Resuscitation and Deteriorating patient
Information Package

Resuscitation Department
01/09/2017

Emergency telephone number: 2222

Contact information:
Resuscitation Officers: Bleep1447
Bleep1448
Bleep1748
Bleep1664

Resuscitation Office: ext: 8453/7218/3862

For booking of ALS, ILS or PILS please contact: EducationCentre@whht.nhs.uk

This pack should be used as preparation for the mandatory resuscitation and deteriorating patient drop-in session.
Medical Staff

It is important you read sections 1, 2 & 4

If you see paediatrics – no matter how seldom - you also need to read section 3.

Nurses, Midwives, Allied Healthcare Professionals & HCA’s

Please read through section 1 & 2

If you see paediatrics – no matter how seldom - you also need to read section 3.

Section 4 contains important information for clinical staff.
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SECTION ONE

GENERAL INFORMATION
Welcome to West Herts Hospitals Trust. The information in this pack is essential information relating to the identification of deterioration and resuscitation of patients within this Trust.

All clinical staff should attend annual resuscitation update training – regardless of ILS/ALS qualification.

FY1 doctors should attend one of the Watford General Hospital Resuscitation Council (UK) ALS courses either during the “Preparation for Practice” within their F1 year.

All other medical staff should attend a deteriorating patient and resuscitation drop-in session within two weeks of commencing employment within the Trust. These sessions take 30-45 minutes (60 minutes if paediatrics included). Time-slots can be booked via the medical education centre staff.

Nurses, Midwives and AHPs should attend a deteriorating patient and resuscitation drop-in session – dates and pre-learning material as well as a video demonstration of adult BLS are available at:

http://www.westhertshospitals.nhs.uk/training/resus_bls.asp

The drop-in includes a BLS and defib assessment as well as completion of an MCQ paper which should be done on-line before attending the session – please bring evidence of completion with you.

There is a video demonstration of adult BLS on the training department website which should be watched as preparation for the drop-in.

It is strongly recommended that staff who are required to take observations complete the NEWS e-learning module before attending a drop-in:

https://tfinews.ocbmedia.com/

This package should also be read as preparation for the drop-in.

Please do not hesitate to contact us if you have any questions or would like a brief orientation/update of the equipment or resuscitation procedures.
Policies and procedures within West Hertfordshire Hospitals NHS Trust.

There is no specific legislation relating to resuscitation practice and training.

However, West Hertfordshire Hospitals NHS Trust follows current Resuscitation Council (UK) evidence-based guidelines for the resuscitation of adults, children and neonates.

The “Resuscitation and Identification and Management of the Deteriorating Patient” policy can be accessed via:


There is a specific “Newborn Resuscitation Guideline”, accessed via:


The “Do Not Attempt Cardiopulmonary Resuscitation” policy can be accessed via:


Staff should be conversant with any policy that is applicable to their area of work.
**Recognition of the deteriorating patient and Early Warning Scores**

Observations should be recorded on the appropriate observation chart for the patient; NEWS (adults), PEWS (paediatrics), neonatal early warning score (used for newborns) or MEOWS (obstetrics).

These forms are designed to assist in the identification of a deteriorating patient. However, the form may not identify deterioration in a patient that has a chronic condition (e.g., chronic obstructed pulmonary disease) or has normally altered physiology (e.g., hypertension). Therefore, trends in a patient’s observations (e.g., increasing respiratory rate, dropping blood pressure etc) are invaluable in identifying the deteriorating patient.

If there is any concern over a patient’s condition – regardless of the observations – senior help should be summoned.

Patients that “trigger” an early warning score should also be escalated using the guidance on the form.

Common errors on observation charts include; missing observations, not scoring oxygen administration (NEWS chart), adding scores up incorrectly and lack of documentation regarding escalation.

Any sick patient (adult, paediatric or obstetric), should be assessed using the ABCDE approach:

- Airway – patency (is it clear, at risk or obstructed)
- Breathing – rate, saturations, signs of respiratory distress
- Circulation – blood pressure, pulse (taken manually), capillary refill
- Disability – conscious level (AVPU), pupils, blood glucose
- Exposure – wounds, drains, rashes, temperature etc

More advanced assessment may be possible depending on staff skill level (e.g., auscultation of the chest) or patient location (e.g., urine output, invasive arterial pressure monitoring) and more basic assessment may be necessary in areas that do not have access to monitoring equipment (e.g., outpatient clinics) or where staff have basic assessment skills (e.g., occupational therapists, radiographers etc).

