use a femoral nerve block to facilitate this.
- Hypotension is not due to head injury alone. Look for other causes ('on the floor and 4 more' as above). An exception to this is infants who may lose disproportionately large amounts of blood from scalp wounds.

D: Disability with secondary prevention

Assess: Level of consciousness:

GCS, or at this stage AVPU
- A Alert
- V Responds to voice
- P Responds to pain
- U Unresponsive

Pupil size and reaction
Lateralising signs e.g. weakness, sensory loss
Spinal cord injury level

E: Exposure with temperature control

- Check the patient’s temperature.
- Expose fully to allow a comprehensive examination, but then KEEP WARM with either warmed blankets or the Bair hugger.
- Patients are generally transported on a scoop stretcher which can be rapidly removed. In the rare case where the patient is on a spinal board perform modified 20 degree tilt and remove the board if not done already but consider delaying this if life-saving interventions are taking place.
- A blood glucose level must be taken if not already done as part of C.

K. USE OF IMAGING

The use of CT in children has to weigh the benefits of finding injuries versus the real risks of ionising radiation in significant doses. The routine use of head to thigh polytrauma CTs in children is NOT appropriate. The principle is to keep radiation dose ‘as low as reasonably achievable’ – ALARA.

Primary survey x-rays

A routine ordering of CXR, C-spine x-ray and pelvic x-ray is no longer appropriate

CXR
4.3 MAJOR TRAUMA - ED MANAGEMENT OF

Life threatening injuries can be picked up on the CXR or by ultrasound. Chest imaging will be required in most instances depending on mechanism of injury. This can be done quickly via portable X-ray in resus. If this is abnormal, then CT can be requested for the chest. If normal, then CT chest is NOT required.

Pelvis x-ray

Children rarely have significant pelvic ring disruption fractures (this excludes isolated pubic ramus fractures) and a routine pelvic x-ray is NOT required. If there is strong clinical suspicion of pelvic ring injury then pelvic x-ray is indicated in resus with CXR.

C-spine x-ray

If the NICE guidelines criteria are met then the initial imaging of the C-spine is by x-ray. 3 views should be obtained if possible. Lateral C-spine and AP is acceptable in younger children where odontoid peg views are difficult (see C-spine guideline 4.5).

CT imaging

Head
Follow NICE Head Injury guidelines (guideline 4.6)

C-spine
Follow NICE Cervical spine imaging guidelines (guideline 4.5)

Abdomen

CT if the following criteria are met:
• Lap belt injury/bruising
• Abdominal wall ecchymoses
• Abdominal tenderness in a conscious patient
• Abdominal distension
• Clinical evidence of persistent hypovolaemia
• Blood from the rectum or NG tube
• BEWARE handle bar injuries / circular handle bar end bruising

Pelvic CT and/or chest CT - only if initial x-rays are abnormal.

Do NOT request CT chest in the patient who requires a CT head and CT abdomen (a common combination) simply because the chest lies between the 2 injured areas. This is inappropriate in children where multi-system trauma is the exception, not the rule. Similarly do NOT request CT C-spine (200 x the radiation dose of 3 view C-spine x-rays) just because the head may require CT.

Whole body CT
The key investigation in the critically injured patient is likely to be a polytrauma CT. This usually means a head to symphysis pubis CT in fact. This incorporates all important
4.3 MAJOR TRAUMA - ED MANAGEMENT OF

body regions including pelvis. National targets (adults) state this should be performed within 30 minutes of the patient’s arrival in the ED. However, few paediatric patients meet the criteria of proper polytrauma required to justify this approach as first line investigation.

Involve the duty radiologist at the earliest possible opportunity when it is clear that the patient needs a polytrauma CT.

As soon as possible after the scan a ‘primary survey’ written report will be available to identify life threatening problems. A more detailed ‘secondary survey’ report should be made available within one hour of the scan.

In the rare event that both CT scanners at SCH are unavailable (maintenance or breakdown) then follow the guideline for arranging urgent CT in the event of CT unavailability at SCH MTC, which involves urgent transfer to NGH in most cases. The ED Consultant may decide to temporarily divert trauma to another hospital according to policy.

L. SECONDARY SURVEY

This is only carried out when all abnormalities of airway, ventilation and hypovolaemia have been addressed. This includes a complete history and physical examination, including assessment of all vital signs and a neurological examination.

The history required is AMPLE: Allergies, Medications, Past illnesses, Last meal, Events/Environment relating to the accident. Examine the whole patient systematically. A suggested system is:

1. Head and face (including fundi)
2. Neck
3. Chest
4. Abdomen
5. Pelvis and perineum
6. Back and spine (Log-roll)
7. Extremities
8. Neurological status i.e.
   a) Formal GCS
   b) Pupil reaction
   c) Lateralising signs

Further imaging may be done at this stage if appropriate to do so.

Secondary survey may be done in the ED, on the ward or ITU. Make sure you hand this over to the receiving team regarding and document clearly in the ED trauma card.

It is essential to keep reassessing ABC throughout as improvements initially may be transient.
4.3 MAJOR TRAUMA - ED MANAGEMENT OF

M. DOCUMENTATION AND AUDIT

- In line with national guidance, SCH is currently submitting data to the Trauma Audit and Research Network (TARN). Clear documentation will facilitate this process. Please be clear regarding the patient’s injuries, interventions given and at what time on the ED Trauma Card.

- Any governance issues arising from a trauma case should be discussed with the on call consultant and fed back to Clare O’Connell (ED Consultant) for action.

References

2) Yorkshire and Humber Major Trauma Network Protocol
3) ATLS – Royal College of Surgeons
4) APLS – 6th edition ALSG
5) South Yorkshire Major Trauma Operational Delivery Network paediatric secondary transfer pathway.
6) NICE guideline (NG39) Major trauma: assessment and initial management. February 2016
7) Guideline for arranging urgent CT in event of CT unavailability at Sheffield Children’s Hospital Major Trauma Centre

APPENDIX 1

Key contact numbers

ODP on call bleep: 526
Radiographer on call bleep: 070
X-ray: 17389
CT: 17194
Blood Bank: 17478

Theatres:
- 17208 (reception)
- 17308
- 60666 (weekends)

PICU
- 17362
- 17119
4.3 MAJOR TRAUMA - ED MANAGEMENT OF

HDU

- 17437
- 60809

Embrace: 0845 1472472

(Section 4.3 reviewed and updated by Dr C O’Connell, May 2020)
(Section 4.3 reviewed and updated by Dr C O’Connell, March 2017)
(Section 4.3 written by Dr C FitzSimmons, May 2012)
4.4 MANAGEMENT OF MASSIVE BLOOD LOSS IN TRAUMA

A. DEFINITION

‘Massive’ blood loss is difficult to define. In the ED it is almost exclusively seen in the setting of major trauma and the following should be read in conjunction with section 4.4 ‘Major Trauma’

Losses may be difficult to quantify in the evolving acute situation. The normal total paediatric blood volume is 70-80mls/kg.

Classically massive blood loss is defined as loss of 50% of blood volume in 3hrs or 2-3ml/kg/min

Consider problems when loss of blood volume at 50%, 40mls/kg of resus fluid given in previous hour with ongoing severe bleeding +/- signs of hypovolaemic shock / coagulopathy. Use the clinical picture - shock is a clinical diagnosis.

B. BACKGROUND

The early recognition of massive blood loss and the steps taken to initiate an action plan can help avoid fatal consequences of hypovolaemic shock.

Successful management of cases of massive blood loss depend on good communication between medical, nursing and laboratory staff. It is essential that our response is consistent both in the clinical areas and blood bank.

This is to be used in conjunction with paediatric resuscitation guidelines and blood administration policies for the Trust. It is essential that the administration of blood and blood components follows the correct identification of patient and product outlined in the integrated care pathway (ICP). Wrong blood to the wrong patient is a particular risk in an emergency and final safety checks must be done at all times.

C. EMERGENCY MANAGEMENT

See Massive Blood Loss Protocol (E) on the following page.

The flowchart suggests when intervention may be required and the volumes needed.

In cases of massive blood loss, the use of larger volumes of products in the early stages may be more beneficial but care must be taken with volume overload. Give all products as rapidly as possible (in boluses) when required.
4.4 MANAGEMENT OF MASSIVE BLOOD LOSS IN TRAUMA

Communicate with blood bank as soon as possible. FFP/Octaplas takes time to defrost. This will be the actioned by blood bank staff if a ‘massive blood loss’ event is declared; this takes 20-30 minutes. Unlike other trusts there are not ‘pre-defrosted’ trauma packs as this would lead to significant waste. It can take up to one hour to get platelets if there are none in the trust. The standard platelet prescription is 10mls/kg. 20mls/kg of platelets are required after 50% blood loss and 40mls/kg if there is ongoing blood loss. Whilst in the Emergency Department blood transfusion is based on clinical findings, the following blood result triggers may help to guide prolonged care. The threshold for platelets is 75 in bleeding patients. The platelet threshold is 100 in those with high energy trauma, CNS injury or if platelet function is abnormal. Cryoprecipitate is required if the fibrinogen is <1.5. Two units of cryoprecipitate provides 3.2-4g in a volume of 150-200mls. Normally cryoprecipitate is administered at 10mls/kg.

Treatment should be guided by laboratory results as early as possible and the advice of a senior haematologist sought. Where massive loss occurs treatment needs to proceed on clinical grounds.

D. LABELLING

YAS crews can contact the Red Telephone in the Emergency Department directly from the site of the incident or while on their way to SC (NHS) FT.

If the Ambulance crew notify us of an injured child who may need a blood transfusion, please request details of the child, if available. Inform the ED reception clerk to prepare ED notes with the PAS number to use for any investigations, even if the child’s name and age are not known. This can help pre-prepare the request forms for blood bank samples. Please note that the information on the blood sample bottles MUST be written by hand. This should always include the
- hospital number
- patient’s full name
- date of birth, if known.

Incomplete request forms and blood bottle labels for transfusion samples from the ED is a clinical risk. There is no substitute for taking time to do this correctly, even in the acute trauma scenario. An absolute minimum required to be filled in on both bottle and form is a gender and a unique ID number (PAS, ED or NHS number). If this is not done, blood bank will return the sample and not process the request.

There is a process for unknown patients. Use the patient details provided by the reception staff and add the gender of the patient to the sample.

In a major incident the stickers specifically designed for use in this situation can be used to label blood forms and samples.
4.4 MANAGEMENT OF MASSIVE BLOOD LOSS IN TRAUMA

As part of a trauma call, if you feel it is likely you will need blood for an injured child, please contact the biomedical scientist on-call early to give him / her time to come from home and cross-match the blood.

There are always 3 units of Group O Negative available in the hospital blood bank. The hospital porters know where to find them, if urgently needed. Consider having O negative blood available before / shortly after the child arrives if massive haemorrhage likely. If the patient is male, O positive blood may be used to preserve O Negative stocks.

If a blood transfusion is required for any LIFE THREATENING situation, this is done under common law, in the best interest of the child. In this situation, consent from the child’s family e.g. Jehovah’s Witness, is NOT REQUIRED.

Children who are having blood transfusion must have wristband in place as this is necessary for administration checks.
4.4 MANAGEMENT OF MASSIVE BLOOD LOSS IN TRAUMA

E. PROTOCOL

CALL FOR HELP
Ward - cardiac arrest team via 2222
Theatres - intercom 'ALL HELP' F70
STATE 'MASSIVE BLOOD LOSS' and location
Team Leader / senior clinician activate Massive Blood Loss protocol

RESUSCITATE: ABC
Assess hypovolaemia - HR, BP, temp and saturations and give oxygen
2 large IV cannula or IO access
Send samples - cross match, FBC, clotting, U&E +/- ABG
(Bottles - 1 large pink, 1 small pink, 1 purple, 1 orange)
Patient must have a wristband.

1 PERSON PHONE URGENTLY
Blood Bank
Porter
On call Haematologist
Senior clinician in charge
State MASSIVE BLOOD LOSS

STOP BLEEDING
Apply pressure/tourniquet.
Engage surgeons
Pelvic binder/manage fractures.

PREVENT HYPOThERMIA
Warm fluids
Air warming blanket
Keep covered

EMERGENCY O NEG RED CELLS
3 units in BLOOD BANK Indice

TRANEXAMIC ACID IV/IO
15 mg/kg over 10 mins (max >1g), then 2 mg/kg/hr infusion for 8 hours or until bleeding controlled

Theatres/Wards
10 ml/kg WARM crystalloid +/- 10 ml/kg if O neg blood not yet available
RBC 10 ml/kg
Octoplas 10 ml/kg (FFP)

ED/ Major Trauma
DO NOT GIVE CRYSTALLOIDS
RBC 10 ml/kg
Octoplas 10 ml/kg (FFP)

ONGOING LOSSES

2nd bolus of products
RBCs 10 ml/kg & Octoplas 10 ml/kg
Platelets 10-20 ml/kg (up to 40ml/kg if ongoing losses)
Cryoprecipitate 10 ml/kg
(as directed by Con Haematologist)

Blood Bank 17478
Haematology 17221
Con Haematologist Via switch
POCU (Red phone) 0114 2836191
General porter 629 / 630
Theatre porter 075 / 042

Therapy Aims
ED - systolic or age equivalent, palpable radial pulses, higher SBP if head injury predominates

Hb 80-100 g/L
Platelets >50 x 10^9/L
APTT <1.5 upper limit of normal
Fibrinogen >1g/L
Ionised Ca+ >1mmol/L
Tamp > 38°C
Monitor potassium

AT THE POINT OF STAND DOWN – Inform Blood Bank; return unused components

DIC risk also increases with aged and shock
Low calcium / magnesium - 0.14 ml/kg 14.7% calcium chloride (1mml) max 7ml; magnesium sulphate 0.2mmol/kg (max 2g)
Volume overload
Recheck all blood and clotting parameters as soon after transfusion to guide further treatment
Consider cell salvage
Complete all documentation
4.4 MANAGEMENT OF MASSIVE BLOOD LOSS IN TRAUMA

References:

1. SC(NHS)FT intranet for Transfusion related guidelines
2. Integrated Care Pathway for blood transfusion SCH(NHS)FT Leaflet 283
3. Guideline for Management of non-trauma massive blood loss CAEC 1451
4. Yorkshire and Humber Paediatric Major Trauma Guidelines

(Section 4.4 reviewed and updated by Dr C O’Connell, May 2020)
(Section 4.4 reviewed and updated by Dr C O’Connell, Jan 2017)
(Section 4.4 reviewed by Dr S Gibbs, Aug 2015)
Approved by Hospital Transfusion Committee July 2013
Written by SCH transfusion committee, Adapted by Dr C Rimmer for ED May 2011
4.5  CERVICAL SPINE INJURIES

A. BACKGROUND

Injury to the cervical spine is rare in children, but should always be considered following significant trauma. Fractures are particularly rare. Due to the flexibility of the paediatric cervical spine, ligamentous damage (which may mean an unstable injury) and injury to the spinal cord are more common, though still rare. Injuries at the level of C1-3 are most common in children. There are numerous physeal lines (which can be confused with fractures), and a range of normal sites for ossification centres. Pseudosubluxation of C2 on C3 and of C3 on C4 occurs in approximately 9% of children; particularly those aged 1–7 years. Interpretation of cervical radiographs can therefore be difficult even for the most experienced. Always involve senior help if unsure. (1)

B. EMERGENCY MANAGEMENT

In trauma the cervical spine should be presumed to be damaged until proven intact, especially if there is obvious injury above the clavicle. In a co-operative or unconscious child immediate in-line manual immobilisation of the head and neck should be applied and maintained until the spine can be either cleared or immobilised.

NICE suggest cervical spine immobilisation for patients who have sustained a head injury and present with any of the following risk factors:

- GCS < 15
- Neck pain or tenderness
- Focal neurological deficit
- Paraesthesia in the extremities
- Any other clinical suspicion of cervical spine injury
- Significant mechanism of injury (see text below)

Hard cervical collars are not necessary to immobilise the paediatric cervical spine and this can be achieved by either manual in-line immobilisation or blocks and tape alone. Whilst there is no evidence for the benefit of a cervical collar, there is increasing evidence of complications associated with them.

If however a cervical collar has already been applied by the paramedic team and it appears to be a good fit and is tolerated by the child it can be left in place until the cervical spine has been cleared.

If the child is un-cooperative or combative, sandbags and tape should not be used as this may do more harm than good. (1).

There is no evidence base to produce strict criteria for when a cervical spine should be immobilised at triage. Common sense should prevail e.g. ambulant patients do not need immobilisation.
4.5 CERVICAL SPINE INJURIES

If you are unsure, discuss with ED or orthopaedic MG.

Don’t forget to assess and manage ABCD as per APLS guidance where appropriate (1)

C. INVESTIGATION (INCLUDING ALGORITHM)

ARRIVAL ON A SCOOP STRETCHER DOES NOT MANDATE CERVICAL SPINE IMAGING.

Following the algorithm below, some children who have experienced trauma will meet the criteria for needing C-spine X-rays or CT. (2, 3). In children younger than 10 years a combination of lateral and AP c-spine views are adequate. Peg views may be difficult to obtain in young children and will be performed at the radiographer’s discretion. (5) In children old enough to co-operate, an additional open-mouthed view for odontoid peg is recommended. (4) Remember that the lateral view must always include T1 (If you can’t see the top of T1 the film is inadequate).

Ideally a doctor should accompany a child to X-ray and remove immobilisation for optimal views. If, in spite of this, inadequate views are obtained, a CT should be considered rather than repeated X-rays.

It is the responsibility of the ED medical and nursing staff to remove earrings and necklaces before the child is X-rayed.
4.5 CERVICAL SPINE INJURIES

INVESTIGATION (continued)

Is imaging of the C-spine indicated?

Are any of the following present?
- GCS < 13
- Intubation
- Definitive diagnosis of c-spine injury urgently required eg before surgery
- Multi-region trauma scanning required
- Neurological deficit
- Paraesthesiae in limbs

YES

CT cervical spine within 1 hour

NO

Any neck pain or tenderness?

Are any of the following present?
- Significant mechanism of injury (see below)
- Consider in:
  - Intoxicated / difficult to assess
  - Distracting injury (e.g. long bone fracture, burns, visceral injury)

YES

CT cervical spine within 1 hour

NO

Are any of the following present?
- Involved in simple rear-end RTA
- Comfortable in sitting position
- Has been ambulant since injury
- No midline cervical tenderness
- Delayed onset of neck pain

YES

Is patient is able to actively rotate neck 45 degrees to the left and right?

Reference
NICE Clinical Guideline No. 176
Paediatric trauma protocols
Aug 2014

NO

Result
- Strong suspicion of neck injury despite normal X-rays
- Bony injury on X-ray
- Inadequate X-ray views

YES

No imaging / further imaging required

NO

X-ray
- Lateral and AP C-spine views
- Odontoid peg view also, if feasible (at radiographer’s discretion)

NO

Are any of the following present?
- No imaging / further imaging required
4.5 CERVICAL SPINE INJURIES

Significant mechanism of injury:

- RTA at high speed (>65 mph)
- RTA with ejection from vehicle or rollover
- RTA with rear end shunt by bus, vehicle at high speed or occupant's vehicle shunted into oncoming traffic
- Falls from height of more than 1 metre or more than 5 stairs (have lower index of suspicion in children <5 yrs)
- RTA involving bicycle or recreational vehicle
- Axial load to the head e.g. diving or contact sports

A CT of the C spine should be requested if:

- There is strong suspicion of an injury despite normal X rays (following discussion with the ED Middle Grade/Consultant or the on-call Orthopaedic Registrar)
- The X rays are abnormal or suspicious
- Inadequate X rays
- There is a severe head injury with a GCS ≤ 8.
- If the patient warrants a head CT (as per head injury guidelines) it doesn’t automatically trigger a cervical spine CT if plain films of the cervical spine are more appropriate for the child. Remember to minimise the amount of radiation given.
- However if the patient is being scanned for multi-region trauma then it makes sense to include cervical spine as part of the imaging.

D. MANAGEMENT / REFERRAL

- C-spine immobilisation should only be discontinued if the doctor is confident there is no clinical or radiological evidence of c-spine injury.
- Remember SCIWORA - Spinal Cord Injury Without Radiological Abnormality. It is rare but it does occur in children, hence the need for clinical as well as radiological clearance.
- If there is any doubt ask for a senior opinion. (ED or orthopaedic registrar).
- C spine immobilisation must not be removed from an unconscious trauma patient as clinical assessment of the c-spine cannot be made.
- Patients are generally transported on a scoop stretcher which can be rapidly removed. In the rare case where the patient is on a spinal board perform modified 20 degree tilt and remove the board if not done already but consider delaying this if life-saving interventions are taking place.
- If there are features suggestive of cord or nerve root injury refer immediately to orthopaedic SpR (MRI is warranted) (1)
4.5 CERVICAL SPINE INJURIES

References:

(1) APLS 6th edition 2016
(4) NICE Clinical Guideline number 56 (adapted from) Sept 2007
(5) Paediatric trauma protocols, Royal College of Radiologists, August 2014.

(Section 4.5 reviewed and updated by Dr C O’Connell, May 2020)
(Written by Dr J Gilchrist after multidisciplinary consultation between ED, Radiology, Paediatric Surgery, Neurology, Neurosurgery, Anaesthetics and PICU, Aug 2002)
4.6 HEAD INJURIES -
GUIDELINES FOR THE ASSESSMENT & EARLY MANAGEMENT OF

A. BACKGROUND
The potential for brain injury should be considered in any child who has sustained trauma to the head or face, BUT not all head and facial injuries are at risk of significant brain injury. Common sense should be applied. Head injury can also be the result of acceleration/deceleration injuries without direct impact to the head (e.g. RTC/Shaken baby).

Epidemiology:
- 700,000 presentations to UK hospital each year (children under 16 years)
- Most head injuries (>80%) seen in the paediatric ED are minor
- Severity is usually related to GCS. The majority of fatal outcomes present with a GCS <13

B. EMERGENCY MANAGEMENT
- In significant trauma – call for senior ED, anaesthetic and neurosurgical help early.
- Assess and treat ABC and c-spine immobilization as per section 4.5 of the ED handbook.
- Remember – resuscitation of ABC optimizes head injury management.
- Assess D – Glasgow Coma Score (GCS - see section G), pupils, posture and BM.
- GCS 8 or less will require intubation.
- If GCS 8 or less discuss with neurosurgeons immediately and consider treatment of raised intracranial pressure. Do not commence specific treatment without discussing with neurosurgeons.
- Manage pain effectively where relevant (D/W senior if unsure. IV opiates are not an absolute CI but a senior must be involved)

C. ASSESSMENT
There is a head injury proforma in the ‘Add Clinical Note’ section of Medway that can be helpful as an aide memoir.

For all children ask about LOC, vomiting, drowsiness and seizures.
Depending on age ask about amnesia, headache, dizziness, diplopia and nausea.
In ambulatory patients a minimal initial assessment should include:
- A general statement re condition e.g. playing happily.
- An assessment of conscious level with full assessment of GCS if other than alert
- Gait / movements.
- Tone / posture.
- Pupil reactivity and eye movements.
- Facial symmetry.
- Co-ordination.
4.6 HEAD INJURIES -
GUIDELINES FOR THE ASSESSMENT & EARLY MANAGEMENT OF

- Examine scalp and face for wounds / haematomas (look specifically for signs Basal Skull Fracture: see below for signs)
Based on this initial assessment a further detailed neurological examination may be required.

D. INDICATIONS FOR CT SCANNING FOLLOWING HEAD INJURY
A CT scan should be requested immediately in the following circumstances, following consultation with a senior staff member:

- Clinical suspicion of NAI (always discuss with Paediatric Registrar) Post traumatic seizure but no history of epilepsy (unless history consistent with a reflex anoxic seizure and fully recovered).
- Age > 1yr: GCS < 14 on assessment in the ED
- Age < 1 yr GCS < 15 on assessment in the ED
- 2 hours after the injury GCS < 15
- Suspected open or depressed skull fracture or tense fontanelle
- Any signs of BSF (haemotympanum, panda eyes, battles sign, CSF from ears / nose]
- Focal neurological signs
- Age <1yr: presence of bruise, swelling or laceration (always discuss with a senior first to decide if scan required)

A CT scan should be requested immediately following consultation with a senior staff member if the child has more than one of the following risk factors (and none of the circumstances above)

- Witnessed LOC > 5 minutes
- Abnormal / prolonged drowsiness
- 3 or more discrete episodes of vomiting (judgement should be used when the vomiting has occurred pre-hospital and the child is completely well on arrival at ED)
- Dangerous mechanism of injury (high speed RTC as pedestrian / cyclist / vehicle occupant. Fall from a significant height. High speed injury from a projectile object)
- Amnesia (antegrade or retrograde) lasting > 5 minutes

Children who have sustained a head injury and have only one of these risk factors should be observed for a minimum of 4 hours after the head injury. If during observation any of the risk factors below are identified, perform a CT head scan following consultation with a senior staff member:

- GCS < 15
- Further vomiting
- A further episode of abnormal drowsiness

Note:
Haematological patients or patients on anticoagulants must be discussed with the on call Haematology consultant and senior ED. Some (but not all) may need a CT scan.

E. INDICATIONS FOR ADMISSION FOLLOWING HEAD INJURY
- New, clinically significant abnormalities on CT
4.6 HEAD INJURIES - GUIDELINES FOR THE ASSESSMENT & EARLY MANAGEMENT OF

- Not returned to GCS 15 regardless of CT result
- Criteria for CT met but scan not done for whatever reason
- Persistent neurological symptoms or signs (including vomiting, drowsiness and severe headache despite adequate analgesia)
- Other sources of concern (drug or alcohol intoxication, other injuries, shock, suspected NAI, meningism, CSF leak, doubts over level of supervision after discharge).

All patients requiring admission after a head injury should be referred to the on call neurosurgical team. If a child has multiple injuries they may require admission under the joint care of several specialities including the neurosurgeons. Children with suspected NAI should be admitted under the joint care of paediatricians and neurosurgeons.

Notes:
- Vomiting, headache, and sleepiness are very common symptoms post head injury in children. They are usually not indications for admission unless prolonged (>4 hours).
- The presence of a VP shunt in a child with a head injury is not an indication for admission unless there are persisting symptoms or worries about the function of the shunt. Nor is it an indication for CT scan on its own.
- If a patient returns to the ED with a persistent complaint relating to the initial head injury, involve a senior doctor

F. DISCHARGE
All of the following must apply before discharging a child home from ED even if they have had a normal CT head scan:
- No Neurology / GCS 15
- No persisting neurological symptoms
- Adequate adult supervision on discharge (including not intoxicated)
- No other factors warranting admission (incl. no child protection concerns)
- All wounds if present adequately treated

Don’t forget to give the head injury advice sheet (leaflet No. 60), explain it to the carer and document that you have done so. (Advice sheets are available in several languages).

[Info leaflet available - No. 60 - Instructions to the parents of a child who has had a head injury]
All children who are discharged after a head CT are contacted by the SCH trust brain injury specialists after their discharge from ED.
Inform parents that in most cases symptoms following a head injury (headache, feeling sick, dizzy) will settle after a few days. Occasionally some may develop some long term complications (usually with those who have had a moderate / severe head injury). These may manifest as: behavioural problems, memory or concentration difficulties or any other concerns raised by the school that are new since the injury. If present contact the Brain Injury Specialist at Sheffield Children’s Hospital (details in the advice leaflet).
Tell the parents to inform school of the symptoms to be aware of post head injury. If the child was knocked unconscious or was otherwise severely affected by the injury, then they should rest for 3 days before returning to school or nursery.
4.6 HEAD INJURIES -
GUIDELINES FOR THE ASSESSMENT & EARLY MANAGEMENT OF

If a child’s head injury is due to alcohol or drugs ingestion and they are now fit for discharge also give them “The Corner” leaflet about the young adults substance misuse project see guideline 3.25 ED handbook.

G. GLASGOW COMA SCALE

VERSION FOR PAEDIATRICS:
The paediatric version of the Glasgow Coma Scale is scored between 3 and 15, 3 being the worst, and 15 the best. It is composed of three parameters:

1. BEST EYE RESPONSE
2. BEST VERBAL / GRIMACE RESPONSE
3. BEST MOTOR RESPONSE

NB Any painful stimulus should be applied ABOVE the neck

1. BEST EYE RESPONSE  (possible score of 4)

<table>
<thead>
<tr>
<th>Response</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>No eye opening.</td>
<td>1</td>
</tr>
<tr>
<td>Eye opening to pain.</td>
<td>2</td>
</tr>
<tr>
<td>Eye opening to verbal command.</td>
<td>3</td>
</tr>
<tr>
<td>Eyes open spontaneously.</td>
<td>4</td>
</tr>
</tbody>
</table>

2. BEST VERBAL RESPONSE  (possible score of 5)

<table>
<thead>
<tr>
<th>Response</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>No vocal response.</td>
<td>1</td>
</tr>
<tr>
<td>Occasionally whimpers / moans or incomprehensible sounds</td>
<td>2</td>
</tr>
<tr>
<td>Cries inappropriately or to pain.</td>
<td>3</td>
</tr>
<tr>
<td>Less than usual ability and / or spontaneous irritable cry.</td>
<td>4</td>
</tr>
<tr>
<td>Alert, babbles, coos, words or sentences to usual ability.</td>
<td>5</td>
</tr>
</tbody>
</table>

Communication with the infant or child’s caregivers is required to establish the best usual verbal response. A “grimace” alternative to verbal responses should be used in pre-verbal patients.

3. BEST GRIMACE RESPONSE  (possible score of 5)

<table>
<thead>
<tr>
<th>Response</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>No response to pain.</td>
<td>1</td>
</tr>
<tr>
<td>Mild grimace to pain.</td>
<td>2</td>
</tr>
<tr>
<td>Vigorous grimace to pain.</td>
<td>3</td>
</tr>
<tr>
<td>Less than usual spontaneous ability or only response to touch stimuli.</td>
<td>4</td>
</tr>
<tr>
<td>Spontaneous normal facial / oro-motor activity.</td>
<td>5</td>
</tr>
</tbody>
</table>

4. BEST MOTOR RESPONSE  (possible score of 6)

<table>
<thead>
<tr>
<th>Response</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>No motor response to pain.</td>
<td>1</td>
</tr>
<tr>
<td>Abnormal extension to pain (decerebrate).</td>
<td>2</td>
</tr>
<tr>
<td>Abnormal flexion to pain (decorticate).</td>
<td>3</td>
</tr>
</tbody>
</table>
4.6 HEAD INJURIES -
GUIDELINES FOR THE ASSESSMENT & EARLY MANAGEMENT OF

|withdrawal to painful stimuli. | 4 |
|localises to painful stimuli or withdraws to touch. | 5 |
|obeys commands or performs normal spontaneous movements. | 6 |

VERSION FOR OLDER CHILDREN:

1. BEST EYE RESPONSE (possible score of 4)

| No eye opening. | 1 |
| Eye opening to pain. | 2 |
| Eye opening to verbal command. | 3 |
| Eyes open spontaneously. | 4 |

2. BEST VERBAL RESPONSE (possible score of 5)

| No verbal response. | 1 |
| Incomprehensible sounds. | 2 |
| Inappropriate words. | 3 |
| Confused. | 4 |
| Orientated. | 5 |

3. BEST MOTOR RESPONSE (possible score of 6)

| No motor response. | 1 |
| Extension to pain. | 2 |
| Flexion to pain. | 3 |
| Withdrawal from pain. | 4 |
| Localising pain. | 5 |
| Obeys commands. | 6 |

Reference:
1) NICE clinical guideline 176: Head Injury January 2014

(Section 4.6 reviewed by Dr O’Connell, June 2020)
(Section 4.6 reviewed and updated by Dr C O’Connell, Jan 2017)
(Section 4.6 updated by Dr C Rimmer after multidisciplinary consultation between ED, radiology, neurosurgery, paediatric surgery, anaesthetics and PICU May 2011)
(Written by Dr J Gilchrist and Mr D Burke following multidisciplinary consultation, between ED, Radiology, Paediatric Surgery, Neurology, Neurosurgery, Anaesthetics &PICU, Aug 2004)
Incorporating guidelines from: June 2003 NICE Guideline No. 4 for Head Injuries.
Scottish Intercollegiate Guidelines Network (S.I.G.N.) ‘Early Management of Patients with Head Injuries’ publication number 46, August 2000
4.7 FRACTURES & DISLOCATIONS - GENERAL PRINCIPLES

A. BACKGROUND
Children's fractures differ from adults' in the following ways:
- The need to grow necessitates epiphyses with growth plates and sutures, all of which can give rise to patterns of injury and complications not seen in adults.
- Bones are less brittle, leading to incomplete fractures, e.g. greenstick fractures and buckle fractures and plastic fractures where the bone bends without breaking the cortex.
- In addition, children may have different patterns of injury at different ages, e.g. falls may cause a sprained ankle in the older child but a tibial “toddlers” fracture in the under 3 year old.

B. GENERAL CONSIDERATIONS
- Remember to check and record the neurovascular status distal to any fracture.
- Analgesia for significant fractures should be given parenterally whenever possible, e.g. as titrated intravenous morphine or intranasal diamorphine. (Also see 4.11 – femoral nerve block).
- Always check the joint above and below for any injury and if necessary X-ray these joints.
- It is routine for patients with fractures to be seen at the next available fracture clinic which will always be within the same week. Clinics are allocated at reception - please do not offer a specific day yourself unless there is a clinical reason why you would like the review to be the next day (Thurs pm for some knee injuries see below) or a significant social reason why the patient cannot attend the clinic offered.
- Remember to think of NAI in all children with fractures but especially those under 2 years old / non mobile children. If you don’t think the mechanism of injury fits with the fracture then discuss it with an ED senior doctor. All children < 2 years old with a long-bone fracture require referral for safeguarding review in addition to orthopaedic referral
- If you are in any doubt as to whether a fracture needs manipulation then speak to an ED senior doctor or contact the Orthopaedic Registrar for advice.
- Babies usually require full limb POPs as half limb POPs tend to come off.
- Please put easily removable casts i.e. backslabs on in the ED as they will almost always be removed the following day in # clinic.
- Although it is common practice to get two views of an affected area when requesting X-rays, in this department clavicles and hips will only have a single view taken in the first instance. If a second view is required then it can be requested from the radiographer.
- Elevation for 24 - 48hrs and adequate analgesia is very useful for many injuries, e.g. ankle sprains.

[Info leaflet available – No. 21 - What is a fracture?]
4.7 FRACTURES & DISLOCATIONS - GENERAL PRINCIPLES

C. SALTER-HARRIS CLASSIFICATION OF INJURIES AROUND THE PHYSIS

![Salter-Harris Classification Diagram]

D. JOINT ASPIRATIONS

Should not be done by ED staff
Refer to orthopaedic on call team.

E. MOULDED CASTS

If needed should be done by the on call orthopaedic SpR or ED senior

F. MANIPULATIONS

Manipulations for limb threatening injuries should be done in the ED. They can be done by appropriately experienced ED staff; alternatively Orthopaedics on call should be called urgently.

On very rare occasions it may be appropriate to do a manipulation on a non limb critical injury in the ED. This MUST be discussed with the ED consultant and can only be done dependent on staff resources at the time. It should be done in the procedure room with appropriate analgesia and/or conscious sedation (see section 4.8 - emergency management large joint dislocation and ischaemic limbs and 2.8 – procedural sedation)

G. REFERRALS

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>1.</td>
<td>Children &lt; 2 years old with a long-bone fracture (excluding toddler fracture)</td>
</tr>
<tr>
<td>2.</td>
<td>Patients with simple fractures and semi-urgent orthopaedic problems.</td>
</tr>
<tr>
<td>3.</td>
<td>Patients with lipohaemarthrosis with NO evidence bony injury or patients with a significant knee effusion / haemarthrosis with suspicion of cartilage / cruciate injury</td>
</tr>
<tr>
<td>4.</td>
<td>Patients with more complicated fractures, e.g. displaced fracture / compound long bone fracture</td>
</tr>
</tbody>
</table>
### 4.7 FRACTURES & DISLOCATIONS - GENERAL PRINCIPLES

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>b) Patients with urgent orthopaedic problems, e.g. suspected septic arthritis</td>
<td>If the on-call middle grade is not immediately available for time critical conditions, the Orthopaedic Consultant on-call should be contacted.</td>
</tr>
<tr>
<td>c) Patients with uncomplicated forearm # needing MUA</td>
<td>Can be “fast tracked” to the ward – see section 4.17 for indications and details.</td>
</tr>
<tr>
<td>5. Patients with non-urgent problems.</td>
<td>Refer back to GP or an Orthopaedic out-patient clinic by letter.</td>
</tr>
</tbody>
</table>

(Section 4.7 reviewed by Dr J Cumberland, June 2020)
(Written by Drs J Cumberland, A Smith & Mr M Flowers, Feb 2004)
4.8 ORTHOPAEDIC EMERGENCIES

A. BACKGROUND

Some orthopaedic injuries must be recognised as time critical, threatening either the structure or function of the limb. It is important to emphasise such a condition is present when referring to orthopaedics. Immediate management may be needed in ED prior to orthopaedic arrival and ED senior help should be sought immediately for the following:
- Vascular compromise / lack of pulse / ischaemia of limb distal to injury (remember to document capillary refill time).
- Neurological deficit distal to the injury.
- Ischaemic skin tented over displaced fracture.
- Compound fractures.
- Massive soft tissue damage.
- Dislocated large joints.

