VIRTUAL CHILDREN'S HOSPITAL FOR LEARNING PEDIATRIC NURSING

Module 4

Learning material 2:

Assessment of the Child with a Respiratory Problem

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Content

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Conducting a thorough evaluation of a child's respiratory health is crucial in determining a diagnosis and subsequently deciding on the appropriate management for a child presenting with respiratory problems.

The essential components of a comprehensive respiratory assessment include:

- First Impressions of the Child
- History taking
- Physical assessment of the child

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First Impressions of the Child (I)

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When meeting a child, aim to assess their condition in the environment they are in (e.g., waiting room, hospital bed, etc.). Observe if the child is:

- Active/Lethargic: Check if the child is moving appropriately for their age, interacting with a caregiver, and alert, or if they are calm, quiet, and lethargic.
- Skin colour: Pink/Pale/Cyanotic: Cyanosis refers to a bluish skin colour due to poor circulation (e.g., peripheral vasoconstriction due to hypovolemia) or inadequate oxygenation of the blood (e.g., congenital heart defects causing right-to-left shunting).

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First Impressions of the Child (II)

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- Breathing difficulties: Could indicate underlying cardiovascular (e.g., congenital heart disease) or respiratory issues (e.g., asthma).
- Pallor: Paleness of the skin, which could signal underlying anemia (e.g., blood disorders, chronic illness) or poor perfusion (e.g., heart failure).
- Weight: Note if the child appears to be at a healthy weight according to their age and height.

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History taking (I)

Presenting Complaint History:

✓Child's age

✓Onset of symptoms: sudden or following a previous illness?

✓Presence of cough, wheezing, or stridor

✓Any feeding difficulties?

✓Other non-respiratory symptoms?

✓Any associated vomiting?

✓Presence of fever?

✓Current medication use or recent administration of medication?

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History taking (II)

Past Respiratory History:

✓Neonatal history: Full-term, preterm, etc.

✓Prior episodes resembling the current issue?

✓History of asthma or other recent respiratory conditions?

✓Up-to-date immunizations?

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History taking (III)

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Family and Social History:

- ✓Family history of atopy such as asthma, hay fever, eczema?
- ✓Presence of similar illnesses in siblings or other family members?
- ✓Living conditions of the family?
- ✓Child's exposure to tobacco smoke?
- ✓Presence of pets in the household?

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Physical assessment of the child (I)

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- Evaluate Sounds and Additional Noises:

✓Grunting

✓Stridor

✓Wheezing

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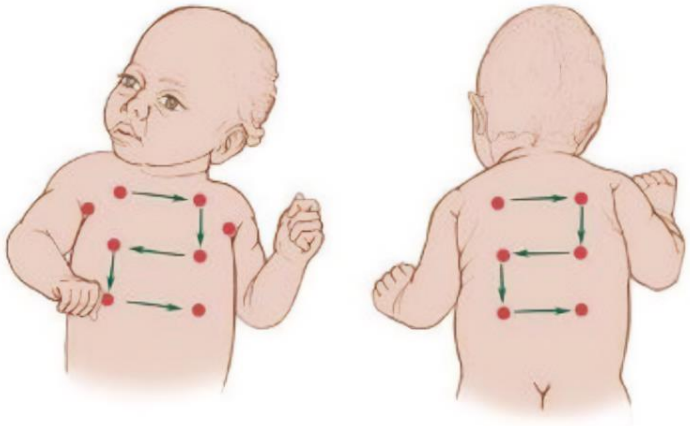
Physical assessment of the child (II)

- Auscultation of the child (Figure 1)



Anterior and posterior view of an infant showing proper points of auscultation to diagnose respiratory distress syndrome

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Physical assessment of the child (II)

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Assess Airway and Respiratory Parameters (rate, depth and effort, work of breathing):

Check for signs of increased respiratory effort which may include:

✓Increased respiratory rate and depth, breathing patterns (Table 1 & Figure 2,)

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Normal values of respiratory and hart rate (Table 1; Table 2)

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Table 1 – Normal values for age: respiratory rate.

Respiratory rate for age	1 month	1 year	2 year	5 year	10 year
Upper limit of normal range	60	50	40	30	25
Lower limit of normal range	25	20	18	17	14

Table 2 – Normal values for age: heart rate.