Further reading:

## Cardiac arrest teams

### Watford - Adult:

<table>
<thead>
<tr>
<th>Hours</th>
<th>Area</th>
<th>Team</th>
<th>Members of Team</th>
</tr>
</thead>
<tbody>
<tr>
<td>WEEKDAYS (09.00 - 21.00)</td>
<td>ALL AREAS OF THE HOSPITAL (includes public areas) If call goes out for arrest in A&amp;E or CDU then RED TEAM will attend</td>
<td>A&amp;E RED TEAM</td>
<td>AAU SpR AAU SHO 1 AAU SHO 2 AAU SHO 3</td>
</tr>
<tr>
<td>ALL NIGHTS (21.00 - 09.00)</td>
<td>AAU level 1 only</td>
<td>A&amp;E RED TEAM</td>
<td>AAU SpR AAU SHO 1 AAU SHO 2 AAU SHO 3</td>
</tr>
<tr>
<td>AND WEEKENDS (24 hours)</td>
<td>ALL AREAS OF THE HOSPITAL except AAU level 1 (includes public areas) If call goes out for arrest in A&amp;E or CDU then YELLOW TEAM to attend</td>
<td>PMOK YELLOW TEAM</td>
<td>ALL NIGHTS: PMOK SPR PMOK SHO AAU SHO 3 PMOK FY1 WEEKEND DAYS: PMOK SPR PMOK SHO 1 PMOK SHO 2 PMOK FY1</td>
</tr>
<tr>
<td>DAY &amp; NIGHT WEEK DAY AND WEEKENDS</td>
<td>A&amp;E/ and support for CA teams in public areas of the hospital</td>
<td>A&amp;E TEAM</td>
<td></td>
</tr>
</tbody>
</table>

### RED TEAM

<table>
<thead>
<tr>
<th>Doctor</th>
<th>Bleep number</th>
<th>Doctor</th>
<th>Bleep number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical Registrar</td>
<td>1470</td>
<td>Medical Registrar</td>
<td>1472</td>
</tr>
<tr>
<td>AAU SHO 1</td>
<td>1638</td>
<td>PMOK SHO 1</td>
<td>1643</td>
</tr>
<tr>
<td>AAU SHO 2</td>
<td>1637</td>
<td>PMOK SHO 2</td>
<td>1644</td>
</tr>
<tr>
<td>AAU SHO 3</td>
<td>1639</td>
<td>PMOK SHO 3</td>
<td>1639 (dual cover from red team)</td>
</tr>
<tr>
<td>AAU FY1</td>
<td>1640</td>
<td>PMOK FY1</td>
<td>1642</td>
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</tbody>
</table>

Spare bleep 1641 (kept in Resuscitation Officers office)
An anaesthetist also attends cardiac arrest calls along with an ODP, as well as an outreach nurse, porter and resuscitation officer (when available).

Should the patient's own medical team or a surgeon need to be consulted, they can be fast-bleeped via 2222.

For arrests in unusual areas, a defibrillator and other equipment is brought by the attending nurse and doctor from A+E.

**Paediatric:**
The paediatric cardiac arrest team consists of; SpR, FY2s, senior paediatric nurse, anaesthetist, ODP, porter, resuscitation officer (if available)

**Maternal:**
The maternal cardiac arrest team consists of the adult cardiac arrest team, the obstetric team and neonatal team.

**Cardiac arrest team leaders must hold a valid Resuscitation Council (UK) advanced life support provider certificate appropriate to their specialty (adult or paediatrics).**

Cardiac arrest bleeps are tested between 09:30 and 10:30 each morning. If you have not received a test bleep before 12:00, please check your bleep with switchboard.

**St Albans City Hospital:**

Resident Surgical Officer (RSO)
Anaesthetist and ODP (Mon - Fri 9am – 8pm) – If available
Porter and Senior Nurse carrying bleep for that area
A nurse from Minor Injuries may attend with an AED - If available

The RMO is expected to act as a team leader. An emergency ambulance should also be called via switchboard on 4001 after the 2222 call.

**Hemel Hempstead General Hospital:**

There is no cardiac arrest team as such at Hemel Hempstead - although the cardiac arrest call should be activated via 2222. An emergency ambulance should be summoned via switchboard on extension 4001 after the 2222 call.

A nurse in the Urgent Treatment Centre (UTC) carries a cardiac arrest bleep and will attend – bringing with them an AED and a doctor from UCT, if possible.

Any other cardiac arrest bleep holders that are present on the Hemel Hempstead site (eg resuscitation officer) will attend.
Defibrillators

There are four types of defibrillators within this Trust and they all have semi-automated defibrillation (AED) facilities built in.

All defibrillators in WHHT are operated using the 1, 2, 3 system.

1 – Switches defibrillator on (all defibs) and selects energy (manual mode only)
2 – charges defibrillator (AEDs do this automatically)
3 – delivers the shock (all defibs)

Philips FR2.

This is an AED which displays the rhythm. This is on most wards and departments in the PMOK building. These are now no longer available and will be gradually replaced by the FR3. This defibrillator can be put in manual mode by simultaneously pressing both the blue buttons to the right of the LCD screen.