B. EMERGENCY REDUCTION OF LARGE JOINT DISLOCATION, SKIN TENTING AND DISTAL ISCHAEMIA POST FRACTURE

- Patient must be in the resuscitation room with full monitoring. Oxygen must be available.
- There must be a minimum of 2 appropriate qualified practitioners present, one for the sedation and one for the manipulation, e.g. one doctor and one senior nurse or 2 doctors. Consider whether you need to call the Orthopaedic doctor on-call to perform the manipulation.
- Have all you need available and ready – if reducing fractures, POP may need to be applied while still applying pressure to the site.
- Cannulate the child.
- Use appropriate sedation – depending on available staff this may be inhalation of Entonox (See section 2.7) with IV Morphine to maximum individual dose of 200 micrograms/kg, in any one single dose. (See section 2.5), or other form of sedation eg Ketamine
- When attempting to reduce either a fracture or dislocation the most important tip is not to hurry.
- Check and document neurovascular status
- With adequate analgesia traction should be applied in the direction of the angulation for at least 30 seconds to disimpact the distal end. This can then be manipulated into as near an anatomical position as possible.
- After reduction and immobilisation, check distal neurovascular status and document, re X-ray the joint / limb.
- Consider admission / Orthopaedic review. If considering discharge this must be discussed with the ED senior.
- Child must be fully recovered if being discharged.
4.8 ORTHOPAEDIC EMERGENCIES

C. DISLOCATED LARGE JOINTS
- In general, considerable force is required to dislocate a large joint. Damage is ongoing and the chances of easy reduction diminish with time. There is also a risk of distal neurovascular compromise.
- Reduction should therefore be achieved as soon as possible.
- Large joint dislocations that are suitable for reduction in ED include shoulder, elbow and ankle.
- It is unlikely that you will have the expertise to reduce hips and the degree of disruption that occurs with a dislocated knee (other than patella) makes attempted reduction dangerous. These should be referred to orthopaedics urgently.
- If the limb appears ischaemic, reduction should be attempted immediately and before X-ray. Otherwise X-ray first unless there is a long wait, if so discuss with middle grade as to whether reduction should be performed first.
- Note that there is often a fracture associated with a large joint dislocation and the fragments must all be accounted for following reduction.
- An operative procedure may still be necessary after reduction if there is a concomitant fracture but it is still important to perform the reduction with some urgency in most cases.
- The majority of reductions can be achieved with IV Morphine and Entonox see above emergency management. (Also see sections 2.5, 2.7 and 2.8 - pain management).

D. NEUROVASCULAR COMPROMISE / ISCHAEMIA / SKIN TENTING
- Reduction is also important and time critical if the distal neurovascular supply or overlying skin perfusion is compromised after a fracture.
- Unless the X-ray can be performed immediately the fracture should be reduced before X-ray.
- Procedure is the same as for dislocations see section B: emergency reduction.

E. OPEN FRACTURES
[Other than fingertip injuries (4.26) and minor abrasions over fractures]
These need to be referred quickly. Debridement and fixation should be performed early to minimise risk of infection.
Management:
- IV morphine
- Call orthopaedic surgeon urgently (before x-ray)
- Take a photograph. Either with the digital camera and then print it, or with the Polaroid. This stops multiple people peeling back the dressings and increasing risk of infection.
- If gross contamination visible, irrigate to clean off mud etc.
- Apply saline-soaked gauze then wrap cling film around (keep it from drying out)
- Immobilise.
- IV Co-Amoxiclav (See section 2.3 Antibiotics / Acute bone and Joint infection).
- Check tetanus status and give tet tox if appropriate. Consider tetanus immunoglobulin if wound is dirty and patient not tetanus immune. See section 4.25 - tetanus prone wounds.
- If there is a significant amount of skin loss, contact the Plastic Surgeon on-call, as well as the Orthopaedic Surgeons.
- There has often been a significant amount of trauma – think of compartment syndrome.
If there is skin tenting over the fracture segment with ischaemia or ischaemia of the distal limb, this is an emergency and the limb will need straightening to allow restoration of blood flow before X-ray (see sections B & D).
4.8 ORTHOPAEDIC EMERGENCIES

References:
Boast 4: The management of severe open lower limb fractures – British Orthopaedic Association
BOAST 5: Peripheral nerve injury – British Orthopaedic Association
BOAST 6: Management of arterial injuries - British Orthopaedic Association
BOAST 10: Diagnosis and management of Compartment syndrome of the limbs - British Orthopaedic Association

(Section 4.8 reviewed by Dr J Cumberland, June 2020)
(Written by Drs J Cumberland, A Smith & Mr M Flowers, Feb 2004)
4.9 COMPARTMENT SYNDROME

A. DEFINITION
Raised pressure, from any cause, within a tightly bound myofascial compartment which affects perfusion of important structures contained within that compartment - muscles and nerves particularly.

B. BACKGROUND
Muscle groups are contained in tight myofascial compartments. An acute injury will cause swelling and bleeding into this compartment with a resultant rise in pressure. As the pressure rises, blood flow will be reduced, producing critical ischaemia of the muscle group. This in turn leads to oedema and a further rise in pressure so a vicious circle is created.

The lower leg is one of the commonest sites for this problem, though it can occur at any site containing compartments. Others include the foot, hand, forearm, buttocks and triceps.

An iatrogenic compartment can be created if an external, non expandable layer is applied to a limb e.g. tight bandage or circumferential cast.

C. CAUSES
Trauma is the main cause seen in the ED, most commonly crush injuries, but it may be seen after direct blows and fractures of the tibia (often undisplaced). It can also occur during reperfusion of ischaemic tissues, after excessive exercise and occasionally in the absence of any acute injury.

Haemophilia or anticoagulation may predispose to acute compartment syndrome or even be the cause of it, secondary to spontaneous bleeding.

Other causes include tight fitting plaster of Paris casts, compression of limbs during general anaesthesia or following intoxication, and chronic compartment syndrome.

Chronic compartment syndrome may present with pain worsening on activity and settling again with rest. It is thought to be caused by an increased compartment pressure due to slight muscle swelling during exercise.

D. DIAGNOSIS
The diagnosis is made on clinical grounds. Severe unremitting pain with an excruciating exacerbation on passive stretch of the affected muscle groups are the hallmarks.

Examination shows marked tenderness over the affected muscle groups and pain on passive stretch of the groups.

It should be noted that symptoms are key to the diagnosis of acute compartment syndrome and not signs. Of the often quoted 6 P’s (pain, paraesthesia, paralysis, pulselessness, pallor and perishing cold) it is pain that is the most significant. The diagnosis of acute compartment syndrome is entirely compatible with normal pulses and normal sensation in the
4.9 COMPARTMENT SYNDROME

distal parts, e.g. hand or foot. Paraesthesia, paralysis and loss of pulses are late signs and by the
time of their onset, muscle is probably already necrotic.

E. EMERGENCY MANAGEMENT

Acute compartment syndrome is a surgical emergency, as any delay in relieving the pressure will
result in muscle necrosis with subsequent major disability. It is thought that from onset of the
symptoms there is less than 4 hours in which to relieve the pressure surgically.

Any patient with severe unremitting pain following an injury to a limb should be urgently referred to the
on-call orthopaedic team. They will arrange admission and limb elevation, and if in any doubt, will
perform fasciotomies.

If the patient has a cast or constricting covering this must be opened / removed immediately to relieve
any constriction (it is not sufficient just to cut a window / slice out of a solid cast)

F. ADVICE IF DISCHARGING

Pain following an injury may indicate normal soft tissue injury or the very early stages of a
compartment syndrome. Consider this with a history of a heavy weight having been dropped on the
hand or foot, or a crush such as a vehicle wheel passing over the limb, even if fractures are excluded
on X-ray.

Have a high index of suspicion when reviewing such patients and ask for a senior review. If any
patient is to be discharged with a mechanism of injury that might put them at risk of a compartment
syndrome, explain the symptoms and signs and give them a ‘Compartment Syndrome’ information
leaflet.

[Info leaflet available - No. 53 – Cast care instructions for carers]

(Section 4.9 updated Dr J Cumberland June 2020)
(Written by Mr C Fitzsimmons, Jan 2006)
(Developed with senior ED clinicians following peer review)

Refs:
‘Musculo-skeletal problems in Emergency Medicine’, Wardrope & English,
Oxford Handbooks, 1998
4.10 FEMORAL FRACTURES

A. BACKGROUND
The spectrum of femoral shaft fractures is wide, ranging from un-displaced buckle fractures to fractures with severe comminution and soft tissue injury.

Many femoral shaft fractures will be the result of relatively high-energy forces - think of additional multi-system injuries and other bony injuries. Associated blood loss may be significant. Consider associated vascular injury. Be aware of the possibility of NAI, especially in the younger child.

B. SYMPTOMS AND SIGNS
Femoral fractures usually present with pain and non-weight-bearing. Beware the young child or child with a learning disability, since they may still be partially weight bearing with an undisplaced fracture. Often the patient has few physical findings, but with femoral shaft fractures it is usual to see a swollen thigh and often angulation / deformity. Any movement of the leg will result in significant pain. There may also be visible external rotation of the leg.

C. TYPES OF FRACTURE
The types of femoral fracture may vary with the age of the patient.

Fracture pattern – buckle, transverse, oblique, spiral or comminuted

A classic mid-shaft fracture is almost always complete, and can occur in all ages of childhood. Spiral, oblique and transverse fractures of this kind account for >70% of femoral shaft fractures.

A distal metaphysis fracture is often a ‘greenstick’ or “buckle” fracture in a baby or toddler. It may be a stress fracture in the older child, a pathological fracture in an older child, or a supracondylar fracture. A ‘toddler’ type fracture is even possible in the distal femur.

A proximal metaphysis fracture may be an avulsion fracture of the greater or lesser trochanter in adolescence, or a subtrochanteric fracture. These are rare.

Proximal physeal, bucket handle metaphyseal, transverse fractures may be signs of NAI. Always take into consideration and involve senior doctor.

Pathological fractures usually occur through existing bone cysts, any age.
4.10 FEMORAL FRACTURES

D. EMERGENCY MANAGEMENT
- Assess the child following APLS / ATLS methods.
- ABCDE approach
- You must gain IV access (Ideally two large bore cannulae).
- Treat shock.
- Remember shock can be caused by a femoral fracture alone, especially in younger children, but beware missing other distracting injuries. A single closed femur fracture can cause 20% blood loss, whereas open femur fracture can cause up to 40%.
- Gaining IV access (unless a simple buckle fracture) is important for 4 reasons
  - IV opiates will be required
  - IV access is required before placement of a femoral nerve block or facsia iliaca compartmental block (FACB) due to possibility of intravascular injection
  - vascular complications and compartment syndrome can occur and may require significant resuscitation
  - other injuries are commonly found. Think ‘is this major trauma?’
- Give IV broad-spectrum antibiotic early and check the tetanus immunisation in open fractures.
- Ensure Thomas splint and ED camera (useful in open fractures) readily available

D. EMERGENCY MANAGEMENT  (continued)
Immediate treatment of the fracture:
- Opioid analgesia, either titrated IV morphine or intra-nasal diamorphine/fentanyl (see 2.6 C & D).
- Assess the distal neurovascular status and document it prior to nerve block.
- Femoral fractures should also have a femoral nerve block prior to application of Thomas splint and x-ray. Be aware that due to multiple innervations of the proximal and distal ends of the femur this will not provide full pain relief in these areas but will still be helpful. (See 4.11). Consider fascia iliaca compartmental block in this situation which blocks not only femoral nerve but also sciatic, obturator and lateral cutaneous nerve of the thigh.
- Thomas Splint application for shaft fractures.
- Re-assess the distal neurovascular status and document it.
- X-Ray. AP and Lateral view after splint applied
- A multiple trauma patient with a fractured femur is not “stable” until they have a Thomas splint on. Do not send them out of the department, e.g. to CT, until this has been done.

E. THOMAS SPLINT
A Thomas Splint is applied for early reduction and immobilisation of all shaft fractures. Document distal neurovascular status before and after application of the splint. Its correct application provides:
- some reduction of the fracture,
- reduced haemorrhage,
- reduced soft tissue damage,
- reduced muscle spasm around the fracture site,
- pain relief,
- more comfortable transfer of the patient.

Distal fractures are treated with a long leg/above knee back slab instead of a Thomas splint.
4.10 FEMORAL FRACTURES

F. REGIONAL NERVE BLOCK (see 4.11)
Femoral nerve block or fascia iliaca block can reduce systemic opiate requirements with their side effects. This is particularly important in children, thus the regional block can be performed to provide preoperative analgesia for fractures of the femur. This nerve block should only be performed by someone who is adequately trained and competent to perform the procedure safely and effectively.

G. OTHER TREATMENTS
Femoral fractures in younger patients (under 3yrs) makes application of Thomas splints impractical and in reality a long leg backslab may initially be required for comfort and immobilisation. Under 1 yr the orthopaedic team will probably opt for different management again e.g. Gallows traction, or a hip spica if under 6 months, so discuss with the Orthopaedic registrar before applying backslabs.

G. REFERRAL
All children < 2 years old, refer for safeguarding review in addition to orthopaedic referral
All patients other than those with minor buckles should be referred to the orthopaedic team.

(Section 4.10 reviewed by Dr S. Perumal June 2020)
(Section 4.10 reviewed by Mr C Fitzsimmons August 2017)
(Section 4.10 updated by Dr J Cumberland and Dr D Warwicker, June 2014)

References:
1. Advance Paediatric Life Support: The child with injuries to the extremities. Sixth edition
4.11 FEMORAL NERVE BLOCK FOR A FRACTURED FEMUR

A. BACKGROUND

The femoral nerve block (faciaca iliaca compartmental block) provides effective anaesthesia for femoral fractures, in conjunction with other analgesia that will usually involve opiates. It facilitates the application of a Thomas splint because of the analgesia provided and because of relaxation of the quadriceps muscle group. It is a relatively safe block, quick to perform, with a high success rate.

B. ANATOMY

The nerve is blocked immediately below the inguinal ligament, where it is quite superficial even in bigger children. The femoral nerve lies lateral to the femoral artery, outside the femoral sheath, which contains the artery, vein and femoral canal.

Remember the acronym, NAVY = Nerve – Artery – Vein – Y-fronts, as one goes lateral to medial.

It's very flat and divides quickly beneath this landmark. The nerve lies beneath fascia lata and fascia iliaca: precise location of the nerve is unnecessary providing the anaesthetic is injected in the right plane beneath fascia iliaca. Successful injection into the faciaca iliaca compartment not only blocks the femoral nerve but also obturator, sciatic and lateral cutaneous nerve of the thigh.

The femoral artery also divides beneath this landmark.
4.11 FEMORAL NERVE BLOCK FOR A FRACTURED FEMUR

Fig 1. Overview of anatomy

Fig 2 Stylised cross-section accompanied by ultrasound appearance

C. CONTRAINDICATIONS

Infection at the puncture site
Femoral nerve injury
High suspicion of compartment syndrome
True allergy to local anaesthetic
Relative contraindication – bleeding disorders or anticoagulant therapy
4.11 FEMORAL NERVE BLOCK FOR A FRACTURED FEMUR

D. COMPLICATIONS

Intravascular injection causing local anaesthetic toxicity, possible seizures, cardiac arrest
Nerve damage
Vascular injury
Block failure
Allergy to any of the preparations used

E. TECHNIQUE

- All patients must have IV access and ECG monitoring
- Use an aseptic technique
- Check the distal neurovascular status
- **Drugs**
  - Levobupivacaine 2mg/kg maximum. Either 0.25% (1ml=2.5mg) or 0.5% (1ml=5mg)) without adrenaline can be used. Draw up 0.8ml/kg if 0.25% or 0.4ml if 0.5% levobupivacaine used.
  - Lidocaine 1% (1ml=10mg) for skin infiltration.

The preferred technique would be ultrasound-guided. The alternative is a blind landmark technique – the jerking caused by a nerve stimulator, as used sometimes in Theatres, could be very painful in this situation.

- **Ultrasound technique**
  - Position the patient supine and locate landmarks
  - Prepare the skin and draw up drugs
  - Choose a high frequency linear probe
  - Place the probe parallel to and immediately beneath the inguinal ligament.
  - Begin by identifying the circular, anechoic and pulsating femoral artery. If it has divided you are probably too distal to the inguinal ligament.
  - If this is not immediately obvious, slide the transducer medially or laterally, check the depth setting and maybe use colour Doppler to help identify the vessels.
  - The nerve usually appears as a hyperechoic speckled flat structure lateral to the artery.
  - Follow the nerve proximally and distally to clarify its identity. Inguinal lymph nodes also appear hyperechoic and can be confused with the nerve. A nerve is a continuous structure and can be traced while a lymph node is discrete.
  - The ideal needle is a purpose-made block needle, blunt with an extension, sometimes etched to make them more visible on ultrasound.
  - Approach laterally using an in-plane technique, getting a good view of the needle and clear where the tip is. If you can’t see the needle on the screen look at your hands to make sure the probe and needle are aligned.
**4.11 FEMORAL NERVE BLOCK FOR A FRACTURED FEMUR**

- Pierce the fascia iliaca near the nerve without actually entering the nerve. The injection point can be some distance from the nerve if the right plane is found, minimising the chances of nerve injury or intravascular injection (fig 3&4)
- The nerve does not have to be surrounded by local anaesthetic for the block to be effective.
- There should be no resistance to injection.
- Aspirate prior to and regularly throughout injection.
- The block will take about 15min to be effective
- Common reasons for failure would be going too distally, not having probe parallel to inguinal ligament, not identifying position of tip of needle or the nerve itself – it's not “the triangle lateral to the artery”.

Fig 3 Ultrasound approach and injection of local anaesthetic (yellow) beneath fascia iliaca

Fig 4 Ultrasound image of needle tip beneath fascia iliaca, before and after injection
4.11 FEMORAL NERVE BLOCK FOR A FRACTURED FEMUR

- **Landmark technique**
  - As above then identify position of femoral artery immediately beneath the inguinal ligament
  - The injection point is lateral to the artery, about 1cm.
  - The needle is advanced to the same depth as the artery, at 45 degrees to perpendicular and aiming toward the umbilicus
  - Two pops may be felt as the tip passes through the fascia lata and then the fascia iliaca. They are more noticeable with a blunt block needle and in older children.
  - There may be paresthesia but there should not be pain.
  - The needle is then steadied and the injection made as above, slowly and with aspirations
  - Again, there should be no resistance to injection and there should be no pain
  - Fanning is not encouraged: it increases the risk of nerve and vessel damage and should be unnecessary if the tip is in the correct plane.
  - A common reason for failure would be going too deep.

**SAFETY POINT** – If performing a femoral nerve block after administration of opiate analgesia, be alert to the possibility of exacerbating some undesirable side-effects, such as respiratory depression once the painful stimulus has been removed.

**F. REFERENCES**

Guidelines and diagrams
- The Royal Children's Hospital Melbourne
- The American College of Emergency Physicians
- Royal College of Emergency Medicine

Video
- NYSORA website (New York School of Regional Anaesthesia)
4.11 FEMORAL NERVE BLOCK FOR A FRACTURED FEMUR

App

- “Regional Anaesthesia Reference”. Free app by Andrew Walters from Seattle that features techniques, videos and a dosage calculator

(Section 4.11 reviewed by Dr S Perumal and Dr R Kwasba June 2020)
(Section 4.11 reviewed by Mr C Fitzsimmons, August 2017)
(Written by Mr D Burke Aug 2005)
4.12 KNEE INJURIES

A. BACKGROUND

Knee injuries in children are common. They often follow sports injuries or falls. The majority are not serious and will respond to simple treatment. Bony injury is uncommon with low-impact injury, however, in the older child, tibial spine avulsion or cruciate ligament damage should be considered. The presence of an effusion is significant - the orthopaedic consultants are happy to see knee effusions in fracture clinic. **Children with a large effusion not due to patellar dislocation or those with a diagnosis of possible meniscal (cartilage) injury should be sent to next available fracture clinic.**

B. HISTORY

Mechanism of injury is very helpful in making a diagnosis. Particular points to note are:
- Valgus / varus stress (e.g. rugby tackles) can cause injury to the collateral ligaments.
- Twisting of the knee with the knee flexed may result in meniscal or cruciate ligament injuries including avulsion of the tibial spine.
- Forced flexion / hyperextension may result in damage to the anterior cruciate ligament. This may be associated with medial meniscal / collateral ligament injury.
- Swelling - instant swelling will probably represent haemarthrosis, indicating bony/ligamentous injury. Gradual swelling is more indicative of generalised soft tissue injury, or reactive effusion and is also seen in meniscal problems
- Ask about the patella moving laterally and spontaneously reducing.

C. EXAMINATION

**Trousers must be removed,** exposing the whole of the legs (including hips). Compare the leg with the good side.

**Check the hips** for swelling / erythema / tenderness / ROM – don’t forget knee pain can be a presentation of hip problems including acute slipped upper femoral epiphysis - **see hip protocol 4.22.**

**Look:** Bruising, swelling, erythema, wounds, wasting.

**Feel:** Warmth, crepitus, tenderness (patellar, tibial, joint lines), deformity, effusion (patellar tap or ballotable fluid).

**Move:** Check for full extension (often not possible with an effusion). Active, then, if appropriate, passive ROM. Straight leg raise - inability to SLR may indicate disruption of the quadriceps/quads tendon, patellar fracture or rupture of the patellar tendon. However, an acutely painful knee will also cause inability to SLR for many children.
4.12 KNEE INJURIES

**Ligaments:** Collateral ligaments: Tested initially with the leg in full extension followed by with the knee flexed at 20° (this will relax the cruciate ligaments). Apply varus (inward) stress to the knee, pain / laxity at lateral collateral may indicate sprain / ligamentous rupture. Similarly, applying valgus (outward) stress may reveal a medial collateral injury.

Cruciate ligaments: Injuries are often associated with significant swelling, so definitive examination may be difficult. Hold the knee flexed at 90°, then immobilise the foot and knee using fingers round the back of the knee to relax the hamstrings and attempt to draw the tibia forwards. Laxity indicates anterior cruciate injury. Laxity or sag when attempting to push the tibia back indicates posterior cruciate injury.

**D. INVESTIGATION**

X-ray those knees in which you suspect a patellar fracture or other bony injury. Fracture is very unlikely in the absence of clinical effusion or swelling. If you are unsure, check with a senior BEFORE requesting an X-ray.

Or if you suspect a ligamentous / meniscal injury (e.g. haemarthrosis). Cruciate ligament injuries may have associated tibial spine avulsion fractures. Collateral ligament injuries may produce avulsion fractures if severe.

**E. MANAGEMENT / REFERRAL**

The majority of knee injuries need nothing more than analgesics, advice on application of icepacks and rest, (with early mobilisation - prolonged rest results in stiffness and prolonged discomfort). Give the patient / parents a knee injury advice sheet. – **No. 245 Exercises to ease your knee pain**

**Patellar fractures:**
- Tiny chips and avulsions - Cricket pad splint, fracture clinic.
- Undisplaced fractures - Above knee back slab / fracture clinic.
- Displaced / comminuted fractures - Refer orthopaedics (may need fixation).

**Haemarthrosis / Effusion:**
- (May have associated cruciate ligament / meniscal injury)
  - Cricket pad splint + crutches / Thur pm fracture clinic ideally or refer orthopaedics.
  - If in doubt, ask ED / Orthopaedic middle grade.

**Tibial spine fracture:**

**Patellar dislocation:**
Reduce with entonox, if not reduced en-route to ED.
- 1st episode: Cricket pad splint / crutches / fracture clinic.
- If recurrent: Symptomatic treatment. Refer fracture clinic.

**Collateral ligament sprain:**
Symptomatic treatment – ice / rest / analgesia +/- ED open access clinic (see guideline 1.22) 10/7 (d/w senior)
- If marked laxity - splint, crutches and fracture clinic (rare).
4.12 KNEE INJURIES

Acutely locked knee:
Often indicates meniscal injury or loose body (osteoarthrosis dissecans). DO NOT ATTEMPT TO REDUCE in the ED it is usually futile and may be dangerous. Analgesia and refer to orthopaedics (may need arthroscopy).

F. ATRAUMATIC KNEE PAIN
Often no specific cause found. However, there are a few conditions of note:

SEPTIC ARTHRITIS should always be considered and excluded. Usually acute onset of pain and reduced use of the limb (maybe pseudoparalysis in infants). The patient may be unwell with fever +/- systemic symptoms. Look for swelling, redness, tenderness, differential warmth, restriction of movement. Refer orthopaedics-admission for antibiotics, joint drainage and lavage.

Referred hip pain:
This is an important presentation. Any child with a history of knee pain in whom no knee signs can be elicited should have their hips evaluated. See hips section 4.22.

Osgood-Schlatter’s
Traction apophysitis of the proximal tibia. Often “sporty” children. Get tenderness +/- swelling at proximal tibia, (at insertion of patellar tendon). Treat with rest / ice / NSAIDs. X-ray usually not needed. GP FU.

Also note Sinding-Larsen-Johansson syndrome, same pathology but affects distal pole of patella. Same treatment.

Non-specific knee pain:
Mixed bag of complaints. Rarely serious. Most respond to analgesia and rest. Give Knee leaflet and refer to GP, may need non-urgent orthopaedic review.

(Section 4.12 reviewed by Dr C Rimmer, June 2020)
(Written and Updated by Dr R Dalton, Feb 2005)
4.13 **ANKLE & FOOT INJURY GUIDELINES**  
(Incorporating the Ottawa ankle rules)

A. BACKGROUND

Limping children are one of the commonest presentations to the ED. When a child 2 years of age and over presents with an ankle and/or foot injury it is important to assess the following: - Mechanism of injury  
- Ability to weight bear immediately post injury and on presentation  
- The Ottawa ankle rules (see below)  
(Be aware - Septic arthritis can present as a “Limp after injury”)

B. EXAMINATION

Note that the Ottawa ankle rules are used to assess the likelihood of a bony injury vs a sprain in specific areas. They have been validated in children age 2 and over who were able to walk pre injury and can localise pain with verbal communication. They are not a rule out of all foot and ankle fractures. It is important to also examine for tenderness at the head of the fibula, to check for the integrity of the Achilles tendon, to gently squeeze the calcaneum (which can occasionally suffer a stress fracture in an inversion foot/ankle injury), and to check for distal tibial and metatarsal fractures which are not covered in the Ottawa ankle rules.
4.13 ANKLE & FOOT INJURY GUIDELINES
(Incorporating the Ottawa ankle rules)

Be careful with teenagers who present with an ankle injury and have a very swollen ankle with tenderness anterior across the ankle. See Tillaux fractures section G below

C. INDICATIONS FOR X-RAY

Indications for an ankle X-ray
The patient complains of pain in the malleolar zone and any of the following:
- bone tenderness at A, or
- bone tenderness at B, or
- inability to weight bear both immediately after the injury and in the ED.

Indications for a foot X-ray
The patient complains of pain in the midfoot zone and any of the following:
- bone tenderness at C, or
- bone tenderness at D, or
- inability to weight bear both immediately after the injury and in the ED.

D. TREATMENT

1. Patients found to have a fracture on X-ray should be put in a below knee backslab and referred to the next fracture clinic
2. Crutches for patients with no fracture are rarely needed. If you think your patient requires them please discuss with an ED senior and offer an open ED clinic appointment (see guideline 1.22)
3. Patients with no fracture and who do not require crutches should be discharged with an ankle advice leaflet, advised to take analgesia, refrain from sport for 6 weeks and advice to re-attend in 10 days’ time, (not weekends), if the symptoms do not improve.

E. PROGNOSIS FOR ANKLE SPRAINS

Most children should be weight-bearing in 3 - 5 days.
Explain that it is difficult to give a definite time to full recovery as this depends on the extent of the soft tissue injury, which cannot be judged clinically. However a good rule of thumb is that the patient should feel a steady improvement in their pain and mobility comparing it with a few days previously. If instead, the pain or swelling or redness gets worse they should return.
A good way of mobilising is to say that when they can walk comfortably on the ankle they can start running and when they can run comfortably they can go back to sport.
When first running / playing sport again, the ankle may swell a little.
Patients with an obvious severe sprain should be warned that it will take a minimum of 6 weeks and possibly up to 3 months to get better.

F. CRUSH INJURIES TO THE FOOT  (see also section 4.9 - compartment syndrome)

Crush injuries to the foot can cause significant soft tissue or tarsal injury that does not show up on standard X-rays. Swelling can be severe enough to lead to compartment syndrome. Compartment syndrome may be suggested if there is tense swelling, significant pain,
4.13 ANKLE & FOOT INJURY GUIDELINES
(Incorporating the Ottawa ankle rules)

especially on passive movements, venous congestion and poor capillary refill (late finding). Absent pulse is a “too late” finding!

Beware – considerable swelling can be delayed by several hours and still be severe enough to cause compartment syndrome.

If the mechanism of injury is significant (car driving over a foot for example) consider admitting these children for 24 hrs elevation and observation even if the X-rays are unremarkable.

If the child is sent home emphasize that the foot MUST be elevated for the next 24 hrs and that they should return if the foot swells or there are signs of neurovascular compromise.

G. TILLAUX FRACTURES

This is a type of fracture specific to teenagers whose distal tibial growth plate has started to fuse. The growth plate fuses from the medial side first across to the lateral side. There are two patterns of fracture. In the most common Tri planar type a Salter-Harris 2 fracture (see section 4.7) will start in the tibia above the growth plate and as it tries to exit through the growth plate will be stopped where the growth plate is fused and therefore continue down across the growth plate and out into the ankle joint turning into a Salter Harris 4 #. It also carries on out through the growth plate medially (hence it is in three planes – coronal, sagittal and horizontal) On the lateral x ray view of the ankle the fracture looks like a Salter-Harris 2 #. On the AP view a lucency can be seen in the epiphysis. This may be undisplaced and easy to miss. If undisplaced it may be relatively comfortable and the patient still able to weight bear.

In the classic Tillaux fracture there is just a Salter-Harris 4 # with a chunk of bone pulled off the medial and anterior aspect of the epiphysis. In this the AP view has the same vertical lucency in the epiphysis but on the lateral all that may (not always) be seen is a double shadow at the front of the epiphysis where the chunk is displaced forward a CT may reveal a surprising displacement.

Beware of the teenager who has tenderness over the anterior distal tibia who otherwise does not qualify for an x-ray on the Ottawa Ankle rules. In this group have a low threshold for an x-ray and if there is any displacement discuss with the orthopaedic registrar.

Similarly if the X-ray appears normal but the child appears to have a significant injury they can be given a backslab and crutches and be seen in # clinic – treat the ankle not the xray.


review article  Arch Dis Child 2005;90:1309-1311

[Info leaflet available – No. 76 – Sprained ankle advice]
A. BACKGROUND

Clavicle fractures are very common in children. They are far more likely to occur than shoulder dislocations. Most can be diagnosed clinically and do not require an x-ray or fracture clinic follow-up.

B. INDICATIONS FOR X-RAY

A child requires a clavicle x-ray if they fulfil any of the following criteria:

- Age < 2 years
- Age > 13 years
- Age 2-12 if the suspected fracture meets one or more of the following criteria:
  - Involves the extreme medial or extreme lateral aspect of the clavicle
  - Has associated skin tenting
  - Is an open fracture
  - Has associated neurovascular injury

Children aged 2-12 years with none of the above features do not require a clavicle x-ray and can be treated as having a simple fracture.

C. MANAGEMENT OF SIMPLE FRACTURE

The patient's arm should be put in a broad arm sling (Not a collar and cuff; the aim is to take the weight off the shoulder not to hang the arm).

Patients / carers should be told that:
- The sling should be used for 10 days under clothes, followed by 10 days over clothes, after which time gentle mobilisation should be encouraged. (Infants and toddlers will often not tolerate a sling, so explain this and be prepared for non-compliance which doesn’t matter).
- The injury can be very painful initially. Adequate pain relief should be given (see section 4.1).
- It is often particularly uncomfortable in bed and sleeping propped up on extra pillows may help.
- The skin over the fracture should be checked for ulceration or breakdown. All will discolour to some extent – and the child should be brought back to ED if there are any concerns.
- A lump will develop over the fracture site, which will initially be tender (soft tissue swelling) and later be hard and non-tender (bony callus). This lump may persist for months, but, especially in the younger child, re-modelling should eventually take place.
- If the child is pain free after a week and no callus has appeared, this would strongly indicate that there was no fracture initially, and the child can resume their normal activities.

An information leaflet is available and should be given to parents / carers
4.14 CLAVICLE FRACTURE GUIDELINES

D. INDICATIONS FOR ACUTE ORTHOPAEDIC REVIEW

- Any child with an open fracture or associated skin tenting /ischaemia or neurovascular injury should be referred to the orthopaedic registrar on-call
- Care must be taken evaluating patients with either fractures of the clavicle adjacent to the sternoclavicular joint or sternoclavicular dislocations as these have a small incidence of thoracic outlet problems. They may need a CT scan to evaluate proximity to major structures. These injuries may be difficult to see on standard radiographs - you need a high index of suspicion when the injury appears medial. If suspicious of posterior displacement refer to the orthopaedic registrar on call.
- Fractures adjacent to the acromioclavicular joint rarely cause concern and only acromioclavicular dislocation or fracture adjacent to the joint with marked displacement need referral to fracture clinic.
- Fractures of both clavicle and scapula / clavicle and humerus lead to an unstable pectoral girdle and need to be referred to the Orthopaedic Registrar on-call.

E. INDICATIONS FOR FRACTURE CLINIC FOLLOW-UP

- Angulation is not considered worrying as long as the overlying skin is normal. They nearly all straighten to some extent with time and do not need follow up.
- Similarly the orthopaedic surgeons do not manipulate any degree of overlap as long as the lateral segment is not pushed into the thoracic outlet. These can be managed as above but it should be mentioned to the patient / parent that there may be a degree of shortening.
- Referral should be considered for:
  - Teenagers with > 2cm overlap / comminuted fractures, however these will almost all be managed conservatively in a broad arm sling so please DO NOT tell the patient / carers that this is for consideration of an operation.
  - Distal fractures extending into the ACJ /ACJ fracture dislocation
  - Proximal SCJ fractures that do not warrant immediate referral to the ortho reg on call.

(Section 4.14 reviewed by Dr A Rawnsley, June 2020)
(Section 4.14 reviewed by Dr Cath Rimmer March 2017)
(Updated by Dr J Cumberland and Dr M Hare April 2014)
(Written by Dr J Cumberland & Mr M Flowers, Aug 2002)

[Info leaflet available – No. 113 – Fracture of the clavicle]
4.15 ELBOW INJURIES

1. ELBOW INJURIES WITH A POSITIVE FAT PAD AND NO RADIOLOGICAL EVIDENCE OF FRACTURE
   A. BACKGROUND
   B. ADDITIONAL INFORMATION FOR MANAGEMENT AT CLINIC REVIEW
   C. ALGORITHM

2. PULLED ELBOWS
   A. BACKGROUND
   B. DEFINITION
   C. DIAGNOSIS
   D. MANAGEMENT
   E. FURTHER MANAGEMENT
   F. REFERRAL

1. ELBOW INJURIES WITH A POSITIVE FAT PAD AND NO RADIOLOGICAL EVIDENCE OF FRACTURE

A. BACKGROUND
In this department, up to 25% of elbow x-rays with a positive fat pad sign have no radiological evidence of a bony injury, many of these have a simple soft tissue joint injury which is significantly improved at 7 days. Of the others most are either undisplaced supracondylar fractures or undisplaced radial neck fractures, both of which can be managed safely in a collar & cuff for 7 days.

The most important injury with regard to outcome is the initially undisplaced lateral condylar # - it is important to look at the x-ray closely for this uncommon injury which should be managed with an above elbow backslab and fracture clinic.

If the child’s elbow is very swollen or clinically there is a significant injury they should be referred to fracture clinic regardless of the lack of radiological bony injury.

Don't forget to assess the radio-capitellar joint for dislocation!

B. ADDITIONAL INFORMATION FOR MANAGEMENT AT CLINIC REVIEW
As mentioned above, the most important “missed fracture” in this algorithm is the uncommon lateral condylar fracture. These typically may present with less pain and swelling than supracondylar fractures and may present late because the child (commonly younger age group) is using the arm a little. The # is often minimally or undisplaced and may not show up on the initial x-ray.

Its importance lies in the fact that, unlike undisplaced supracondylar # which rarely cause a problem, lateral condylar fractures are more likely to become increasingly displaced and go on to delayed or non-union with cosmetic deformity and loss of function. A high index of suspicion is therefore needed to exclude these fractures and if there is concern a repeat X-ray should be taken or the child simply referred to the next fracture clinic.
4.15 ELBOW INJURIES

C. ALGORITHM

No obvious fracture on x-ray and positive fat pad sign
Mark x-ray as “fat pad but NO # seen ED review only” on pax
Collar and cuff review in ED clinic 7 days
if under 5 years
Open clinic appt if 5 years + (see guideline 1.22)

X-ray report reviewed at 7 days unless returned earlier by hot reporting

X-ray reports fracture
Next fracture clinic

X-ray reports no fracture
Review at ED clinic

Not better
Fracture clinic

Better
Discharge

Note; MARKING THE X-RAY ON PACS AS ABOVE IS ESSENTIAL. This algorithm is only safe if the radiologist reviewing the films knows they have to return the report urgently to the ED if a missed fracture is seen.
4.15 ELBOW INJURIES

2. PULLED ELBOWS

A. BACKGROUND
A pulled elbow is a commonly seen acute paediatric orthopaedic problem. It usually occurs in two to four-year-olds, however, it can occur in the age range of 8 months to eight years.

