

Paediatric Respiratory Physiotherapy

Paediatric Respiratory Team
Leeds General Infirmary

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Paediatric On call Physiotherapist

LGI paediatric respiratory service

- We have a blanket referral system for our intensive care units.
- We assess all patients on a daily basis and our treatment frequency is dependent on their needs. This can vary between 2 and 4 times a day.
- We have a specific paediatric on call service for patients with on-going physio problems and those who develop an acute need.
- We have put together the following information to assist you but we are happy to be contacted for specific advice or more information.

Assessment

- Patient assessment is the most important aspect of any Physiotherapy intervention especially in a child as they can change rapidly.
- Assessment is essentially the same for adult and paediatric patients however their responses may vary.

Signs and Symptoms of Respiratory Distress in a child

- Nasal flaring
- Head bobbing
- Grunting
- Tracheal tug
- Apnoeas
- Irritable & restless or quiet & floppy child
- Stridor and other abnormal breath sounds
- Tachypnoea
- Heart rate – Tachycardia and Bradycardia
- Recession – intercostal, subcostal, sternal

Normal values for children – Paediatric Acute Warning Score (PAWS)

- PAWS is being introduced across Yorkshire
- It is based on the concept of Adult MEWS
- PAWS charts will soon be in use in most paediatric areas
- For more information see next slide and www.leedspicu.org flu_pandemic resources/PAWS



1. Perform initial observations TPR, SpO2, CRT, BP, AVPU. Score each observation

0 1 3 10

2. Add Cumulative score

3. Suggested Action

Respiratory Rate (per minute)

	≤ 8	9-10	11-12	13-14	15-16	17-18	19-20	21-22	23-24	25-26	27-28	29-30	31-32	33-34	35-36	37-38	39-40	41-42	43-44	45-46	47-48	49-50	51-52	53-54	55-56	57-58	59-60	61-62	63-64+	
1 - 11 months	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red
1 - 2 years	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red
3 - 4 years	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red
5 - 11 years	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red
12+ years	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red

Score 0-2
Continue observations as per protocol or 12hrly RR, HR,temp, AVPU.

Oxygen Saturation In Air (see notes below)

Greater than 94% 90 - 94% 86 - 89% less than 86%

Either:

Oxygen Saturation in Any Oxygen (see notes below)

Greater than 94% 90 - 94% less than 90%

Or:

Score 3 - 5
Notify nurse in charge. Review by doctor. Increase frequency of observations to hourly until doctor review Include SpO2 and CRT and recalculate PAWS

Heart Rate (bpm)

	≤ 50	51-55	56-60	61-65	66-70	71-75	76-80	81-85	86-90	91-95	96-100	101-105	106-110	111-115	116-120	121-125	126-130	131-135	136-140	141-145	146-150	151-155	156-160	161-165	166-170	171-175	176-180	181-185	186-200+	
1 - 11 months	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red
1 - 2 years	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red
3 - 4 years	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red
5 - 11 years	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red
12+ years	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red

Score 6 - 9
Notify nurse in charge. Seek urgent medical review Perform fullobservations hourly RR ,HR, temp, BP, AVPU, SpO2 and CRT. Start continuous monitoring ECG, SpO2 , NIBP Review medication (O2, analgesia, antipyretics)

Systolic Blood Pressure

	≤ 50	51-55	56-60	61-65	66-70	71-75	76-80	81-85	86-90	91-95	96-100	101-105	106-110	111-115	116-120	121-125	126-130	131-135	136-140	141-145	146-150	151-155	156-160	161-165	166-170	171-175	176-180	181-185	186-200+	
1 - 11 months	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red
1 - 2 years	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red
3 - 4 years	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red
5 - 11 years	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red
12+ years	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red

Capillary Refill Time (seconds)

Less than or equal to 2 seconds Greater than 2 but less than 4 seconds 4+ seconds

Temperature (°C)

Less than 35 35 - 37.9 More than 37.9

Neurological Status (AVPU)

Alert (A) Responds to verbal stimuli (V) Responds to painful stimuli (P) Unresponsive (U)

Score 10 or greater
URGENT MEDICAL REVIEW CALL FOR HELP Review ABC -treat as necessary CRASH CALL 2222 Start continuous monitoring Start / increase O2 therapy

NOTES:

- Oxygen saturations refer to patients without known cyanotic disease
- Record oxygen saturations in AIR or Oxygen as appropriate. **DO NOT** stop Oxygen therapy to record oxygen saturation in Air.
- If oxygen saturation is less then 94% increase oxygen flow.