Heart rate for age	1 month	1 year	2 year	5 year	10 year
Upper limit of normal range	180	170	160	140	120
Lower limit of normal range	110	100	90	70	60

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Physical assessment of the child (III)

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- ✓Grunting
- ✓Nasal flaring
- ✓Head bobbing
- ✓Use of accessory muscles like intercostal, supraclavicular, and subcostal recession
- ✓Tracheal tug
- ✓Respiratory effort (see Figure 2)

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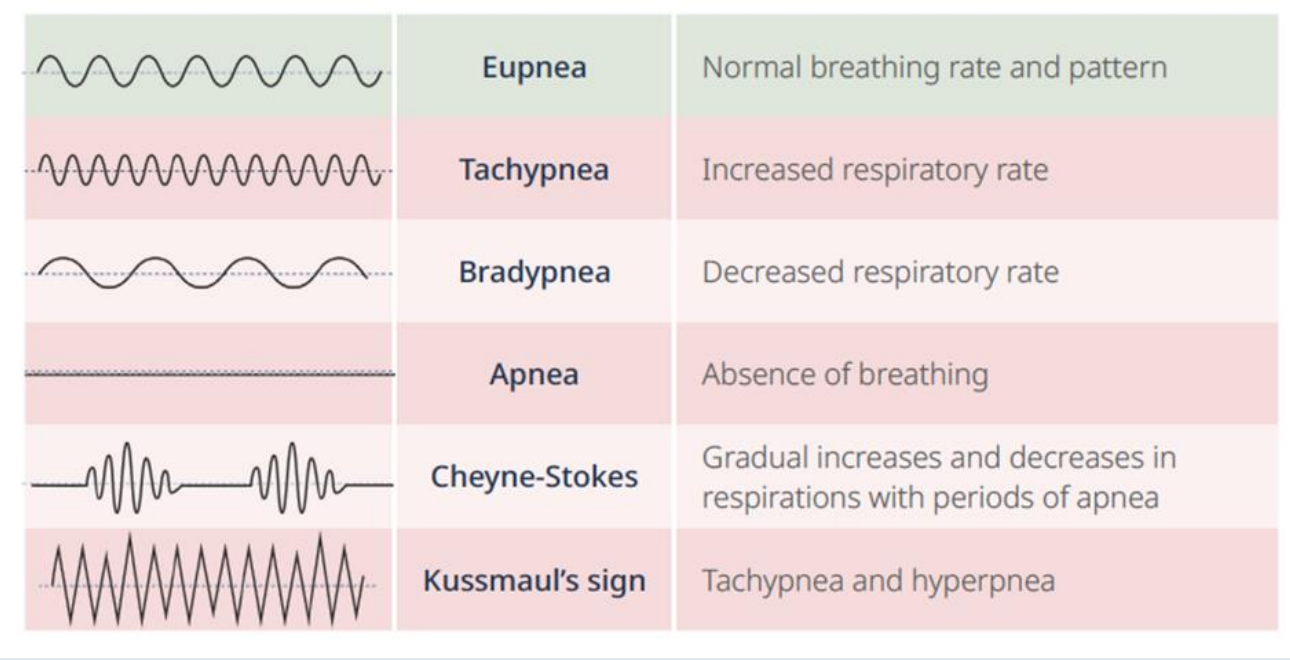
Breathing patterns



Eupnea	Normal breathing rate and pattern
Tachypnea	Increased respiratory rate
Bradypnea	Decreased respiratory rate
Apnea	Absence of breathing
Cheyne-Stokes	Gradual increases and decreases in respirations with periods of apnea
Kussmaul's sign	Tachypnea and hyperpnea

Figure 2. Breathing patterns

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Physical assessment of the child (V)

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Evaluate Other Respiratory Indicators:

- ✓Perform pulse oximetry
- ✓Conduct blood gas analysis
- ✓Measure peak flow
- ✓Consider chest X-ray, microbiology, and virology tests

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Physical assessment of the child (VI)

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Assess Physical Appearance and Cardiovascular System:

- ✓Examine skin colour, lips, nails, limbs, and warmth
- ✓Observe if the child appears relaxed or anxious
- ✓Check capillary refill time
- ✓Assess pulse quality
- ✓Monitor heart rate and pulses
- ✓Evaluate chest movement symmetry
- ✓Observe the child's level of consciousness

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Assessing the throat

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Assessing the throat involves a series of steps to ensure a comprehensive examination.

- **Preparation**

✓Gather Equipment (penlight or flashlight, tongue depressor, gloves)

✓Position the Patient

✓Have the patient sit upright in a well-lit area

✓Ensure they are comfortable and relaxed

✓Be on the same level as the patient

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Throat examination steps (I)

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External Inspection

- ✓Observe the neck for swelling, asymmetry, or any visible abnormalities
- ✓Palpate the lymph nodes around the neck and jaw to check for tenderness or enlargement.