B. DEFINITION
Pulled elbow results from subluxation of the radial head through the fibres of the annular ligament. It typically occurs when a parent tugs the child's arm against resistance, e.g. falling while hand in hand with his parent, sustaining a forceful upwards tug on the arm. Another common situation is the toddler falls off something grabbing for support while falling. The parent may hear a click when this happens. There may be no history other than playing with an older sibling and a tug on the arm is presumed.

C. DIAGNOSIS
The history is the single best key. On examination the arm usually hangs limply and slightly pronated. Alternatively, the elbow may be partly flexed with the child clutching the wrist to stop elbow extension and supination which is painful. They often play happily without using the affected arm at all. Tenderness is sometimes elicited over the region of the radial head. In such a case, with no other bony tenderness, an X-ray is not necessary. However, if in any doubt about history or examination do an X-ray prior to manipulation.

D. MANAGEMENT
Simple manipulation will relocate a pulled elbow very easily. There is no one single agreed best manoeuvre. In one smooth action, pronate the forearm and flex the child's elbow simultaneously, while pressing firmly with the thumb of the other hand on the radial head to relocate it. If uncertain about relocation, the reverse manipulation of extension and supination may be successful, you might feel a click but this isn't always the case. Observe the child prior to discharge and confirm that normal movements are now possible.

See over for diagram.
4.15 ELBOW INJURIES

E. FURTHER MANAGEMENT
If after 15-20 minutes playing, the arm is still not being used, place the arm in an outside collar and cuff for 2-3 days. These children should be offered an open appointment (see guideline 1.22) as spontaneous reduction is common in this period.

F. REFERRAL
If the arm is still not being used after review in the ED clinic and repeat manipulation is unsuccessful, then refer to the next available fracture clinic. Spontaneous resolution is still the most likely outcome but can take as long as 2 weeks.

(Section 4.15 reviewed by Dr A Rawnsley, June 2020)
(Reviewed by Dr J Gilchrist, March 2017)
(Section re-written and updated by Dr J Cumberland May 2008)
(Updated by Dr J Cumberland in agreement with Mr MJ Flowers Aug 2006)
4.16 HAND INJURIES
(See also section 4.26 – fingertip injuries)

A. BACKGROUND
Hands need special consideration due to their functional importance. In the older child immobilisation is poorly tolerated and fingers rapidly become stiff. Care must be taken when immobilising a hand to maintain a functional position (usually the Edinburgh position).

B. GENERAL CONSIDERATIONS
The following should always be documented:
- Dominant hand.
- Mechanism of injury.
- Timing of injury (influences ability to correct deformity*).
- Swelling**.
- Deformity*, including the presence OR ABSENCE of rotational deformity in flexion and extension.
  If full flexion or extension is not possible due to swelling or pain this should be recorded + the absence of rotational deformity to this point.
- Flexion and extension against resistance at each individual finger joint in any mechanism of injury which may cause tendon damage.
- Neurological status – sensation. Both sides of digit not just tip.
- Circulation - colour / capillary return / venous congestion.

* Fractures of the hands and feet heal faster than most other long bones. Metacarpals and phalanges will be “sticky” within a week and difficult / impossible to manipulate by ~10 days, faster in young children. It is important that any deformity is picked up by this time and patients / parents should be asked to look for rotational deformity within this time period if the child is not being reviewed.

** Swelling restricts movement and causes pain - elevate the limb for at least 48 hrs.

Finger AND metacarpals should always be referred to by their names NOT numbered, i.e.: Thumb, Index, Middle, Ring and Little. This also applies for toes (Great instead of thumb!).

C. EMERGENCY MANAGEMENT
- Any deep or penetrating wound or possibility of tendon, nerve or vessel damage should be referred immediately to the Plastics SpR on-call.
- Fractures which need immediate treatment should be referred to the Orthopaedic SpR on-call.
- Open fractures with significant soft tissue injuries should be referred to both the on-call Plastics and Orthopaedic SpRs.
4.16 HAND INJURIES
(See also section 4.26 – fingertip injuries)

- Other fractures should be managed as per the limb guideline (see section 4.19) and sent to the next fracture clinic except those injuries which do not need orthopaedic follow-up - some fingers and 5th metacarpals and finger tip injuries, see below.

D. EXAMINATION OF TENDONS.

<table>
<thead>
<tr>
<th>Tendon Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flexor digitorum profundus (FDP)</td>
<td>Flexion at the DIP joint with PIP joint held in extension.</td>
</tr>
<tr>
<td>Flexor digitorum superficialis (FDS)</td>
<td>Flexion at the PIP joint, other fingers held in extension to neutralise the effect of flexor profundus</td>
</tr>
<tr>
<td>Extensor digitorum (ED) – proximal lesion</td>
<td>Extension of digit with hand held palm down on flat surface.</td>
</tr>
<tr>
<td>Extensor digitorum middle slip</td>
<td>Extension at PIP joint with MCP joint held extended to neutralise effect of lumbricals</td>
</tr>
<tr>
<td>Extensor digitorum terminal slip</td>
<td>(Mallet Finger) Extension at the DIP joint with middle phalanx supported.</td>
</tr>
<tr>
<td>Flexor pollicis longus (FPL)</td>
<td>Flexion of thumb IPJ with proximal phalanx fixed.</td>
</tr>
<tr>
<td>Extensor pollicis longus (EPL)</td>
<td>Lift thumb when hand held palm down on flat surface (tendon visible &amp; palpable).</td>
</tr>
</tbody>
</table>

(Remember to examine the relevant tendons in foot and toe injuries also.).

Note that partial-thickness tendon lacerations are common and will only be revealed on wound exploration. Any suspicion of tendon injury, deep or penetrating wound must be referred to the plastic surgeons.

E. METACARPAL NECK FRACTURES

Isolated fractures of only one metacarpal neck (not thumb metacarpal) which are buckle or greenstick type and where there is no rotational deformity of the associated finger & minimal loss of extension at the MCP joint can be managed in the ED. They should be neighbour strapped for 2 weeks and the child should remain off contact sport for 5 weeks. **They do not need referral to fracture clinic**

Fractures through both cortices should be sent to next day’s fracture clinic.

Fractures of the little finger metacarpal with rotational deformity or angulated > 45° can be manipulated in the ED after discussion with an ED senior. If this fails or there is not the expertise in the department they should be referred to the Orthopaedic SpR.

For those sent home without follow-up, do not forget to give advice about mobilisation.

F. FINGER INJURIES

Do not forget to look for and document rotational and other deformity.

- In PIPJ hyperextension injuries to a digit, if the pulp of an affected finger can touch the palm and there is no deformity - clinically a soft tissue injury is most likely and an X-ray is not required. Advise analgesia, mobilise the finger but no sport until the pain settles.
- Flake fractures (flake<2mm from the bone), minor buckles and avulsion fractures (<1/3 articular surface) with no deformity (other than swelling), undisplaced Salter-Harris 2 #s, can be elevated,
4.16 HAND INJURIES
(See also section 4.26 – fingertip injuries)

neighbour strapped for up to 2 weeks, off sport for minimum 4 weeks and discharged with hand instructions. **They do not need referral to fracture clinic.** (An information leaflet is being developed). Neighbour strapping provides symptomatic treatment and should be discontinued as early as possible and certainly no longer than 2 weeks.

- Other fractures requiring manipulation in the ED and shaft fractures should be referred to next fracture clinic.
- Displaced fractures involving the articular surface, with no open soft tissue injury (STI) should be referred to the Orthopaedic SpR on-call. If there is an accompanying open STI these should be referred to the plastic surgeons.
- **Distal phalanx injuries** are almost all managed with ED follow up (see section….fingertip injuries). On the rare occasion you think these need referral to another clinic / specialist please d/w a senior. Again if the injury includes an open wound it should go to the plastic surgeons, not orthopaedics.

**THUMB INJURIES**
Examination of the thumb includes testing the Ulnar Collateral Ligament.

Fractures around the thumb may cause considerable swelling. If so, and as long as the fracture does not require acute intervention, it is often appropriate to treat these overnight with a Bennett style wool and crepe and strict elevation prior to being seen in fracture clinic. The patient should be told that they may have a POP the following day. Thumb metacarpal injuries should go into a Bennett backslab overnight. **Please do NOT put elastoplast strapping on an injury that is going to fracture clinic the next day – It is very painful to remove!**

Crush fractures to the terminal phalanx can be treated as other fingertip injuries but beware fractures through the epiphyseal plate with palmar apex angulation. The deformity is often unimpressive radiologically but the thumb has a “dish” shape and may have reduced function once healed. These can be manipulated in the ED, and then sent to next available # clinic.

**MANIPULATION AND DIGITAL NERVE BLOCK FOR SIMPLE SH II FRACTURES**
Simple Salter Harris II fractures of the base of the phalanges with deformity can be manipulated in the ED. You would be expected to perform at least your first one under supervision.

Digital nerve block is performed under aseptic conditions:
- FIRST test for sensation.
- The hand is cleaned.
- Entonox can be given as required.
- Lidocaine (Lignocaine) 1% is injected either side of the metacarpal head. It may also be necessary to inject Lidocaine over the dorsum of the base of the finger to achieve full anaesthesia.
- Once anaesthesia has been obtained this is a good opportunity to test motor function without pain and assess the true extent of deformity.
- The fracture is reduced by traction and then movement to correct the deformity – using a pen in the web space to act as a fulcrum may help.
4.16 HAND INJURIES
(See also section 4.26 – fingertip injuries)

- The finger is then neighbour-strapped and re-X-rayed.
- If correction is adequate clinically and radiologically, advise elevation, analgesia and give appointment for next day’s fracture clinic.

(Section 4.16 reviewed by Dr A Rawnsley, June 2020)
(Section 4.16 reviewed by Dr Gilchrist, March 2017)
(Written by Dr J Cumberland, reviewed & approved by Mr M Flowers, Feb 2005)
4.17 FOREARM FRACTURES – FAST-TRACK ADMISSION POLICY

A. BACKGROUND

Children who attend ED with a fracture of the forearm or distal radius may be admitted via a fast-track system to prevent unnecessary delays in the ED.

B. MANAGEMENT

Exclusions:
- All open fractures.  ) Ortho review
- Fractures associated with vascular and / or neurological complications.  ) Ortho review
- Segmental fractures.  ) Ortho review
- Intra-articular fractures.  ) Ortho review
- Undisplaced fractures.  ) discharge
- Minimally angulated or displaced fractures with no obvious clinical deformity.  ) discharge

i.e. all those which should be referred as an emergency or those that can be discharged after appropriate management with cast/splint.

Inclusions:
Fractures of the distal radius and ulna, including physeal injuries
- Obvious clinically deformity.
- Radiological deformity:
  ° Displacement more than 25%.
  ° Angulation more than 20 degrees in children in girls below 10 and boys below 12.
  ° Angulation more than 10 degrees in girls above 10 and boys above 12.

Fractures of the forearm:
- All displaced fractures of the forearm.
- All angulated fractures of the forearm with obvious clinical deformity.

Any associated dislocation or subluxation -
- At the distal radio-ulnar joint (Galeazzi) or, proximally, radio-capitellar joint (Monteggia, Monteggia variant) with single bone fracture.

If any doubt whether eligible discuss with ED senior.

Process:
- Patient evaluated on arrival for analgesia and splint requirements.
- Patient evaluated by ED doctor / ENP.
- X-ray.
- Angulation and displacement of fracture measured radiologically.
- Patient re-evaluated for analgesia.
- Above elbow POP backslab (if not applied on arrival).
- Ward informed and message given to on-call SHO/ Orthopaedic Registrar to review on ward.
- Patient transferred to ward.
- All children < 2 years old, refer for safeguarding review in addition to orthopaedic referral.

(Scene 4.17 reviewed by Dr A. Rawnsley June 2020)

(Written by Dr A Smith & Mr J Fernandes [Consultant Orthopaedic Surgeon], Aug 2004)
4.18  BUCKLE FRACTURES OF THE DISTAL RADIUS –
WRIST SPLINT

NB See laminated diagrams next to the main X-ray viewer. This flowchart is copied on the following page for reference.

A. DEFINITION
B. BACKGROUND
C. MANAGEMENT / PARENTAL ADVICE
D. FURTHER MANAGEMENT – SAFETYNET FOR CORRECT MANAGEMENT
E. FLOWCHART

A. DEFINITION
Fractures appropriate for this treatment are isolated buckles of a single cortex of the distal radius only. When looking at the lateral X-ray, the deformity must be seen on one cortex only, with the opposite cortex having no discontinuity.
On the AP view small “bumps” are seen on one or both sides of the radius.
The fracture should not be too proximal (within the metaphysis only, a good tip is to measure the width of the physis on the AP, if the buckle is the same distance or less from the physis going down the bone it is within the metaphysis), nor too angulated (>15°).
An associated ulna buckle does not alter the treatment.

B. BACKGROUND
These injuries are usually caused by a fall onto the outstretched or flexed hand. They present with pain and swelling around the wrist / distal forearm region. Younger bones tend not to fracture like the distal forearm of adults but buckle instead. Children with an isolated buckle fracture of the distal radius +/- ulna are managed with a wrist splint and not a POP.
(NICE suggests that these injuries do not require treatment, but until the results of the trial looking at this is available, we will continue to manage as above).

C. MANAGEMENT / PARENTAL ADVICE
The child’s wrist should be put in a splint for 3 weeks.
- Parents / patients should be advised that they can remove the splint for essential washing during this time, and permanently after 3 weeks.
- The child should not return to sporting activities or rough play for a further 3 weeks (this needs to be emphasised in detail, i.e. extra-curricular sport as well as school PE.
- They should be given the parents information sheet, which should be explained to them.
- They should be told that the x-rays will be reviewed and they will be contacted if any change in management is needed.
They do not need a further fracture clinic or ED appointment but should be asked to contact the Emergency Department if they have any further problems.

D. FURTHER MANAGEMENT – SAFETY NET
On PACS write “buckle # protocol” in the comments box – this alerts the radiologist that the patient is having no follow-up.
4.18 BUCKLE FRACTURES OF THE DISTAL RADIUS –
WRIST SPLINT

E. FLOWCHART

STEP 1 – Lateral wrist x-ray with buckle on one surface of distal radius

Is the opposite cortex broken?

Is the fracture too proximal?
(distance from physis > width of physis)

Is there significant angulation?
(>15deg angulation of metaphysis to shaft)

This is a buckle fracture suitable for treatment in a splint. (A bump may be seen on both sides of the radius or ulna on the AP view)

Discharge with wrist splint and appropriate advice sheet

(Section 4.18 updated by Dr S Ramlakhan, May 2020)
(Written by Dr J Cumberland & Mr M Flowers, Aug 2002)
[Info leaflet available – No. 79 – Buckle fracture to the wrist]
### 4.19 LIMB FRACTURES

A. **SHOULDER GIRDLE** *(also see 4.14)*

B. **HUMERUS**

C. **ELBOW & FOREARM** *(also see 4.15)*

D. **WRIST** *(also see 4.18)*

E. **HAND** *(also see 4.16)*

F. **FEMUR** *(also see 4.10 & 4.11)*

G. **KNEE** *(also see 4.12)*

H. **LOWER LEG**

I. **ANKLE** *(also see 4.13)*

J. **FOOT** *(also see 4.13)*

[Info leaflet available – No. 53 – Cast care instructions for carers]

<table>
<thead>
<tr>
<th>A. SHOULDER GIRDLE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Site</strong></td>
</tr>
<tr>
<td>---</td>
</tr>
</tbody>
</table>
| **Sternoclavicular dislocation** | Usually requires some force. If dislocates posteriorly then mediastinal tissues may be damaged. May require CT Scan. | - Broad arm sling (BAS).  
- Fracture clinic.  
- If posteriorly displaced refer to orthopaedic on-call. |
| **Acromioclavicular dislocation** | X-ray appearances can be deceptive as in children the natural separation is significant. Look for significant soft tissue swelling over the ACJ as well as point tenderness there | - BAS.  
- Fracture clinic, If displaced. |
| **Clavicular fracture** | Watch for tenting of skin over fracture although this is rarely a problem  
No need to x-ray if clinically # at middle 2/3 and within defined age range and appropriate injury mechanism (thinking of pathological fractures – deposits or OI) | - *(See 4.14)* |
| **Scapular fracture** | Unusual injury. Requires significant force so look for other injuries. | - BAS.  
- Fracture clinic. |
| **Soft tissue injuries** |  | - Encourage mobilisation.  
- BAS if required for short time only |
| **Shoulder dislocation (anterior) without fracture** | Remember to check axillary nerve. | - Manipulation in the ED *(See 4.7)*  
- BAS under clothes.  
- Fracture clinic.  
- May require admission for manipulation. |
## 4.19 LIMB FRACTURES

### Shoulder dislocation (posterior) without fracture

- Single AP shoulder X-ray may look normal. Look for restriction of external rotation. May occurs after seizures.
- Manipulation with analgesia but often requires this under GA.
- BAS under clothes.
- Fracture clinic.

### Shoulder dislocation with fracture

- Refer for manipulation by orthopaedics.

### HUMERUS

<table>
<thead>
<tr>
<th>Site</th>
<th>Notes</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fractured neck of humerus *</td>
<td></td>
<td>- If minimally displaced collar and cuff (C&amp;C), (Not Broad arm sling)</td>
</tr>
<tr>
<td>Fractured shaft of humerus *</td>
<td>Check for radial nerve function.</td>
<td>- If displaced refer for assessment regarding manipulation and/or fixation.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- minimally displaced: upper arm back slab</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Fracture clinic.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- If displaced refer for ? fixation.</td>
</tr>
</tbody>
</table>

### ELBOW

(Remember to look for the anterior and posterior fat pads)

<table>
<thead>
<tr>
<th>Site</th>
<th>Notes</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>No fracture seen but raised anterior or posterior fat pad present.</td>
<td>This indicates a joint effusion / haemarthrosis suggestive of a bony injury. (Anterior fat pad is a normal finding, only abnormal if raised)</td>
<td>Elbow Fat Pad protocol (see section 4.15)</td>
</tr>
<tr>
<td>Supracondylar / lateral condylar fracture *</td>
<td>Check brachial artery and median nerve function. High risk of neurovascular damage in displaced fractures.</td>
<td>Undisplaced fracture: Backslab with elbow at &gt;90° if soft tissues allow. Fracture clinic.</td>
</tr>
<tr>
<td>Lateral epicondyle *</td>
<td></td>
<td>Displaced fracture: Manipulation and/or fixation.</td>
</tr>
<tr>
<td>Medial epicondyle *</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

|                                           |                                                                                           |
|                                           | Displaced fractures: Require fixation.                                                   |
4.19 LIMB FRACTURES

C. FOREARM
(Forearm views should show the elbow and wrist joints.)
*All children < 2 years old with a fracture, refer for safeguarding review in addition to orthopaedic referral

<table>
<thead>
<tr>
<th>Forearm Site</th>
<th>Description</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ulnar shaft *</td>
<td>Isolated fractures of the ulna are rare. <strong>Look for associated radial fracture or radial head dislocation.</strong> (Monteggia variant)</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Undisplaced fracture:</strong></td>
<td><strong>Displaced/complex fractures/dislocations:</strong></td>
</tr>
<tr>
<td></td>
<td>- Treated in a full arm backslab</td>
<td>- Admit for manipulation and ? fixation.</td>
</tr>
<tr>
<td>Olecranon *</td>
<td>Check for radial head dislocation.</td>
<td><strong>Undisplaced fracture:</strong></td>
</tr>
<tr>
<td></td>
<td>- Above elbow backslab in extension</td>
<td>- Fracture clinic.</td>
</tr>
<tr>
<td>Dislocated radial head *</td>
<td>The radial head should always be in-line with the capitellum on any view of the elbow.</td>
<td><strong>Displaced fracture:</strong></td>
</tr>
<tr>
<td></td>
<td>- Admit for fixation.</td>
<td></td>
</tr>
<tr>
<td>Radial head or neck *</td>
<td></td>
<td><strong>Undisplaced fracture:</strong></td>
</tr>
<tr>
<td></td>
<td>- C&amp;C. If there is significant discomfort then a backslab may be applied but tell patient this may be changed to C&amp;C in # clinic.</td>
<td>- Fracture clinic.</td>
</tr>
<tr>
<td>Radial shaft *</td>
<td>Isolated fracture is rare so check for associated ulnar fracture or dislocation.</td>
<td><strong>Displaced / angulated fracture:</strong></td>
</tr>
<tr>
<td></td>
<td>- Full arm backslab.</td>
<td>- Requires manipulation - refer ortho.</td>
</tr>
<tr>
<td></td>
<td><strong>Displaced fracture / dislocation:</strong></td>
<td>- Angulation should be measured as the angle made by the articular surface to the proximal shaft (the physis can be used as a proxy for the articular surface) Significant angulation requiring discussion is &gt;/= 30deg – this is fine</td>
</tr>
</tbody>
</table>

D. WRIST

<table>
<thead>
<tr>
<th>Site</th>
<th>Notes</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ulnar styloid</td>
<td></td>
<td>- Above elbow backslab.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Fracture clinic.</td>
</tr>
<tr>
<td>Distal radius</td>
<td>A buckle implies the cortex has failed but in a stable manner. The injury can be described by which surface is buckled, e.g. a buckle of the dorsal surface.</td>
<td><strong>Buckle fractures of either cortex in isolation (ie no ulna #):</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- May be treated in a wrist splint for 3 weeks without follow up.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- <strong>See section 4.18</strong> to assess suitability for this treatment.</td>
</tr>
</tbody>
</table>
## 4.19 LIMB FRACTURES

<table>
<thead>
<tr>
<th>Scaphoid</th>
<th>Any other minimally displaced fractures, including those with associated ulnar injuries:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>- Above elbow backslab.</td>
</tr>
<tr>
<td></td>
<td>- Fracture clinic.</td>
</tr>
<tr>
<td></td>
<td>Displaced fractures:</td>
</tr>
<tr>
<td></td>
<td>- Require MUA by orthopaedics.</td>
</tr>
<tr>
<td>Scaphoid</td>
<td>Normal X-ray (but clinical suspicion):</td>
</tr>
<tr>
<td></td>
<td>- Wrist splint.</td>
</tr>
<tr>
<td></td>
<td>- ED review in 10 days.</td>
</tr>
<tr>
<td></td>
<td>- Scaphoid POP if severe pain.</td>
</tr>
<tr>
<td></td>
<td>Positive X-ray:</td>
</tr>
<tr>
<td></td>
<td>- Scaphoid wool and crepe to allow for re-examination in fracture clinic.</td>
</tr>
<tr>
<td></td>
<td>- Fracture clinic.</td>
</tr>
<tr>
<td>Other carpal bones</td>
<td>Unusual injuries.</td>
</tr>
<tr>
<td></td>
<td>Minor flakes:</td>
</tr>
<tr>
<td></td>
<td>- Below elbow backslab.</td>
</tr>
<tr>
<td></td>
<td>- Fracture clinic.</td>
</tr>
<tr>
<td></td>
<td>Genuine fracture:</td>
</tr>
<tr>
<td></td>
<td>- Scaphoid wool and crepe</td>
</tr>
<tr>
<td></td>
<td>- Fracture clinic.</td>
</tr>
<tr>
<td>Carpal dislocation</td>
<td>Wrist will usually be very swollen. High risk of median nerve injury.</td>
</tr>
<tr>
<td></td>
<td>- Backslab for comfort</td>
</tr>
<tr>
<td></td>
<td>- Refer for MUA by orthopaedics.</td>
</tr>
</tbody>
</table>

### E. HAND

**IMPORTANT read section 4.16 - Hand Injuries**

<table>
<thead>
<tr>
<th>Site</th>
<th>Notes</th>
<th>Treatment</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thumb metacarpal</td>
<td>Do NOT put an elastoplast thumb spica on a child who is going to # clinic – it will be removed for examination and this is PAINFUL!</td>
<td>Minimally displaced fractures:</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Bennett’s style backslab. Or wool and crepe</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Fracture clinic.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Displaced fractures, especially those involving the joint:</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Refer for manipulation.</td>
<td></td>
</tr>
<tr>
<td>Other metacarpals</td>
<td>During examination ensure there is no rotational deformity and that there is full extension. Minor displacements can be manipulated in ED – discuss it with an ED senior.</td>
<td>Minor flakes and buckles:</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Neighbour strapped for 2 weeks and discharged.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Minimally displaced fractures with cortical break:</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Neighbour strapping.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Fracture clinic referral.</td>
<td></td>
</tr>
</tbody>
</table>
## 4.19 LIMB FRACTURES

<table>
<thead>
<tr>
<th>Fracture Type</th>
<th>Description and Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impacted # / buckles</td>
<td>Impacted # / buckles do not need to go to # clinic</td>
</tr>
<tr>
<td>5th MC fracture info leaflet available</td>
<td>5th MC fracture info leaflet available no 658</td>
</tr>
<tr>
<td>Significant displacement:</td>
<td>- 5th MC – MUA in the ED</td>
</tr>
<tr>
<td></td>
<td>- others - refer for possible MUA.</td>
</tr>
<tr>
<td>Multiple metacarpal fractures:</td>
<td>- Often require admission but discuss with the ED middle grade.</td>
</tr>
<tr>
<td>Thumb dislocation (MCPJ)</td>
<td>As many as 50% will be irreducible. Look for a dimple on the volar aspect of the MCPJ which makes this more likely.</td>
</tr>
<tr>
<td></td>
<td>Reduce in ED.</td>
</tr>
<tr>
<td></td>
<td>Back slab or wool and crepe thumb spica.</td>
</tr>
<tr>
<td></td>
<td>Fracture clinic.</td>
</tr>
<tr>
<td></td>
<td>Failed reduction requires orthopaedic referral for open reduction.</td>
</tr>
<tr>
<td>Thumb Sprain (MCPJ)</td>
<td>Check for ulnar collateral and radial collateral stability. Compare with the other hand. If there is difficulty in assessing properly because of pain then discuss with ED senior about possible ED clinic review.</td>
</tr>
<tr>
<td></td>
<td>Mobilisation is best but a short period in a thumb spica may be of benefit.</td>
</tr>
<tr>
<td></td>
<td>If there is evidence of instability needs immobilisation refer to # clinic.</td>
</tr>
<tr>
<td>Proximal and middle phalanges</td>
<td>During examination ensure there is no rotational deformity and that there is full extension. Minor displacements can be manipulated in ED – discuss it with the ED senior.</td>
</tr>
<tr>
<td></td>
<td>Minor flakes, buckles, undisplaced Salter-Harris 2s:</td>
</tr>
<tr>
<td></td>
<td>- Neighbour strapped for 2 weeks and discharged.</td>
</tr>
<tr>
<td>Distal Phalanx (mallet finger)</td>
<td>Look for loss of ability to fully extend DIP (mallet deformity). If unable to fully extend DIP needs treatment even if no fracture seen on x-ray.</td>
</tr>
<tr>
<td></td>
<td>- Mallet splint for 6 weeks and advise must not remove splint without supporting DIP</td>
</tr>
<tr>
<td></td>
<td>- Review ED clinic in 6 weeks. or sooner (3 weeks) if compliance is felt to be an issue</td>
</tr>
<tr>
<td>Fingertip injuries</td>
<td>See section 4.26</td>
</tr>
<tr>
<td></td>
<td>- Do not need referral to fracture clinic.</td>
</tr>
</tbody>
</table>
## 4.19 LIMB FRACTURES

### F. FEMUR

*All children < 2 years old with a fracture, refer for safeguarding review in addition to orthopaedic referral*

<table>
<thead>
<tr>
<th>Site</th>
<th>Notes</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slipped Upper Femoral Epiphysis (SUFE)</td>
<td>Occurs as a chronic problem or acutely as a Salter Harris I fracture. Be careful to check the hips of any child with a significant fall / injury. Remember that when there is knee pain with a normal knee examination you must exclude hip pathology.</td>
<td>- Immediate referral for fixation is required. See 4.11 for femoral nerve block.</td>
</tr>
<tr>
<td>Femoral shaft *</td>
<td>Remember to check the distal neurovascular status. Intravenous analgesia and / or a femoral nerve block for pain relief before X-ray or splint application</td>
<td>- Thomas splint and referral.</td>
</tr>
<tr>
<td>Femoral condyles *</td>
<td>High energy injury. High risk of injury to the neurovascular structures. Also low energy insufficiency fractures eg OI or after spica removal especially in children with spina bifida</td>
<td>Minor buckles, Undisplaced fracture:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Above knee backslab.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Fracture clinic.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Displaced fracture:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Require referral.</td>
</tr>
</tbody>
</table>

### G. KNEE (see also section 4.12 – knee injuries)

Remember: Check for a lipohaemarthrosis on the lateral Horizontal Beam knee X-ray. This indicates bony injury has occurred. Immediate swelling following injury indicates bleeding in the joint, a haemarthrosis. This means that there must be some damage in the knee and the patient should not be discharged without follow-up. Discuss with the ED senior as to whether acute orthopaedic referral is required or whether follow up in fracture clinic is more appropriate. IF A CHILD COMPLAINS OF KNEE PAIN ALWAYS CHECK THEIR HIPS.

<table>
<thead>
<tr>
<th>Site</th>
<th>Notes</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patellar fractures</td>
<td>To view the patella properly requires a skyline view but this needs the knee to be flexed and is often not possible acutely. A separate fragment in the superolateral corner of the patella is a normal variant unless indicated otherwise clinically</td>
<td>Undisplaced fracture:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Above knee backslab.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Fracture clinic.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Displaced fracture:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Referral for ? fixation.</td>
</tr>
<tr>
<td>Patellar dislocation</td>
<td>Usually dislocates laterally. Often reduced spontaneously before arrival. Can be reduced in ED with Entonox – see section 2.7.</td>
<td>- Reduction, then extension splint and crutches.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Recurrent dislocations can be treated symptomatically following reduction.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Refer to fracture clinic.</td>
</tr>
<tr>
<td>Tibial spines</td>
<td>These spines are where the cruciate ligaments attach. A lipohaemarthrosis will often be visible on the X-ray.</td>
<td>- Refer to orthopaedics</td>
</tr>
</tbody>
</table>
4.19 LIMB FRACTURES

H.

LOWER LEG

*All children < 2 years old with a fracture (excluding Toddler fracture) refer for safeguarding review in addition to orthopaedic referral

<table>
<thead>
<tr>
<th>Site</th>
<th>Notes</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tibial shaft *</td>
<td>High risk of compartment syndrome with tibial fractures.</td>
<td>Minor buckles:</td>
</tr>
<tr>
<td></td>
<td>All cortical fractures should be considered for admission, elevation and observation.</td>
<td>- Below knee backslab.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Fracture clinic.</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Undisplaced fracture:</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Long leg backslab consider admission for elevation</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Displaced fracture:</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Require MUA.</td>
</tr>
<tr>
<td>Toddler’s Fracture</td>
<td>This often occurs with minimal trauma, which may not even be remembered.</td>
<td>Normal X-ray and minimal symptoms:</td>
</tr>
<tr>
<td></td>
<td>The child presents with a limp or refusal to weight bear.</td>
<td>- Review in ED clinic 2-3 days. Parents may cancel if better.</td>
</tr>
<tr>
<td></td>
<td>X-ray changes may take 14 days to occur.</td>
<td><strong>Normal X-ray but clear Hx of significant injury, not/difficulty w/b and happy not early sepsis:</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Full leg POP.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- ED review at 14 days.</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Abnormal X-ray:</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Long leg backslab or full scotch cast if &gt; 48hrs old and not swollen.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Fracture clinic</td>
</tr>
<tr>
<td>Fibular fractures *</td>
<td>These can often be treated symptomatically.</td>
<td>Minor buckles:</td>
</tr>
<tr>
<td></td>
<td>Proximal fractures are associated with ankle injuries</td>
<td>- Treat symptomatically with or without a POP.</td>
</tr>
<tr>
<td></td>
<td>Look for ankle diastasis.</td>
<td>- Fracture clinic.</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Undisplaced fracture:</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Long leg backslab.</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Displaced fractures or diastasis:</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Require MUA/fixation.</td>
</tr>
</tbody>
</table>

I.

ANKLE (see also 4.13 – ankle & foot injuries)

<table>
<thead>
<tr>
<th>Site</th>
<th>Notes</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ankle Sprain</td>
<td><strong>See section 4.13 ankle injuries</strong></td>
<td>- Best mobilised as able.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Occasionally crutches are required, in which case review in ED in one week.</td>
</tr>
<tr>
<td>Malleolar flake fractures</td>
<td>These are effectively sprains and are treated symptomatically.</td>
<td>As above.</td>
</tr>
<tr>
<td>Malleolar</td>
<td>Look for talar shift.</td>
<td><strong>Undisplaced fracture:</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Below knee backslab and crutches.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Fracture clinic.</td>
</tr>
</tbody>
</table>
## 4.19 LIMB FRACTURES

<table>
<thead>
<tr>
<th>fractures</th>
<th>Displaced fracture:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>- Admit for manipulation.</td>
</tr>
</tbody>
</table>

### J. FOOT

#### Site | Notes | Treatment
---|---|---
Calcaneal fractures | Usually occur following a fall from a height. The forces on landing on transmitted up the leg to the spine. Check for associated knee, hip and spinal injuries. Request specific calcaneal views. | Minor cracks with no swelling:  
- Can be considered for discharge with crutches.  
- Fracture clinic.  
Significant or intra-articular fracture:  
Admit for elevation and ? CT. |
Tarsal fractures | **See section 4.16 foot and ankle guidelines** | Avulsion flakes: Below knee backslab and fracture clinic  
Other fractures: have usually required significant force and are at risk of swelling; Low threshold for referral on call.(Especially crush injuries) |
1st Metatarsal | Very common in limping toddler | Minor buckle:  
- Can be treated symptomatically.  
Minor fracture:  
- Below knee backslab.  
- Fracture clinic.  
Displaced intraarticular fracture:  
- Referral to orthopaedics. |
Other Metatarsals | | Minor buckle:  
- Can be treated symptomatically.  
Minimally displaced fracture:  
- Treated symptomatically with crutches + / - POP.  
- Fracture clinic.  
Displaced or multiple fracture:  
- Admit for elevation and fixation. |
Phalanges | X-rays are only required if you suspect the MTPJ is involved or toe looks deviated. | - Neighbour strapping and/or metatarsal pad.  
- Treatment is effectively symptomatic for the next 2 - 3 weeks. |

(Section 4.19 reviewed by Dr A Rawnsley, June 2020)  
(Section 4.19 updated by Dr J Cumberland and Mark Flowers August 2017)  
(Section 4.19 updated by Dr J Cumberland, Aug 2008)
4.20 PHYSIOTHERAPY

A. BACKGROUND
Physiotherapy is sometimes used to treat acute injuries but is rarely required in children with minor injuries. For acute thigh and knee injuries there is an advice sheet on quadriceps exercises available in the ED.

B. REFERRAL
If you feel a child may benefit from physiotherapy then discuss this with the ED senior first prior to making the referral. If a referral is required complete a referral form found in the drawers at the back of the nurses’ station. Make sure you write ‘acute injury’ on the card and give a clear description of the injury in the box for clinical details. This is to ensure the child is seen as soon as possible, however be aware that the minimum wait for an appointment is at least 2 weeks and may be considerably longer depending on staffing levels. Send the referral via the internal post to the Physiotherapy Department.

(Section 4.20 Reviewed by Dr. S Perumal, June 2020)
(Updated by Dr J Cumberland, June 2014) (Written by Dr A Smith, Aug 2004)
4.21 BACK PAIN

A. BACKGROUND
We see a significant number of children with back pain in ED. The majority of these have a simple muscular strain, with a history of minor trauma which would fit with this diagnosis, pain and tenderness paraspinally and no other features. These children do not form part of the group that the rest of this guideline is about.

True back pain in children has different significance to that in adults. While 26 – 36% of children report back pain on direct questioning, fewer than 2% seek medical advice and of these between 50 – 65% will have a specific or serious cause. This is a much higher pick-up rate than is found in adults, especially in the under 12s. Serious causes may present with relatively minor symptoms and the diagnosis is often delayed. **Always consider infection.**

B. SIGNIFICANT FEATURES
• Age <12 years.
• Age <4 years highly significant.
• Duration of symptoms > 2 weeks.
• Interference with function e.g. school, play, sport.
• History of significant trauma.
• Night pain and / or pain at rest
• Competitively sporty / dancer.
• An acutely rigid spine.
• Morning stiffness.
• Painful scoliosis - more pronounced on forward flexion of the spine.
• Gait disturbance / weakness.
• Loss of saddle sensation
• Serious or progressive neurological deficit in the lower extremity
• Associated systemic symptoms, fever, weight loss, easy bruising, abnormal bleeding etc.
• Alteration of bowel or bladder habit (ask nocturnal enuresis).
• Associated conditions e.g. neurofibromatosis, lumbosacral skin conditions.

C. ASSESSMENT
Should include:
• Temperature.
• Fully undressing child to underwear, this may reveal leg deformities / muscle wasting etc.
• Palpation for tenderness or a step.
• Spinal movements including straight leg raise.
• Full neurological examination, including saddle sensation.
• Gait assessment
• Rest of the body: look for purpura/bruising, hepatosplenomegaly, lymphadenopathy
4.21 BACK PAIN

D. DIFFERENTIAL DIAGNOSIS

- Developmental – e.g. Spondylosis/ spondylolisthesis, Scoliosis, Scheuermann’s disease, (Commonest causes of pathological back pain in adolescents).
- Mechanical – herniated disc, (overuse syndrome - diagnosis of exclusion), apophyseal ring fracture
- Inflammatory – Discitis, osteomyelitis, including TB, rheumatologic.
- Neoplastic – Benign e.g. osteoid osteoma, aneurysmal bone cyst. Malignant e.g. lymphoma, leukaemia, Wilms’ tumour, Ewing’s sarcoma, osteosarcoma,.
- Extrinsic causes e.g. polycystic kidneys, pyelonephritis, renal colic, retroperitoneal infections.
- Sickle cell crisis.
- Non accidental injury.