<table>
<thead>
<tr>
<th>Adult/Child Defib Pads for FR2</th>
<th>Paediatric Defib Pads for FR2</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;8 years old</td>
<td>&lt;8 years old</td>
</tr>
</tbody>
</table>
**Philips FR3**

This is the FR3 defibrillator and is gradually replacing the FR2 defibrillators. Both Adults and Paediatrics use the same pads with a pink key inserted if the patient is <25kg (<8 years old)
Aldenham ward, Flaunden ward, Stroke Unit and all other acute areas for example ITU, CCU, A+E and AAU have a manual defibrillator (Philips MRX or XL+) with monitoring, external pacing and AED facility.

**Philips MRX**

**Philips XL+**

<table>
<thead>
<tr>
<th>Adult/Child defib pads are used for &gt;10kg (&gt; 1 years old). Can be used in manual or AED mode.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infant defib pads are used for &lt;10kg (&lt; 1 years old). Can be used in manual or AED mode (XL+ only).</td>
</tr>
</tbody>
</table>

It is your responsibility to ensure that you know how to use the defibrillators in your clinical areas.

If a defibrillator fails, get the defibrillator from the neighbouring ward.
Administration of oxygen.

Oxygen (O₂) is a drug and therefore requires prescribing in all but emergency situations. The prescription will incorporate a target saturation range.

Oxygen cylinders should only be used when a pipeline is not accessible.

A piped oxygen outlet looks like this:  
A piped air outlet looks like this:

Oxygen flowmeters only fit oxygen outlets and air flowmeters only fit air outlets. However, oxygen tubing can easily be attached to the wrong flowmeter. Therefore, it is extremely important that a careful check is made that the oxygen tubing is connected to the correct flowmeter.

Air flowmeters must be removed from outlets when not required in order to reduce the risk of incorrect administration of air instead of oxygen.

Where present, air flowmeters must have an “Airguard” attached (see below)

An incorrect connection may result in a patient being given 21% oxygen instead of 100% oxygen, causing severe injury or death.
If the oxygen tubing is not long enough to reach the flowmeter, replace the entire length of tubing with an adequate length of oxygen tubing – DO NOT make ad-hoc connections between lengths of oxygen tubing due to the risk of disconnection.

Procedure for checking an oxygen cylinder

1. Check that the correct cylinder is in the trolley. Also check that the cylinder is securely located in the trolley.

2. Check the expiry date on the label attached to the cylinder.

3. Ensure the flowmeter is turned off.

4. Turn the cylinder valve on.

5. Check the contents gauge to ensure that there is at least a quarter of a cylinder of gas remaining – if there is less, a replacement cylinder should be requested from the portering department.

6. Turn the cylinder off and check that the contents gauge needle does not fall. If it does, check for leaks by listening and feeling around the cylinder valve.

7. Turn the flowmeter on to empty the contents gauge – the needle should fall to zero. There should be a free flow of gas from the flowmeter outlet. Once empty, close the flowmeter.

8. If there are any faults/leaks detected on the flowmeter, the biomedical engineering (EBME) department should be contacted. NEVER USE OIL, GREASE OR ADHESIVE TAPE ON ANY PART OF THE CYLINDER OR VALVE.
We have the following cardiac arrest drugs available:

**On all cardiac arrest trolleys:**

Adrenaline 1:10000 1mg (10mls) x 6

**Adult 2\textsuperscript{nd} line drug box (only available in selected areas – see below):**

Atropine 3 mg in 10 mls x 1
Calcium Chloride 1G in 10mls x 1
Amiodarone 300mg in 10 mls x 2
Magnesium sulphate 50% - 4mmols/2ml ampoules
Sodium bicarbonate 8.4% - box of 10 x 1mmols ampoules

Please note: we use calcium chloride within WHHT for treatment of severe hyperkalaemia, not calcium gluconate. Asking for calcium gluconate in an emergency will cause delays.

2\textsuperscript{nd} line drug boxes are only available in the following areas:

**Watford:**

Aldenham Renal Unit
Letchmore Delivery suite
Acute Stroke Unit Katherine
AAU 1 - Green/Purple Elizabeth
AAU 2 – Day ward Shrodell’s - Tudor ward
AAU 3 - Green/Purple Granger suite – Bluebell ward
AAU red Ambulatory Care Unit

**St Albans City Hospital:**

Delamare Renal Unit
Out-of-hours emergency drug cupboard

**Hemel Hempstead:**

Urgent Care Centre

There are neonatal drug boxes in neonatal areas. There are no specific paediatric drug boxes as the drugs used in paediatric cardiac arrest are identical to those available on the adult cardiac arrest trolleys.

