

# **Integrated Case Management Guidelines: The critically ill child**

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## Identify critically ill children on arrival

- The best system will depend on local circumstances. Opportunities for checking children occur:
  1. on arrival/at registration
  2. during weighing (when the children should be undressed)
  3. while waiting in the queue
- From brief inspection identify children who are obviously very ill, or who need an immediate closer look.

### **Some signs which suggest a very ill child:**

*Needs immediate attention i.e. stop whatever else you are doing*

- cyanosis
- unconsciousness
- lethargy
- floppiness
- convulsions
- severe chest indrawing
- stridor in a calm child
- dehydration
- purpura/petechiae

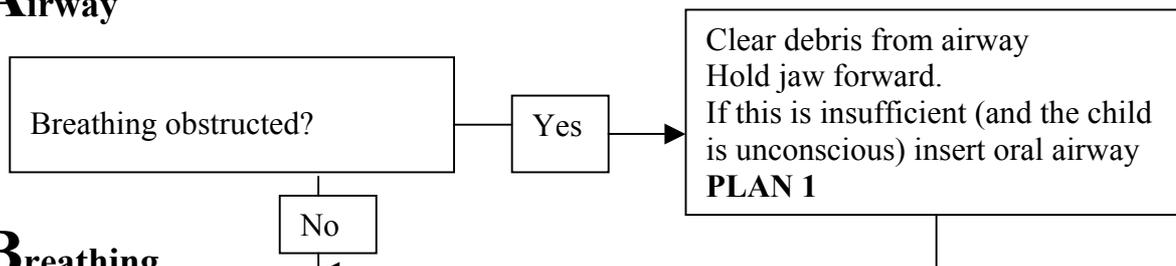
*Needs priority attention*

- not feeding
- fast breathing (without other danger signs)
- vomiting everything
- infants under 7 days
- history of toxin ingestion

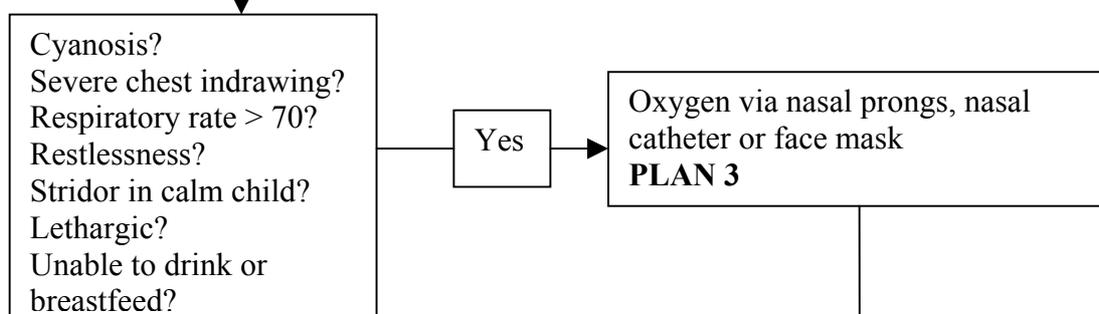
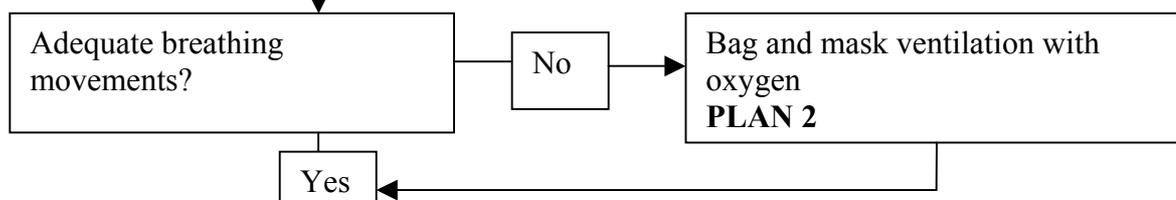
- **Children at risk for deterioration**  
Even if they look well, children with diarrhoea need to be observed and given oral rehydration solution while waiting to be seen.
- **Don't forget the caregivers**  
Remember that the caregivers will be extremely anxious. They need support.