E. MANAGEMENT

For older children > 12 yrs with recent onset back pain, no pyrexia and no other suspicious history or findings, it is appropriate to give 10 – 14 days of analgesia with an open ED clinic appointment after that time. X-rays may be taken or left at this first visit, depending on presentation.

In all other children baseline investigations should be done:
- AP and lateral spinal X-rays – site specific
- FBC, ESR, CRP
- Urinalysis if considering pyelonephritis or renal colic

Referral to orthopaedics on-call in discussion with the middle grade should be made for all:
- Very young children (< 4 years),
- those with acute trauma with bony injury,
- any suggestion of infection or inflammatory disease,
- suspected Cauda Equina syndrome.
- suspected bone malignancy

Other children should be discussed with the ED senior as to whether acute / routine orthopaedic follow-up, initial ED follow-up or no follow-up is most appropriate.

Non urgent orthopaedic referral (see section 4.8) should be made for children with less acute, defined problems e.g. Spondylolisthesis etc.

Beware the child with back pain and pyrexia, discitis is often not recognised at first presentation and radiographs are usually normal for at least 2 weeks following onset of symptoms.

(Section 4.21 updated by Dr S Perumal and Dr A Smith, June 2020)
(Written by Dr J Cumberland April 2004)
4.22 THE LIMPING OR NON-WEIGHT BEARING CHILD

A. BACKGROUND

We see many limping children in this department. For many the cause is obvious from the
history and examination, e.g. sprained ankle, FB in foot, broken toe, etc. For others the
cause is less obvious because:
- The child is too young to say where it hurts or what happened.
- Poor localisation of pain or referral of pain (e.g. hip to knee or knee to hip).

B. ASSESSMENT

i) History

As the differential diagnosis of a limp is wide it is essential that a thorough history is taken
including trauma and recent illnesses

ii) Examination

TEMPERATURE
General Statement of wellness
Wt bearing or not
Examine problem leg
Remember signs may be subtle so examine for local warmth, subtle swelling and stressing the
tibia specifically in young children.

EXAMINE OTHER JOINTS, BACK, ABDOMEN, TESTES

If history or initial examination suggests a likely systemic cause a full thorough examination is
essential.

If a child is difficult to assess, ensure adequate analgesia and d/w middle grade.

C. DIFFERENTIAL DIAGNOSIS

By Site

a. Any Site
Fracture - specifically exclude toddlers fracture and femoral shaft
Soft tissue injury – e.g. sprained ankle, foreign body foot
Septic Arthritis - usually systemically unwell
Osteomyelitis - may not be systemically unwell
Neoplasia
Systemic conditions e.g. rheumatological, leukaemia,
4.22 THE LIMPING OR NON-WEIGHT BEARING CHILD

b. Knee (see section 4.12)

c. Hips
   i. Irritable hip
      A transient synovitis usually with effusion that causes a painful limp. May be associated with a recent or current upper respiratory infection.

   ii. Septic arthritis
       Tend to be systemically unwell.

   iii. Perthe’s disease
       An avascular necrosis of the upper femoral epiphysis affecting typically the 3 to 9 years age group.

   iv. SUFE
       Slipped upper femoral epiphysis (8 to 15+ years age group)

v. Congenital problem
   e.g. missed DDH (Developmental Dysplasia of the Hip).

d. Back - e.g. discitis (see section 4.21)

e. Abdomen - e.g. peritonitis, hernias

f. Genitalia - e.g. testicular torsion

Age Specific Points

a. If the child is very young, i.e. in the toddler age group it is more likely to be a bony injury than an irritable hip. Examine carefully for a tibial or femoral fracture.

b. If the child is over 11 years of age the chance of it being irritable hip decreases. Consider SUFE, muscular strain, bony abnormality, back problems, etc. Seek advice if in doubt.

SEE PATHWAY IN SECTION D FOR MANAGEMENT OF LIMPING CHILD OVER 1 YEAR
4.22 THE LIMPING OR NON-WEIGHT BEARING CHILD

D. Limping Child (over 1 year of age) Pathway

- Limping Child aged over 1 year
  - Full history & examination after adequate analgesia.
  - Examination must include back and abdomen in all patients, and genitalia in boys

### RED FLAGS

In all cases there are specific markers which raise the suspicion of severe disease and these should be specifically looked for in the history and examination.

- **Non-accidental Injury**
  - Follow local guidelines

- **General**
  - Systemic upset, non weight bearing, limping for more than 4 weeks

- **Malignancy**
  - Night pain, night sweats, pallor, bruising, lymphadenopathy, hepatomegaly, splenomegaly, abnormal neurology, back pain

- **Haematology**
  - Sickle cell disease

- **Rheumatology**
  - Leg length discrepancy, multiple joint involvement

- **Sepsis**
  - Immuno-compromise

**Site Unclear**

- **Localised to Hip**
  - Aged less than 8 years
  - Perform FROG LATERAL Hip X-Ray to exclude SUFE

  - Normal
  - Abnormal
    - Refer to Orthopaedics

  - Exit Pathway
    - Seek more expert opinion
    - Consider FBC & Film, CRP, Blood Culture, Imaging
    - Refer patient as appropriate

**Site Unclear**

- **Systemically well**
  - No fever
  - No history of fever
  - Partial or full weight bearing

**Clear Diagnosis**

**Unclear Diagnosis**

**Exit Pathway**

- Manage according to local guidelines
- Systemically unwell
  - Or History of a fever
  - Or Currently febrile
  - Or Non weight bearing
  - Or Any red flag

**Exit Pathway**

- Aged less than 8 years
- Aged over 8 years

**Allow open access ED clinic for 14 days**

Discuss with ED senior prior to discharge

Discuss contents of leaflets and availability of open access clinic appointments with parent/carer

Reinforce need for regular analgesia (paracetamol + ibuprofen)

Advise to return immediately if:
- becomes unwell
- develops a fever
- becomes non weight bearing
- increasing pain despite regular analgesia
4.23 DRESSINGS AVAILABLE IN THE ED

A. BACKGROUND
Most wounds can be managed in the Emergency Department and the use of an appropriate wound dressing can aid the healing process. The following dressings are available.

B. MEPITEL  [Mepitel info leaflet available – No. 87]
Is a non-adherent silicone dressing that is porous and allows exudate to pass out into an outer absorbent dressing, i.e. gauze.

**NB** Not cost effective if not left in place for a minimum of 7 days. However, this is only a consideration and not criteria for deciding which dressing is most suitable for both the child and the presenting wound.

<table>
<thead>
<tr>
<th>USES</th>
<th>AIMS</th>
<th>APPLICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wet wounds. Old / new wounds. Grazes / abrasions. Infected / non-infected. Over sutures/steristrips.</td>
<td>Provides a moist healing environment. Will not disturb wound-healing process. Will not disturb the wound. May be re-assessed through mepitel. Can be used with creams under / over dressing.</td>
<td>SINGLE LAYER ONLY Occluded with gauze / bandage. Can be left in place for 7-14 days. Allows re-attending flexibility</td>
</tr>
</tbody>
</table>

C. BACTIGRAS  [Bactigras info leaflet available – No. 81]
An open mesh dressing impregnated with soft paraffin and chlorhexidine acetate.

**NB** Do not use over sutures / steristrips

This dressing is a suitable and cheaper alternative to Mepitel when treating very superficial wounds that only require occlusion for a few days.

Also a good dressing to use when patients are returning for plastics operation within the next 2 days

**BACTIGRAS** (continued)

<table>
<thead>
<tr>
<th>USES</th>
<th>AIMS</th>
<th>APPLICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wet wounds. Flat / shallow wounds. New / old wounds. Infected / non-infected.</td>
<td>Prevention of infection. To control any existing infection.</td>
<td>Minimum of 6 layers (may be folded to create required layers). Must be occluded with gauze / bandage. May be left in place for 4 - 5 days maximum.</td>
</tr>
</tbody>
</table>
4.23 DRESSINGS AVAILABLE IN THE ED

D. MEPILEX (BORDER AND NON-BORDER)
Mepilex (border and non-border) is a soft silicone foam dressing that is highly absorbent and will help to debride a dirty wound.

<table>
<thead>
<tr>
<th>USES</th>
<th>AIMS</th>
<th>APPLICATION</th>
</tr>
</thead>
</table>
| Dirty, gritty wounds ONLY. | Provides moist wound healing environment. Absorbs exudates. Minimises the risk of maceration to the skin. | **DO NOT APPLY LIGNOCAINE GEL AND SCRUB WITH TOOTHBRUSH**
To remove gross contamination (if using Mepilex) clean wound with water.
Apply adherent side to wound, hold in place with bandage, no gauze required.
- May be left in place for up to 7 days, however, dressing may need changing sooner if wound is likely to produce a large amount of exudate.
Dressing could initially cause an increase in size of wound, due to debridement process. This is normal. Mepilex border does not need securing with bandage as it is self-adherent. |

(Reviewed by ED Sister / Clinical Nurse Educator, J Cherrington April 2020)
(Reviewed by ED Sister / Nurse Manager J Morcombe, March 2015)
(Reviewed by ED Sister / Nurse Manager J Morcombe, Aug 2008)
4.24 NURSE LED DRESSING CLINICS

A. BACKGROUND
These clinics will be held Monday to Friday mornings from 08:00hrs. It will be run by an Emergency Nurse Practitioner or senior member of the nursing team (Band 6 or above), who has undertaken further training. This will enable the nurse to autonomously assess and treat children returning to the Emergency Department for wound review or dressings, within the criteria below.

B. PATIENT / CLIENT GROUP
The nurse will see all children attending the Emergency Department as planned re-attenders for wound review or dressing change, as set out in this guidance.

C. LIMITATIONS OF PRACTICE
The nurse with this expanded role will not undertake the treatment of the following categories of patients:
- Post sutured wound with a high risk of infection that may need a decision on further management of treatment, e.g. animal bites with delayed closure, dirty puncture wounds or foreign bodies.
- Deep lacerations to hands / fingers (2nd visit only), where the prime concern is the re-assessment of movement for tendon involvement or nerve damage.
- Avulsed nail injuries (2nd visit only).
- NAI cases.
- Police cases.
- All cases that the nurse identifies as needing a medical opinion.
- Any patient who requests to be seen by a doctor.

D. WOUNDS FOR INCLUSION
The wounds that this nurse could assess and treat without medical intervention are as follows:
- All minor burns / scalds.
- Superficial lacerations.
- All grazes / abrasions.
- Full / partial finger tip injuries.
- Avulsed nail injuries.

(Reviewed by Sister J Parker April 2020)
(Reviewed by Dr E Snelson, March 2017)
(Section 4.24 reviewed by Sister J Morcombe, May 2008)

[Info leaflet available – No. 143 – After care of burns & scalds]
4.25 WOUNDS

A. DEFINITIONS

B. BACKGROUND

C. EMERGENCY MANAGEMENT

D. ASSESSMENT

E. INVESTIGATION

F. MANAGEMENT

G. REFERRAL / DEFINITIVE CARE

H. ED CLINIC FOLLOW-UP

A. DEFINITIONS

Incision / cut: Caused by a sharp object, will often have clean-cut edges

Laceration: Caused by a blunt injury causing the skin to tear. The edges may be irregular, with adjacent tissue damage caused by crushing.

Puncture: Penetrating wound with a sharp, (very occasionally blunt), object.

Abrasion / graze: From blunt trauma. May well be contaminated with dirt, gravel etc.

B. BACKGROUND

Wounds are common in children and the majority heal well with minimal intervention. It is important to assess whether a child with wounds has other, potentially more serious injuries, especially those that may compromise the airway, breathing or circulation. Abdominal or back wounds must be carefully evaluated to rule out the possibility of underlying visceral trauma. We are fortunate to have experienced nursing staff, who will advise about wound management. Ask if you are unsure.

C. EMERGENCY MANAGEMENT

Wounds with significant haemorrhage need to be dealt with as an emergency. Apply direct pressure and elevate if possible. If shocked, provide O₂, obtain IV access, commence IVI, and get help early (see section 4.3 and 4.4). Analgesia should be provided when needed. Anticipation of pain and early treatment is preferable (see section 4.1)

D. ASSESSMENT

History:
- Mechanism – sharp, blunt, bite, glass.
- When (>6hrs – increased risk of infection).
- Clean / Dirty.
- Tetanus cover if needed (see below and section 3.43).

Examination
- Size – length and depth.
- Site.
- Type – incised wound, laceration, puncture wound, abrasion.
- Foreign bodies.
4.25 WOUNDS

- Contamination / signs of infection.
- Tendon function (look / feel / move).

(For detailed hand exam, see section 4.16 Hand Injuries)

E. INVESTIGATION

X-rays are mandatory for wounds in which any radio opaque foreign body (e.g. glass, metal) may have penetrated the skin. Glass or ceramics ‘cut like nothing else’ and can penetrate deeply into wounds, lying remote from the entry point. Wood is not visible on x-ray but USS may well detect it. Consider using the department ultrasound scanner for these injuries.

Wound swabs may be useful only if an infection is established and there is concern regarding an atypical organism (most commonly Staph Aureus). Provide antibiotics, (flucloxacillin 5 days is the first choice, (see antibiotic section 2.3)), and arrange for ED follow-up when the swab results become available, (usually 2 - 3 days).

F. MANAGEMENT

Most wounds can be managed in the Emergency Department. Indications for referral include the need for G.A (either through lack of patient co-operation or due to a wound that is too large or complicated for L.A.), tendon, nerve or vascular injury, or concerns regarding the cosmetic result. (See section G for referral instructions).

Cleaning:

DILUTION IS THE SOLUTION TO POLLUTION

Tap water is usually adequate for wound cleaning. Irrigation with large quantities of water or saline via a syringe or giving set and green cannula is effective for deeper and more contaminated wounds. A sterile brush is useful for contaminated wounds / ‘gravel rash’.

Topical LAT (lidocaine, adrenaline and tetracaine) gel is useful to allow thorough cleaning (in the cupboard in clean utility).
- 0.5-1ml per cm of wound
- Max dose 2ml for 1-3yr old
- Max dose 3ml for >3yr olds.
- Max wound size 5cm

NB – if required for further exploration injected local anaesthetic can be used in addition, at usual doses. (Lidocaine 1% (10 mg/ml) without adrenaline, maximum dose 0.3 ml/kg or 200mg)

Dirty abrasions should have any large gritty matter removed, be copiously washed and then covered with mepilex for 5 days – this lifts the dirt out. Very occasionally a GA will be necessary to remove deeply ingrained gravel or grit.

Devitalised tissue should be debrided as it forms a focus for infection.

Exploration:

Wounds, usually in the hand, should be explored if there is a risk of partial thickness tendon laceration. This requires senior advice and should only be done by those with the appropriate skills. Unless there is good patient co-operation, referral may be necessary for GA. In cases of definite
4.25 WOUNDS

neurovascular or tendon injury there is no point in further exploring in ED as referral for repair is necessary.

Closure:
Most wounds can be closed at the time of presentation – primary closure. However, wounds that are heavily contaminated, most bites (see section 4.28), and wounds over 12 hrs old (except clean facial wounds) are generally not closed on presentation, due to the high risk of infection. They can either be left to heal by secondary intention (granulation) or delayed primary closure at 3 - 5 days under antibiotic cover (see antibiotics section 2.3). Do not be tempted to use ‘loose’ Steristrips. Discuss with an ED Senior.

Closure Methods:
Before closure, ensure active bleeding has stopped to prevent haematoma formation within the wound. When closing wounds ensure the skin edges are everted to prevent depressed scar formation.

The majority of wounds can be closed with Steristrips or tissue glue. Only a minority of wounds require suturing:
- Wounds over moving parts e.g. knees and elbows (may also require immobilisation).
- Wounds too deep or under too much tension to be held by other methods. These wounds may benefit from deep absorbable sutures to prevent tension at the surface of the skin and remove dead space within the wound.
- External lip lacerations.

Making the correct decision as to whether or not a wound needs suturing requires experience. If in doubt, ask a middle grade or consultant, or an experienced nurse.

Lip lacerations can be managed in ED as long as the doctor is confident of obtaining a good cosmetic result. It is essential that the vermillion border is accurately opposed at the outset. Intra oral lacerations can generally be left open unless particularly large and gaping. Obtain senior advice if in any doubt. Most tongue lacerations heal spontaneously. However, large lateral tongue wounds or wounds which penetrate the full thickness of the lip may need referral to maxfax for suturing
[Info leaflets available - No. 38 – Skin glue / No. 82 – Stitches]
[No. 83 – Hair knots / No. 102 – Steristrips]

Tetanus:
The following wounds are all considered to be tetanus prone.
- Any wound with significant devitalisation of tissue including severe crush injuries and significant / extensive burns.
- Wounds heavily contaminated by soil or stable manure.
- Contaminated deep penetrating or puncture wounds (where removal of such material is difficult or impossible).
- Wounds showing clear clinical evidence of sepsis at first presentation.

Note that simple puncture wounds, e.g. stood on nail, are not included and that time to presentation alone is not relevant. For example, a simple clean wound older than 6 hours at presentation is not at
4.25 WOUNDS

increased risk for tetanus, and a wound heavily contaminated with soil presenting within 1 hour will be.

Decide on the tetanus risk and then follow the immunisation advice in section 3.40 according to the tetanus immunisation status of the patient.

**Antibiotics:**
There is no role for routine use of antibiotics in wounds. Proper lavage and closure techniques should prevent the majority of infections. The exception to this is in the case of some bites and some heavily contaminated wounds. Please refer to section 4.28.

**G. REFERRAL / DEFINITIVE CARE**

Wounds that are too large to close in the ED, where there is worry about tendon involvement, (especially hands), or those where cosmetic effect is a concern ought to be referred to Plastics. Lip lacerations involving the vermillion border can be sutured in the ED, but only by someone experienced in doing so, otherwise refer to Max-fax, who will assess and may elect to close the wound.

In general, referrals should be made as below:

<table>
<thead>
<tr>
<th>Wound Area</th>
<th>Referral Department</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hand and wrist</td>
<td>Plastic surgery</td>
</tr>
<tr>
<td>Limbs</td>
<td>Orthopaedic surgery</td>
</tr>
<tr>
<td>Trunk</td>
<td>General surgery</td>
</tr>
<tr>
<td>Neck</td>
<td>ENT surgery</td>
</tr>
<tr>
<td>Face and mouth</td>
<td>Oral &amp; maxillofacial surgery</td>
</tr>
</tbody>
</table>

**F. ED CLINIC FOLLOW-UP**

Wounds that are at risk of infection can be reviewed in the ED clinic, although thorough cleaning and effective closure should negate the need for follow-up of most wounds. If follow-up is required simply for dressing changes make use of the nurse led dressing clinic (see section 4.24). If in doubt, inform the child and parents of the signs and symptoms of infection, (spreading erythema, pus-like discharge, fever, “unwellness”), and encourage them to see their GP / attend ED if these happen. Consider giving parents a copy of the How to Book an Emergency Department Clinic Appointment leaflet (no. 0977). Like burns, a wound does not need to be especially big to cause problems with infection. The written information sheet on Wound Closure (no. 673) should be given to parents.

Overgranulation of wounds is an infrequent, but potentially significant problem. The current recommended treatment for overgranulation is application of Hydrocortisone 1% ointment to the affected area twice daily, and GP follow-up. In addition, the use of Silver Nitrate sticks may be appropriate. If in any doubt, discuss with the ED senior on duty, or refer to the next appropriate ED clinic.
4.25 **WOUNDS**

Sutures can (and should), be removed by GP practice nurses.
Steristrips can be removed by parents or the child, (once the wound has healed!). Give specific instructions.
Glue doesn’t need removal, or follow-up.

Ref:
Resch K, Schilling C, Borchert BD, Klatzko M, Uden D.

(Updated by Dr H. Stewart, May 2020)
(Section 4.25 re-written by Dr R Dalton & Mr C FitzSimmons, Feb 2005)
4.26 TRAPPED FINGERS & AMPUTATED FINGER TIPS

A. BACKGROUND

Non-amputating injuries are often simple crushes or ‘trapped’ fingers. The simplest injury is a subungual haematoma or small collection of blood under the surface of the nail. Fractures are often associated with such injuries. An amputated tip usually occurs from a crushing injury, from a clean incised wound or from a de-gloving type injury.

B. EMERGENCY MANAGEMENT OF TRAPPED FINGERS

Trapped finger tips with partial avulsions of the nail or where the finger pulp appears ‘burst’ should not be sutured. Later swelling may cause significant tissue necrosis. If the nail is intact and a significant (>50%) collection of blood appears below the nail (a subungual haematoma) then this may warrant drainage by trephining with a trephining pen. The usual indication is severe throbbing pain.

For other injuries, consider the use of a digital nerve block to the finger to allow the following to occur:
- X-ray finger if clinical deformity or likely fracture.
- Clean gently, reposition nail and hold in place with Steristrips.
- Lateral strips may be necessary, but leave a space between strips.
- DO NOT PUT STRIPS ALL AROUND THE FINGER.
- Put on a non-adherent dressing. Mepitel is the current choice.
- Over this put a mitten bandage or finger dressing dependent on the age of the child.
- Check that tetanus cover is up to date.
- Review in ED clinic at 7 days.
- Prophylactic antibiotics are not needed if thorough cleaning of the wound is carried out.
- Compound fractures of the distal phalanx with heavily contaminated wounds, with significant tissue loss or devitalised tissues may warrant antibiotics. Minor grazes over a # phalanx, which are properly cleaned do not need prophylactic antibiotics.

C. FURTHER MANAGEMENT

At review in ED clinic:
- Warn the parent that the finger may look worse at the first dressing.
- Remove the dressings only, leaving the strips in position if satisfactory, redress with a non-adherent dressing as before.
- Follow up again as necessary after another 7-10 days. Then remove all the strips. Further dressings may not be necessary after this.

DO NOT DISCHARGE UNTIL YOU ARE SATISFIED THAT FUNCTION IS FULL.
D. EMERGENCY MANAGEMENT OF AMPUTATIONS OF FINGER TIPS

Terminal amputations of finger tips in young children do extremely well with conservative treatment only. Even if the terminal phalanx is visible (not fractured) it should be left alone. If a significant amount of bone is exposed, or fractured ends are visible, or the amputation is proximal to the nail bed, obtain senior advice as a referral to plastic surgery is likely to be necessary.

- X-ray.
- Clean gently using normal saline.
- Use a Mepitel dressing and mitten bandage or finger dressing as appropriate.
- Check tetanus immunisation (see section 3.43).
- If there is amputation through the bone, or the bone is significantly exposed, give antibiotics (Flucloxacillin for 5 days - if allergic, use clarithromycin).

E. FURTHER MANAGEMENT

- Leave alone for a week. Explain to the parents that it should do very well despite the initial appearance.
- On review, repeat the same dressing and review in another one to two weeks.
- There should be re-growth of the tip and nail and complete restoration of function with an excellent cosmetic result eventually, sometimes there may be permanent mild “beaking” or ridging of the nail (the nail curves over the tip of the finger if there has been significant tissue loss - look at the series of photographs in the ED dressings file). Occasionally there are problems with granulation tissue as part of the healing process. This can be treated with hydrocortisone cream 1%. If in doubt seek a senior ED opinion, who may advise on plastic surgery review.

F. REFERRAL / DEFINITIVE CARE

Refer the following finger injuries for plastics opinion at first presentation:
- significant amount of bone is exposed,
- fractured ends are visible,
- de-gloving injuries,
- amputation is proximal to the nail bed.

and at later presentation from the ED review clinic:
- suspected deep soft tissue infection or osteomyelitis

(Reviewed by Dr Helen Stewart, May 2020)
(Updated by Dr J Cumberland, June 2013)
4.27 BURNS

A. DEFINITION

Burns are thermal injuries associated with extremes of temperature, contact with chemicals or electricity. Severity of burn is determined by the temperature of the burning agent and the duration of the exposure. Simple erythema is not included in the calculation of the size of the burn area. Skin injuries caused by cold should be treated as per this guideline. True frostbite of the extremities should be referred to the plastics registrar on call. Friction burns should be managed as burns and assessed for size and depth etc.

B. BACKGROUND

Many burns presenting to this ED are appropriate to be managed without referral to the specialist Burns Unit or for admission to hospital. Major burns and / or smoke inhalation are rare. Burns can also be a presentation of non-accidental injury. Pay particular attention to cigarette burns or scalds in an unusual distribution e.g. in a glove / stocking distribution or involving hair straighteners, irons etc. For making a decision about ongoing management follow the algorithm in D.

The Burns UNIT at SCH is a High Dependency Unit (HDU) that is open 24/7 and gives advice on management, dressings, and clinic referrals/follow up, as well as for admissions, including those needing O₂, monitoring, IVI, nebulisers; ie HDU level care. Contact is via ext 60858, 60694 or via bleep 078. If a patient needs to attend /be admitted to the Burns Unit you also need to contact the plastic surgery SpR - available through SCH switchboard during working hours or via NGH switchboard out of hours. Burns CENTERS offer higher level of care – referral to them is through the Plastic Surgical Registrar and not directly from the ED.

C. EMERGENCY MANAGEMENT

- APLS approach. ABC. High flow O₂.
- Remember the potential risk to the airway. If in doubt, early intubation should be considered. If any indicators for airway burns –see below- contact the on call anaesthetist. Consider smoke inhalation / CO poisoning and check a blood gas for carboxy haemoglobin and acidosis. (See Below)
- Shock should be treated (20 ml per kg crystalloid) and then in addition calculate any fluid replacement requirements as below.
- Analgesia should be given, this should include cooling and covering the burn, but keep the child warm also. Be cautious using large burn shields with regard to hypothermia.
- Treat shock before giving IV morphine. Intranasal diamorphine can be very useful.
- Remember to check tetanus status. See section 3.43
D. ALGORITHM FOR REFERRAL OF ACUTE PRESENTATION

ED MANAGEMENT OF BURNS

All burns

Age< 6 months

Changing history
Hx not fitting inj
Delayed presentation
Atypical burn distribution
Cigarette burns

NO

NAI ?

Refer Burns Unit AND paediatrics

NO

Any burn to special areas.
significant chemical/radiation/
high voltage electrical burns

See Total Body Surface Area chart

Partial thickness and
=/> 5%
OR
Full thickness and > 1%

Partial - blisters,
painful, mottled, may... NOT
HEALING - any concerns, see
paragraph below

All other burns - Dress
Review ED 1 week

Yes

NO

ALL

Age< 6 months

Refer to Burns Unit
Bleep 078
Phone 60858/ 60694

Partial thickness and
=/> 5%
OR
Full thickness and > 1%

Discuss with plastics registrar. - Burns Unit as ward attender follow up
(initial referral at 48 hrs - ED has open access slots)

Yes

NO

NO

Age< 6 months

Refer to Burns Unit
Bleep 078
Phone 60858/ 60694

Age< 6 months

Refer to Burns Unit
Bleep 078
Phone 60858/ 60694

Partial thickness and
=/> 5%
OR
Full thickness and > 1%

Burns Unit +/- admit

Age< 6 months

Partial thickness and
=/> 5%
OR
Full thickness and > 1%

Burns Unit +/- admit

Partial - blisters,
painful, mottled, may blanch or not
Full - charred, white, leathery, absent pin
prick, absent capillary refill

Not
HEALING - any concerns, see
paragraph below

All other burns - Dress
Review ED 1 week

DEEPER?
INFECTED?

All burns

Partial thickness and
=/> 5%
OR
Full thickness and > 1%

Burns Unit +/- admit

Partial - blisters, painful, mottled, may blanch or not
Full - charred, white, leathery, absent pin prick, absent capillary refill

Not
HEALING - any concerns, see
paragraph below

All other burns - Dress
Review ED 1 week

DEEPER?
INFECTED?
4.27 BURNS

E. CLASSIFICATION AND ASSESSMENT OF BURNS
The severity of the injury is usually classified by its depth through the skin (see table below).

Classification and appearance:

<table>
<thead>
<tr>
<th>Depth</th>
<th>Appearance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Superficial</td>
<td>Erythema only does not need treatment other</td>
</tr>
<tr>
<td></td>
<td>than analgesia and cooling</td>
</tr>
<tr>
<td>Superficial partial</td>
<td>Thin walled blisters. Blanches.</td>
</tr>
<tr>
<td>thickness</td>
<td></td>
</tr>
<tr>
<td>Partial thickness</td>
<td>Mottled red and white or pink. May or may not</td>
</tr>
<tr>
<td></td>
<td>blanche</td>
</tr>
<tr>
<td>Full thickness</td>
<td>Charred or white. Absent capillary refill and</td>
</tr>
<tr>
<td></td>
<td>pinprick sensation.</td>
</tr>
</tbody>
</table>

Assessment
The assessment of a burn requires noting the depth of the burn, the area involved, any associated injuries and / or smoke inhalation. Beware that erythema seen shortly after injury may later disappear or go on to blister, therefore the initial assessment of burn area may considerably over- or under-estimate the true burn area. Erythema only is not counted as burn in the Body Surface Area calculation (BSA) as the epidermis is intact.

With larger burns, the size should be calculated using a burns chart, simple erythema is not included in this calculation.

F. BURNS CHARTS –

The burns chart indicates the correct area for the different regions of the body at different age. It is important to use age related burns charts as the relative body proportions change significantly with growth. (e.g. the head is a larger proportion of the surface area in babies than in adults). The ‘rule of nines’ does not apply. Age Related Burns Charts are available in resus for Baby, 2yr, 5yr, 10yr and 15yr old – use that which fits the size and age of the child best. As a rough guide the patient’s hand and fingers (with fingers adducted) approximates to 1% of the BSA.
4.27  BURNS

G. FURTHER MANAGEMENT

Burns of > 10 %
These need immediate resuscitation before transfer to the Burns Unit at SC(NHS)FT. The most common cause of death is smoke inhalation and therefore attention to the ABCs is essential.

IV Hartmans solution, solution should be given according to the modified Parkland Formula for children

% burn x weight (kg) x 3mls = volume of fluid (ml)

Half of this fluid should be given in the first 8 hours, and half over the next 16 hours.
Note: This is the fluid requirement for the first 24 hours, referring to the time from the burn, and not the time from arrival at the ED and is the resuscitation or replacement fluid
PLUS
IV 0.9% Saline in 5% Glucose (+Kcl) for maintenance fluid

Requirements calculated as standard maintenance requirements:

- 100ml/kg/24 hours up to 10kg bodyweight plus
- 50ml/kg/24 hours from 10-20kg bodyweight plus
- 20ml/kg/24 hours for each kg over 20kg bodyweight

This is necessary as children have low glycogen stores, which are soon depleted in a burn induced hypermetabolic state, leading to hypoglycaemia

Human Albumin Solution is no longer recommended.

In Burn patients there are massive compartment shifts of fluid, necessitating the aggressive fluid resuscitation detailed above, however, especially with large burns and therefore large amounts of fluid, there are concerns that overly aggressive resuscitation can exacerbate the fluid shift with detrimental consequences. In some cases the plastic surgical reg/consultant may decrease the speed of fluid administration while monitoring closely for adequate tissue perfusion.

Analgesia should be given as intravenous opiates in small increments diluted in 10 ml 0.9% Sodium Chloride. Opiates should not be given intramuscularly to these patients. Intranasal diamorphine can also be used.

Other procedures on extensive burns before transfer should include:
- Catheterisation in all children of any age (1ml / kg / hr is adequate urine flow). children with up to 20% TBSA can be left uncatheterised and will be assessed following admission to the Burns Centre
- Baseline investigations of FBC, U&E and Group & Save.
- Chest X ray and blood gases if smoke inhalation is a possibility.
- TPR and fluid charts started.
4.27 BURNS

Note that for transfers from other hospitals, for those units that refer PICU into Sheffield, burns care is co-ordinated from the Burns Unit at Sheffield Children Hospital. If enquiries are received in the ED from other units they should be directed to the Plastic Surgical Registrar on-call for Sheffield (Mon-Fri 0800-1600 via SCH on 0114 271 7000 and out of hours via Northern General Hospital on 0114 243 4343).

The SCH Burns Unit will accept all patients with burns up to 30% TBSA intubated or un-intubated.

Children with more than 30% TBSA burns will be referred to Manchester Burns Centre.

NAI should be considered in all children with burns and scalds and if concerns are raised should be referred to the Child Assessment Team / medical registrar as per protocol.

All children under the age of 2yrs MUST have a referral on Medway to the Paediatric Liaison Service even if no safeguarding issues are raised.

H. SMOKE INHALATION MANAGEMENT

Smoke inhalation may cause mucosal oedema in the upper respiratory tract, which can rapidly occlude the airway.

Suspect the possibility of an inhalation injury if any of the following features are present:
- Exposure to smoke in a confined space.
- Confusion or decreased conscious level.
- Oropharyngeal burns.
- Hoarseness or loss of voice.
- Soot in the nostril or sputum.
- Singed nostrils.
- Wheeze or stridor.
- Dysphagia or drooling.

Upper airway burns require early intubation before swelling renders this difficult or impossible. Obtain urgent anaesthetic assistance and senior ED opinion.

Check the Arterial / capillary Blood Gas – including the carboxyhaemoglobin level. Carboxyhaemoglobin levels can vary between rural and urban areas but are generally between 0.5% -5%. A level of >5% should trigger a discussion with a senior. Give 100% oxygen from the outset. There is a COHb non-invasive sats monitor which can be used as a baseline screen for elevated CO levels but is not reliable to definitively rule out CO poisoning, and does not replace the blood gas.

Even asymptomatic patients with any of the above features should be admitted for observation. Onset of respiratory distress can be delayed for several hours.

I. ELECTRICAL BURNS

All patients with electrical burns should be discussed with ED seniors. They may require a 12 lead ECG and usually urinalysis. Significant electrical burns can cause rhabdomyolysis and warrant PICU and Burns Unit involvement. If urinalysis is normal and there is no significant soft tissue damage, the child can be discharged. Urinalysis in the presence of myoglobin should read positive for blood. Discuss any significant electrical burns with plastics registrar.
4.27 BURNS

J. CHEMICAL BURNS
Specific “Toxbase” advice should be sought. Any dry powders should be brushed off first, after which the area should be washed with copious amounts of water. Certain caustic chemicals may react with water and ‘deepen’ the burn if this is not done. If there is any doubt, involve the senior doctor on duty. Discuss with Plastics registrar if overt (not erythema)

K. ED CLINIC MANAGEMENT
Following the ED algorithm for burns management, all other burns seen in the ED that do not fall into the above categories are suitable to be dressed with Mepitel initially and reviewed initially weekly in the ED clinic. In practice the only burns seen in ED clinic are <2% partial thickness burns which are not in a special area.

L. CONSIDER REFERRAL TO THE BURNS UNIT FOR:
1. Any burn that is not healing within 2 weeks. Assess to ascertain if this is due to adverse factors e.g. infection, increased depth etc delaying healing, or simply within the appropriate healing of that particular wound. Note most burns would be expected to remain moist for at least the first week’s review– this should be differentiated from infection.
2. Infected burns
3. Burns which on clinic review are more extensive than first appreciated and are now >2% partial thickness or have full thickness areas.

M. REATTENDERS AND TOXIC SHOCK SYNDROME.
Any child with a burn who returns unwell with pyrexia, rash diarrhoea, vomiting should have Toxic Shock Syndrome considered. These children should all be discussed with an ED senior doctor and if there is any doubt should be referred.

If there is any uncertainty about the need for referral, please discuss with the Burns Unit via the bleep holder on 078 or ring 60858 or 60694.

Info leaflet available – No 143 – Burns and scalds

(Section 4.27 reviewed and updated by Dr E Snelson, May 2020)
(Rewritten by Mr C FitzSimmons in conjunction with the Burns Unit SCH, March 2010)
4.28 MAMMALIAN BITE - WOUND CARE

A. DEFINITION
A bite by a human or other mammal, which by definition carries an increased risk for potential infection due to the nature of organisms often, carried on the teeth.

B. BACTERIAL INFECTION RISK

<table>
<thead>
<tr>
<th>Risk Level</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very Low Risk</td>
<td>Wounds presenting &gt;72hrs, which are uninfected, and wounds not involving the dermis are considered to have a very low risk of infection.</td>
</tr>
<tr>
<td>Low Risk</td>
<td>Facial and scalp wounds.</td>
</tr>
<tr>
<td>High Risk</td>
<td>Hand wounds, Puncture wounds (don’t forget ‘fight bites’, host factors, e.g. neutropenic, asplenic patients, diabetes, immunosupressed.)</td>
</tr>
</tbody>
</table>

All other wounds are considered intermediate risk.

C. EMERGENCY MANAGEMENT
In case of any doubt, discussion with ED senior doctor is suggested.
X-ray if bone or joint involvement or suspicion of tooth fragments.

A. Tetanus status checked and administered if necessary.
B. LA if necessary to allow adequate wound toilet.
C. Irrigation (>250mls) and thorough cleaning.
D. Debridement of devitalised tissue.
E. Facial wounds are usually closed on presentation under antibiotic cover. Consider referral to Max-Fax or Plastics.
F. Other wounds should generally be left open to reduce the risk of infection and covered if necessary with a dressing. They can either be allowed to heal by secondary intention, or be closed by delayed primary suture, if clean on review. ‘Loose’ steristrips or sutures should not be used as they give the worst of both worlds – a poor cosmetic result and a high risk of infection.