Laminated sheets detailing location of nearest second line drug boxes have been placed in all cardiac arrest trolleys.
Cardiac Arrest Record Form

A cardiac arrest record form should be completed after every cardiac arrest, peri-arrest and false alarm. Once completed, the yellow original should be placed in the clinical notes and the white carbon copy sent to the resuscitation department. The yellow original is the medical notes for the cardiac arrest and should reduce the amount that needs to be written in the clinical notes.

The information from these forms are entered on both the Trust database as well as the National Cardiac Arrest Audit (NCAA) database, administered by the Intensive Care National Audit and Research Centre (ICNARC).

It is vitally important forms are completed for all cardiac arrest and peri-arrest calls, even if it transpires to be a false alarm.

A form should also be completed for out-of hospital cardiac arrests arriving in the emergency department.
Do Not Attempt Cardiopulmonary Resuscitation (DNACPR) form guidance

Main features of the DNACPR form:

- One sided – aids completion.
- Triplicate copy;
  - Original in **front** of clinical notes
  - Discharge copy – to be given to patient or placed in the community notes on discharge **if it has been discussed with them by a member of the medical team**. Otherwise it should be sent to the GP with the discharge letter
  - Audit copy – send to resuscitation officer
The form is valid indefinitely unless stated otherwise. Therefore, a new decision does not have to be made and discussed with the patient on each admission. If there is no copy in the medical notes on admission, a new form must be completed.

This form is recognised by the ambulance service, care homes, GPs, Hospices etc. Patients may be admitted with one of these forms – or its predecessor, the East of England DNACPR form – check admission letter/community notes. If the existing form is valid, but is not a WHHT form, a new WHHT form should be completed, but another discussion with the patient or relatives should not be necessary.

The form can be completed by junior medical staff. For example, an FY2 may sign the form after discussing a patient with the registrar or consultant on the telephone. The form must then be endorsed by the responsible clinician (ideally consultant) at the earliest opportunity. In this situation, it is extremely important that it is documented in the clinical notes who made the decision and why the form was signed by junior medical staff. The decision rests ultimately with the consultant in charge of the patient’s care but may be made by a senior registrar (ST3 and above) and reviewed by the consultant at the earliest opportunity. Nurses cannot make DNACPR decisions unless they have received specialist competency-based training.

It is essential that DNACPR decisions should be discussed with the patient and/or relatives (with the patient’s consent), if at all possible. However, the DNACPR decision is a clinical one and difficulty in having this discussion should not delay the decision being made and form completed.

If the patient’s mental capacity to take part in the discussions regarding their ceilings of care is in question, then a mental capacity form including the best interests section must be completed specific to DNACPR (an MCA form must be completed for all DNACPR and TEP decisions). All efforts must be made to involve the family/carer/LPA. These can be found on the wards or printed from the intranet.

http://wghintra01/nursingandmidwifery/safeguarding/adults/documents/Mental%20Capacity/Capacity_and_Best_Interest_Assessment_forms.pdf

Please ensure a supporting entry is made in the clinical and nursing notes regarding any discussions that have taken place regarding the DNACPR decision and form. If a discussion has not taken place with the patient or relatives, a reason must be given both on the form and in the clinical notes.
The DNACPR form only relates to cardiopulmonary resuscitation. **All other appropriate treatment and care should still be given.**

It is each nurse’s responsibility to know the resuscitation status of his/her allocated patients. It should not be necessary to seek clarification from the medical notes if a patient is found in cardiac arrest. If there is any doubt regarding the resuscitation status of a patient, CPR should be commenced and the cardiac arrest call activated, whilst clarification is sought.

**Completion of the DNACPR e-learning module is mandatory for all medical staff that may be involved in DNACPR decisions:**

http://www.westhertshospitals.nhs.uk/training/optional_modules.asp

Treatment Escalation Plan (TEP)

This must be completed for ALL patients. The first question asks if they are at risk of deterioration or not. If ‘NO’ is ticked, the form can be stopped there, then signed and dated. If ‘YES’ is ticked, the second question should be answered. If the patient is for cardiopulmonary resuscitation, tick yes, stop the form there and sign at the bottom. If the decision has been made that the patient is not for cardiopulmonary resuscitation, tick no and complete sections 2A and 2B, then sign and date at the bottom. These should be completed by an ST3/SPR and above as soon as possible (preferably on admission) and endorsed by a consultant at the earliest opportunity.

A TEP is to promote timely, forward planning of ceilings of care for all patients.