## Algorithm for the management of the critically ill child

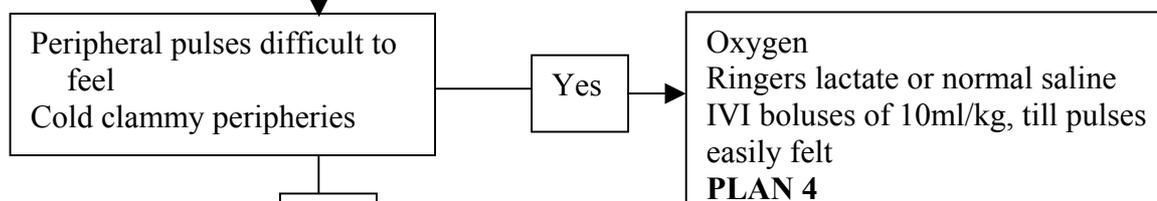
### Airway



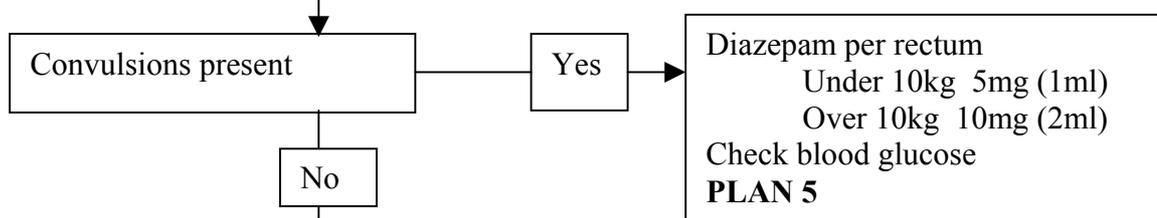
### Breathing



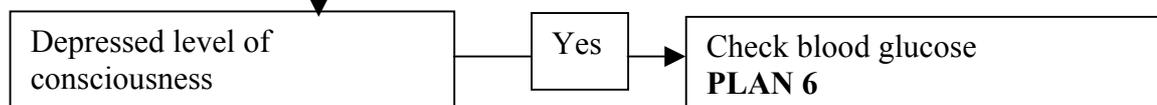
### Circulation



### Convulsions



### Consciousness



## Assessment

### Ask

- Has the child had a fit or been twitching?
- Was the child seen to play with or eat small objects?
- Was there a sudden unexpected coughing spell?

### Observe

- Are there adequate breathing movements?
- Is air moving? – listen for exhaled air  
– feel for air flow at the mouth
- Is the child having a convulsion?

### Examine

- Peripheral pulses difficult to feel?
- Cold clammy peripheries?
- Level of consciousness?
  - unrousable
  - rousable, but immediately goes back to sleep
  - conscious, or easily rousable
- Respiratory rate and chest wall movement?

## Management plan

| Clinical signs  | Classify As                            | Treatment Plan  |
|---|--|-----------------|
| <ul style="list-style-type: none"> <li>• Making breathing efforts, but no air moving</li> </ul>   | OBSTRUCTED<br>BREATHING                | ➤ <b>PLAN 1</b> |
| <ul style="list-style-type: none"> <li>• Not making adequate breathing movements</li> </ul>   | INADEQUATE<br>BREATHING                | ➤ <b>PLAN 2</b> |
| <ul style="list-style-type: none"> <li>• Making adequate breathing efforts and air moving, but:               <ul style="list-style-type: none"> <li><input type="checkbox"/> Cyanosis</li> <li><input type="checkbox"/> Severe chest indrawing</li> <li><input type="checkbox"/> Respiratory rate &gt; 70</li> <li><input type="checkbox"/> Restlessness</li> <li><input type="checkbox"/> Stridor in calm child</li> <li><input type="checkbox"/> Lethargic</li> <li><input type="checkbox"/> Unable to feed</li> </ul> </li> </ul> | RESPIRATORY<br>DISTRESS                | ➤ <b>PLAN 3</b> |
| <ul style="list-style-type: none"> <li>• Peripheral pulses difficult to feel</li> <li>• Cold clammy peripheries</li> </ul>  | POOR<br>CIRCULATION                    | ➤ <b>PLAN 4</b> |
| <ul style="list-style-type: none"> <li>• Having a convulsion</li> </ul>   | CONVULSION                             | ➤ <b>PLAN 5</b> |
| <ul style="list-style-type: none"> <li>• Unrousable or goes straight back to sleep after being roused</li> </ul>  | DEPRESSED LEVEL<br>OF<br>CONSCIOUSNESS | ➤ <b>PLAN 6</b> |

**REFER all children once stabilised**

## Management

### Plan 1: Obstructed breathing

- **Clear debris** (blood, vomitus, foreign body etc) from the airway by manual removal or suction
- **Hold the jaw forward.** If this is insufficient (and the child is unconscious), insert an oral airway.  
Airway sizes  
Choose the correct size by placing the airway next to the face. With the flange (front opening) at the corner of the mouth, the tip of the airway should reach the angle of the jaw. Insert the airway while a tongue depressor holds the tongue on the floor of the mouth. If a tongue depressor is not available, invert the airway and rotate it 180° into its proper position once it approaches the back of the nasopharynx.