All wounds require:
- Elevation.
- Consider follow up – see ED clinic guideline

All wounds except those with low risk of infection require:
- Consider prophylactic antibiotics, see below
- Consider follow up – see ED clinic guideline
4.28 MAMMALIAN BITE - WOUND CARE

D. ANTIBIOTIC TREATMENT

In addition to high risk wounds (above), antibiotic prophylaxis should also be considered for patients who sustain bites from humans or cats, bites to the hand or where bone or joint penetration is possible, when a facial bite has been closed, when the genital area is involved or in complicated injuries.

<table>
<thead>
<tr>
<th>Wound</th>
<th>First line antibacterial</th>
<th>Second line antibacterial</th>
<th>Route &amp; Duration</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Co-trimoxazole</td>
<td>Prophylaxis for 3 days.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Human/animal bite (established infection)</td>
<td>Co-amoxiclav</td>
<td>If penicillin allergic:</td>
<td>Oral (or I.V. if oral inappropriate)</td>
<td>Treat for 10 to 14 days. Cleanse wound. Consider tetanus toxoid. Assess hepatitis B and rabies risk.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Co-trimoxazole PLUS</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ciprofloxacin</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

NB Wounds that expose bones, tendon sheath / tendons or nerves must be referred to Plastics / Orthopaedics.

Cat-scratch disease is caused by Bartonella henselae and may follow a bite or scratch from a cat or dog. Cat-scratch disease presents with a primary erythematous papule 3–14 days after the injury, followed by lymphadenopathy and symptoms including fever, malaise, headache, and poor appetite. Lymph glands near the scratch become swollen (this may take up to 50 days to become evident), and swelling may persist for several months. Cat-scratch disease is usually mild and self limiting.

E. TETANUS STATUS. Bites, like other wounds are only considered HIGH RISK for tetanus if heavily contaminated with manure or farm dirt, or with extensive devitalised tissue, deep penetrating or puncture wounds, or clearly infected already. Please see ED guideline – Immunisations / immunisation schedule for tetanus advice.

F. HEPATITIS B RISK

Note: Human bites, not caused by a family member, carry an unknown risk of Hepatitis B transmission. (If caused by a family member, presumably carer will know of any transmission risk). You should have a low threshold for offering an accelerated course of Hepatitis B vaccine. (See ED guideline - needlestick injuries – for this info).

Note: Rabies – if animal bite happened abroad (in an endemic area) or bitten by a bat in the UK seek advice re: rabies risk (public health via RHH switch). Rabies incubation can be up to one year.

Refs:
http://cks.nice.org.uk/bites-human-and-animal#!/references/A27045
4.28 MAMMALIAN BITE - WOUND CARE


(Section 4.28 reviewed by Dr E Snelson, May 2020)

(Written by Mr S Ramlakhan & Mr B Tesfayohannes, Aug 2003)
4.29 NEEDLESTICK INJURIES

SECTION ONE - COMMUNITY ACQUIRED
A. BACKGROUND
We sometimes receive telephone enquiries from parents saying that their child has found a discarded hypodermic needle and syringe and pricked themselves with it. The main blood borne viruses of concern are Hep B, Hep C and HIV.

B. ADVICE ON ATTENDANCE
During the day parents should be asked to bring their child to the Emergency Department. If they have the needle and syringe, they should bring it with them for us to dispose of it. They should be advised to take care when handling the needle and syringe. The needle and syringe can be disposed of in the Emergency Department; it does not need to be sent to Virology. Parents should be advised to encourage the wound to gently bleed, and to wash it with running water and soap if available. They should not scrub or suck the wound.

For telephone calls received after 17:00 hrs a full history of the incident and nature of the wound should be taken. If it is considered clinically appropriate, the caller can be told to bring the child the following morning rather than immediately. The caller should be advised to clean the area thoroughly. If the caller is worried they should be invited to attend the Emergency Department that same evening.

C. ACUTE AND FOLLOW-UP MANAGEMENT
The nature and site of any puncture wound should be noted and the wound thoroughly cleaned. (See section 4.25 - Wounds)
Check that the child is fully immunised against Tetanus. These are not tetanus prone wounds per se (See section 3.43)

Management is based on Public Health England guidance. Percutaneous exposure, i.e. needlestick or other contaminated sharp object injury is considered to be a significant exposure and therefore requires management according to the Hep B immunisation status of the person exposed, and the Hep B status of the source.

Any child born after 1st August 2017 should have received a full course of Hep B vaccine as part of the routine childhood immunisation schedule (3 doses at 8, 12 and 16 weeks), which is considered to give long-term satisfactory protection. However, the immunisation status should be clarified in all cases.

If possible, all children should have a blood sample taken for storage prior to any treatment. Vaccinated children should also have their immunity checked at this stage.

If possible, blood should also be taken from the source to confirm seropositivity.
4.29 NEEDLESTICK INJURIES

Vaccinated child

- If the child is fully vaccinated with a primary course of Hep B vaccination completed more than 1 year ago, and the Hep B status of the source is either unknown (most cases) or known to be HBsAg positive then the patient will need a booster dose of Hep B vaccine.
- If they are known to be a non-responder to the vaccine, they should also be given Hepatitis B Immunoglobulin (HBIG – see below) along with their booster vaccine, followed by a further dose of HBIG at 1 month.
- If the child is only partially vaccinated, and the Hep B status of the source is either unknown or known to be HBsAg positive, then the child will need to have a one-off dose of Hep B vaccine, and then to complete their vaccination course as planned.

Unvaccinated Child

This will include most children born before 1st August 2017, but immunisation status should be clarified.

- If the source is unknown, the child will need an accelerated course of Hep B vaccine (see below)
- If the source is known to be HBsAg positive they should be given HBIG in addition to an accelerated course of Hep B vaccine.

Accelerated Course of Hep B

1. Take a 5ml serum blood sample and send to virology for storage
2. Give the first dose of accelerated course of Hep B vaccine in ED
3. Inform the parent/guardian that the child needs a further two doses of vaccine, one at one month and one at two months, and a blood test at 6 months. This should all be sought from their own GP. Please give the parents the relevant information leaflet.
4. Write to the GP with details of the incident and request that they complete the accelerated course at one and two months, and follow this up with a blood test of 5ml serum (clotted) to be sent to Virology at 6 months, to check response to the vaccine. Pre-written letters to the GP are kept with the parent advice sheets in the ED.

Giving Hepatitis B Immunoglobulin (HBIG)

HBIG should ideally be given within 24 hours of injury, and should not be given more than 7 days after the incident. If requiring both, Hep B vaccine and HBIG should be given concurrently at different sites. HBIG is not stored in the Emergency Department. If the child attends after 17:00 hrs they should be asked to re-attend the following morning for the blood test, HBIG, and first dose of Hep B vaccine. Give Ametop cream to take home, (for the blood test site, not the vaccination site)

D. ADVICE AND REASSURANCE

It is difficult to quantify the incidence of Hepatitis B in drug abusers in Sheffield. However, it is fairly low, in part due to the strong advice and excellent uptake of vaccination in this group. Between 2013 and 2017 there were only 8 new positive cases of Hep B in people who inject drugs in Yorkshire and Humber. There is a risk of seroconversion after a needlestick but this is negated by the offered course of Engerix B.

In addition to the risks from Hepatitis B some parents may be aware of risks of Hepatitis C. Although the incidence of Hepatitis C in drug abusers in this Yorkshire is high (44%), the rate of seroconversion after inoculation from a known source is low ~1% - 3%, as HCV is a relatively fragile virus. There is no prophylaxis (vaccine or immunoglobulin) against Hepatitis C.

Some parents are extremely worried about HIV. They can be reassured that this risk is extremely small. The incidence of HIV in Sheffield is very low, <1% incidence in 2017. There were no new cases
**4.29 NEEDLESTICK INJURIES**

*in children.* The risk of transmission of HIV from hollow needle inoculation from a known positive source is ~0.1%.

Any family who would like further discussion and counselling can be referred to Dr Shackley in her OPD clinic.

If you have any other queries, Dr Thompson, Infection control Consultant, can be contacted on ext 17579 or by bleep 255 and is happy to help if patients have acute severe anxieties. Alternatively, Dr Alison Cope (Consultant Virologist ext 14925) can be contacted during the day via NGH switchboard, or the on-call Virologist at night via the NGH switchboard.

For the rare child who has a known exposure to HIV and needs prophylaxis contact the ID consultant of the week via switchboard. If they are not available contact the on call infectious diseases doctor at the RHH.

**SECTION TWO - OCCUPATIONAL NEEDLESTICK EXPOSURE IN STAFF**

Appropriate washing / first aid should be carried out as required - see above.

All blood and body fluid exposure incidents should be managed in accordance with the “Blood and body fluid exposure incident pack (March 2007)” which is available in hard copy on every ward and department (A4 booklet with white cover with pictures of blood splatters) and on the Intranet under the POLICIES section (Corporate).

Occupational Health (out of hours contact via switchboard) offer excellent support and risk assessment individuals as required and are able to offer prophylaxis (for which there is a tight window of opportunity for maximum protection) and index case testing with appropriate counselling where indicated.

**References:**
- [https://www.hse.gov.uk/healthservices/needlesticks/](https://www.hse.gov.uk/healthservices/needlesticks/)
- [https://www.nhs.uk/conditions/vaccinations/hepatitis-b-vaccine/](https://www.nhs.uk/conditions/vaccinations/hepatitis-b-vaccine/)

Section 4.29 Needlestick Injuries updated by Dr D O’Donnell June 2020)
(Updated by Dr S Gibbs, Mar 2016)
(Section 4.29 updated by Dr P Fenton & Dr J Cumberland Aug 2008)
4.30 FRACTURES OF THE FACIAL SKELETON

A. BACKGROUND
Facial fractures are relatively uncommon in children. They take significant force to occur and tend to be seen in falls from a height, RTAs and assaults. They also occur during sporting accidents. Beware - facial fractures have an associated risk of significant head injury / skull fracture and cervical spine injury due to the nature of the mechanism of injury.

B. EMERGENCY MANAGEMENT
Assessment of the patient must take priority over taking the history: CALL FOR HELP EARLY.
The priority in severe facial injuries is the airway.
- (i) Airway with C-spine control.
- (ii) Breathing.
- (iii) Haemorrhage control.
- (iv) Treat shock.

(i) **Airway**
Clear mouth and pharynx of blood, mucus and foreign bodies and keep clear with suction. Put the patient in the recovery position (IF no C-spine concerns) using an oral airway if necessary or head down trolley position with C-spine control. A tongue suture may be used to help pull the tongue forward if obstructing the airway.
A severe middle third facial fracture may be impacted, thus occluding the airway. Disimpact by inserting fingers behind the upper hard palate and pulling forward. Orotracheal intubation may be necessary with impacted fractures or severe haemorrhage. Nasotracheal intubation is contraindicated in suspected base of skull fractures and this would be a significant concern with severe facial injury. In any circumstances intubation will be a procedure for an experienced anaesthetist as this represents a seriously compromised airway. Tracheostomy is seldom necessary.

(ii) **Breathing**
High flow oxygen is essential. Assist ventilation as required. Assess for associated chest injuries or aspiration compromising ventilation.

(iii) **Haemorrhage control**
Direct pressure or clamping of visible bleeding points within superficial wounds is acceptable. The nasal cavity can be packed with ribbon gauze or use a Foley catheter balloon. Intubate if persistent bleeding.
Ligation of major vessels e.g. external carotid is very occasionally indicated, but otherwise do not blindly clamp structures in the region of a bleeding vessel.
Get Senior maxillo-facial help early.
4.30 FRACTURES OF THE FACIAL SKELETON

B. EMERGENCY MANAGEMENT (continued)

(iv) Shock
This is rare in facial injury alone. Look for other sources of bleeding.

(v) Disability
Assess for co-existing head injury
- Pupillary size, equality & reaction.
- GCS.
- (see ED guideline on head injuries)

C. FACIAL EXAMINATION:
(i) Extra-oral inspection
(ii) Extra-oral palpation
(iii) Intra-oral inspection
(iv) Intra-oral palpation

(i) Extra-oral inspection
Look for:
- Oedema.
- Ecchymosis.
- Soft tissue laceration.
- Bony deformity / facial asymmetry
- Nasal asymmetry / swelling / septal deviation or haematoma
- Haemorrhage.
- CSF leak.
- Subconjunctival haemorrhage and Hyphaema

(ii) Extra-oral palpation - always done from behind.
Check:
- The zygomatic bones and arches.
- Orbital rims.
- Nasal complex.
- Mandible and jaw movements.
- Examining for tenderness, step deformity, surgical emphysema, unnatural mobility and anaesthesia / paraesthesia of infra-orbital or inferior dental nerves.
- Eye movements - specifically check for diplopia and restricted upward gaze - this may indicate orbital floor fracture if present

(iii) Intra-oral inspection
Look for:
- Ecchymosis or haematomas of buccal and lingual sulci.
- Step deformities of occlusal plane or alveolar ridges.
- Derangement of the bite.
- Dental injuries
4.30 FRactures of the Facial Skeleton

C. FACIAL EXAMINATION (continued)
(iv) Intra-oral palpation
Check for:
- Tenderness.
- Bony irregularity.
- Mobility of teeth.
- Mobility of possible fracture sites.

D. INVESTIGATION – X-RAYS
- If examination reveals no signs of significant facial fracture, (malocclusion/crepitus/diplopia/facial paraesthesiae), x-rays are unlikely to be helpful and are rarely performed in the paediatric population.
- Discuss views required with ED senior or maxillo-facial SpR and / or radiographer.
- Commonest performed views are AP and 30° occipito-mental (OM) views. Lateral views have been shown to be of no additional benefit.
- Orthopantograms are available (in cooperative children) for mandibular / dental problems
- Other degrees of OM view are available however in complex / severe trauma CT is the imaging modality of choice.

E. MANAGEMENT
Most facial fractures require referral to the maxillo-facial team for:
- Further assessment.
- +/- operative intervention.
- Follow up.
Simple fractures such as isolated fractures of the zygoma do not need admission but discuss with the maxillo-facial team to arrange appropriate follow up.

Significant maxillo-facial injuries increase the risk of serious head injury. Consider the option of performing a CT head and face at the same time, if indicated.

If examination does not suggest a significant fracture, it is reasonable to discharge the patient. The patient must be told to return to the ED if they experience facial paraesthesiae, diplopia, problems biting, or facial swelling on nose blowing or sneezing! (compound #)
Even if the X-ray reveals no fracture, patients in whom there is a strong suspicion of a fracture (e.g. swelling, tenderness, asymmetry, paraesthesia) will need follow-up +/- referral. Discuss with ED senior doctor if so.

F. THE DISLOCATED MANDIBLE
Often occurs following an over-zealous yawn! Occasionally can be traumatic. The patient is in pain and is unable to close the jaw fully.
Reduce the dislocation :-
- Protect the thumbs using gauze swabs.
- Place both thumbs on the lower molar teeth.
- Push gently but firmly downwards and backwards while angling the point of the chin forwards and upwards.
- Alternatively, the extra-oral reduction technique can be used and is better tolerated.

(Section 4.30 updated by Dr S Ramlakhan, May 2020)
(Updated by Dr S Gibbs, Mar 2017)
[Info leaflet available – No. 158 – Nose injury]
4.31 DENTAL INJURIES

A. BACKGROUND
Dental injuries are relatively common. The pattern of injury is often dictated by the age of the child as deciduous teeth tend to be ‘looser’ and more easily displaced. The usual presentation is often a fall onto the face resulting in intruded or avulsed teeth (younger children), or a direct blow to the face e.g. in sports contact which may result in a fractured tooth (usually older children). The treatment of injuries to deciduous teeth is different to that of the permanent teeth, so take into account the age of the child and the history. (See dental charting below to help decide when permanent teeth erupt).

B. EMERGENCY MANAGEMENT
When faced with dental injuries, depending on the mechanism of injury, think about

- head injury
- facial injuries
- C-spine injury

Consider the airway as a priority, especially if bleeding is brisk or heavy. Treat ABCs. Avulsed or fractured teeth can pose a threat to the airway.

Emergency management of the dental injury may require the services of the maxillo-facial department, although many can be seen by their own or the emergency dentists.
4.31 DENTAL INJURIES

C. DENTAL CHARTING: Describe teeth as upper right (patient’s right), upper left (patient’s left), lower left or lower right e.g. upper right central permanent incisor, lower left second primary molar. Dentists usually annotate teeth within grids, so that the patient’s upper right teeth are represented as \[ \begin{array}{c} \text{incisal edge} \\ \text{maxillary (upper)} \\ \text{buccal surface} \\ \text{palatal surface} \\ \text{lingual surface} \\ \text{buccal surface} \\ \text{mandibular (lower)} \end{array} \]

...e.g. upper right central permanent incisor = \[ \begin{array}{c} \text{central incisor (A)} \\ -erupts 6 months \end{array} \]

D. ISOLATED DENTAL TRAUMA
Between 09:00 and 17:00 hrs contact the paediatric dentistry clinic at the Charles Clifford Dental Hospital for advice and referral of patients if necessary (ext 17882 / 3). An Emergency Dental service is available at Taptown House (patient can book via 111) Monday-Sunday between 2pm - 4.30pm and 5.30pm – 8pm. There is also an additional morning clinic on weekends from 9am - 1pm.

(i) Avulsion
Every attempt should be made to replace loose or avulsed permanent anterior teeth as this is a time critical condition (<1 hour extra-oral dry time for best prognosis). This is done by a combination of repositioning and splinting. Place the tooth in saline immediately (do not handle the root part of the
4.31 DENTAL INJURIES

Tooth. Administer local anaesthetic, irrigate the socket with saline and reposition any fractures in the socket wall. Then replant the tooth and check the orientation. Apply a flexible splint (if not comfortable doing this, call Maxillofacial on-call). Administer antibiotics (Amoxicillin or Clindamycin if Penicillin allergic). If the tooth has been lost, check that it was not inhaled. If this is suspected, send the patient for a chest X-ray. Advise follow-up with their own dentist ASAP (as the tooth will likely need root canal treatment).

NB. The treatment for deciduous incisors is different. These should not be replanted! The risk to the younger child of aspirating a tooth that falls out again far outweighs the risk of any cosmetic problems for the short period before the permanent tooth erupts.

(ii) Intrusion
Deciduous teeth
Can usually leave – the tooth should re-erupt within 3 - 4 weeks. However, if displaced into the permanent tooth, an extraction may be needed. Warn about the possibility of damage to the developing permanent successor. The patient should be referred to their own dentist or Taptonville House Dental.

Permanent teeth
Mature permanent teeth that have been intruded usually need to be surgically extruded, realigned and splinted. Patient should be referred to their own dentist or Taptonville House Dental.

(iii) Subluxed / mobile teeth
Subluxed teeth are ones that are displaced from their normal position but are still retained in their sockets. This is not time critical and follow-up with their own dentist is advised.

Deciduous teeth
Primary teeth are usually very mobile when subluxed and this will not improve even if they are repositioned. Extraction is the treatment if the tooth is very mobile or being traumatised by the occlusion, otherwise leave alone. Give supportive advice regarding a soft diet, analgesia and chlorhexidine mouthwash / sponges. Follow up with own dental practitioner or refer immediately to their own dentist or Taptonville House Dental in case of an extraction.

Permanent teeth
If very mobile or displaced, teeth may need to be splinted. If not too mobile or displaced, advise soft diet, chlorhexidine mouthwash / sponges and analgesia. Advise follow up with own dentist or refer immediately to their own dentist or Taptonville House Dental if very mobile or displaced.

NB: There is a maxillo-facial doctor on-call available for advice and help via the Hallamshire switchboard.

(iv) Fractured teeth
Uncomplicated fractures.
These are fractures confined to enamel or dentine, not exposing the pulp (nerve). Minimal fractures just involving enamel can be left, but advise follow up with own dental practitioner. More extensive fractures into dentine can be sensitive and should be covered as soon as possible with a dental material. Patient should be referred to their own dentist or Taptonville House Dental.
4.31 DENTAL INJURIES

Complicated fractures
These are fractures of the enamel and dentine that involve the tooth pulp. If the nerve is exposed immediate pulp coverage is indicated (otherwise the pulp may become contaminated and become non-vital). The patient should be referred to their own dentist or Taptonville House Dental,

(v) Dento-alveolar fracture
These are fractures of the alveolar bone (upper usually) which takes the contained teeth with it. These therefore appear displaced but are not avulsed and remain (often firmly) within their sockets. It tends to affect the upper 2 incisor teeth and for the reasons given above these are not avulsions, and again do not represent a time critical condition. Request advice from the on-call maxillo-facial team.

(Section 4.31 updated by Mr S Ramlakhan, Mr I Varley, Mr R Moh’d- Ali & Dr T Loganathan May 2020)
(Up-dated by Dr J Gilchrist and Dr H Rodd, Feb 2004)
4.32 DENTAL HAEMORRHAGE

A. BACKGROUND
Ask if there is any previous history of post-extraction bleeding, or other signs and symptoms which may suggest a bleeding or coagulation disorder. In a normal child, persistent haemorrhage from a tooth socket is uncommon.

B. EMERGENCY MANAGEMENT
A 4 x 4 gauze swab, rolled up, placed over the socket, and pressure applied by the patient biting hard on it continuously for 15 minutes will arrest the haemorrhage in the majority of cases. Don't allow the child to wash mouth out (it may dislodge blood clots formed). Advise to avoid hot drinks next 12hrs. If unsuccessful, call max-fax, attempt packing of the socket or suture the socket yourself if able (see below).

C. HISTORY
- Where and when were the extractions?
- Hyperaemic tissues (where infection is present) predispose to haemorrhage.
- Method of anaesthesia used.
- Number of teeth removed and whether deciduous or permanent.
- If bleeding has ever stopped.
- If the patient has been rinsing excessively.
- If the patient has been restless and crying.
- Methods already tried.

D. EXAMINATION
General
Assess for the pallor of excessive blood loss.
Check: Pulse, Respiratory rate, CRT and BP

Intra-oral
Clean bleeding site with small swab. Then note:
- Number of sockets bleeding.
- Any soft tissue damage.
- Any unsupported tissue moved by cheek or tongue.
- Any haematoma spreading into adjacent soft tissue; this may be the first manifestation of a bleeding disorder.
- If the socket has already been sutured.
4.32 DENTAL HAEMORRHAGE

E. FURTHER MANAGEMENT
This will usually be carried out by the maxillo-facial team:
- Apply Lignocaine gel on pledget of cotton wool on both sides of socket.
- Inject 0.5ml Prilocaine with Felypressin under lax mucosa on either side of socket. 
- Place one or two sutures across the socket, using 3/0 ethilon or vicryl on a curved needle. (Absorbable sutures will not need to be removed at a later date so may be preferable)
- Apply pressure with gauze swab again for 15 minutes.
- If no fresh bleeding after a further 15 minutes, then patient can be discharged.

If the above does not control bleeding, and bleeding is from more than one socket, then a systemic cause should be suspected.

F. REFERRAL
The following two conditions may warrant referral, the first to the maxillo-facial team and the second to the paediatricians.

RECURRENT HAEMORRHAGE
Usually occurs a few days after extractions. Often due to an infected socket.
Treat as above but if haemorrhage uncontrollable refer to the maxillo-facial team.

SPONTANEOUS HAEMORRHAGE
May be initial manifestation of a systemic disorder.

(Section 4.32 reviewed by Dr S Ramlakhan, May 2020)
(Reviewed by Dr C FitzSimmons, May 2015)
4.33 DENTAL INFECTIONS & ACUTE INFECTIONS OF THE FACE

A. BACKGROUND
Infections can be from the tooth itself or arise from the soft tissues of the face de novo. The majority of acute facial swellings are due to dental abscess - infection spreading from a non-vital tooth, which has a necrotic pulp (secondary to dental caries, trauma, or a recent deep filling). Sometimes an acute infection can occur around an erupting tooth (usually a wisdom tooth).

B. EMERGENCY MANAGEMENT
Treat ABCs. If the airway is compromised then treat accordingly and give high flow oxygen. Call ED, anaesthetic and maxillo-facial seniors. Consider the need for analgesia and anti-pyretics.

C. DIAGNOSIS / PRESENTATION
Toothache is the usual presentation. Occasionally it is only a unilateral swelling to the face that raises concerns and prompts an attendance. Thorough examination (including intra-orally) will reveal the likely source.

Remember that infection can track as follows, and examine accordingly:
Maxillary teeth - spread into facial soft tissues (infraorbitally)
   - intraoral swelling may be seen in the buccal sulcus
Mandibular teeth - spread submandibularly, and around angle of mandible
   - intraoral swelling may be seen buccally or lingually

D. DIFFERENTIAL DIAGNOSES
Skin lesions:
Usually a small portal of entry at alae nasi or angle of mouth. Abscess or cellulitis may ensue. Consider whether there is an infected dermoid cyst present (common in these positions.)
Other aetiologies:
Parotid or submandibular salivary glands may cause facial swelling due to viral or bacterial infection. Facial swellings may also arise from infected lymph nodes - usually involving the submandibular region.

E. EXAMINATION
- Assess ABC. The priority is the airway.
- Is the airway in danger?
- Can the mouth be opened, and by how much?
- Are the tissues at base of tongue and floor of mouth swollen?
- Is the tongue elevated or fixed?
4.33 DENTAL INFECTIONS & ACUTE INFECTIONS OF THE FACE

LUDWIGS ANGINA
Is a rare but potentially life threatening infection of the tissues of the floor of the mouth secondary to dental infections.
Presentation is with neck swelling, pain, FEVER, raised tongue, hard swelling of the submandibular and sublingular spaces, DYSPHAGIA (including own saliva) +/- STRIDOR
Inform senior ED, maxfax +/- anaesthetist. Patient will need airway monitoring/management, IV AB’s and I+D.

F. FURTHER MANAGEMENT / REFERRAL
- Call maxillo-facial team. Serious acute dental infection is one of the few indications for immediate intervention and removal of the offending tooth.
- If the airway is in danger, or the patient is pyrexial >38.5°C then the child should be admitted.
- External drainage may be necessary.
- Simple infections or abscess requires treatment with oral amoxicillin for 5 days (metronidazole if penicillin allergic) and referral to the patient’s own dental practitioner for review/later tooth extraction.

(Section 4.33 reviewed by Dr S Ramlakhan, May 2020)
(Reviewed by Mr C FitzSimmons, May 2015)
(Reviewed & up-dated by Dr J Gilchrist and Dr H Rodd, Feb 2004)
4.34 DENTAL CARE - EMERGENCY ACCESS

Children who present with dental problems (who can be safely discharged), can be managed in the following ways:

- Those who already have a locally registered dentist are advised to contact their own dentist as soon as possible. They may agree to provide acute care, but are not obliged to.

- Those who do not have a locally registered dentist or cannot get access as above should ring 111

True dental emergencies (only) should be referred to the on-call maxillo-facial team out of hours (via STH Switchboard) or to the specialist Paediatric Dental Service at Charles Clifford Dental Hospital during 9-5 hours, Mon-Fri (ext 17882/3)

(See Dental/MaxFax Referral Poster)

Updated by Mr S Ramlakhan, Dr T Loganathan, Mr I Varley & Mr R Moh’d-Ali, May 2020
(Reviewed by Mr C FitzSimmons, May 2015)
(Information provided by Dr J Gilchrist, Aug 2004)
5. SURGICAL PROBLEMS

5.1 Neonatal surgical problems
5.2 Abdominal pain
5.3 Vomiting in babies
5.4 Management of Gastrostomy & Jejunostomy tubes
5.5 Inguino-scrotal problems
5.6 Penile inflammation
5.7 Swallowed foreign bodies (FB)
5.8 ENT problems
5.9 Lumps in the neck – management of
5.10 Eye Problems
5.11 Gastrointestinal bleeding
5.12 Emergency contraception (EC)
5.13 Gynaecological problems
5.14 Pregnancy and related problems
5.15 Female Genital Mutilation (FGM)
SURGICAL PROBLEMS

5.1 NEONATAL SURGICAL PROBLEMS

A. UMBILICAL HERNIA
Herniation through the central portion of the umbilicus. The size is measured by feeling the defect underlying the umbilicus, not the size of the protuberant skin. Generally asymptomatic they rarely require treatment. Most (95%) resolve spontaneously before 5 years of age, with 90% closing before 3 years of age. If parents want surgical opinion, advise GP follow-up for further discussion.

B. PYLORIC STENOSIS
Narrowing of the pylorus due to muscular hypertrophy. The first symptoms begin during the second to third week of life when babies begin with “spitting up” which develops into projectile vomiting. (Caution – many parents use the term ‘projectile’ for what we would consider a normal forceful vomit – establish what the parent means.) The vomiting occurs after feeding, is not usually bile stained and the baby is typically hungry for a feed soon afterwards. A mass can often be felt in the right upper quadrant following a test feed, but this requires some experience and ultrasound is the definitive test. A history of projectile vomiting or a typical history of vomiting which is worsening over a few days should be sufficient to refer for surgical review. Definitive treatment of this condition is a pyloromyotomy procedure.

C. INTUSSUSCEPTION
This is telescoping of one section of the intestine into another. Half of all cases occur in children under 1 year of age, with males being three times more likely to be affected than females. Prolonged intussusception can lead to bowel necrosis and perforation. The child usually presents between the ages of 6 months and 4 years with sudden onset of acute abdominal pain which may be accompanied by episodes of pallor. Crying and drawing up of the knees to the chest is common. The pain may be intermittent with normal behaviour between episodes. Vomiting is usual and the child may pass one normal brown stool. As the condition progresses, vomiting increases and the child becomes listless. Stools may change to red colour with the consistency of jelly due to stool mixed with blood and mucus – this is a late sign. A sausage shaped mass may be palpable to the right side of the abdomen.

The diagnosis may be confirmed by air or barium enema, which may also be curative, by reducing the intussusception. More prolonged case may require surgery because of the risk of perforating an ischaemic or necrosed bowel.

Refer to the surgeons early in all suspected cases.
D. HYPOSPADIAS
A birth defect in boys caused by opening of the urethra on the shaft of the penis rather than on the tip. The penis may be bent on erection due to the presence of chordee. The foreskin is hooded due to failure of correct fusion. Refer to surgical out-patients for assessment. **Warn the parents the child is NOT to be circumcised in the meantime** (the foreskin tissue is used in the reconstruction). Surgical correction usually takes place between the ages of 2 and 4 years.

E. ATRESIAS /MALROTATION
This is usually picked up early on the maternity unit but given the increased number of home births and very early discharges we may see more present to the ED. They present in similar fashion – vomiting- often bilious, poor feeding, irritability/ unsettled, may have had bowel motion but that will reduce, abdominal distension, failure to thrive. **ALL NEONATES WITH BILIOUS VOMITING SHOULD BE SEEN BY SURGEONS.**

F. HERNIAS / HYDROCOELES
See section 5.5

(Section 5.1 updated by Dr E Snelson, March 2018)
(Written by Mr D Burke, Feb 2006)
5.2 ABDOMINAL PAIN

A. BACKGROUND
Abdominal pain is a frequent and often difficult to assess presentation to the Emergency Department. It is one of the few medical (as opposed to traumatic) conditions that presents with severe pain and is often very emotive for both patient and parents. As such it may be difficult to get an accurate history and a satisfactory examination especially at first consultation.

B. DIFFERENTIAL DIAGNOSIS
While constipation, non-specific abdominal pain and mesenteric adenitis may be the most common diagnoses, the less common causes (e.g. appendicitis, intussusception) have important consequences if missed. It is therefore important to come to a conclusion and give good advice about returning before discharging the patient. Many conditions including tonsillitis, pneumonia, urine infections, flu, glandular fever can all cause abdominal pain. IF IN DOUBT, GIVE ANALGESIA AND RE-EXAMINE AFTER 1 - 2 HOURS AND SEEK ADVICE FROM A SENIOR ED DOCTOR.
If surgical causes and acute viral infection have been ruled out, constipation becomes a strong possibility and it may be difficult to get a classic history from a child. Revisit this possibility after other causes of abdominal pain are ruled out in such cases. (see section 3.36) Note that abdominal X-ray is not needed a clinical diagnosis of constipation has been made.

C. MANAGEMENT

History
- Take an accurate history - including any recent drugs / possible ingestions.
- Take particularly seriously a history of abdominal pain with vomiting. Remember that vomiting and diarrhoea in a young child may be an intussusception or appendicitis.
- Take detailed bowel habit history. 'Normal' is a very poor descriptor of stool – ask re; size, frequency, consistency, pain on passing, straining, soiling, withholding behaviour.

Examination
- Watch how the child walks from the waiting room and moves around the couch and palpate the abdomen– no need for a formal rebound test to diagnose peritonitis.
- First rule of abdominal pain in boys ALWAYS examine the testicles PROPERLY (not just a glance) however old or shy the patient or the doctor is. Missing torsion by not examining genitalia is indefensible and they often present with abdominal, not testicular pain.
- Even in girls it may be appropriate to examine the genitalia. In young children worms, labial fusion, vulvovaginitis or NAI for example, may present as tummy ache.

Investigation
- Check the temperature and urine.
- Remember to do a sickle test in appropriate racial groups.

NB Finally, once again, always examine the testicles and hernial orifices!
5.2 ABDOMINAL PAIN

D. REFERRAL

Junior staff should have a LOW threshold for discussing these children with an ED senior doctor before discharging them. You should discuss your opinions with the patients / parents who MUST be advised to return if the pain persists or if new symptoms occur.

(Up-dated by Dr E Snelson, March 2018)
5.3 VOMITING IN BABIES

A. BACKGROUND

Vomiting in babies is a common complaint but significant pathology is rare. However, causes are multiple and all need to be considered and where possible, excluded. Posseting is distinct from vomiting. It is the repeated regurgitation of milk into the mouth after feeding and usually resolves during the first six months of life.

B. EMERGENCY MANAGEMENT

Airway.
Breathing.
Circulation including fluid resuscitation.
Disability – look for signs of raised intracranial pressure, don't forget the glucose

Refer as appropriate based on the history and clinical findings.

C. DIFFERENTIAL DIAGNOSIS

Common

- Feeding technique / volume problems (over-feeding)
- Gastro-oesophageal reflux (diagnosis of exclusion)
- Sepsis / meningitis
- UTI / Bronchiolitis/ gastro-enteritis
- Non-IgE Cow's milk protein allergy

Surgical and other causes not to be missed

- Pyloric stenosis.
- Intussusception.
- Midgut volvulus.
- Obstruction e.g. strangulated hernia
- Raised intra-cranial pressure e.g. head injury / NAI
- Other Medical - Metabolic (e.g. DKA, IBEM)
5.3 VOMITING IN BABIES

D. HISTORY AND EXAMINATION

Take a thorough general and feeding history (type of milk, frequency and volume of feeds, calculate feeds in ml/kg/day, behaviour during and between feeds, whether water/non-milk feeds are given). It is important to weigh the baby and plot on centile chart and if possible review the red book for previous weigh gain.

Examine thoroughly, looking to exclude surgical causes where possible (bilious/projectile vomiting, abdominal distension and/or masses, PR blood). Remember to check the testes and the hernial orifices. All bile stained vomiting has a surgical cause until proven otherwise. The age of the baby may guide you as to other possible surgical causes. Think of the following:

6 days - Midgut volvulus (bile stained vomiting, shock, abdominal distension and tenderness, rectal bleeding).

6 weeks - Pyloric stenosis (projectile vomiting (non-bilious), failure to thrive, and weight loss, hungry baby).

6 months – 4 yrs - Intussusception (colic, vomiting, abdominal mass, “redcurrant jelly” PR a late sign).

E. MANAGEMENT

If surgical conditions are found or suspected refer immediately to the surgical on call team. However, the majority will have no suspected surgical cause. If there is no clear surgical diagnosis and they need further investigation / inpatient management / observation, refer to the medical team. If well and thriving (and parents happy) the remainder can be discharged with appropriate advice and GP follow up.

I) FEEDING VOLUME & TECHNIQUE

Up to weaning age, bottle fed babies should take feed volumes in the region of 120-150ml/kg per day of milk. Many babies present with vomiting due to being given excess volume but this diagnosis should only be made in a well-baby, who is gaining weight normally, and clearly the appropriate history. Consuming air on swallowing, adverse positioning during feeding and insufficient winding may also precipitate regurgitation. Changing brand of formula or bottle is not helpful.

II) GASTRO-OESOPHAGEAL REFLUX

As stated above, this is a diagnosis of exclusion. Be entirely sure that the baby is well and gaining weight. Make sure not overfed, advise to elevate head of cot, keep child upright 15-20mins post-feeds, before starting any medications. Plot growth charts. Refer back to GP for ongoing review. Severe cases should be followed up in medical outpatients. Failure to thrive warrants immediate medical referral. NICE recommends that first line treatment for bottle fed babies is a thickener and for breast fed babies infant gaviscon can be used first line. Second line treatment is less effective and the need for further treatment often warrants a review of the diagnosis and a referral to paediatric outpatients.

(Section 5.3 reviewed and updated by Dr E Snelson, March 2018)
(Guideline Written by Dr S Ireland and Mr C Fitzsimmons, Feb 2005)
5.4 MANAGEMENT OF GASTROSTOMY AND JEJUNOSTOMY TUBES

A. BACKGROUND

A number of SCH patients are fed via in-dwelling gastrostomy or jejunostomy tubes. These patients are under the care of either the gastroenterology or surgical teams.

The most common reason for presentation to ED is a dislodged tube which requires replacement.

NB A Gastrostomy/Jejunostomy site with no tube in situ can start to heal closed within a few minutes.

In-patient notes should be requested early to identify the child’s medical problems and the responsible in-patient team.