If the patient’s mental capacity to take part in the discussions regarding their ceilings of care is in question, then a mental capacity form including the best interests section must be completed specific to a TEP (an MCA form must be completed for all DNACPR and TEP decisions). All efforts must be made to involve the family/carer/LPA. These can be found on the wards or printed from the intranet.

http://wghintra01/nursingandmidwifery/safeguarding/adults/documents/Mental%20Capacity/Capacity_and_Best_Interest_Assessment_forms.pdf
Mental Capacity Assessment (MCA) Form

This needs to be completed for all DNACPR and TEP decisions. It is not necessary to complete this form if the patient has capacity.

http://wghintra01/nursingandmidwifery/safeguarding/adults/documents/Mental%20Capacity/Capacity_and_Best_Interest_Assessment_forms.pdf
SECTION TWO

ADULT RESUSCITATION
Adult in-hospital resuscitation

**Collapsed/sick patient**

**Shout for HELP and assess patient**

**Signs of life?**

**NO**

- **Check for Danger**
  - Check for Response
  - Shout for help

- **Check/open Airway**
  - Check for Breathing
  - Check for signs of Circulation (if trained)

  **Dial 2222**, state “adult cardiac arrest” and exact location

  **Chest compressions:**
  - Centre of chest
  - 120/minute
  - 5-6cms depth
  - Allow full recoil

  **Breaths:**
  - Only 2 attempts after every 30 chest compressions

  **CPR 30:2**
  - With oxygen and airway adjuncts

  **Apply pads/monitor**
  - Attempt defibrillation if appropriate

  **Advanced Life Support**
  - when resuscitation team arrives

**YES**

- **Assess ABCDE**
  - Recognise and treat
  - Oxygen, monitoring, IV access

- **Call resuscitation team if appropriate**

- **Hand over to resuscitation team**

- **Once intubated:**
  - Continuous chest compressions and breaths at 10-12 per minute (asynchronous)
Adult basic life support follows the DRS ABC approach;

- **Danger** – on approach, check for hazards to yourself or the patient

- **Response** – talk to the patient and gently tap them on the shoulder, if no response to voice, try to get a response to pain - a trapezius muscle squeeze is best

- **Shout** – if the patient is unresponsive, shout for help and pull the emergency bell

- **Airway** – check for obstructions, then open the airway with a head-tilt, chin-lift or jaw thrust (in suspected neck injury)

- **Breathing** – look for chest rise, listen for breath sounds and feel for breaths and/or chest movement for no more than 10 seconds.
  - patient definitely breathing; consider recovery position, ensure help is on way and complete ABCDE assessment
  - patient not breathing; commence chest compressions
  - patient gasping/retching (agonal respirations) or unsure; commence chest compressions

  **Other signs of life should also be checked during this assessment; purposeful movement, eye opening, verbalising etc**

  **If trained and competent to do so, a carotid pulse can be palpated during the breathing assessment**

  **If no help has arrived at this point and cardiac arrest has been confirmed, the rescuer should leave the patient and summon help before commencing chest compressions**

- **Chest compressions** – centre of chest, 100-120/min, 5-6cms depth. Ensure elbows are locked straight and shoulders are over the top of the hands. Allow full recoil of chest between compressions. Set bed on CPR mode in order to attain optimum position and deflate mattress (if appropriate) before commencing chest compressions. Continue until help and equipment arrive, then commence 30:2 compressions:ventilations, pausing every 30 chest compressions for two attempts at ventilation using a bag-valve-mask.

Once the patient has been intubated (had an endotrachel tube inserted into the trachea) or had an i-gel inserted, asynchronous chest compressions at a rate of 120/min and ventilations at a rate of 10-12/min should be commenced. The means chest compressions are performed non-stop and the patient is ventilated (once every 6 seconds) whilst chest compressions are performed.

On discovering a collapsed patient, clinical staff should have the skills to recognise cardiac arrest, call for help, commence basic life support using airway adjuncts and provide defibrillation within three minutes (Cardiopulmonary Resuscitation – Standards for Clinical Practice and Training, Resuscitation Council [UK] 2008).

The most senior member of the nursing team who has the requisite skills to use the semi-automated defibrillator (AED) should apply it to the patient and deliver a shock - if instructed to do so by the AED. It is not necessary to wait for a member of the medical team to arrive before using the AED.

Defibrillator electrode application:
The standard positioning of defibrillation pads are; one pad under the middle of the right clavicle (collarbone) and the other pad one hand breadth below, and in line with, the left axilla (armpit).

Cautions:
- Hair - shave if pads do not adhere to skin
- Fluid/sweat - dry chest
- Electrodes, patches etc – remove
- Implanted pacemaker etc – pads should be at least 12.5cms away
- Jewellery – necklaces should be pulled up, away from pads, piercings should not usually a problem
- Chest drains/central lines etc – consider alternative position

Alternative pad positions :
- Both pads in mid-axillary line (side-to-side shocking)
- One pad on the front of the chest to the left of the lower half of the sternum (breast bone) and one pad on the back of the patient, just under the left scapula (shoulder blade). This is known as the anterior-posterior (A-P) position.

The aim is for the heart to be between the pads.