### Plan 2: Inadequate breathing

- Give artificial **ventilation** with a resuscitation bag and facemask.
- Connect and switch on the **oxygen** supply.
- Hold the mask firmly over the mouth and nose, ensuring that there are no leaks. Lift the jaw forward and squeeze the resuscitation bag. If two people are available, one can use both hands to keep the airway open and the mask in place, while the other squeezes the bag.
- With each squeeze of the bag the chest should move up and down the distance of normal chest movement. It may be necessary to gently move the head and neck through a range of positions to find the best position for an open airway (if neck trauma not suspected). If this is not successful, consider re-suctioning the airway, insert an oral airway, re-check the position of the mask and jaw, and try again.
- **The chest wall must be moving before starting other treatment.**

### Plan 3: Respiratory distress

- Give **oxygen** or nasal prongs at 1-2 litres/min. Alternatively, pass an 8FG soft catheter into the nose to a depth equal to the distance from the side of the nose to the front of the ear, and strap securely. Feed oxygen through this at a flow rate of only 0.5-1 litre/min. If neither of the above are available, Give oxygen by a facemask without mixer, at 4 litres/min.
- Give **first dose of antibiotic** for pneumonia

|                       |                     |               |
|-----------------------|---------------------|---------------|
| Amoxicillin (25mg/ml) | 3 months-5 years    | 5ml 8 hourly  |
|                       | If weight over 20kg | 10ml 8 hourly |

## Plan 4: Poor circulation

- Give **oxygen** by facemask or nasal prongs.
- **Ringers lactate/normal saline solution** IVI (use 200ml bags)  
Give repeated boluses of 10ml/kg at a time until the pulses are easily felt (maximum 40 ml/kg)

Ask caregiver about the presence of diarrhoea, and check for other signs of dehydration. If there is a history of diarrhoea, or signs of dehydration are present, treat for diarrhoea (see Diarrhoea guideline).

### If an IV line cannot be put up immediately:

- ❑ An intra-osseous infusion (into the bone) is easy, and safe in children under 18 months. It can be inserted in an emergency by health personnel. For technique see Appendix 1.
- ❑ Emergency drugs may be given through the line. The patient may be transferred with the line in place. Remove the intra-osseous infusion as soon as another line can be set up.

## Plan 5: Convulsions

- Ensure adequate **airway** (see Plan 1).
- **Oxygen** by facemask or nasal prongs
- **Diazepam** per rectum
  - under 10kg: 5mg (1ml)
  - over 10kg: 10mg (2ml)Instil the IV preparation with a 1ml or 2ml syringe (and no needle!)
- Check *blood glucose*. If less than 2.6 mmol, treat as in Plan 6.
- Check for *meningitis*. Treat immediately, if suspected (see meningitis guideline)
- When stabilised, give **phenobarbitone** 15-20 mg/kg IMI as a single dose before transfer.

## Plan 6: Depressed level of consciousness

- Turn the child on his/her side (**coma or recovery position**).
- Ensure adequate **airway** (see Plan 1)
- Check **blood glucose**
  - If less than 2.6 mmol, infuse 10% dextrose 5 ml/kg over 15 minutes. Recheck the blood glucose. Once the hypoglycaemia is corrected, continue the IV infusion with 5% dextrose water or 1/2 Dextrose Darrows.
- Think of possible **causes** of the depressed level of consciousness
  - Shock*: check the pulses again
  - Meningitis*: if suspected, treat according to the meningitis guideline
  - Drugs/toxins*: ask the caregiver about medicines and insecticides at home
  - Post-ictal*: ask about twitching or jerking recently, and about a past history of convulsions
  - Head injury*: ask the caregiver, and look for signs of trauma. Beware of neck trauma.

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## Appendix 1 Technique for insertion of an intra-osseous infusion

### *Equipment:*

Use an 18 X 1.5 or 20 X 1.5 lumbar puncture needle (the short pink or yellow ones). If this is not available use a 15-18 gauge injection needle.

### *Technique:*

1. Put on gloves and cleanse the skin over the insertion site with an antiseptic solution.
2. Grasp the thigh and knee above and lateral to the insertion site with the palm of the left hand (if right-handed). Wrap the fingers around the knee to stabilise the proximal tibia. Do not allow any portion of your hand to rest behind the insertion site.
3. Find the site of insertion i.e. feel the tibial tuberosity. The site of insertion is 2 cm below this tuberosity on the broad *flat* medial surface of the tibia.
4. Insert the needle through the skin over the *flat* surface of the tibia.
5. Holding the needle low down near the skin, advance the needle through the bony cortex of the tibia, directing the needle perpendicular ( $90^{\circ}$ ) to the long axis, using a gentle but firm twisting or drilling motion.
6. Stop advancing the needle when a sudden decrease in resistance to forward motion of the needle is felt.
7. If a spinal needle is used, remove the stylet from the needle.
8. Slowly inject 10ml of normal saline through the needle. Check for any signs of increased resistance to injection, increased circumference of the soft tissues of the calf, or increased firmness of the tissue. (If an injection needle has been used, the needle might be blocked by a core of bone, which may need to be flushed through. The flow rate should rapidly increase after flushing through.)
9. If the test injection is successful, disconnect the syringe and join an infusion set to the needle. Secure the needle and tubing with tape and support it with a bulky dressing.
10. If the test injection is unsuccessful (i.e. infiltration of the normal saline into the leg tissue is observed), remove the needle and try again on **the other leg**.

### *Signs of successful insertion:*

- Sudden decrease in resistance to insertion as the needle passes through the bony cortex.
- The needle remains upright without support.
- Fluid flows freely through the needle without evidence of subcutaneous infiltration.