B. DEFINITIONS

The devices used include:

- NG (naso-gastric tubes)
- NJ (naso-jejunostomy tubes)
- PEG (percutaneous endoscopic gastrostomy) which include Mic-key and mini buttons.
- PEJ (percutaneous endoscopic jejunostomy).

PEG / PEJ buttons use an extension set which attach to the top opening on the button to allow feeding.

C. PEG BUTTONS

In the event that a child’s Gastrostomy button falls out:

1) If the parents/carers are trained and confident to replace the button with a spare they will do so at home. If parents/carers are not happy to replace gastrostomy button they are advised to put a naso-gastric tube (ideally the same French size as the gastrostomy button or minimum size 12fr) 1.5-2cm into gastrostomy site, tape down securely and bring the child to ED at Sheffield Children’s Hospital. They are also advised to bring a spare gastrostomy button and extension set to ED if possible.

2) In ED some of the nursing or medical staff are able to replace the gastrostomy button. If not follow directions below.

3) In ED if managing Dr/Nurse not able to replace gastrostomy button then to ensure a nasogastric tube has been inserted (as above) and secured into gastrostomy site as above to
5.4 MANAGEMENT OF GASTROSTOMY AND JEJUNOSTOMY TUBES

keep the site open (this is ONLY to be used to keep the site open and is NOT to be used for medications or feed or flush).

4) If ED team require further advice or assistance to contact the Gastro team 9am-5pm, Monday to Friday (if inserted by the Gastro team) or the surgical team out of hours (or if they inserted the gastrostomy).

5) Once the gastrostomy button has been replaced and is flushing and working well, if both the Dr and parents happy then the child can go home and parents to contact their community nurse to let them know what size and type button is now in situ.

D. PEJ BUTTONS

In the event that a child’s jejunostomy button falls out:

1) Parent/carers to gently insert a nasogastric tube (ideally the same French size as the gastrostomy button or minimum size 12fr) 1.5-2cm into jejunostomy site, tape it down securely and bring the child to ED at Sheffield Children’s Hospital. To bring spare jejunostomy button and extension set to ED with the child if possible.

2) In ED Dr/nurse to ensure a nasogastric tube has been inserted and secured into jejunostomy site as above to keep the site open (this is ONLY to be used to keep the site open and is NOT to be used for medications or feed).

3) ED team to contact radiologist to discuss re-inserting jejunostomy button under fluoroscopy.

4) If ED team require further advice or assistance to contact the Gastro team 9am-5pm, Monday to Friday (if inserted by the Gastro team) or the surgical team out of hours (or if they inserted the jejunostomy).

5) Once the jejunostomy button has been replaced and is flushing and working well, if the Dr and parents happy then the child can go home and parents to contact their community nurse to let them know what size and type button is now in situ.

Note: Parents are asked to bring their spare device. If they don’t bring it or if surgeons / gastro team require a different device or introducer then there is a supply in theatre.

E. NG / NJ TUBES

A number of patients are fed via an in-dwelling NG or NJ tube.

NG tubes can be replaced by ED nursing staff.

NJ tubes need to be replaced by the radiologist under fluoroscopy – ED team to contact radiology directly.
5.4 MANAGEMENT OF GASTROSTOMY AND JEJUNOSTOMY TUBES

F. FLUID MANAGEMENT

If there is a delay in re-insertion of the child’s feeding device then a decision will need to be made as to whether the child needs to have an NG tube sited for feeding/fluids or IV fluids in place.

This is an individual decision related to the frequency of fluids / feeds and whether the child is suitable to be fed via a naso-gastric tube. Review in-patient notes and discuss with the gastro or surgical teams.

(Section 5.4 updated by Dr E Snelson, March 2018)
(Section 5.4 written by Dr S Gibbs and Rhona Hubbard Sept 2014)
5.5 INGUINO-SCROTAL PROBLEMS

A. BACKGROUND
Scrotum or groin swellings are not uncommon in babies and young children - occurring in 2-3% of the population. They may be asymptomatic, or may cause abdominal pain and vomiting. (See section 5.2 & 5.3)

B. DIFFERENTIAL DIAGNOSIS
- Inguinal hernia.
- Hydrocoele.
- Testicular torsion.
- Torsion of a testicular appendage.
- Epididymo-orchitis.
- Other conditions such as femoral hernia, inguinal abscess and testicular tumours.

C. HERNIAE & HYDROCOELES

A hernia is a sac containing small bowel or other abdominal structure, e.g. omentum.

A hydrocoele contains fluid and usually surrounds the testis but can be on the cord (round ligament on girls). Virtually all hydrocoeles in the first year of life disappear spontaneously. Hydrocoeles often increase in size after prolonged crying secondary to raised intra-abdominal pressure pushing fluid into scrotum. Parents then think the baby is crying because of the swollen scrotum. Will transilluminate brightly. (However note that in babies, hernias may also transilluminate)

At around the eighth week of intrauterine development an elongation of peritoneum known as the processus vaginalis develops and passes through the layers of developing abdominal wall down to the scrotum. The testis will follow this course but the processus vaginalis remains patent at birth in 90% of children. Failure of this processus to close, results in the potential for a hernia or hydrocoele to develop.

Emergency Management of Hernias

Hernias may be reducible, in which case they present as intermittent swellings, often appearing when the baby cries. Give baby/child analgesia, or a bottle, to relax abdominal wall musculature and attempt to reduce a soft hernia. They may become irreducible in which case the lump is hard. These may become painful and skin colour changes may be seen. Do not attempt to forcibly reduce these. An incarcerated hernia is a surgical emergency, as infarction of the testis or bowel may occur. The potential for this is highest in the first year of life.
Referral

An incarcerated or irreducible hernia requires urgent surgical referral to the on-call team. Children under 6 months with reducible inguinal hernias should be referred to urgent surgical out-patients. Older children (>6 month old) can be referred by their GP to surgical out-patients. Hydrocoeles - If still present at 12-18 months are usually operated on. Refer back to GP for review at this age.

D. TESTICULAR TORSION

i) Definition
The spermatic cord twists leading to compromise of the blood supply to the testes. If not reversed quickly (within 6 hours from onset of symptoms in children), the testes will infarct and can lead to sub-fertility later in life. Commonest in the neonatal period and around puberty

ii) Emergency Management
Most of these patients present with a relatively sudden onset of severe pain, often abdominal, and a swollen red scrotum. Vomiting is often a prominent symptom.
Give adequate analgesia and consider an intravenous line for hydration.

iii) Referral
Urgent referral to the on-call surgical team is required.

E. TORSION OF APPENDIX TESTIS

i) Definition
More than 80% of males have a vestigial remnant on either the testis or epididymis. This may twist and cause pain that is less severe than torsion of the testis. In the age range 2 - 16 yrs this is more common than testicular torsion.

ii) Emergency management
Some of these patients may be managed with analgesia, others need surgical exploration, and especially if differentiation form testicular torsion is not possible.

iii) Referral
Urgent referral to the on-call surgical team is needed.

F. EPIDIDYMO-ORCHITIS

i) Definition
Bacterial infection of the epididymis and testis - about 10% of acute scrotal cases in boys. Unusual in paediatric age group but may be associated with UTI

ii) Background
This painful condition usually affects boys from pubertal age onwards. Bacterial infection tracking back from the urine causes acute inflammation leading to significant swelling of the scrotal skin with oedema. Occasionally there may be inflammation of the spermatic cord and an associated hydrocoele.

iii) Differential Diagnosis
The main differential diagnosis is testicular torsion. A similar appearance occurs with ‘idiopathic scrotal oedema’ but pain is minimal.

iv) Referral
Urgent referral to the on-call surgical team is needed to exclude torsion.

H. UNDESCENDED TESTES
This is often found as an incidental finding on examination of children presenting with other problems. If undescended testes are noted please ask the GP to refer the patient to Surgical OPD BEFORE THEY ARE 6 MONTHS OLD. Or refer urgently to Surgical OPD if older than that. Note that retractile testes
5.5 INGUINO-SCROTAL PROBLEMS

may be followed up in Primary Care. If the testis can be found in the inguinal canal and moved to the scrotum, ask the parent to make an appointment with the GP to monitor this.

(Reviewed by Dr E Snelson, March 2018)
(Re-written by Dr S Ireland & Mr A E Mackinnon, Feb 2005)
5.6 PENILE INFLAMMATION

(See also 5.1)

A. BACKGROUND

Penile problems presenting to the ED are not uncommon. The more common ones are briefly described below.

B. DIFFERENTIAL DIAGNOSIS

Physiological phimosis
Paraphimosis
Balanitis
Posthitis
BXO (balanitis xerotica obliterans)

C. PHIMOSIS

This term describes an inability to retract the foreskin. Physiological phimosis is NORMAL in early childhood - a significant proportion of boys aged up to 6 years still have a non-retractile foreskin (prepuce). It is an important diagnosis as no treatment is required (unless there are complications such as those below) and the parents can be reassured as this will typically resolve before adolescence. Phimosis continuing into adolescence will normally be managed in general practice with mild steroid creams, or later in the outpatient surgical clinic. Ballooning of the foreskin during micturition is usual in the presence of phimosis and is no cause for alarm.

D. PARAPHIMOSIS

This is entrapment of the foreskin in the retracted position. If the retracted foreskin is somewhat tight, it may act as a tourniquet causing the glans penis to swell thus further blocking the inability to return the foreskin to its resting position. This painful condition requires urgent reduction to prevent vascular compromise to the glans. Cold compresses and lubricating jelly may allow reduction. May need GA for reduction. Discuss with ED senior (or surgical team if out-of-hours)

Caution: many cases of paraphimosis are iatrogenic in origin. Do not retract the foreskin of any child, but if necessary e.g. catheterising a patient, always be careful to return the foreskin to its resting position!
5.6 PENILE INFLAMMATION

(See also 5.1)

E. BALANITIS AND POSTHITIS

Balanitis:  
An inflammation of the glans penis  

Posthitis:  
An inflammation of the foreskin alone  

Balano-posthitis:  
Inflammation of both glans penis and foreskin

These conditions are common, can affect any age group, and usually have no long term complications. They are easily treated.

Aetiology – can be bacterial or fungal or of irritant/ non-infective aetiology. Bacteria and fungi like to grow in warm moist conditions. In boys who are not circumcised and especially those with a non-retractile foreskin, this area can be an ideal culture environment. NB It is NORMAL for the foreskin to be non-retractile up to about the age of 6 yrs. Patients/ parents should be advised NOT to try to force the foreskin back as this can cause trauma and scarring.

Infection here is more likely if

- there's been a recent course of antibiotics – fungal
- glucose is present in the urine
- the sensitive skin of the glans is already damaged or irritated - think new soap/shampoos etc
- there's been a build-up of sweat/urine/debris beneath the foreskin (hygiene here is important)
- your patient is adolescent and sexually active (think STI's)

Tests - Usually aren't necessary, but think about doing a BM if you may have an undiagnosed diabetic patient, or a dipstick urine if the patient is symptomatic of a UTI or is having urethral discharge.

Treatment - may be tailored directly to the likely specific cause if known (allergy/inflammation= steroid, fungus=antifungal, or bacteria=antibiotic). Usual practice in the ED is:

- Give hygiene advice - regular (e.g. twice each day whilst inflamed), gentle cleansing of the area with warm water +/- a mild soap.
- Avoid further irritants - preferably non-biological detergents when washing underwear, rinsed well, and avoid fabric softeners.
- Recommend simple analgesia
- Consider prescription of a combination cream - the local preference is Canestan HC.
- If there is significant discharge, or spreading cellulitis, an oral antibiotic should be considered
- If swelling and redness involves the whole penis refer for IV antibiotics.
- Advise follow-up with the general practitioner.
5.6 PENILE INFLAMMATION
(See also 5.1)

Prognosis - most cases settle within 5 days or so. Only if the patient is experiencing recurrent episodes is he likely to need a consultation with a paediatric surgeon.

F. BALANITIS XEROTICA OBLITERANS (BXO)

This condition of unknown aetiology is rare in PED but does present. It affects the glans, and occasionally the prepuce. Its cycle of inflammation followed by scarring leaves some white colouration within the skin, giving a characteristic mottled appearance to the glans. It can affect the meatus itself giving a reduction in the ability to void and pressure damage to the posterior urethra and proximally. It can also cause adherence of the foreskin to the glans. If found, it requires urgent surgical referral.

http://cks.nice.org.uk/balanitis#!scenariorecommendation

(Section 5.6 reviewed by Dr J Terris, May 2018)
(Written by Dr S Ireland, approved by Dr P Fenton [Consultant Microbiologist] & E Cawthorne [Clinical Governance Pharmacist], Feb 2005)
A. BACKGROUND

Ingested foreign bodies rarely cause problems. However when problems do occur it can be life threatening e.g. oesophageal rupture, aorto-oesophageal fistula, tracheo-oesophageal fistula. The following guidelines have been developed following multi-disciplinary consensus agreement based on current best-practice.

B. NON-HAZARDOUS, SWALLOWED FOREIGN BODIES
5.7 SWALLOWED FOREIGN BODIES (FB)

C. HAZARDOUS, SWALLOWED FOREIGN BODIES
Hazardous = sharp object, very large object, button battery, magnets or filled balloons

- **Hazardous foreign body**
  - AP CXR. If not seen or if symptoms dictate, consider AXR and/or lateral soft tissue XR of neck *
  - **Oesophagus**
    - Refer to paediatric surgeons (not ENT)
  - **Stomach**
    - Eat / drink. Repeat XR after 12 hours.

- Not moved
  - Urgent surgical referral
- Out of stomach
  - Discharge

* May do videofluoroscopy instead of x-ray (radiographer’s decision)

**Additional Points:**
- If history of coughing or choking, consider inhalation of foreign body (see sections 3.30 & 5.7).
- Do not send home a child who is coughing, choking, drooling or refusing to eat / drink after a suspected ingestion, without a senior review.
- If there is evidence of complications, films should be requested.
- A metal detector will pick up aluminium, e.g. can ring-pulls, which may not be seen on an X-ray.

D. INGESTION OF BUTTON BATTERIES

**Background**
These batteries can be dangerous if ingested as the seal on them is dissolved by gastric acid and the contents are toxic. There is also a danger of local erosion of the mucosa by current passing from the battery, if the battery is a fresh one. If possible obtain the battery details from the packet of another battery of the same sort and contact the poisons centre on #6119 with the details to find out the contents as they differ from battery to battery.

**Management**
All children who have swallowed a battery should have an X-ray of the chest (and abdomen if not visible on CXR) to locate the battery as soon as possible. **A metal detector is unreliable.**
5.7 SWALLOWED FOREIGN BODIES (FB)

- If the battery is in the oesophagus, or the patient is symptomatic, urgent referral to the Paediatric Surgeons is needed.
- If the battery is below the diaphragm AND the child asymptomatic, the child can eat and drink normally. Repeat the AXR after 12 hours, or as soon after this time in order to be done in daylight hours. The child can go home between films, providing the parents are instructed to bring the child in sooner if any abdominal symptoms develop.
- If the battery has not moved on the second X-ray, refer to the surgeons urgently. The battery may have become adherent to the gastric mucosa, leading to a high risk of erosion.
- If the battery has moved position below the diaphragm and is not fragmenting (i.e. out of the stomach) the patient can be safely discharged.

E. INGESTION OF OTHER TYPES OF BATTERIES

**Background**

Other types of battery (such as AAA) are occasionally ingested by children. These ingestions are generally less dangerous than button battery ingestions as they are less likely to get stuck to intestinal mucosa and cause erosion and perforation. However, if they do leak, they are more likely to be toxic as they contain greater amounts of heavy metals.

**Management**

This is similar to the management of button battery ingestion, except that the second AXR may be performed at 48 hours rather than at 12 hours.

*If the AXR shows that any type of battery has fragmented or leaked, the patient should be referred immediately to the surgeons for urgent removal of the battery.*

**Do not instruct parents to “look for FB in the stools”**.

If in doubt at any stage, discuss with the surgical registrar.

**References**:

- Just how good are Metal Detectors for Handheld Foreign Bodies? Mason et al Annals Emerg Med Apr 2017;69:4, 516-18
- Preventing Battery Ingestions: An Analysis of 8648 Cases, Toby Litovitz, Nicole Whitaker and Lynn Clark. Pediatrics 2010;125;1178

(Section 5.7 reviewed by Dr J Terris, May 2018)

(Reviewed & up-dated by Mr S Marven & Drs J Gilchrist & A Smith, Feb 2005)
5.8 ENT PROBLEMS

A. BACKGROUND
The commonest ENT problems seen in the ED are probably foreign bodies inserted up nostrils and into ear canals, followed by the acute infections of tonsillitis and otitis media.

B. EPISTAXIS
- Common – triggered by minor trauma, coryza or URTI.
- Bleeding usually from the anteriorly placed Little’s area, apply pressure on fleshy part below bone with finger and thumb for 15 mins, sit forward with mouth open. (young children will often require an adult to do this as they get easily distressed).
- If not settling with 2 or 3 spells of pressure consult ENT Registrar.
- Rarely requires packing or cauterisation.
- Can try putting alginate dressing in nostril to stop bleeding, if persistent.
- Please do not use nasal packing kit unless you have been trained in its use with children.
- Advise not to pick / blow nose, avoid hot foods / drinks for 24 hours.
- Rarely is the presenting feature of systemic illness, exclude evidence of anaemia or thrombocytopenia.
- Prevent recurrent episodes by considering a course of antibacterial treatment with naseptin or mupirocin (for peanut allergic) to reduce crusting and vestibulitis.

C. NOSE INJURIES
- Check for function (breathing and smell) and for deformity. Nose injuries do not require an X-ray, fractures are diagnosed clinically.
- Fractured nasal bones will present with bony tenderness over the bridge of the nose, with bruising, swelling and occasionally deformity.
- If the nose is straight on first presentation it usually heals without problems. The best way to check for deformity is to look straight down from above the patient.
- Listen to patients and parents if they say that the nose looks bent.
- Assess for septal deviation.
- Always check for septal haematoma (looks like a cherry and is fluctuant), needs urgent ENT referral. Ask senior to review if unsure.
- If the nose is straight, give advice and discharge. However, ask child / parents to review the nose once the swelling has gone down (at 5 days). If there is any concern of deformity then, ask the parents to phone the ED as a matter of urgency. We can then arrange for...
5.8 ENT PROBLEMS

them to be seen in the next ENT clinic. Document this advice in the notes, and give the patient information leaflet No 158 – Nose Injury

- EUA of nasal fractures should be within 14 days maximum and we would like to have suspect cases reviewed by ENT before then

- **D. FOREIGN BODY IN THE NOSE**
  - If visible and easy to remove, then do so.
  - Various methods are available – the ‘kissing technique’ – best done by a parent; suction catheter; jobson probe; crocodile forceps; toothed forceps. Be very careful not to cause further trauma. Do not try repeated distressing attempts.
  - If unable to remove it, then refer to next ENT clinic. The ED has slots available for just such referrals.
  - Most objects do not require urgent referral same day. Metal, batteries and tablets need urgent removal (Consider X-ray if unsure of presence).
  - Unilateral offensive nasal discharge is strongly suggestive of a long-standing foreign body. If seen, try fine bore suction for removal, otherwise refer to next ENT clinic.

- **E. FOREIGN BODY IN THE EAR**
  - Remove only if you can do so easily.
  - Do not attempt to syringe out porous substances.
  - If it is a battery, refer to ENT Registrar on-call.
  - Otherwise refer to next ENT clinic for their opinion (not necessarily removed in clinic – an EUA may be required).
  - DO NOT make repeated attempts at removal, as this distresses the child and makes the ENT surgeon’s job more difficult.

- **F. FOREIGN BODY IN AIRWAY OR UPPER OESOPHAGUS (see also 3.30)**
  - If ingested FB is stuck in upper oesophagus consider removal with Foley catheter in ED, **Always discuss first with ED senior**. If not available refer to Paediatric surgeons.
  - Airway FB needs referral to ENT Registrar on-call. Witnessed inhalation or good history of inhalation but no clinical evidence of deterioration of respiratory function still needs urgent referral.
  - **Always request CXR** with inhaled FB (looking for collapse), and lateral neck for soft tissues if FB is suspected to be in the neck, irrespective of whether FB is radio-opaque or not. A normal chest x-ray will not rule out an inhaled foreign body.

- **G. PERICHONDritis**
  - Infection of the cartilage needs referral to the ENT Registrar on-call, as i.v. antibiotic treatment is often needed, e.g. following high ear piercings.
  - Cartilage can be rapidly destroyed by infection leading to an obvious cosmetic deformity.

- **H. HAEMATOMA OF THE PINNA**
  - Same day referral to ENT registrar.
  - A tense collection of blood can render the cartilage ischaemic and destroyed cartilage will again lead to a cosmetic deformity.
5.8 ENT PROBLEMS

I. ACUTE OTITIS MEDIA
- Most cases will resolve spontaneously and require simple analgesia alone. Generally otitis media will last around 4 days.

- You will often see just a red eardrum, but more typical of focal otitis media is a deformed/irregular or bulging eardrum with pus (opaque fluid) visible behind the drum.
- This is often very painful. The pain often abates if the eardrum perforates.
- Adequate analgesia with paracetamol / ibuprofen is the most important aspect of management.

- High Risk Patients
- Children with a cochlear implant. -these patients are at increased risk of an otitis media leading to bacterial (particularly pneumococcal) meningitis and will require treatment with oral antibiotics (amoxicillin)

NICE suggest that the following children are also at higher risk of complications and should have oral antibiotics. Children with
- immunosuppression,
- cystic fibrosis,
- young children who were born prematurely
- significant co-morbidities.

Other groups that may benefit from treatment with oral amoxicillin include
- under 6 months of age,
- worsening symptoms after 3 days,
- continuously discharging ear >7 days.

- Always look for clinical evidence of mastoiditis (tender or red over mastoid, or ear protruding) and if present the child should be seen by the on-call ENT surgeon.

- Otitis media is not always associated with mastoiditis, but mastoiditis is ALWAYS associated with middle ear infection.

J. TONSILLITIS
Acute sore throat (including pharyngitis and tonsillitis) is self-limiting and often triggered by a viral infection of the upper respiratory tract. Symptoms can last for around 1 week, but most people will get better within this time without antibiotics, regardless of cause (bacteria or virus).

Use the FeverPAIN clinical score to aid your treatment decision. Score 1 point each for presence of:-
- Fever - history of fever in last 24 hours
- Purulent tonsillar exudate
- Acute onset of illness – 0-3 days
- Inflamed tonsils – must be severe inflammation to score
- No cough
•Score 0-1 - use NO antibiotic strategy
5.8 ENT PROBLEMS

• Score 2-3 and symptoms are present for 3 days or less
  • use NO antibiotic strategy.
  • advise will need review by GP if no improvement after 3 days, or symptoms worsen.

Score 2-3 and symptoms are present and not improving after 3 days
  • prescribe antibiotics.

Score ≥4 - prescribe antibiotics

**NO antibiotic strategy** – oral analgesia with Paracetamol and Ibuprofen, and possibly Difflam spray. Advise:
  • antibiotic is not needed
  • tonsillitis usually lasts around 1 week
  • seek medical help if symptoms worsen rapidly or significantly, do not start to improve after 1 week (after 3 days if FeverPAIN score 2-3) or the person becomes very unwell

**Antibiotic treatment** - Penicillin V for 10 days or Clarithromycin if penicillin allergic.

- **DO NOT TAKE ROUTINE THROAT SWABS.**

- If recurrent tonsillitis or the tonsils are large ask to see GP for evaluation and possible referral to ENT. **Do not refer direct or tell the parents their child needs a tonsillectomy.**

References:
https://www.nice.org.uk/guidance/ng84/resources/visual-summary-pdf-4723226606 Jan 2018
https://www.nice.org.uk/guidance/ng84 Jan 2018
https://ctu1.phc.ox.ac.uk/feverpain/index.php Oct 2017

(Section 5.8 reviewed by Dr A Smith, Jan 2018)
(Up-dated by Dr J Gilchrist, Aug 2003)
5.9 ASSESSMENT OF NECK LUMPS IN THE ED

A. BACKGROUND
Neck lumps are not an uncommon finding on examining children in the emergency dept and the vast majority of these will be self-resolving reactive lymphadenopathy related to minor infections. Head and neck solid tumours are thankfully rare in children, so adult protocols which focus on ruling out cancers are not always appropriate. However, some lumps and bumps do warrant further investigation and this guideline attempts to guide you through a rational approach.

B. EMERGENCY MANAGEMENT/TRIAGE
ABC
Any child with evidence of airway obstruction due to a neck mass should be transferred to resus immediately – but with a minimum of fuss or drama. It is important not to worsen the situation by upsetting the child, as they can completely obstruct a partially obstructed airway if they become frightened or agitated. They need urgent ED senior input and senior ENT review. PICU should also be alerted.

C. DIAGNOSIS
HISTORY
How long has the lump been there? – Congenital lesions may occasionally present acutely via ED (see below)
Is it changing in size or colour?
Is it painful?
Do they have any other local or general symptoms? – ask esp. re ENT symptoms, skin problems, swallowing or breathing problems, appetite loss, weight loss, sweats, voice changes
Any medications?
Any recent travel or exposure to animals?
Any recent immunisations?

EXAMINATION
Record weight, temp, heart rate and resp rate.
Try to describe accurately the position and nature of the lump
- Is the lesion midline or lateral?
- Unilateral or bilateral?
- Multiple or solitary?
- Well defined or poorly circumscribed?
- Tender?
5.9 ASSESSMENT OF NECK LUMPS IN THE ED

- Hard, Fibrous, Rubbery, Soft, Cystic, Fluctuant?
- Fixed to skin or to underlying tissue?
- Any overlying skin changes?

Examine for other lymphadenopathy, (parotid, post auricular, occipital, post chain, ant chain, jugulodigastric, submandibular, submental, supraclavicular, axillary/groin) and document absence or presence of palpable nodes.

Full ENT examination
Check mouth and teeth
Organomegaly, anaemia, bleeding disorders (petechiae, bruises)

D. DIFFERENTIAL DIAGNOSIS

- Reactive lymphadenopathy secondary to local or generalised infection.
- Lymphadenitis – infection of the node itself
- Malignancy – Hodgkins/NHL/leukaemia/metastases
- Infiltration – histiocytosis
- Vasculitis – Kawasaki's, SLE, JCA

<table>
<thead>
<tr>
<th>Infective causes</th>
<th>Non-infectious causes</th>
<th>Other</th>
</tr>
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<td>Hodgkin’s Disease</td>
<td>Congenital torticollis</td>
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<tr>
<td>Grp A beta-haemolytic Strep</td>
<td>Non-Hodgkin’s Lymphoma</td>
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<td>Adenovirus</td>
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<td>CMV</td>
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<td>Varicella</td>
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</table>
5.9 ASSESSMENT OF NECK LUMPS IN THE ED

E. INVESTIGATION AND MANAGEMENT

If the lump is:
1. smaller than 2cm
2. present for less than 6 wks
3. not increasing in size
4. mobile
5. has normal overlying skin
6. onset beyond neonatal period
7. is concurrent with obvious ENT/URTI infections
8. not present in multiple sites

then it is most likely to be benign and does not need further investigation.

- If you are concerned that the child has acute tender unilateral lymphadenitis it is reasonable on the first visit to commence a course of treatment with Amoxicillin (usually due to Staph Aureus or Grp A Strep). These children should be seen by GP within one week for follow up.

Again, they will rarely require investigation or further management.

- If the child has any concerning or continuing symptoms and signs, ultrasound scan of the lesion can be useful in differentiating abscess from reactive nodes. This can be arranged in normal working hours, or for the next day along with ED clinic review.
- Consider Chest X-ray if symptoms suggest underlying malignancy (weight loss, shortness of breath, organomegaly)
- If diagnosis is still not clear ENT review may be useful. For an unwell child, this should be through contacting the on-call ENT registrar. For an otherwise reasonably well child, this can be through the ED slot at next available ENT clinic.
- Suspected malignancy should be referred directly to paediatric medical team for further urgent investigation.

F. FOLLOW UP

As stated above, GP follow up is usually satisfactory.

These patients rarely need ED clinic follow up. ENT or medical follow up will be arranged as appropriate by those teams once they have assessed the patient.

Ref;

(Section 5.9 reviewed by Dr J Terris, May 2018)
(Section 5.9 written by Dr D O'Donnell & Mr N Bateman, May 2013)
5.10 EYE PROBLEMS

1. BACKGROUND

Eye injuries and eye infections in children are common causes of presentation to the Emergency Department. Whilst many cases can be treated simply in the ED, others may be sight or even life threatening. A good history and basic examination is therefore essential to exclude serious or sight-threatening problems.

2. BASIC HISTORY

- onset of symptoms?
- any associated symptoms? (e.g. headache, nausea, vomiting)
- if trauma – nature of injury (? Blunt injury or sharp instrument)
- if chemical – nature of chemical (i.e. acid or alkali)
- Past ophthalmic history (e.g. glasses wear, known squint or lazy eye, previous eye surgery, previous herpetic keratitis, is patient already attending an eye department?)
- Medical history Inc. drug history and known allergies
- Relevant family history (e.g. retinoblastoma or childhood cataracts)

3. BASIC EXAMINATION

- Visual acuity for each eye, using glasses or contact lenses if worn
  
  Normal vision is 6/6 (distance between patient and chart (in meters) / line read on chart)

- Inspect the lids for swelling/erythema/bruising/lumps/crusting/discharge

- Inspect conjunctiva and sclera for swelling/redness/haemorrhage

- Inspect cornea for foreign bodies, haze, scratches, abrasions

- Check pupil size, shape, and reactivity

- Check for a red reflex

- Inspect fundus (this may require dilation)

- Check eye movements
5.10  EYE PROBLEMS

If examination is very difficult (e.g. in a young child) or acuity is impossible to check, it may be necessary to arrange an out-patient ophthalmological follow up (or urgent review depending on presentation).

4. DIFFERENTIAL DIAGNOSIS OF COMMON OCULAR SYMPTOMS AND SIGNS IN CHILDREN

**Common causes of ocular foreign body sensation or ocular pain**
- Corneal foreign body
- Sub-tarsal foreign body
- Blepharitis
- Corneal abrasion
- Keratitis (esp. HSV)
- Iritis

**Common causes of red eye with discharge**
- Viral conjunctivitis
- Bacterial conjunctivitis
- Chlamydia conjunctivitis (esp. neonates or teenagers)
- Blepharitis
- Cellulitis
- Allergic conjunctivitis
- Keratitis
- Molluscum (esp. if history of >4 weeks duration)

**Common causes of red eye without discharge**
- Blepharitis
- Sub-conjunctival haemorrhage
- Episcleritis
- Iritis
- Keratitis
- Foreign bodies
- Phlycten (corneal/conjunctival nodule)

**Rarer but important causes to consider**
- Dry eye syndromes (esp. if possibility of poor nutrition or reduced blinking)
- Lid malpositions/floppy eye lid syndrome / facial nerve weakness
- Scleritis

**Common problems associated with eye trauma**
- Peri-orbital/lid bruising (‘black eye’)
- Sub-conjunctival haemorrhage (consider NAI in pre verbal children)
- Corneal abrasion
- Surface foreign body
- Lid laceration
5.10 EYE PROBLEMS

- Conjunctival laceration
- Intra-ocular haemorrhage (hyphaema, vitreous haemorrhage)
- Traumatic uveitis

Rarer but very important problems to consider

- Corneal laceration
- Retinal injury
- Penetrating injury (cornea/sclera)
- Lens damage
- Intraocular foreign body
- Globe rupture
- Blow out fracture

Common causes of diplopia

- Post-viral illness
- Orbital cellulitis
- Ocular/orbital injury
- Cranial nerve palsy (II, IV, VI)
- Intracranial space occupying lesion
- Multiple sclerosis or ADEM

Rarer but important causes to consider

- Cavernous sinus thrombosis
- Orbital tumour
- Orbital cellulitis
- Benign intracranial hypertension

5. MANAGEMENT PLANS – YOU MUST ALWAYS ASSESS VISUAL ACUITY!

A. ACUTE ONSET OF SQUINT

Take history and perform basic eye examination – remember to check visual acuity, motility and fundus. Perform full neurological examination.

If acute cranial nerve palsy or associated neurological abnormalities refer to neurology
If ocular signs only discuss urgently with ophthalmology

B. ACUTE ONSET OF VISUAL LOSS

Take history and perform basic eye examination – remember to check visual acuity, pupils and fundus. Perform full neurological examination. Discuss with ophthalmology.

C. LEUKOCORIA (WHITE PUPIL)

Take history and perform basic eye examination – remember to check visual acuity.
5.10 EYE PROBLEMS

Refer urgently to ophthalmology.

D. INFECTIVE CONJUNCTIVITIS

Most infective conjunctivitis will clear up on its own without treatment and with good hygiene.(www.nhs.uk)

*Symptoms* include “red eye”, discharge, eyelids sticking, FB sensation.

*Signs* include conjunctival injection and discharge. A watery discharge is more typical of viral conjunctivitis. A purulent white-yellow-green discharge is more typical of bacterial.

Pre-auricular lymphadenopathy may be present in adenoviral, HSV and chlamydial conjunctivitis (in children over 6 months of age).

Take history and perform basic eye examination – remember to check visual acuity.

*In the neonate* - Remember naso-lacrimal duct dysfunction (blocked tear duct) is a common cause of sticky/watery eyes in the neonate. Conjunctival inflammation is absent. Massage over the nasolacrimal sac and mucus/pus may be expressed. Take swabs and if discharge expressed from sac advise twice daily massage and give Chloramphenical ointment QDS for 5 days.

- if discharge is purulent and or blood-stained, and/or conjunctiva inflamed treat as *ophthalmia neonatorum*
  - take swabs for m/c&s, chlamydia / gonorrhoea from both eyes
  - admit under medics
  - refer to ophthalmology

*In the older child*

- Swabs are usually not needed. Exceptions include frequent recurrences and resistance to treatment.
- treat with chloramphenicol qds or fucithalmic bd
- prescribe a tube for each eye
- advise family on hygiene (i.e. don’t share towels / pillows)
-Remember ointment stays in eye better than drops but can blur vision temporarily so may not be preferred in older children.

E. LID LUMPS / STYES / CHALAZION

*Symptoms* include acute or chronic eyelid lump.

*Signs* include lid lump, erythema and often blepharitis. Lesion may be “pointing”. There may be secondary preseptal cellulitis.

- Take history and perform basic eye examination – remember to check visual acuity
- Treat as for blepharitis (below)
- Use topical antibiotic if lesion discharging or sticky discharge.
- PO antibiotics if lesion infected (pointing) or associated cellulitis
5.10 EYE PROBLEMS

F. BLEPHARITIS

Symptoms include itchy lids, burning sensation, foreign body sensation, photophobia. Signs include crusty, red thickened eyelid margins. There may be conjunctival injection and corneal changes (punctate keratopathy, opacities or vascularisation).

Take history and perform basic eye examination – remember to check visual acuity. - Advise on lid hygiene (clean lids twice daily using diluted baby shampoo with a make-up pad). - Warm compresses for five minutes twice daily. - If severe Chloramphenicol bd to lid margins and refer to ophthalmology cyst/blepharitis clinic. - If corneal changes are present refer same day.

G. PRE-SEPTAL CELLULITIS

Symptoms include lid swelling and redness. Signs include lid swelling and erythema but otherwise normal eye examination. Take history and perform basic eye examination – remember to check visual acuity, pupils and motility.

If under 3 months old – admit under medics and refer to ophthalmology and ENT. If over 3 months old – If systemically well, sensible parents and mild features (Lids can be opened, the eye itself is not red, eye movements and VA are normal and none of the symptoms or signs of orbital cellulitis below are present) may be allowed home on PO antibiotics (co-amoxiclav). Give clear instructions to return immediately if condition worsens (increased swelling or child becomes lethargic, develops fever, headache, vomiting or blurred vision.

H. ORBITAL CELLULITIS (POST-SEPTAL)

Symptoms include: General malaise, pain, blurred vision, double vision, loss of colour vision, sinus headache. Signs include: Significant eyelid swelling, erythema, warmth, tenderness, conjunctival chemosis and injection, proptosis and/or restricted eye movements often with pain on attempted eye movements. Signs of optic neuropathy (reduced vision, RAPD, abnormal colour vision) may be present in severe cases. Child is usually systemically unwell.

Take history and perform basic eye examination – remember to check visual acuity, pupil responses and motility. Admit under medics for IV antibiotics and refer to ophthalmology and ENT urgently.

I. ACUTE DACRYOCYSTITIS

Symptoms may include watery eye, tender swelling on side of nose. Signs include tender, erythematous swelling on side of nose near medial canthus. Take history and perform basic eye examination – remember to check visual acuity.

In neonates discuss urgently with ophthalmology – very likely to need admission. In older children in early stages may settle with co-amoxiclav PO but if any doubt discuss with ophthalmology as usually require IV antibiotics.
5.10 EYE PROBLEMS

J. KERATITIS

Symptoms include FB sensation, photophobia.

Signs include red eye, hazy cornea, frank corneal ulcer, dendritic ulcer seen on staining with fluorescein.

There may be a history of cold sores or previous HSV keratitis.

Take history and perform basic eye examination – remember to check visual acuity.

Refer to ophthalmology same day.

K. UVEITIS (OR IRITIS)

Symptoms include photophobia, red eye, blurred vision, pain.

Signs include ciliary injection, ground glass appearance to eye, clover-leaf pupil.

Take history and perform basic eye examination – remember to check visual acuity.

Refer to ophthalmology same day.