Safety issues:
- Free flowing oxygen should be at least one meter away when delivering a shock (risk of fire)
- There should be no direct or indirect contact with patient by any member of the team when a shock is delivered (risk of accidental shock)
- Do not attach a defibrillator to a patient lying in water (bathrooms, in the rain etc) – remove patient to dry area and dry chest before applying pads
Maternal cardiac arrest

Women who are more than 20 weeks into their pregnancy are treated following the same in-hospital resuscitation algorithm (page 21), with the following important modifiers:

- When placing the 2222 call, the words “Maternal cardiac arrest” instead of “Adult cardiac arrest” should be used
- The uterus should be manually displaced to the patient’s left side by either of the techniques shown below.

- At Watford General Hospital, the adult resuscitation team, the obstetric emergency team and the paediatric resuscitation team will attend maternal cardiac arrest calls.
- If a return of circulation is not achieved within 4 minutes of resuscitation attempts, the baby should be delivered by emergency caesarean section within 5 minutes of the onset of cardiac arrest. Emergency caesarean section packs can be found at the following locations;
  - Accident and Emergency – resuscitation room
  - Main theatres – level 6, Princess Michael of Kent wing
  - Delivery suite – maternity
  The caesarean section should be performed at the site of the collapse.
- At St Albans and Hemel Hempstead hospitals there is no specific response to maternal cardiac arrest calls – the patient should be transferred to the acute hospital site on arrival of the ambulance service

Resuscitation of patients with temporary or permanent tracheostomy

Temporary tracheostomy: The tracheostomy tube should be checked for patency and either suctioned or the inner tube removed. Patients with a temporary tracheostomy generally have a normal upper airway and can, therefore, be ventilated in one of two ways;

- Attach a bag-valve-mask to the tracheostomy tube and ask an assistant to seal the nose and mouth. If the tracheostomy tube is of the cuffed variety, the cuff may be inflated to make sealing the mouth and nose unnecessary.

- If the above method is ineffective – because either the tube is completely obstructed or displaced, for example – the tracheostomy tube can be sealed with a gloved finger and the patient ventilated normally via a bag-valve-mask applied to the patient’s face. In this case, **the cuff must be deflated (if present)**
Permanent tracheostomy (Laryngectomy): Patients with a permanent tracheostomy stoma have usually had major surgery to the neck (total laryngectomy, for example) and are also known as “neck-breathers”. Any oxygen therapy or ventilation must be applied to the tracheostomy stoma. If the patient requires ventilation – such as during cardiopulmonary resuscitation – a paediatric facemask should be attached to the bag-valve-mask in place of the adult mask. This mask is then placed over the tracheostomy stoma and ventilations commenced at a ratio of 2 attempts to 30 chest compressions. It is still necessary for an assistant to seal the nose and mouth during ventilations as the patient may have a one-way valve connecting the remainder of the patient’s airway to the oesophagus in order to allow modified speech.

Further reading: [http://www.resus.org.uk/pages/trachEm.htm](http://www.resus.org.uk/pages/trachEm.htm)
Alternate back blows and abdominal thrusts until the obstruction is relieved. If the patient becomes unconscious, CPR should be commenced – even if signs of a circulation are still present.

Further reading:

Anaphylaxis

**Resuscitation Council (UK)**

**Anaphylaxis algorithm**

- **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

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1. **Life-threatening problems:**
   - **Airway:** swelling, hoarseness, stridor
   - **Breathing:** rapid breathing, wheeze, fatigue, cyanosis, SpO₂ < 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

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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

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Anaphylaxis guidance

If a patient becomes acutely unwell following exposure to an antigen (medication, food, latex etc), the anaphylaxis algorithm should be followed and the patient assessed using the standard ABCDE approach.

If there is any suspicion of anaphylaxis, a peri-arrest call should be activated and the cardiac arrest trolley brought to the patient. In areas that do not have a cardiac arrest trolley, the emergency equipment and anaphylaxis pack should be brought to the patient.

Adrenaline administered intramuscularly (IM) is the first drug of choice, following the dosing guidance on the algorithm.

**IM adrenaline saves lives in anaphylaxis**

**High-flow oxygen should be administered as soon as possible**

**All other medications are second-line treatments**

Registered nurses, midwives, operating department practitioners, radiographers and other appropriately trained healthcare professionals working in high-risk areas are permitted to administer IM adrenaline without a prescription.

Only one life-threatening sign is necessary in order to administer IM adrenaline – eg swelling of the airway, severe bronchospasm, deteriorating conscious level etc.

**Anaphylaxis packs are available on all cardiac arrest trolleys.**

SECTION THREE

PAEDIATRIC RESUSCITATION
**Paediatric Basic Life Support Algorithm**

For anyone who sees paediatric patients in their job role, you will have theory and practical assessment in paediatric BLS

[Diagram of Paediatric Basic Life Support Algorithm]

- 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 resuscitation team
        - (1 min CPR first, if alone)
The paediatric BLS algorithm should be used for any patient who, on appearance, is a child. This is a personal judgement at the time if you are unsure of exact age of the patient.