TOTAL:

Your clinical judgment is paramount. PERI-ARREST situations DO NOT require a PAWS score. If you are in any doubt, seek senior support / medical review

Blood Results

Platelets normal range 150 – 400

- 100-150 – Manual Techniques with caution
- 50 – 100 – manual techniques if unable to clear secretions by other means and after discussion with medical Staff
- < 50 – Avoid the use of Manual Techniques

Alkaline Phosphatase normal range 20-140

- This is more commonly looked for in the very young patient, particularly ex premature babies.
- It is an indicator of the patients risk of developing Osteopaenia of prematurity, therefore more at risk of rib fractures.
- 400 – 800 Manual Techniques must only be used if strong indicators and following discussion with the consultant.
- >800 avoid Manual Techniques.

Indications for Physio

- Resolving consolidation
- Acute lobar collapse
- Aspiration
- Excessive secretion production
- Increased work of breathing
- Weaning ventilation
- Change in SpO₂ or ABGs

Timing of treatment

- We would aim to co-ordinate our treatment with patients regular medication eg. sedation or bronchodilators. If a patient has previously been wheezy with treatment we would arrange to treat the patient after bronchodilators and they may also need an extra dose post physio.
- It may be necessary for the patient to have boluses of sedation or paralysis to enable you to treat effectively. If a patient becomes agitated with treatment, we would then arrange further medication before our next treatment.
- Children are at higher risk of reflux and aspiration therefore continuous feeds may need stopping before your treatment or time treatment around bolus feeds.

Positioning

- Regular repositioning is vital
- Avoid supine, especially with infants
- Avoid “head down” tip as a routine
- Use “head up” position to reduce diaphragm splinting, 25-35 degrees “head up” optimal
- Prone is best position for V/Q in bilateral lung pathology
- Side lying is best for unilateral lung pathology
- Position with affected side uppermost for secretion drainage / improve aeration
- Position with affected side down for V/Q matching

Manual Hyperinflation

Indications

- To increase tidal volume
- To maintain Patient stability
- To mobilise secretions in child greater than 7 when collateral ventilation has developed
- To maximise oxygenation

Contraindications/ Cautions

- Undrained Pneumothorax
- Emphysematous Bullae
- Increasing bronchospasm
- CVS instability
- Rib fractures

Manual Hyperinflation

What size of Bag?

- Newborn –4 years 0.5 l with open ended valve
- 2 years – 6 years 1 l if available
- 4 years upwards 2 l with pressure valve

There is a teaching presentation on the use of open ended bags
(Ayre's T-pieces) on www.leedspicu.org

Pressures

- maximum of 20% greater than PIP (peak inspiratory pressure) on ventilator
- manometer enables safe practice, allowing practitioner to maintain PEEP and avoiding too high a pressure

Saline / 0.9% sodium chloride

- Bench marking across PICUs in country show this is advocated for use with paediatric population despite little evidence to support its use.
- It can help to maintain a patent airway.
- Help remove the secretions in a suspension.
- All amounts are approximate and the general advice is if secretions are clearing with the minimum amount then there is no need to increase.

Recommended amount per instillation:

- 0.5 – 1ml /kg up to max 10 ml

Manual techniques

- We would progress to use manual techniques if we are unable to clear secretions using positioning, MHi, saline and suction.

Cautions for manual techniques:

- Low platelet count / coagulopathy
- Active or recent pulmonary haemorrhage
- Severe bronchospasm
- Osteoporosis / Osteopenia
- Pain

Percussion

- Using Tented fingers (3 middle fingers)
- Face mask
- Cupped hand
- In infants and young children single handed percussion is normal



Vibrations

- Vibrations are normally performed every 3rd breath due to an increased Respiratory rate on a younger patient.
- Need to vary pressure according to the size of the patient and consider any limiting factors.
- Due to increased rib compliance in small children / babies one hand should be used to support chest whilst other hand applies vibrations to avoid excessive force.
- Depending on the child's size it may only be necessary to use fingers to apply vibrations (avoid finger tips to reduce pain and trauma).
- It is good practise to start with minimal force and build up as required to be effective.

ETT Suction

Depth of suction (in line and open)

To prevent damage to the child's more delicate airway.

- Consider Length of ET Tube, this should be at least 1cm above the carina and therefore depth of suction must only be a maximum of 1 cm beyond end of ETT.
- Always pull catheter back as you apply suction.
- If you feel any obstruction during insertion of catheter always pull back and then apply suction.
- Try to avoid circling the catheter in the airway as this can damage the tissues.

Suction

Catheter size:

- To calculate the correct suction catheter size you double the ETT size and this gives the french gauge size (FG).
- If catheter used is **too small** - secretions will not be effectively cleared.
- If catheter used is **too large** - will remove more oxygen from the airway and risk desaturation or occlude the airway.

Further information

- Please contact paediatric respiratory team at LGI (Sarah Hibbert, Jenny Carter, Kathryn Reeves) on 0113 243 2799 bleep 2441
- Refer to On Course for On Call CD ROM (ACPRC publication)