I. FOREIGN BODIES (FB)

- Take history and perform basic eye examination – remember to check visual acuity.
- Exclude a penetrating/perforating injury.
- If foreign body is seen instill proxymetacaine anaesthetic drops and gently attempt to remove with a damp cotton bud - If unable to remove FB contact ophthalmology to see.
- If no foreign body is seen evert upper lid with cotton bud to look for subtarsal foreign bodies.
- If a subtarsal FB is present, remove it with a damp cotton bud. If unable to remove FB refer to ophthalmology.
- Instill fluorescein drop and examine under blue light – abrasions will glow luminous green. NB the green light on most of the ophthalmoscopes is not good enough at displaying these. Foreign body may stain dark.
- If abrasion seen – give Chloramphenical tds for 3 days.
- If large abrasion or abrasion over pupillary area refer to ophthalmology follow up clinic.
- If dendritic (branching) ulcer of HSV seen or if past history of known HSV keratitis refer to ophthalmology.
- If abrasion seen in contact lens wearer – discuss with ophthalmology.

M. CHEMICAL INJURIES

Signs include red eye, pain, ground glass appearance to cornea.

-See immediately – delay can cause permanent loss of vision.
- Determine nature of chemical (please note alkalis e.g. plaster, bleach, liquitabs etc. are extremely dangerous.
- Check the pH of both eyes prior to and after irrigation
- Instil proxymetacaine anaesthetic eye drops.
- Irrigate immediately with 0.9% sodium chloride through an i.v. giving set – at least 3-4 litres, no matter the nature of the chemical.

“Dilution is the solution to pollution”
5.10 EYE PROBLEMS

- upper and lower lids must be everted and irrigated (esp. important if plaster or cement)
- Check pH – if not equal to fellow eye – repeat irrigation.
- If pH equal wait 5 minutes and recheck – if pH remains equal no further irrigation required however if not equal repeat irrigation.
- If unable to irrigate consider sedation – d/w ED senior.
- instill fluorescein and check for epithelial loss.
- All but minor injuries should be referred to ophthalmology urgently.

N. BLUNT TRAUMA (EG PUNCH/FOOTBALL IMPACT)

- Take history and perform basic eye examination – remember to check visual acuity.
- check anterior segment and posterior segment carefully.
- if visual acuity reduced or any abnormality detected - discuss with ophthalmology.

Potential problems include:

- Orbital floor fractures (DISCUSS WITH SENIOR. check mobility carefully – if restricted do facial x-ray with orbital views)
- Subconjunctival haemorrhages
- Hyphaema
- Traumatic mydriasis
- Lens dislocation
- Vitreous haemorrhage
- Retinal tear or detachment
- Choroidal rupture
- Traumatic optic nerve avulsion

O. BLOW OUT FRACTURES

- Take history and perform basic eye examination – remember to check visual acuity.

Signs include
- Enophthalmos
- Restricted eye movements (particularly upgaze)
- Infra-orbital nerve damage (numbness over cheek, nose, upper teeth)
- DISCUSS WITH SENIOR before facial x-rays – with orbital views, should only be done if significant signs are present.
- Refer to maxillo-facial surgeons and ophthalmology.

P. PENETRATING / PERFORATING TRAUMA

- Be very suspicious of a penetrating injury if the history is suggestive i.e. sharp object thrown at face or airgun injury or patient near drilling or hammering
- Take history and perform the basic eye examination – remember to check visual acuity.
- Check for obvious entry wounds - irregular pupil shape / iris prolapsing / dark patch on sclera.
- look for abnormal red reflex.
- Be very suspicious of subconjunctival haemorrhage.
5.10 EYE PROBLEMS

- DISCUSS WITH SENIOR before arranging orbital x-rays in up and down gaze if possibility of intra-ocular or intra-orbital FB.
- If any abnormal findings or if in any doubt seek urgent advice from ophthalmology.

ANY PENETRATING INJURY/WOUND IN OR AROUND THE ORBIT REQUIRES A SAME DAY REFERRAL TO OPHTHAMOLOGY

Q. LID LACERATIONS

- Take history and perform basic eye examination – remember to check visual acuity.
- Check eyelid function and exclude possible ocular injury.
- If simple lid laceration treat in department.
- If lid margin is involved refer to ophthalmology.

(Reviewed by Dr S Ramlakhan, March 2018)
(Section 5.10 rewritten by Jane Marr, Chris FitzSimmons and Avril Kuhrt, May 2009)
5.10 EYE PROBLEMS

Paediatric Ophthalmology Emergency Referrals Pathway

PATIENT ATTENDS E.D

TRIAGED BY E.D NURSE

EXAMINED BY E.D DOCTOR

URGENT?

YES

DURING OFFICE HOURS CONTACT SCH EYE CLINIC. THEY WILL ARRANGE FOR PATIENT TO BE SEEN IN CLINIC IF DOC AVAILABLE.

IF NOT AVAILABLE IN CLINIC / OUT OF HOURS; CONTACT ON CALL OPHTHAL AND THEY WILL COME OVER FROM STH TO SEE THE PATIENT.

NO

UNSURE

SEEK ADVICE FROM E.D CONS / ON CALL EYE DOC OR CONTACT FRANCIS DONEY bleep 250 IN OFFICE HOURS

INITIAL TREATMENT

CLINIC APPOINTMENT
5.11 GASTROINTESTINAL BLEEDING

A. BACKGROUND
The differential diagnosis for GI bleeding can be extensive and varies according to the age of the child. A specific diagnosis can usually be made with a thorough history and examination.

Upper GI bleeding is defined as bleeding from a source above the ligament of Trietz (2nd part of duodenum), while lower GI is distal to this level.

B. EMERGENCY MANAGEMENT
An assessment of the ABCs is required.

Airway – The airway must be protected and secured, especially where there is potential for aspiration of blood, or reduced conscious level. Seek senior help early.

Breathing

Circulation – If there is evidence or at risk of hypovolaemia, two large bore cannulae must be sited and one or more 20 ml/kg fluid boluses given. Blood should be taken for cross match, FBC, LFTs, clotting as dictated by the patient’s history and clinical status.

Urgent referral to Surgical Registrar on call.

Active management of significant blood loss includes:

- Transfuse as necessary and tranexamic acid if massive blood loss (see guideline 4.5)
- Octreotide 5mcg/kg loading dose over 30 mins followed by 5mcg / kg / hr infusion if suspicion of liver disease or portal hypertension/varices.
- Omeprazole 0.5mg/kg iv 12 hourly
- Nil by mouth

C. ASSESSMENT
The nature of the blood loss can point to the origin of bleeding.

- Bright red haematemesis: Little or no contact with the gastric secretions, usually active bleeding at a site at or above the stomach
- Coffee-ground haematemesis: Altered by gastric secretions
- Melaena and tarry stools: Requires blood loss greater than 50-100 ml in 24 hours and usually originates proximal to the ileocaecal valve
- Streaks of blood on stool: Lesion in rectal ampulla or anal canal
- Fresh PR blood: Brisk haemorrhage or haemorrhage distal to the ileocaecal valve.

The history is important in identifying the cause; for example, ask about delivery, perinatal insults, drugs, maternal cracked nipples etc. in a neonate.
5.11 GASTROINTESTINAL BLEEDING

Children can initially compensate for hypovolaemia quite well, and assessing volume of blood loss can be difficult. Ensure that heart rate (best early guide of blood loss), blood pressure, capillary refill, and their postural changes are measured.

D. DIFFERENTIAL DIAGNOSIS
Most causes of GI bleeding are self-limiting and benign, but it is important to look for more serious conditions presenting in this way.

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<td>Gastritis</td>
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<td>Coagulopathy (including Vit K or Sepsis)</td>
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<td>Stress ulcers</td>
<td>Caustic ingestion</td>
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<th>Lower GI</th>
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<td>HSP</td>
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E. MANAGEMENT & REFERRAL
In most children, bleeding ceases spontaneously, and only supportive therapy is necessary. Treatment should be directed at the underlying cause and follow-up as appropriate. Discussion with the ED senior doctor is advisable before discharging patients home with suspected GI bleeding.

* In infants and children remember button battery ingestion is particularly hazardous and may be unwitnessed. If other cause not identified follow guidelines for button battery ingestion.

For all significant GI bleeds, referral to the Surgical team on-call is required. If unsure, please discuss with relevant ED/ Surgical middle grades.

(Section 5.11 reviewed by Dr S Ramlakhan, May 2018)
(Section 5.11 amended by Dr J Gilchrist and Mr P Godbole, Feb 2014)
(Section 5.11 written by Dr S Ramlakhan, May 2007)
5.12 EMERGENCY CONTRACEPTION (EC)

A. DEFINITION
Emergency contraception (EC) is a means of preventing pregnancy following unprotected sexual intercourse (SI) or potential contraceptive failure.

B. BACKGROUND
Two methods of EC are recommended. The hormonal method of choice is the progestogen-only EC, Levonelle, which may be taken up to 72 hours after the 1st episode of unprotected sexual intercourse (SI). This is up to 95% effective but efficacy decreases with increasing time since the episode of unprotected SI. The most effective method of EC is by insertion of a copper IUD. This can be inserted up to 5 days after the 1st episode of unprotected SI. If the girl opts for insertion of an IUD refer to Central Health Clinic Tel (0114 3054000). You can prescribe Levonelle in addition to IUD insertion.

C. LEGAL CONSIDERATIONS
A girl under 16 years is entitled to the same rights of confidentiality as an adult but the prescriber needs to satisfy themselves that she has consented to SI and is able to consent to treatment. Please discuss all these cases with an ED senior.

Consent to SI
For girls aged < 13 years SI is considered to be statutory rape irrespective of whether consensual or not. In this case refer to Social Services as a child protection concern (see guideline 6.2). Some girls >13 but <16 years may also require referral if you are concerned that they have not given informed consent to SI. The main factors to consider are the age difference and any power differential between the girl and her partner. If in doubt discuss with ED senior.

Consent to treatment
In 1985 Lord Fraser in the ‘Gillick Judgement’ set out when contraception may be prescribed to a girl under 16 years. The doctor should first “seek to persuade her to tell her parents” and this must be documented in the ED record. If the girl refuses then the doctor is justified in proceeding without the parents’ consent or knowledge if:-

- The doctor feels it is in the girl’s best interests to give her contraceptive advice, treatment or both without parental consent.
- The girl understands the nature, purpose and hazards of the treatment.

D. INDICATIONS FOR ADMINISTRATION
EC is indicated following unprotected SI within 72 hours if prescribing Levonelle, or 5 days if an IUD is to be inserted. Unprotected SI includes:
- No contraceptive method used.
5.12 EMERGENCY CONTRACEPTION (EC)

- Failure of barrier methods of contraception.
- Expulsion / partial expulsion of IUD.
- Pill error (see table).
- Rape or sexual assault

D. INDICATIONS FOR ADMINISTRATION (continued)

<table>
<thead>
<tr>
<th>Type of contraceptive pill</th>
<th>Indication for EC</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Combined</strong></td>
<td></td>
</tr>
<tr>
<td>1. Missed 2 or more pills of the 1st 7 pills in packet and SI occurred during this period or in the following 7 days.</td>
<td></td>
</tr>
<tr>
<td>2. Missed 4 or more pills of the middle 7 pills in packet and SI occurred during this period or in the following 7 days.</td>
<td></td>
</tr>
<tr>
<td>3. SI during short-term antibiotic use or in 7 days after antibiotic treatment completed.</td>
<td></td>
</tr>
<tr>
<td>4. SI during or in 28 days following the use of liver enzyme-inducing drugs.</td>
<td></td>
</tr>
<tr>
<td><strong>Progestogen-only</strong></td>
<td></td>
</tr>
<tr>
<td>1. One or more pills missed or taken &gt; 3 hours late and SI occurred in 2 days following this.</td>
<td></td>
</tr>
<tr>
<td>2. SI during or in 28 days following the use of liver enzyme-inducing drugs.</td>
<td></td>
</tr>
</tbody>
</table>

E. ASSESSMENT

History must include the following;
- Menstrual – LMP and was this normal, usual cycle length and estimated date next menses due.
- Sexual – Time elapsed since 1st episode of unprotected SI. If > 72 hours but < 5 days refer to Central Clinic for IUD insertion. Tel 0114 3054000.
- Contraception.
- PMH – Check for Porphyria, severe liver disease and IDDM.
- DH – Check if taking antibiotics, liver enzyme-inducing drugs or Warfarin.

Examination
- Check BP
- Further examination not usually required

F. LEVONELLE

<table>
<thead>
<tr>
<th>Indication</th>
<th>Requesting EC and &lt; 72 hours since 1st episode of unprotected SI.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contraindications</td>
<td>No absolute contraindications. Advised caution with porphyria and severe liver disease. Interacts with Warfarin. May affect diabetic control.</td>
</tr>
<tr>
<td>Dose</td>
<td>1.5 mg stat dose. If taking enzyme inducing drugs a second dose of 0.75 mg is required 12 hours after the 1st dose.</td>
</tr>
<tr>
<td>Side-effects</td>
<td>Nausea in 20%, vomiting in 5%. If the vomiting occurs &lt;2 hours from taking tablets will need to repeat dose. Disturbances in the timing of next menses common. May be early or late. Increased risk of ectopic pregnancy.</td>
</tr>
</tbody>
</table>
5.12 EMERGENCY CONTRACEPTION (EC)

<table>
<thead>
<tr>
<th>Efficacy</th>
<th>Coitus to treatment interval (hrs)</th>
<th>Percentage of expected pregnancies prevented</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&lt; 24</td>
<td>95%</td>
</tr>
<tr>
<td></td>
<td>25-48</td>
<td>85%</td>
</tr>
<tr>
<td></td>
<td>49-72</td>
<td>58%</td>
</tr>
</tbody>
</table>

G. FOLLOW-UP ADVICE
- If vomits < 2 hours after EC will need to repeat the medication. Can attend Central Clinic / GP / ED.
- Give advice on ongoing contraception and advise follow up from own GP or Central Clinic.
- Advise girl to attend Youth Clinic at Central Health Clinic or GUM clinic at Royal Hallamshire as at risk of STI.
- If next menses > 5 days late or is abnormal in any way then she will need a pregnancy test and follow up by own GP.
- Seek medical attention urgently if she gets any lower abdominal pain over the next few weeks (increased risk of ectopic pregnancy)

Useful contacts
Central Clinic  Youth Clinic for Under 19 yr olds (leaflets in Adolescent Room)
Mon – Thurs 3.30pm – 6pm and Saturday 11 am – 1pm
1, Mulberry Street, Sheffield (opposite Crucible Theatre in city centre)
0114 3054000

GU Medicine 0114 2713528


(Section 5.12 reviewed by Dr D O’Donnell March 2018)
(Written by Dr A Smith, Aug 2004)
5.13 GYNAECOLOGICAL PROBLEMS

1. VAGINAL DISCHARGE
   A. DEFINITION
   Any secretion which comes from the vagina.

   B. BACKGROUND
   Vaginal discharge is one of the most common gynaecological problems encountered in the paediatric and adolescent populations and may have many causes. It is useful to approach the diagnosis by categorizing the patient as being pre-pubertal or post-pubertal.

   C. PRE-PUBERTAL
   The commonest cause of vaginal discharge in pre-pubertal girls is vulvovaginitis. This is mostly caused by non-specific irritation but in rare cases may be caused by bacterial infections (e.g. haemophilus influenza, group A beta haemolytic strep) or threadworm infestation. Patients present with vaginal discharge, redness, soreness, itching and occasional dysuria.

   Other causes of vaginal discharge in pre-pubertal girls include vaginal polyps, lichen sclerosis and foreign body in vagina (presenting with persistent foul smelling discharge +/- bloody discharge). **Thrush is rare in pre-pubertal girls therefore Canesten/Fluconazole are not used in treating vulvovaginitis.**

   Examination should include an inspection of the genital area and anus (for threadworms). Internal examination should not be attempted on a pre-pubertal girl. Swabs of vaginal secretions from the introitus should be considered.

   Advice regarding hygiene should be given, avoidance of harsh soaps, bubble bath, tight-fitting pants and nylon tights all contribute to vulval irritation. It is also important to ask about and manage constipation. Antibiotics should only be considered if a pure or predominant growth of a pathogen is identified.

   D. POST-PUBERTAL
   Vaginal discharge in the post-pubertal group may be physiological or may be associated with vaginitis or cervicitis.
5.13 GYNAECOLOGICAL PROBLEMS

Physiological discharge begins around the time of menarche and is clear or white in colour. Its consistency may vary according to cyclic hormonal influences. Girls in early adolescence may have concerns about such a discharge and need reassurance that it is normal.

Vaginal discharge in sexually active post-pubertal group should be considered a sexually transmitted infection (e.g. Chlamydia Trachomatis, Neisseria Gonorrhoea) until proved otherwise. It is important to diagnose and treat the infection but also to trace contacts anonymously. For this purpose, appointments at the Youth clinic in the Central Health Clinic should be arranged; or if the child is over the age of 14, they can attend the GUM clinic at the Royal Hallamshire Hospital. Appointments are available in the daytime and evening (see Section 5.12 for contact details).

E. IMPORTANT POINTS
The possibility of sexual abuse should always be considered in children presenting with genital symptoms.

Isolation of organisms that have a strong association with sexual transmission require urgent further investigation.

Young people under 13 years:
Sexual intercourse in this age group is considered a statutory rape irrespective of whether it is consensual or not and all cases need to be discussed with the Child Protection Unit at social services and the SARC team (see guideline 6.2).

2. MENSTRUAL PROBLEMS / MENORRHAGIA

A. DEFINITION
The official definition is menstrual blood loss of more than 80ml per cycle. This is obviously difficult to assess - in studies in adults with subjective complaint of menorrhagia only 32% had blood loss greater than 80ml (1).

B. BACKGROUND
Heavy, irregular periods are common in the early years following menarche. Failure of ovulation is commonly the underlying pathophysiology and as the cycles become ovulatory the problems diminish.

C. ASSESSMENT
Take a thorough history of menstrual cycle duration, severity, size and frequency of clot formation. Number and type of sanitary protection required is also useful although does depend on the habits of the individual. It is also important to assess the impact of the excessive bleeding on her life and why she has chosen to seek help now (e.g. close to exams). It is important to ascertain a sexual history. In particular, dyspareunia and post-coital bleeding point towards sexually transmitted infections.

Remember menorrhagia is not always due to dysfunctional uterine bleeding – it may be a sign of endocrine conditions, coagulation disorders, miscarriage or sexually transmitted infections (in particular Chlamydia). A history of general health, systemic symptoms and other signs of excessive bleeding/bruising may point towards these causes.
5.13 GYNAECOLOGICAL PROBLEMS

On examination – first check the patient is haemodynamically stable – pulse & BP. Look for signs of anaemia and examine the abdomen. Inspect external genitalia, PV examination is not usually required.

D. INVESTIGATIONS
Urine beta-HCG to exclude pregnancy. ‘Heavy period’ could be ectopic pregnancy or miscarriage. See pregnancy guidelines (5.14) for further management if positive.

According to NICE guidelines consider FBC if clinically indicated
Ferritin, female hormones or thyroid tests are not routinely indicated.

E. MANAGEMENT
Generally, reassurance that menstrual problems should settle is often all that is required. Menorrhagia treatment is best managed by the GP who can monitor response and follow up the patient, usually with combined OCP or levonorgestrel-releasing IUD. However, occasionally it may be appropriate to start a short course of treatment (that may reduce bleeding by up to 30%) in the Emergency Department.

If treatment is required first consider non-hormonal treatment.
- Prostaglandin inhibitor – Mefenamic acid 500mg tds (Ponstan) – taken from onset of bleeding until heavy phase of period has passed. (contraindications see BNFC)
- Fibrinolytic inhibitors – Tranexamic acid 1g tds (Cyclokapron) – taken from onset of bleeding until heavy phase of period has passed (up to 4 days). (contraindicated in thromboembolic disease - see BNFC)

To stop an exceptionally long or heavy period, consider hormonal treatment with progestogens e.g. Norethisterone 5mg tds (much higher than contraceptive dose). This should only be used if other options are unsuccessful. Side effects include mood swings and weight gain.

It is important to refer the patient back to their GP for follow up.

REFERENCES
3. Garden AS. Paediatric and Adolescent Gynaecology. Published by Arnold.

(Section 5.13 reviewed by Dr J Stone, March 2018)
(Section 5.13 written by Dr S Croft, May 2007)
5.14 PREGNANCY AND RELATED PROBLEMS

A. DEFINITION
The ClearBlue pregnancy test used in the Emergency Department measures urinary beta-HCG and is 99% accurate for detecting pregnancy from the first day of the missed period. However, a single urine beta-HCG analysis should not be taken as absolute evidence for the presence or absence of pregnancy.

NB. It is entirely possible that the girl attending the ED who is known to be pregnant and has, for example, abdominal pain has appendicitis or other non-pregnancy related problem. If after clinical assessment the diagnosis is not clear then ask the surgical Registrar for an opinion in the first instance – not the obstetric/gynae registrar in the Hallamshire. If they believe the problem is related to the pregnancy, he/she needs to discuss the girl with the surgical consultant on call and then needs to discuss with the on call Obstetrician or Gynaecologist if appropriate. The same is true of the girl who attends with abdominal pain and is not known to be pregnant, but who produces a positive urine pregnancy test in the ED.

B. BACKGROUND
In more than three quarters of pregnant adolescents the pregnancy is unplanned(1). 30% of males and 26% of females are sexually active before the age of sixteen (from Sheffield data).

Several studies have looked at teenagers presenting to the ED in whom pregnancy was subsequently diagnosed. These have shown that the presenting complaint is usually gastrointestinal (GI) or genitourinary (GU) and that the clinician must have a high index of suspicion of pregnancy in adolescent girls(2-4).

C. LEGAL CONSIDERATIONS
Consent to Sexual Intercourse
In all sexually active children it is important to gain some details of the sexual relationship (i.e. age of partner, status…) in order to consider the possibility of exploitation or abuse.

Young people under 13 years:
Sexual intercourse is considered a statutory rape irrespective of whether it is consensual or not and all cases need to be discussed with the Child Protection Unit at social services and the person on call for SARC.(see Guideline 6.2)

Young people between 13 and 16 years:
The Sexual Offences Act 2003 states that there should be no sexual touching (this involves all physical contact even through clothing - includes kissing and intercourse). It reinforces that
5.14 PREGNANCY AND RELATED PROBLEMS

whilst mutually agreed, non-exploitative sexual activity between teenagers does take place and often no harm comes from it, the age of consent still remains at 16 years. This group of young people is still vulnerable even though they do not view themselves as such. Discussion with Social Services is not mandatory and will depend on the degree of risk/need assessed by the clinician seeing the girl. (discuss with senior).

Consent to treatment
As per EC guidelines, a girl under 16 years has the same rights of confidentiality as an adult and the clinician needs to satisfy themselves that she has consented to sexual intercourse and is able to consent to treatment. When obtaining consent for carrying out a pregnancy test, children under 16 yrs can consent if they understand its ‘nature, purpose and hazard’.

D. INDICATIONS FOR PREGNANCY TESTING IN THE ED
All females of child-bearing age presenting with gastrointestinal (GI) or genitourinary (GU) symptoms should have a pregnancy test. Always have a high index of suspicion, taking into account sexual maturity. Even if the girl denies pregnancy or being sexually active a test should still be performed. Be highly suspicious in cases where the presentation is of gastrointestinal/genitourinary problems or in those who fit the at risk group (as above).

E. HOW TO APPROACH THE PATIENT
Ask them if there is any chance that they could be pregnant and if they are sexually active. If the answer is yes then take a menstrual and sexual history and state that you will do a pregnancy test. In girls who deny the possibility of pregnancy then you still need to do a pregnancy test to confirm this and you could say:

"In girls like yourself who are sexually mature or who have started their periods there is always the possibility that you may become pregnant, and actually becoming unwell may be the first sign of pregnancy. We therefore do a pregnancy test on all girls who fit into that group. When girls come to A&E unwell we would usually check a water/urine sample for infection and then we can do the pregnancy test at the same time."

You could go on to explain that if we didn’t do a test and prescribed treatment then it may be damaging to the unborn foetus or mother. It is also important to diagnose a pregnancy as soon as possible so that they can get the appropriate care and treatment. Remember to ask them if they would like to be informed of the result with or without parent(s) present.

F. WHAT TO DO WITH A POSITIVE RESULT IF THEY ARE WELL:
Decision to share this information with parents will be taken using professional judgement. Decisions need to be based on the child’s age, maturity and ability to appreciate what is involved in terms of implications and risks to themselves. This should be coupled with the parent’s ability and commitment to protect the young person. The ED doctor should encourage the young person at all points to share information with their parents, where safe to do so.

In any girl who you suspect is pregnant has a positive test result, inform them of the result and obtain more details on the menstrual and sexual history.
5.14 PREGNANCY AND RELATED PROBLEMS

Refer pregnant teenagers to the gynaecology unit at the Royal Hallamshire Hospital on 2268890 and ask for the nurse in charge, who will then be able to make the appropriate appointment in (1) the early pregnancy assessment unit (EPAU) if they are experiencing pain/bleeding or (2) the termination of pregnancy (TOP) service if they are requesting an abortion. Please advise patient that we will try to perform an abdominal scan but that a transvaginal scan maybe necessary. Vaginal examination and swabs may also be required.

It would also be advisable that a referral is made to the Vulnerabilities Specialist midwifery Team via the email sht-tr.VulnerabilitiesSpecialistMidwiferyTeam@nhs.net.

There is a counselling service available for those who are undecided regarding their decision. If a teenager requests a termination this session is mandatory and will usually be linked to their TOP pre-assessment appointment.

It is not necessary to notify the GP at this stage as any appropriate referrals will be made by gynaecology services. If patient DNAs appointment in EPAU/TOP service a referral to GP will automatically be made.

Please notify the patient (and their parent/guardian) that the appointment on the gynaecology unit may last up to two hours and that the patient will be seen alone for part of the appointment.

In girls under 13 years:
You need to make it clear to them that sexual intercourse under the age of 13 is illegal; they may be at risk of abuse or being exploited. It is your obligation/duty as a doctor to refer them to Social Services so that a proper assessment can be carried out.

It is the ED doctor’s duty to make the Social Services referral (as a child protection case) even if the child is being admitted under the Medics/Surgeons.

G. WHAT TO DO WITH A POSITIVE RESULT IF THEY ARE UNWELL:

CONSIDER THE NON-PREGNANCY RELATED CAUSES FIRST

1. MISCARRIAGE
Presenting complaint will be vaginal bleeding unless a missed miscarriage (foetus died in utero and not identified until bleeding occurs or detected on the scan). There may be pain from uterine contractions and therefore it is often difficult to distinguish from an ectopic pregnancy. Remember the psychological effects of miscarriage even in an unplanned or unwanted pregnancy can be significant and long-lasting and it is important to treat these patients with the same respect and dignity you would give older patients.

Management
Pelvic U/S will show if the foetus is in the uterus and viable. If the foetus is seen in utero then this virtually excludes an ectopic pregnancy. Intravenous access and bloods should be taken for beta-HCG, cross-match, FBC and Rhesus group.
5.14 PREGNANCY AND RELATED PROBLEMS

Further advice should be taken from Gynaecology Consultant 8-5 Monday to Friday or Registrar on-call via the STH switchboard.

2. ECTOPIC PREGNANCY

These are becoming more common in the UK and occur in 1 in 100 pregnancies. Common in lower socioeconomic classes and with a previous history of pelvic inflammatory disease (secondary to STI or an IUD, appendicitis, and pelvic surgery (especially tubal) (5).

Consider in any girl of child-bearing age who presents with abnormal vaginal bleeding, abdominal pain or collapse. Usually lower abdominal pain is followed by dark, scanty vaginal bleeding but they may present separately. Amenorrhoea of 4-8 weeks may be reported; however, others may be unaware that they are pregnant. Pain is often colicky and then constant. Syncopal episodes and shoulder tip pain suggest intraperitoneal blood loss. Collapse with abdominal pain only occurs in < 25%.

Management

If you suspect an ectopic pregnancy at any age and the girl is stable then do the following:

- Nil by mouth
- Pregnancy test
- IV access with FBC, beta-HCG and cross-match blood.
- Contact on-call Gynaecology Consultant 8-5 Monday-Friday Out of hours contact the gynaecology registrar via the RHH switchboard.

If you suspect an ectopic and the girl needs resuscitating then IMMEDIATELY:

- ABC including large bore IV access for fluid +/- blood
- Take bloods for beta-HCG, cross-match, Rhesus group, FBC.
- Call CRASH/2222 team. Surgical team may need to take patient to theatre emergently.
- Contact on-call Gynaecology Consultant who will arrange to attend SCH Resus Room.

References

6. NICE guideline on ectopic pregnancy and miscarriage. CG154

(Section 5.14 updated by Ms Karen Selby and Dr Jo Stone, May 2018)
(Dr J Gilchrist, Written in consultation with Dr Kath Teasdale + Ms Karen Selby, Aug 2007)
5.15 FEMALE GENITAL MUTILATION (FGM)

A. BACKGROUND

Female Genital Mutilation (FGM) includes all procedures that involve partial or total removal of the external female genitalia or other injury to the female genitalia for non-medical reasons. 60,000 girls under 15 are at risk of FGM in the UK. Over 130 million girls and women worldwide have undergone FGM. 137,000 girls and women are living with the consequences of FGM in the UK. FGM is practiced in more than 29 countries across Africa, parts of the Middle East, South East Asia and countries where migrants from FGM affected communities live.

B. FGM AND THE LAW

FGM is a criminal offence - prohibition of Female Circumcision Act 1985. It is a crime to take a UK citizen or UK permanent resident out of the country for FGM. The Female Genital Mutilation Act 2003 Mandatory reporting to police if a child discloses FGM or a professional identifies signs of FGM on examination - Serious Crime Act 2015.

C. COMPLICATIONS OF FGM

Short Term - haemorrhage; pain; sepsis; wound infection; fracture pelvis or limbs; urinary retention; injury to adjacent structures e.g. urethra, perineum; HIV, Hepatitis, Tetanus

Long Term - Recurrent UTIs; Painful menstruation; sexual activity difficulties, psychological problems, infertility, complications with pregnancy, keloids, dermoid cysts, vulval abscesses.

D. WHAT TO DO WHEN YOU SUSPECT FGM IN ED / AAU

The following is practical advice on what to do if you suspect FGM in a girl presenting to the Emergency Department or AAU

a) ACUTE - Any girl presenting with acute (i.e. bruising, bleeding, scabs, stitches) genital injury / trauma where FGM is suspected

Manage wound as required.
When available - Seek advice from safeguarding team in hospital and Doctor on-call for SARC (9am - 9pm, Mon- Fri, 10-6pm Sat, 11-4pm Sun and bank holidays.) Outside SARC hours - Admit under general paediatrics (or surgeons if wound needs managing). To stay in until she can be seen and discussed with / assessed by SARC doctor +/- surgeon / urologist.

Refer to Children's Social Care / police urgently (Even if presentation is out of hours, as an urgent strategy discussion including the police will be required.) Consider ringing police directly if family refuse to stay.
5.15 FEMALE GENITAL MUTILATION (FGM)

b) HISTORICAL - Any girl who you notice during your examination has had FGM or who tells you they have had FGM

Explain that you’ve seen signs that suggest FGM and ask girl / parents if girl has had FGM. Ask when and where it took place.
Explain that you will need to arrange an assessment of girl, to determine the type of FGM and any treatment required.
Explain that FGM is illegal in the UK and therefore police and social care will need to be informed of FGM in order to ensure prevention and protection for this child and other girls in the family.

There is a mandatory duty to refer to the police, on 101. -however, this does not need to be done urgently out of hours.
Children do not need to be admitted if there are no other safeguarding / medical concerns requiring admission.
Make sure we have correct contact / address details for the child.

If sure about your diagnosis / disclosure- refer to Social Services in hours. They will arrange a strategy discussion followed by Child Protection medical in CAU. Do discuss this referral with the safeguarding team / CAU. We can give advice on the mandatory reporting to the police.

If less sure about the diagnosis-(FGM is not easy to spot and you’re not expected to be experts in genital anatomy) and parents / child deny FGM - speak to CAU before making Social Services referral. It may be appropriate to arrange a 2nd opinion medical assessment in CAU prior to referral to Social Services / mandatory reporting to the police.

c) AT RISK OF - If during a visit to ED a girl confides in you that she is worried that she is being taken somewhere for FGM to be carried out.

Keep her in the department and ring Social Services / police urgently.
The statement opposing FGM, passport insert is a very useful explanation of the UK law relating to FGM and is available in many different languages.

E. REFERENCES

http://sheffieldscb.proceduresonline.com/chapters/p_female_gen.html

(Section 5.15 written by Dr A Ramsbottom and Dr J Gilchrist, Dec 2018)
6. CHILD PROTECTION AND BEREAVEMENT

6.1 ED Safeguarding Overview
6.2 Non-accidental Injury (NAI)
6.3 Child sexual abuse
6.4 Social care & Early help
6.5 Paediatric Liaison Service
6.6 Child bought in dying
6.7 Children who die in department or who are bought in dead
CHILD PROTECTION

6.1 ED SAFEGUARDING OVERVIEW

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B. ED SAFEGUARDING REFERRALS
C. ED SAFEGUARDING ALERTS
   a. CP-IS
   b. Medway ** / *** alerts
D. ED SAFEGUARDING CHECKLIST
E. LINKS

A. SHEFFIELD SAFEGUARDING CHILDREN BOARD - THRESHOLDS OF NEED
Sheffield Safeguarding Children Board (SSCB) has developed guidance on thresholds of need and service provision for children and their families in Sheffield¹. It is a multi-agency tool, including health, education, social services, housing, employment, finance etc. The needs of children and their families lie along a continuum of the levels and may move in either direction as their needs are met, or new needs are identified. The thresholds are useful in the ED as they help guide our referral pathways.

The following levels are described:-
Level 5 – Child in need of protection
Level 4 – Child requiring complex multi-agency support
Level 3 – Child requiring multi-agency support
Level 2 – Child requiring single agency support
Level 1 – Child whose needs are met by universal services (e.g. parents, GP, school etc.)

B. ED SAFEGUARDING REFERRALS
Referrals should be made as follows:-
Safeguarding Support Unit / Paediatric Registrar - see ED guideline 6.2
Any child with suspected abuse/neglect (Level 5)
All children under 2 years of age with a long bone fracture
Police via 101* – see ED guideline 6.3
Any child where there is an alleged sexual assault within the last 14 days (Level 5)
Any child who alleges child sexual exploitation (Level 5)
Any child who is involved in knife or gun crime
*If you have any issues contacting the Police via 101 then ask SCH switchboard to connect you directly to the “Police Control Room – semi urgent referral line”

Social Services – see ED guideline 6.4
When it is clear in ED that the child is in need of protection* (Level 5)
Any child where there is alleged sexual assault (Level 5)
CHILD PROTECTION

6.1 ED SAFEGUARDING OVERVIEW

Any child where you suspect child sexual exploitation (Level 5)
Any child who is involved in knife or gun crime
*Suspected cases of child protection will be explored further by SSU / Paediatrics and be referred to Social Care by that team if appropriate

Early Help – see ED guideline 6.4
Any child who needs multi-agency support (Level 3 & Level 4)

C. ED SAFEGUARDING ALERTS
   a. CP-IS
   Child Protection Information Sharing System (CP-IS) is an NHS England information sharing system. CP-IS provides us with a connection to participating local authority children’s social work systems. It flags those who are subject to a child protection plan and/or looked after children. If ‘CPIS Flag – Yes’ is documented in the presenting complaint section of Medway and on the ED record the assessing ED doctor or ENP should:-
      • On the NHS Spine Portal open the child’s SCR (use your NHS Smartcard). Click on ‘Child Care Alert’ tab which will state ‘child protection plan’ and/or ‘looked after child’
      • Document the alert and any actions taken in the child’s ED record

   b. Medway ** / *** alerts
   If you see a child with *** on their ED record this means they have a current Sheffield child protection plan, or have been on the child protection register at some point in their life, or are known to MARAC (Multi Agency Risk Assessment Conference).
   If they have ** this reflects a medium safeguarding risk i.e. known to various services but not with a full child protection plan. For example the family may be known to police re; domestic violence, accommodation services re; homelessness, or Early Help teams, or the child may be a Looked After Child (i.e. in foster or local authority care)
   On the Medway system these children with stars are identified by a red box on screen.

D. ED SAFEGUARDING CHECKLIST
   The ED safeguarding checklist contains 6 questions. Complete this for all ED patients you see. If any answers are in the boxes shaded grey this may indicate a safeguarding concern and the child must be discussed with a senior doctor.

E. LINKS
   ¹ https://www.safeguardingsheffieldchildren.org/assets/1/threshold_guidance_book.pdf

   (Section 6.1 reviewed by Dr A Smith and Dr E Asumang, April 2020)
CHILD PROTECTION
6.2 NON-ACCIDENTAL INJURY

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A. PRESENTATION TO THE ED OF CHILDREN WITH CHILD PROTECTION CONCERNS
B. EMERGENCY DEPARTMENT MANAGEMENT
C. INDICATORS OF ABUSE
D. REFERRAL FOR MEDICAL ASSESSMENT
   a. Arrangements in hours
   b. Arrangements where there is no SSU clinic availability or out of hours
   c. Consent for medical assessment
   d. SCH safeguarding team follow up
E. INFORMATION SHARING AND CONFIDENTIALITY
F. PUBLICATIONS AND LINKS

A. PRESENTATION TO THE ED OF CHILDREN WITH CHILD PROTECTION CONCERNS

Children with child protection issues may present to the Emergency Department in the following circumstances:

1. Brought in by other professionals with allegation of child maltreatment.

Management: Unless the child requires resuscitation or immediate management of their injuries in the Emergency Department the child should be booked in as a GP referral and then referred directly for assessment of abuse, (see section D).