Paediatric basic life support follows the DRS ABC approach:

- **Danger** – on approach, check for hazards to yourself or the patient
- **Response** – talk to the patient and gently touch them on the shoulder, if no response to voice, try tickling the soles of the feet or gently tugging the hair in front of the ear
- **Shout** – if the patient is unresponsive, shout for help and pull the emergency bell
- **Airway** – check for obstructions, then open the airway with a head-tilt, chin-lift or jaw thrust (in suspected neck injury). **In infants, place the head in the neutral position**
- **Breathing** – look for chest rise, listen for breath sounds and feel for breaths and/or chest movement for no more than 10 seconds.
  - patient definitely breathing; consider recovery position, ensure help is on way and complete ABCDE assessment
  - patient not breathing or gasping; attempt five rescue breaths

  **Signs of life should be checked after rescue breaths; purposeful movement, eye opening, verbalising etc**

  If trained and competent to do so, a carotid pulse (older child) or a brachial pulse (infant) should be palpated after successful rescue breaths

  - if child does not show signs of life following effective rescue breaths or if pulse is below 60bpm or if there is no chest rise with rescue breaths, commence chest compressions

- **Chest compressions** – 15 chest compressions - centre of chest, 120/min, 1/3 to 1/2 depth of the chest. Use either 2 fingers, heel of one hand or two hands as appropriate to size of the child. Continue a ratio of 2 ventilations to 15 chest compressions until the resuscitation team arrives. Stop after one minute of BLS, reassess signs of life and ensure help is on way. If there is any doubt that help has been summoned, go and activate the 2222 call yourself – if possible take the child with you.

Further reading: [https://www.resus.org.uk/resuscitation-guidelines/paediatric-basic-life-support/](https://www.resus.org.uk/resuscitation-guidelines/paediatric-basic-life-support/)
Paediatric Choking Algorithm

Assess severity

Ineffective cough
- Unconscious
  - Open airway
  - 5 breaths
  - Start CPR
- Conscious
  - 5 back blows
  - 5 thrusts (chest for infant)
  - (abdominal for child > 1 year)

Effective cough
- Encourage cough
  - Continue to check for deterioration to ineffective cough or until obstruction relieved
SECTION FOUR

OTHER IMPORTANT INFORMATION
Cardiopulmonary resuscitation in the prone position.

In areas such as the operating theatres and intensive care unit, staff may be required to resuscitate a patient in the prone position (face-down).

If a patient suffers a cardiac arrest, chest compressions should be started immediately and defibrillation performed as soon as possible in any clinical setting. This includes patients that are in the prone position.

Evidence suggests that chest compressions performed on patients in the prone position are at least as effective as those performed in the supine position (face-up), when performed correctly (1-9).

In order to perform CPR in the prone position, the patient must have a definitive airway in place (eg intubation) in order that ventilations can be performed. In situations where this is not the case, chest compressions should be continued until the patient can be safely turned onto their back.

Chest compressions:

The heel of the hand should be placed in the centre of the patients back at the level of the 7th thoracic vertebra – this is approximately between the scapulae. Any open wound should be temporarily covered with a sterile swab. The elbows should be straight and the shoulders directly over the hands. A step may be required to achieve the desired position.

Monitoring of end-tidal carbon dioxide is useful in monitoring the efficacy of chest compressions. An end-tidal CO2 of 2.0 - 2.5kPa during CPR should be achievable with high quality compressions.
Placement of defibrillation pads:

Defibrillator pads should be applied to the patient as soon as possible in either of the following ways;

1. Bi-axillary. Place one pad on each side of the patient’s chest, one hand breadth below the axilla in the mid-axillary line.

2. Posterior-lateral. One pad on the right scapula and one pad in the left mid-axillary line, one hand breadth below the axilla.

Defibrillation is then performed, if indicated, in the usual way.

References:


10. Management of cardiac arrest during neurosurgery in adults
Intraosseous access – EZIO

Resuscitation guidelines state that during cardiac arrest - if intravenous access is impossible within 90 seconds – intraosseous access should be attempted. The operating department practitioner (ODP) will bring the EZIO drill to the site of the cardiac arrest. EZIO training sessions are available via the resuscitation officers. Please see the resuscitation department intranet site for details. Alternatively, please contact one of the resuscitation officers for a one-to-one training session.

http://wghintra01/uploads/out/C159IntraosseousPolicy_v2.pdf
Implanted Cardioverter/defibrillators (ICDs) and ring magnets

Ring magnets are used to deactivate an ICD in an emergency. This does not affect any pacing functionality of the device.