2. Brought in by parent with an injury and the history or examination has raised suspicions of child maltreatment.

Management: If the child requires resuscitation or immediate management of their injuries this is the priority. Otherwise, rather than proceed with a detailed examination, inform the senior ED doctor about your concern as the child may need to be referred to the medical team or safeguarding support unit (SSU). The medical team will undertake a detailed evaluation and take the appropriate actions. If there is a concern regarding possible sexual abuse, please refer immediately to guideline 6.3 On CSA.

B. EMERGENCY DEPARTMENT MANAGEMENT

If there is suspicion or allegation of sexual abuse, please refer to guideline 6.3 CSA

History: You must continually bear the possibility of abuse in mind when seeing children. Look for the CP-IS and Medway ** / *** alerts on the child’s ED record and Medway screen. (see section 6.1). It is
CHILD PROTECTION

6.2 NON-ACCIDENTAL INJURY

good practice in the first instance to ask all patients if they have a social worker, and if an alert is on
the card, to ask the parents or carers if they have any input or support from any agencies. This should
be done politely and respectfully as this is a sensitive subject for some families. If possible discuss
this in private with the parent, i.e. away from the child/children. Please document the names and roles
(e.g. mother, stepfather, mum’s partner etc.) of all the adults accompanying the child.

If you have concerns related to the current attendance then it is essential to obtain further information
and review the child’s previous ED cards / attendances. You should discuss the case with the ED
senior and also consider reviewing the child’s EDMS record where there may be more information
recorded.

Examination: If there are injuries or signs/symptoms of illness that need urgent intervention then
 treat them as you usually would.
However, do not proceed with a detailed examination if you suspect child abuse from the history. If,
during your examination in an otherwise uncomplicated case, you find evidence to suggest child
abuse then do not proceed further. Ensure that you clearly document the history and examination that
you have performed.

ED child safeguarding checklist:
Remember to always complete the child safeguarding checklist on the ED card once you have
completed your history and examination. If there are any red flags discuss with the ED senior.

Further Assessment: If you suspect abuse you MUST act. Remember abuse usually escalates and
if you fail to act a child may suffer serious injury or die. Discuss the case with the ED senior. The ED
senior will advise regarding referral to the SSU or paediatric registrar for further assessment. See
section D for referral pathway.

For other issues re; parenting, education or supervision, it may be appropriate to be referred to the
paediatric liaison service – see guideline 6.5. Discuss with ED senior if unsure.

Medical Records: Carefully document your history, examination and discussions with the family or
health professionals thus far, including times. Keep your records objective and factual. Use a body
chart to document the position, type, size (measured not estimated) and colour of any injuries you
have observed. These can be found in the child protection packs in the clean utility.

Occasionally it may also be necessary to arrange for photographs of the injuries but only if clinically
indicated, e.g. compound fractures or burns which require prompt dressings for pain
relief. This should be done after discussion with a senior doctor and with the consent of the parent or
carer. Digital photographs must be printed immediately and should not be saved on
CHILD PROTECTION

6.2 NON-ACCIDENTAL INJURY

the computer or camera for printing later. **Always label, date, time and sign** any documentation including charts and photographs.

**The Family:** If you suspect abuse ideally the child must not leave the ED. If the parents do leave the ED with the child, contact Social Services who will consider the appropriate action, e.g. Police protection or Emergency Protection order. If you feel the child is in imminent danger then the Police should also be contacted.

**C. INDICATORS OF POSSIBLE ABUSE**

- Unexplained delay in seeking treatment
- Changing or incompatible story. A **non-mobile** infant who sustains an injury **however slight** without an **adequate accidental explanation**, or something you can’t explain, is a serious concern
- Child did not cry/ felt no pain
- Carers aggressive or unconcerned
- Bruises in unusual places- face, mouth, pinna, base neck, on the back on non-bony parts of the face or body; or
- Bruises with particular patterns e.g. slap marks
- Burns (particularly those which look like cigarette burns)
- Fractures in a child under 2 years old
- Signs of suffocation, poisoning, fabricated or induced illness.
- Failure to thrive, dirty, severe persistent infestations, not attending for immunisations or other medical care, increased ED attendances due to lack of supervision, no affection; can all be suggestive of neglect.

**Fabricated or induced illness**

Consider when a child’s history, physical and psychological presentation or findings on examination or investigation lead to a discrepancy with a recognised clinical picture:
- biologically unlikely history of events
- inexplicably poor response to treatment
- multiple opinions sought despite definitive clinical opinion being reached
- limitation of child’s daily activities out of proportion with any known medical problem
- reported signs and symptoms only observed by carer

**Other important considerations**

- Children with disabilities
- Domestic violence
- Parental or child Mental Health issues
- Parental/carer drug or alcohol misuse
CHILD PROTECTION

6.2 NON-ACCIDENTAL INJURY

- Parental learning difficulties
- Children sharing accommodation with known offenders

D. REFERRAL FOR MEDICAL ASSESSMENT

a) Arrangements in hours (09.00-17.00 Monday – Friday)

It is anticipated that the majority of medical assessment of suspected child abuse who attend in hours will be seen in the safeguarding support unit (SSU) clinic. Contact the SSU secretary on 2267803. You will be referred to the medical registrar on-call (054) if there is no clinic availability.

b) Arrangements where there is no SSU clinic availability or out of hours

17:00 – 09:00 hrs. Contact the medical registrar on-call (bleep 054 until 21.30 then 531 or via hospital switchboard).

c) Consent for Medical Assessment

1 Parental informed consent should always be sought for a child undergoing a medical assessment and for subsequent investigations, treatments or photographs
2 A caregiver’s refusal should not allow unnecessary delay. Legal advice may be needed.
3 Children over 16 can give their own consent to be examined
4 Children under 16 who are thought to be Fraser competent can be examined under their own consent.
5 Children should not be medically examined against their wishes unless there is a need for emergency medical assessment and management

d) Safeguarding team follow up

For any referred patient please leave a brief message for the Safeguarding nurses on the secure answer machine at 17675. This will ensure that each case is fully followed up from the Trust, whatever Social Care and the Police decide to do.

E. INFORMATION SHARING AND CONFIDENTIALITY

In English Law, where there are concerns that a child is, or may be, at risk of significant harm, the overriding consideration is to safeguard the child.

You must explain to children and families at the outset how and with whom the information provided will be shared unless it will put the child, family member or staff member at greater risk or will undermine the prevention, detection or prosecution of a serious crime.

If the child or family don’t consent to information sharing you may still do so if you feel there is sufficient need to override that lack of consent. You should discuss concerns with the ED consultant or a member of the team on SSU. You must always record the reason for your decision. The information you share should be accurate, up to date, necessary for the purpose and only with those
CHILD PROTECTION

6.2 NON-ACCIDENTAL INJURY

people who need the information.
Dr Asumang is Named Doctor for Safeguarding for the Trust and can give advice.
Safeguarding Nurse Specialists are available on bleep 049 to give advice.

F. PUBLICATIONS AND LINKS
Sheffield Children's Hospital 'Safeguarding' website is available on the trust intranet. It contains additional information for different types of abuse and links to evidence based guidelines and advice.

NICE guidance CG89 When to suspect child maltreatment (2009) (www.nice.org.uk)

RCPCH Guidelines
3) Paediatric Forensic Examination in Relation to Possible Child Abuse (October 2007)

http://nww.sch.nhs.uk/departments/safeguarding
https://www.nice.org.uk/guidance/cg89
https://www.rcpch.ac.uk/key-topics/child-protection
https://www.rcr.ac.uk/system/files/publication/field_publication_files/bfcr174_suspected_physical_abuse.pdf

(Section 6.2 reviewed by Dr A Smith and Dr E Asumang, April 2020)
CHILD PROTECTION
6.3 CHILD SEXUAL ABUSE

CONTENTS
A. DEFINITIONS
B. ED MANAGEMENT AND REFERRAL
C. INFORMATION SHARING AND CONFIDENTIALITY

A. DEFINITIONS

Child Sexual Abuse is enticement or forcing of a child /young person into sexual activities, which includes physical contact or non-contact (e.g.; viewing images or activity) or behaving in a sexually inappropriate way. Sexual intercourse with a child <13yrs is statutory rape. A child of any age may present themselves to the department with a history of being raped or sexually assaulted. Any disclosure must be taken seriously. On rare occasions they may be brought by police or social work for assessment of an acute injury in need of medical treatment, but more often, these children will not be seen in ED but will be seen directly in the Sexual Assault Referral Centre (SARC), if they are considered medically stable.

Child Sexual Exploitation (CSE)

CSE is when people use the power they have over a child or young person to sexually abuse them. Their power may result from a difference in age, gender, intellect, strength, money or other resources. People often think of child sexual exploitation in terms of serious organised crime, but it also covers abuse in relationships and may involve informal exchanges of sex for something a child wants or needs, such as accommodation, gifts, cigarettes or attention. Some children are "groomed" through "boyfriends" who then force the child or young person into having sex with friends or associates. Part of the challenge of tackling child sexual exploitation is that the young person involved may not understand that they are the victim of sexual abuse.

Signs of child sexual exploitation include the child or young person:
- going missing for periods of time or regularly returning home late
- skipping school or being disruptive in class
- appearing with unexplained gifts or possessions that can’t be accounted for
- experiencing health problems that may indicate a sexually transmitted infection
- having mood swings and changes in temperament
- using drugs and/or alcohol
- displaying inappropriate sexualised behaviour, such as over-familiarity with strangers, dressing in a sexualised manner or sending sexualised images by mobile phone ("sexting")
- they may also show signs of unexplained physical harm, such as bruising and cigarette burns

If the child / young person confirms CSE then refer as outlined below.
If you suspect CSE but the child / young person does not confirm then you must refer the child / young person to Social Care.
CHILD PROTECTION

6.3 CHILD SEXUAL ABUSE

B. ED MANAGEMENT AND REFERRAL

ALWAYS INVOLVE THE ED SENIOR

There are two ways these patients present to us.

1. Urgent - Acute alleged assault ( <14 days )
2. Non-urgent - Chronic or historical concerns of sexual abuse

1. Urgent

As always, our first priority is to assess the severity of any injury and treat any bleeding, pain or medical problem as it appears. These patients must receive any medical treatment they require. Delaying vital treatment for forensic or evidential concerns is not appropriate. It is a police responsibility to decide if they need to obtain forensic samples for evidence. This should not be performed by the ED staff.

If the child needs admission for medical or surgical management then they should be referred to the most appropriate admitting team. A child admitted to the surgical team should also be referred to the medical team who will arrange work-up from SSU/SARC jointly. If police not already aware then ED staff must telephone them to report the incident on phone number 101*.

If a child is physically well, not intoxicated or impaired by drugs and otherwise fit for discharge, and home is a safe place to go to, ED staff must telephone the police to report the incident on phone number 101*. They should discuss the details outlined in table 1. Document this in the ED notes. The police will then refer to the Joint Investigation Team (JIT) which will include social work, SARC and a senior police officer. ED staff do not need to contact Social Care to make a separate referral. However it is good practice to contact Social Care to check if child is already known to them.

Once contacted by the Police, the SARC doctor will arrange to see the child at an appropriate time for examination, emergency contraception (EC) and any STI screening or treatment required. The patient does not need admission just to expedite SARC assessment. The patient is advised not to bath or shower in the interim, and police will usually want to collect their clothing.

Emergency Contraception is more effective the sooner it is given. If the patient presents within the timeframe for emergency contraception ED staff should prescribe and dispense either Levonelle within 72hrs or EllaOne up to 5 days post-intercourse. A urinary pregnancy test should be conducted before EC is prescribed.

If the family have already contacted the police, but no police are present, ED staff should phone 101* to report the incident.

* If you have any issues contacting the Police via 101 then ask SCH switchboard to connect you directly to the “Police Control Room – semi urgent referral line”

2. Non-urgent

After taking the history and ensuring there are no urgent physical issues, in the case of an ‘old’ or long-term concern of sexual abuse the ED must contact Social Care in the first instance. This is
CHILD PROTECTION

6.3 CHILD SEXUAL ABUSE

regardless of the time of day. Social Care will then decide whether to involve the JIT team and will arrange a strategy meeting. They will also decide on placement of the child in the meantime. It is rarely appropriate to admit these children to SCH as “a place of safety”. SARC (Sexual Assault Referral Centre) is based at SCH but all referrals must go via police and Social services. ED cannot refer a patient directly to SARC, but we CAN phone them during their working hours if we need advice or support. Switchboard has their contact numbers and rota.

<table>
<thead>
<tr>
<th>TIME OF INCIDENT</th>
<th>TIMING OF EXAMINATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute - within 14 days</td>
<td>Same day (clinic or forensic examination, if necessary)</td>
</tr>
<tr>
<td>Non Acute or historic</td>
<td>The next available appointment</td>
</tr>
</tbody>
</table>

C) INFORMATION SHARING AND CONFIDENTIALITY

In English Law, where there are concerns that a child is, or may be, at risk of significant harm, the overriding consideration is to safeguard the child.

This means that ED staff are obliged to report any allegations of sexual assault to the police or social services. This includes when the family or child state they don’t want to report it to the police or press charges. You must be open and clear with the patient and family about this reporting.

Full and detailed documentation of the history given in ED is essential. ED staff must also record the names, roles and contact numbers of anyone they discuss the case with, especially other agencies and the times these conversations occurred. Obviously strict confidentiality is paramount in sensitive cases like these.

For any of these patients referred please leave a brief message for the Safeguarding nurses on the secure answer machine at 17675. This will ensure that each case is fully followed up from the Trust, whatever Social Care and the Police decide to do.

Table 1

<table>
<thead>
<tr>
<th></th>
<th>Date and time of call</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Name, rank, collar number and telephone number of police officer spoken to</td>
</tr>
<tr>
<td>2</td>
<td>Patient details and contact numbers</td>
</tr>
<tr>
<td>3</td>
<td>Whether or not patient is intoxicated/impaired</td>
</tr>
<tr>
<td>4</td>
<td>If a language interpreter is required</td>
</tr>
<tr>
<td>5</td>
<td>Names and contact numbers of carers/those with parental responsibility</td>
</tr>
<tr>
<td>6</td>
<td>Basic details of allegation</td>
</tr>
<tr>
<td>7</td>
<td>Details of current social work involvement</td>
</tr>
<tr>
<td>8</td>
<td>Confirm with the police officer whether they will need to attend the ED to use Early Evidence Kit</td>
</tr>
</tbody>
</table>

(Section 6.3 reviewed by Dr A Smith and Dr E Asumang, April 2020)

(Section 6.3 Re-written by Dr D O’Donnell, with Dr A Ramsbottom Oct 2014)
CHILD PROTECTION

6.4 SOCIAL CARE AND EARLY HELP

CONTENTS

A. SOCIAL CARE REFERRALS
   a. Criteria for referral
   b. Contacting Social Care
   c. MACF

B. EARLY HELP
   a. Background
   b. Making an Early Help referral

A. SOCIAL CARE REFERRALS
   a. Criteria for referral

You should make a Social Care referral

- When it is clear in ED that the child is in need of protection (Level 5).
  *Suspected cases of child protection will be explored further by CAU / Paediatrics and be referred to Social Care by that team if appropriate.*
- Any child where there is alleged sexual assault (Level 5)
- Any child where you suspect child sexual exploitation (Level 5)
- Any child who is involved in knife or gun crime

In addition you may wish to speak to Social Care to share information about a child already known to the service.

   b. Contacting Social Care

Sheffield Social Care is contacted via SCH switchboard.

For children from out of area who have a child protection plan or are looked after children then contact details for their local Social Care service can be found on the NHS Spine Portal (use your NHS Smartcard). Open the child’s SCR and click on the ‘Child Care Alert’ tab.

   c. MACF

The multi-agency confirmation form (MACF) should be completed following a new Social Care referral. It is not required following information sharing when a child is already known to the service.

The form can be found in the Safeguarding filing cabinet under the ED staff base or a downloadable document from the intranet. Complete as much information as possible on the form but don’t worry if there are gaps. Once you have completed the form print it out and leave it with the ED record. ED reception will pass the form to the ED secretaries who will forward it to Social Care and SCH safeguarding nurses.
B. EARLY HELP

a. Background

The Early Help framework brings together organisations across Sheffield who deliver services to families. It is a single point of access for requesting support. Multi-agency partners meet every 2 weeks to consider referrals and allocate the right level of Early Help support to families in accordance with Sheffield’s 5 levels of need. Any practitioner working with families who identifies an unmet or new need can refer into the Early Help gateway meetings to access relevant support for a child and their family. Consider an Early Help referral for issues including acute or chronic family dysfunction, problems around schooling/education including bullying, a child or young person with criminal/anti-social behaviour, parental health issues including substance misuse and mental health problems, family accommodation issues, financial/employment issues. This list is not exhaustive.

b. Making an Early Help referral

The forms to make an Early Help referral are found in the Safeguarding filing cabinet under the ED staff base or a downloadable document from the intranet. First ask the parent or carer to sign the initial section of the form giving their consent for information sharing with Early Help. Then complete as much information as possible on the form but don’t worry if there are gaps. Make sure you indicate what your concerns are and what support you think might be required. Once you have completed the form leave it with the ED record. ED reception will pass the form to the ED secretaries who will forward it to Early Help.

(Section 6.4 reviewed by Dr A Smith, April 2020)
6.5 REFERRAL TO THE PAEDIATRIC LIAISON SERVICE  
(previously Health Visitor & School Nurse Liaison Service)

A. BACKGROUND

B. REFERRAL

A. BACKGROUND
The central purpose of the Paediatric Liaison Service (PLS) is to safeguard children and promote their well-being through the development of effective two way communication sharing relevant and timely information between the hospital and the 0-19 Health Service, as well as the promotion of integrated care across acute and primary care settings.

The Service provides early identification of vulnerable children and young people, promoting intervention and prevention, through appropriate onward referrals to the 0-19 practitioners of vulnerable unborn babies, neonates, children and young people.
Paediatric Liaison Nurses are based at SCH, as well as Northern General ED, Charles Clifford Dental Hospital, Jessop Wing and Drug & Alcohol Services. The team liaises with the 0-19 health service, to ensure consistent information sharing between acute and community services to safeguard vulnerable children and young people.

B. REFERRALS
Remember that referral to the Paediatric Liaison Service does not replace referral to Social Care or the Safeguarding Support Unit.
If you have safeguarding concerns about a child please refer to ‘section 6.1, 6.2, 6.3 and 6.4’ in the Emergency department guidelines. Discuss with ED senior staff if you are unsure who to refer to.

All ED attendances are routinely notified to GPs. 0-19 teams have access to this information if the GP practice is on System One (via EPR Core). If you wish to draw the attention of a 0-19 practitioner to a specific matter then please make a PLS referral to ensure this information is captured.

Any age child, about whom you have concerns, can be referred to PLS (please note if you have specific safeguarding concerns you need to act on them appropriately)

For school age children: Specific information also needs to go to the GP via the Medway discharge summary. To do this when coding the patient on Medway you need to enter specific information in the **Record Clinical Details** section. They should be coded in **Outcome/Plan as D) Safeguarding Concerns – Documented as below** and the details of the concern should be added in **Clinical Text**.

If you intend to refer a child to PLS you should inform the family and ideally obtain consent. Record your concerns in the ED record and complete the electronic referral form.

Consider following concerns:

- Feeding problems.
- Accidental fracture(s) in a child less than two years old, where there is a clear history
- More than one head injury in a child less than one year, where there is a clear history.
- Burns and scalds in the under-fives.
- Accidental ingestions.
- Deliberate ingestions including alcohol and ‘recreational’ drugs (including ‘legal highs’). Consider referral to The Corner Project – in context of ‘Hidden Harm’ Strategy.
6.5 REFERRAL TO THE PAEDIATRIC LIAISON SERVICE
(previously Health Visitor & School Nurse Liaison Service)

- Deliberate overdoses and self-harm
- Frequent attendees and/or delays in presentation
- Suspected, but undisclosed domestic abuse
- Concerns about parenting capacity e.g. unkempt children, lack of supervision, poor interaction, low mood, high anxiety
- Concerns about parental behaviour e.g. aggression, under the influence of alcohol/drugs.
- Reported bullying at school or home
- Teenage pregnancy
- Dog Bites
- Road Traffic Accidents
- Child/ Young Person with Mental Health Issues requiring referral to STAR team or CAMHS

NB All deaths should be reported to the Paediatric Liaison Service.

If a child attends unaccompanied or fails to re-attend for review this should be dealt with by the ED staff at the time. If there are ongoing concerns regarding the child these cases should be discussed with the ED senior. The Social Work team or the police may need to be contacted as the situation dictates. A referral to the Paediatric Liaison Service may also be appropriate depending on the situation.

A Paediatric Liaison Service referral should also be made if:

- A child is referred for Child Protection Medical or SARC (Sexual Assault Referral Centre) assessment
- A child is referred to Social Services or Early Help teams
- A child who attends ED, who has *** on ED card or CP-IS +ve

Referrals are made electronically via Medway. The Paediatric Liaison Service can also be contacted on ext 17312 (24 hour confidential voicemail) or via bleep 159.

Referrals will be dealt with in a timely manner (i.e. within two working days of receipt by the Paediatric Liaison Service). However, if a family needs support at home as a matter of urgency consider a referral from ED to Social Care.

Our Paediatric liaison nurse who collates and acts on referrals made can record actions or discussions on the original PLN referral, saved in EDMS – found under the ‘Safeguarding’ tab as a clinical note.

Further information about the Paediatric Liaison Service can be found in the SCH Policy “Information Sharing between Paediatric Liaison Service & 0-19 Service Protocol”

(Section 6.3 reviewed by Dr A Smith, June 2020)
(Section 6.3 reviewed by Dr D O’Donnell, April 2015)
6.6 WHEN TO STOP RESUSCITATION

A. ALGORITHM
B. WHEN TO STOP RESUSCITATION
C. CHILDREN WHO HAVE BEEN RESUSCITATED BUT DEATH IS INEVITABLE

A. ALGORITHM
If a child is being resuscitated when brought into ED or if a child is brought in and may be "resuscitatable", then follow this process:

BEING RESUSCITATED → "RESUSCITATABLE"

CONTINUE WITH RESUS AND ASSESS CHILD
START RESUSCITATION AND ASSESS CHILD

CALL CRASH TEAM AND ED MIDDLE GRADE OR CONSULTANT IF AVAILABLE

GET ALL AVAILABLE INFORMATION ON CHILD
e.g.
- History from paramedic
- History from parent/carer.
- Hospital records.
- Limitation of treatment agreement (LOTA).

CONTINUE WITH RESUS
DECISION TO STOP RESUS AND CERTIFY DEATH (see section B below)

See ED Guideline 6.7 Child Death in ED
6.6 WHEN TO STOP RESUSCITATION

B. WHEN TO STOP RESUSCITATION

The team involved in resuscitating a child, led by the team leader (usually the ED/Paediatric SpR) should make the decision to stop resuscitating when it becomes apparent that the attempt is futile.

Cardiac arrest in children has a very poor prognosis and those few who survive often have severe and permanent neurological deficits. Those who arrest out-of-hospital and arrive pulseless and apnoeic have little chance of intact neurologic survival especially if the arrest has been greater than 20 minutes. Prolonging a futile resuscitation is unfair on the child’s family who may have unrealistic ideas about the chance of recovery.

The team should consider stopping (or not starting) resuscitation attempts:

- After 20 minutes of asystolic arrest
- After 20-30 minutes of refractory VF or PEA when reversible causes have been corrected/ruled out
- If there are signs that suggest prolonged pre-hospital arrest (e.g. rigor mortis, post-mortem lividity)

Resuscitation may need to be prolonged in the following circumstances as there is a higher chance of successful outcome (seek senior/PICU advice):

- Hypothermia (continue until core temp at least 32 degrees).
- Drowning
- Tricyclic antidepressant overdose (and some other instances of poisoning)
- After thrombolysis treatment given for suspected massive PE

C. CHILDREN WHO HAVE BEEN RESUSCITATED BUT DEATH IS INEVITABLE:

When a child is successfully resuscitated but death is predictable, please inform the child death Joint Agency Response team (See ED Guideline 6.7)


(Section 6.6 updated by Dr A Smith, July 2020)
6.7 CHILD DEATH IN THE EMERGENCY DEPARTMENT

A. INTRODUCTION

Most deaths in the ED are unexpected. This guideline should be used in the event of an unexpected death. For an expected death please refer to the Trust guidance:
http://nww.sch.nhs.uk/judownload/0_1594549662_jFZpSP/1922v2_0120_child_death_review_guideline_MERGED.pdf

B. DEFINITIONS

Unexpected death is defined as:
- The death of an infant or child (less than 18 years old) not anticipated as a significant possibility for example, 24 hours before the death.
- The death of an infant or child following an unexpected collapse or incident leading to / or precipitating the events which led to the death.

Examples of unexpected deaths include sudden unexpected deaths in infancy or childhood (SUDI/SUDC) with no immediately apparent cause; deaths from external causes for example, accidents; deaths of children detained under the Mental Health Act; and deaths where the initial circumstances raise suspicions that the death may not have been natural.

Joint Agency Response (previously known as the “rapid response”):

Unexpected child deaths all require a Joint Agency Response (JAR), which will involve the on-call health professional for unexpected deaths (SUDIC doctor / nurse). All such deaths will require a police investigator and duty social worker to be contacted immediately.

The Joint Agency Response is the coordinated multi-agency response which should be triggered if the child’s death is:
- Due to an external cause
- Is sudden and there is no immediate apparent cause
- Occurs in custody / if child is detained under Mental Health Act
- Where the initial circumstances raise suspicions that death may not have been natural
- In the case of a stillbirth where no health professional was in attendance

The Joint Agency Response should also be triggered if children are brought to hospital near death, are successfully resuscitated but are expected to die in the following days. Triggering the JAR should be considered after resuscitation when child is referred to PCCU. The team accepting the child should make the JAR referral.
6.7 CHILD DEATH IN THE EMERGENCY DEPARTMENT

C. DEATH IN THE ED

No child considered to have died unexpectedly should be examined in the ambulance. All such children must be brought into the Department to facilitate a thorough assessment of the child and care of the family.

In the initial assessment of the child presenting unexpectedly dead or moribund, resuscitation in the ED will usually be instituted according to Advanced Paediatric Life Support protocol, until an experienced doctor (can be paediatric specialist trainee ST4+, consultant paediatrician, emergency medicine specialist trainee ST3+ or consultant in emergency medicine) has made a decision that it is appropriate to stop (see ED guideline 6.6)

In all cases the consultant paediatrician on call should be notified of the death immediately. The ED consultant should be notified when appropriate to do so.

Clothes and nappies of child: When clothes, nappies etc are removed they should be stored in individual labelled paper bags and kept with the child initially.

Following any resuscitation the team lead should ensure all staff are offered support before they return to other duties. This might be done formally later or as a ‘hot/at the time’ debrief. The debrief leader should document any key learning points and recommended actions. As part of their investigation the key worker/ SUDIC Paediatrician / nurse should contact the debrief leader to ensure recommended actions are fed into the “the Final Case Discussion”.

D. PARENTS

Care of the parents should be considered an utmost priority. The parents may stay with the child, or remain in the Quiet Room, according to their wishes. In either case, a member of staff must be dedicated to their care. Always consider the need for an interpreter if the family are from a minority ethnic group.

The most senior doctor available should speak to the parents. Remember you are dealing with people who are in the first stage of grief. They may be shocked, numb, withdrawn, or hysterical. Ask if they wish anyone to come to be with them. Ensure you use the child’s name at all times. Always handle the child as though s/he were alive. Tell them gently that the child has died. Avoid technical terms and jargon and, when giving information, check it has been understood by the parents.

It is entirely natural for a parent/carer to want to hold or touch the dead child. Providing this is done with a supportive professional (such as a police officer, nurse, mortuary staff or Bereavement Coordinator) present, it should be allowed in most cases, as it is highly unlikely that forensic evidence will be lost. If, however, the death is by this time considered suspicious, the Senior Investigating Officer should, where possible, be consulted before a parent/carer is allowed to hold the child.

The most senior paediatrician available should record history and background information in as much detail as possible and without delay, in particular, detailed history of last few days and in particular the last 24 hours, when the child was last seen alive, actions and circumstances of the parents when the child was found. Record carefully who the history is taken from (name and relationship to child) and what each person says about the circumstances leading up to the death. This includes both early explanations and also later comments, which may produce conflicting accounts. Bear in mind that, history-taking does not need to be a one-off process, and the taking of further detailed medical and family history may be taken at a later stage such as at the initial home visit.
6.7 CHILD DEATH IN THE EMERGENCY DEPARTMENT

Ask parents who they would like to be informed, e.g. partner, grandparents, religious leader. Take into account any religious and cultural beliefs that may have an impact on procedures and handle discussion of these with sensitivity, but with due regard to the importance of preserving evidence.

Explain to the parents that all cases of sudden unexpected death must be referred to the coroner. Explain sensitively to the parents that the coroner has to find out the cause of death and is likely to direct that a post-mortem examination will take place and that there may also be an inquest, (see section I below). The police may wish to have the child identified or visit the home to help the coroner. This is not an indication that the parents are suspected of being responsible for the death.

Explain to the parents what will happen next, where their child will be taken and when they will be able to see him/her again. The Mortuary Staff and the Bereavement Care Coordinator will help and support them over the coming days. Provide contact names and numbers for the hospital mortuary / bereavement support coordinator (usually Trudy Donn Mortuary Manager or Anatomical pathology technician (APT on call.) and if possible introduce the family to the bereavement team who will guide and support the parents through the arrangements over the next few days. In normal working hours the Bereavement Support Coordinator can be contacted on 53317 to come and support the family or staff until the child is transferred to the Bereavement Suite.

Explain that there is likely to be a “joint agency response” and that a paediatrician / senior nurse will be contacting them at home later. This is usually done in conjunction with the Senior Investigating Officer from the Police. Social Care will be routinely informed.

Health staff in ED should offer the family the option of arranging mementos such as handprints. This should be done sensitively and may not be wanted by all. The mementoes are performed after the child is transferred to the bereavement suite. If there are suspicious circumstances surrounding the death, the taking of mementos should be discussed with the investigating officer, as it may be appropriate to delay this until after the post-mortem examination.

Tell them that the GP and the Liaison Health Visitor will be informed.

Explain that all child deaths are reviewed by the Sheffield Child Death Overview Panel.

Ask the parents where they are going and document the address, contact telephone number, who will be with them (they should not be alone), how they will get there safely (they may need hospital transport).

Leaflets are available in the bereavement pack to reinforce what you have said, including leaflets that explain the roles of hospital / coroner / voluntary agencies, etc.

Provide relatives with all relevant information leaflets including NHS England’s leaflet; “When a Child Dies: a guide for parents and carers,” (see bereavement pack) and contact telephone numbers for the Bereavement suite.

E. EXAMINATION AFTER DEATH

After certifying the child to have died, a thorough physical examination should be carried out by the most senior Paediatrician available and be carefully documented in the Child Death Proforma for ED, found in the bereavement pack in the ED resuscitation room. It should include all positive and negative findings including:

- General state including cleanliness, clothing, nutrition, evidence of dehydration, and rashes
6.7 CHILD DEATH IN THE EMERGENCY DEPARTMENT

- Post-death changes, such as presence and site of dependent lividity, position and rigidity, as well as evidence of frothy blood-stained fluids from the airways.
- Signs of injury (full physical examination), such as marks, abrasions
- Examination of the retina
- Core temperature (rectal thermometer)
- Weight and head circumference

Document the following:
- Swabs taken if appropriate, e.g. nose, throat, eyes
- All sites of intervention eg venepuncture / needle insertion sites on a body chart

IV / IA / IO lines should only be removed following discussion with the police
ETT can be removed after correct placement confirmed by direct laryngoscopy, preferably by someone other than who inserted it, and after discussing with police / coroner. Document the ETT site and size.

Following interview with the parents and examination of the child the senior paediatrician must complete the Immediate Decision Making Proforma Following a Child Death found in the bereavement pack in the ED resuscitation room.

F. INVESTIGATIONS
During resuscitation, medical sampling may be taken according to medical needs. Once child has been confirmed dead, different rules apply to the taking of medical samples. All sampling should be done in Human Tissue authority (HTA) – licensed premises. In ED this is the resuscitation room.

If it is a normal working day no investigations are needed in the ED as all investigations will be done by the pathologist.

On a non-working day the medical team should attempt a single femoral vein / artery aspiration for blood culture. If the history suggests asthma or anaphylaxis, then tryptase, IgE and FBC should also be taken. All other sampling will be taken in the mortuary.
Any stool / urine passed should be sent for bacterial culture and virology.

The exception to the above is where the death is clearly unnatural / criminal (as in these cases samples must be collected with “chain of evidence”). In these cases there should be discussion with the pathologist / police senior investigating officer. The child should be examined thoroughly and examination findings can be documented according to the Child Death Proforma for ED, found in the bereavement pack in the ED resuscitation room. The police investigator should be present while this happens. Ensure the name and contact details of the police investigator are documented.

G. TWINS AND MULTIPLES
Twins and multiple pregnancies have a higher risk of SIDS compared to singletons. When one twin dies from SIDS, the surviving twin should be admitted for at least 24 hours. Investigations to exclude infection, inherited metabolic disease or underlying cardiac condition should be undertaken. Arrange follow up support with the “Care of the Next Infant” (CONI) programme (see ED guideline 3.6)

H. ACTIONS TO BE TAKEN AFTER THE PARENTS HAVE LEFT
The senior paediatrician should ensure the following actions have been taken:-
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- Obtain agreement for the child to be moved to the mortuary from the Senior Investigating Officer (Police)
- Ensure police details and contact numbers are noted.
- Consider if referral to the Coroner is necessary using the Coroner’s referral checklist found in the ED bereavement pack. If referral is needed notify the coroner in writing using the Coroner’s referral letter found in the ED bereavement pack.
- Ensure the relevant people are informed to start the Joint Agency Response for a child death. (see section J below)
- If there are child protection/safeguarding concerns inform the Named Nurse and Named Doctor for Safeguarding
- Fully complete the Initial notification of child death to CDOP using the eCDOP initial notification. [https://www.ecdop.co.uk/SouthYorkshire/Live/public](https://www.ecdop.co.uk/SouthYorkshire/Live/public)
- Inform the GP to support the family.
- Inform the Paediatric Liaison Nurse - Bleep 159, ext. 17312 (confidential 24 hour voicemail available), and the community midwife, via the community liaison officer at the Jessop Wing, ext. 68020 (confidential 24 hour voicemail available if applicable).
- Ensure both the Child Death Proforma and the Immediate Decision Making Proforma are with the ED records so they can be uploaded to eDMS

I. THE CORONER

The coroner must be informed where the cause of death is unknown or where the death meets any other criteria for referral, see coroner referral checklist in the ED bereavement pack. Referrals should be made to the senior coroner in writing using the Coroner’s referral letter also found in the ED bereavement pack.

The coroner will direct a post mortem examination and has control of the body. Mementoes and samples outside the terms of this protocol should not be taken without prior consultation with the coroner. This does not apply to any samples taken during resuscitation. The coroner does not need the consent of the family to order a post mortem. As consent of the family is not required, it should not be sought. The family can be reassured any samples cannot be used for any purpose other than the post mortem. In a coroner’s post mortem the major organs will be removed and examined. Samples of tissue and fluids will be taken for later detailed inspection. The organs are then returned to the body (although they cannot be returned to their original position). The samples of tissue taken for testing are under the ruling of the Coroner until he has completed his investigation. Consent will then be sought from the family regarding retention / disposal of these samples. Consent is sought by either the Coroner’s officer or one of the bereavement suite team. N.B. It must be remembered the police have the power to seize tissue as part of a criminal investigation.

J. JOINT AGENCY RESPONSE

A team of consultant paediatricians (Child Assessment Unit / Community) and nurses cover a rota coordinating the Joint Agency Response (JAR) to the child’s death. This rota is kept in ED, switchboard and with the 524 bleep holder and operates from Monday – Friday 9am-5pm, and weekends and bank holidays during stipulated hours. Once the SUDIC Paediatrician / nurse has been made aware of the child’s death, they will co-ordinate a home visit to the family in conjunction with the police. The scene of death will be viewed, and a detailed medical and family history is obtained. Out of hours, the scene will be viewed by police, and a subsequent joint police / Paediatrician / SUDIC nurse rapid response will occur in hours.

The SUDIC Paediatrician / nurse will provide a report from the JAR visit for the Coroner, Pathologist, Senior Investigating Officer, CDOP Manager and the Designated Doctor for Child Deaths. A report will
6.7 CHILD DEATH IN THE EMERGENCY DEPARTMENT

also be provided to the Trust Governance Department in circumstances where the child is already under Children’s Hospital care.

The SUDIC Pediatrician / nurse will be the Lead Health Professional to coordinate the health response for the family, and will ensure the family are supported and updated as appropriate.

For further details see http://nww.sch.nhs.uk/departments/child-death/#Unexpected

References


(Section 6.7 reviewed by Dr A Smith, July 2020)
(Section 6.5 reviewed by Dr Clare O’Connell April 2017)
(Updated by Dr E Jones with input from Simon Torr Police District Commander Aug 2012)

[The following info leaflets are available – No. 45 – The Chaplaincy Team,
No. 52 – Information for parents following the death of their child,
No. 86 – What happens after death]
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