Indications for deactivating an ICD include:

- Patient wishes
- Imminent death (emergency deactivation with a magnet).
- Patient no longer able to take anti-arrhythmic medications
- Worsening health due to comorbidity and deteriorating function

Patients in cardiac arrest with an active ICD will need a magnet to deactivate it. Alive patients out-of-hours who have a mis-firing ICD or who have a DNACPR in place - and therefore require ICD deactivation - will also need a ring magnet and correct paperwork completed by an ST3/SPR.

In hours (mon-fri 9am-5pm), the ICD should be deactivated by a cardiac physiologist and correct paperwork completed by the patients Consultant.

Please note it is not necessary to send the ring magnet with the patient to the mortuary. Once the patient is certified dead they will no longer require a ring magnet and it can therefore be removed.

Please note: When a magnet is used for emergency deactivation, arrangements should be made as soon as is practicable for definitive deactivation, using a programmer. Emergency ICD deactivation packs for use in this way are available in the Resuscitation Trolleys on AAU level 1 green/purple and AAU L3 green/purple, A+E resuscitation room, Red suite, Bluebell, Tudor, Elizabeth, ITU, Theatre level 6 PMOK, Letchmore, Aldenham, Stroke unit, Renal Unit, Gynae Theatre, Simpson ward at HHGH, De La Mare ward at SACH and from the Cardiac Physiology Departments Healthcare professionals who may need to undertake emergency ICD deactivation should ensure that they know where to access a magnet when necessary and complete the authorization form stored with the magnet.

This is the form to be completed in hours:

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This is the form to be completed out of hours or in an emergency situation:
Thrombolysis

If the cause of cardiac arrest is suspected to be thromboembolic (pulmonary or cardiac), Tenecteplase should be administered as a bolus (see below).

Please send a member of staff to AAU level 3, green/purple (cardiac care) to collect the RED THROMBOLYTIC THERAPY BOX containing Tenecteplase.

The staff member will be given two doses of Tenecteplase (Metalyse) 40mg and 50mg in a red box.

Tenecteplase can be administered as a rapid bolus as per medicines guide in the red box and should be administered on the basis of body weight.

The drug should be administered as a bolus over 10 seconds and CPR continued for at least 60 minutes after administration as recommended by current Resuscitation Council (UK) guidelines.

<table>
<thead>
<tr>
<th>Weight of patient</th>
<th>Dose</th>
<th>How do I give it?</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;60kg</td>
<td>30mg (6000 units)</td>
<td>6mls of the 8000 unit pack</td>
</tr>
<tr>
<td>60 – 70kg</td>
<td>35mg (7000 units)</td>
<td>7mls of the 8000 unit pack</td>
</tr>
<tr>
<td>70 – 80 kg</td>
<td>40mg (8000 units)</td>
<td>8mls of the 8000 unit pack</td>
</tr>
<tr>
<td>80 – 90kg</td>
<td>45mg (9000 units)</td>
<td>9mls of the 10000 unit pack</td>
</tr>
<tr>
<td>&gt;90kg</td>
<td>50mg (10000 units)</td>
<td>10mls of the 10000 unit pack</td>
</tr>
</tbody>
</table>

If patients in cardiac arrest are being thrombolysed then CPR must continue for 60-90 minutes. Collecting the automated chest compression device from A&E may be appropriate.

Automated chest compression device – Autopulse

In the event prolonged resuscitation is indicated (thrombolysis, hypothermia etc), the Autopulse device should be used to provide high-quality, consistent chest compressions. The device is kept in the emergency department in the resuscitation room. If requested, this will be brought to the location of the arrest and applied by one of the emergency department staff.

Pericardiocentesis

If the cause of cardiac arrest is suspected to be a cardiac tamponade, pericardiocentesis should be performed by experienced personnel after confirmation via fast scan or cardiac echo during a rhythm check. Chest compressions may need to stop whilst pericardiocentesis takes place.

Please send a member of staff to AAU level 3, green/purple (cardiac care) to collect the Pericardiocentesis box (blue) containing the equipment required.
**Targeted temperature management**

Patients that regain a spontaneous circulation but remain unconscious following cardiac arrest can have targeted temperature management commenced. This will be down to individual choice of the accepting ICU consultant.

If normothermia is opted for then the patient should be kept around the normal temperature of 36.8°C. Patients who become hyperthermic have very poor outcomes so this is not an option.

If the choice is to cool the patient, which has been shown in some studies of VF arrest patients, to provide neurological benefit then the patient should be kept cool (<35°C) for 24 hours in order to improve the chances of good neurological outcome. The patient must be intubated and ventilated and nursed in intensive care. Cooling may commence outside ITU, if there is any delay in transfer of the patient. The attending anaesthetist should oversee the cooling process and monitor the patient’s core temperature. The cooling equipment should be requested from ITU if there is any delay in transfer. There are three contraindications to therapeutic hypothermia – sepsis, active bleeding (inc intracranial haemorrhage) and haemodynamic instability attributable to the cooling process.