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Throat examination steps (II)

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Internal Inspection

✓Ask the patient to open their mouth wide to expose the throat.

✓Use a penlight to illuminate the oral cavity and throat.

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Throat examination steps (III)

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Using a Tongue Depressor:

✓Gently press down on the back of the tongue with a tongue depressor for a better view of the throat structures.

✓Be cautious to avoid triggering the gag reflex.

Examine the Tonsils:

✓Look for redness, swelling, or exudates (white or yellow patches).

✓Note the size of the tonsils and any signs of tonsillitis.

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Throat examination steps (IV)

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Check the Uvula:

✓Ensure the uvula is midline and moves symmetrically when the patient says "ah".

✓Deviation may indicate neurological issues or other pathologies.

Inspect the Pharynx and Posterior Wall:

✓Look for signs of inflammation, redness, or lesions.

✓Check for any abnormal growths or ulcers.

Evaluate the Soft Palate

✓Observe the soft palate's movement and color.

✓Ensure it rises symmetrically with phonation.

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Thermoregulation and fewer

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- Thermoregulation is the process by which the body maintains its internal temperature within a certain range despite external temperature fluctuations. This process is crucial for maintaining homeostasis, ensuring that bodily functions can proceed optimally.

- Maintaining a stable body temperature ensures enzyme function, as most body enzymes work optimally within a narrow temperature range. Proper thermoregulation ensures that metabolic reactions proceed efficiently.

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The key components of thermoregulation (I)

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- The **hypothalamus** in the brain acts as the body's thermostat. It receives signals from temperature receptors in the skin and other body parts and initiates appropriate responses to maintain a stable internal temperature.

- The **skin** plays a vital role in thermoregulation. **Blood vessels** in the skin can dilate (vasodilation) to release heat or constrict (vasoconstriction) to retain heat. Sweating and shivering are also mechanisms the skin and muscles control to help regulate temperature.

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The key components of thermoregulation (II)

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- **Sweat glands** produce sweat, which evaporates from the skin surface, removing excess heat and cooling the body.
- **Muscle shivering** generates heat through rapid, involuntary muscle contractions. This process helps raise body temperature when it is too low.

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Table 3. Thermoregulatory body warming and cooling mechanisms

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Body warming mechanism	Body cooling mechanisms
Vasodilatation The hypothalamus triggers vasodilation to increase blood flow to the skin, promoting heat loss.	**Vasoconstriction:** The hypothalamus triggers vasoconstriction to reduce blood flow to the skin, minimizing heat loss.
Shivering: physical activities such as exercise increase heat production through muscle contractions	**Sweating,** which cools the body through evaporation.
Decrease in basal metabolic rate: The body's metabolism generates heat as a byproduct of chemical reactions	**An increase in basal metabolic rate** is mediated by adrenal medullary and thyroid hormones. The body's metabolism generates heat as a byproduct of chemical reactions
Warmth seeking behaviour	**Cold** seeking behaviour

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Thermoregulatory Disorders (I)

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Maintaining a constant core body temperature is vital for normal cell function, and the rates of all metabolic processes are highly temperature-dependent.

Table 4. Normal body temperature

The age of child	Normal body temperature	Measured
Newborn/Infant	36,6°C - 37,3°C < 37.9°C	Under the armpit rectally
Child	< 37.2°C	Under the armpit

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Thermoregulatory Disorders (II)

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- **Hyperthermia** occurs when the body produces or absorbs more heat than it can dissipate, leading to heat exhaustion or heat stroke.
- **Hypothermia** occurs when the body loses heat faster than it can produce, resulting in dangerously low body temperatures.
- **Fever (**pyrexia), is a rise in temperatures above the normal range „set-point“ not associated with exercise or a high ambient temperature. A fever usually is a temperature of 38 degrees Celsius or higher.

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Typical fever curves

- Ascent phase (prodromal stage): body temperature rises, often accompanied by chills and discomfort.
- Maximum peak period (stable phase): body temperature reaches. Symptoms such as sweating, flushed skin, and rapid pulse may occur during this stage.
- Temperature decline (defervescence): body temperature decreases rapidly or gradually. Often accompanied by profuse sweating.
- Recovery period (convalescence): body temperature normalizes, and the body begins to recover.

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Typical febrile episode

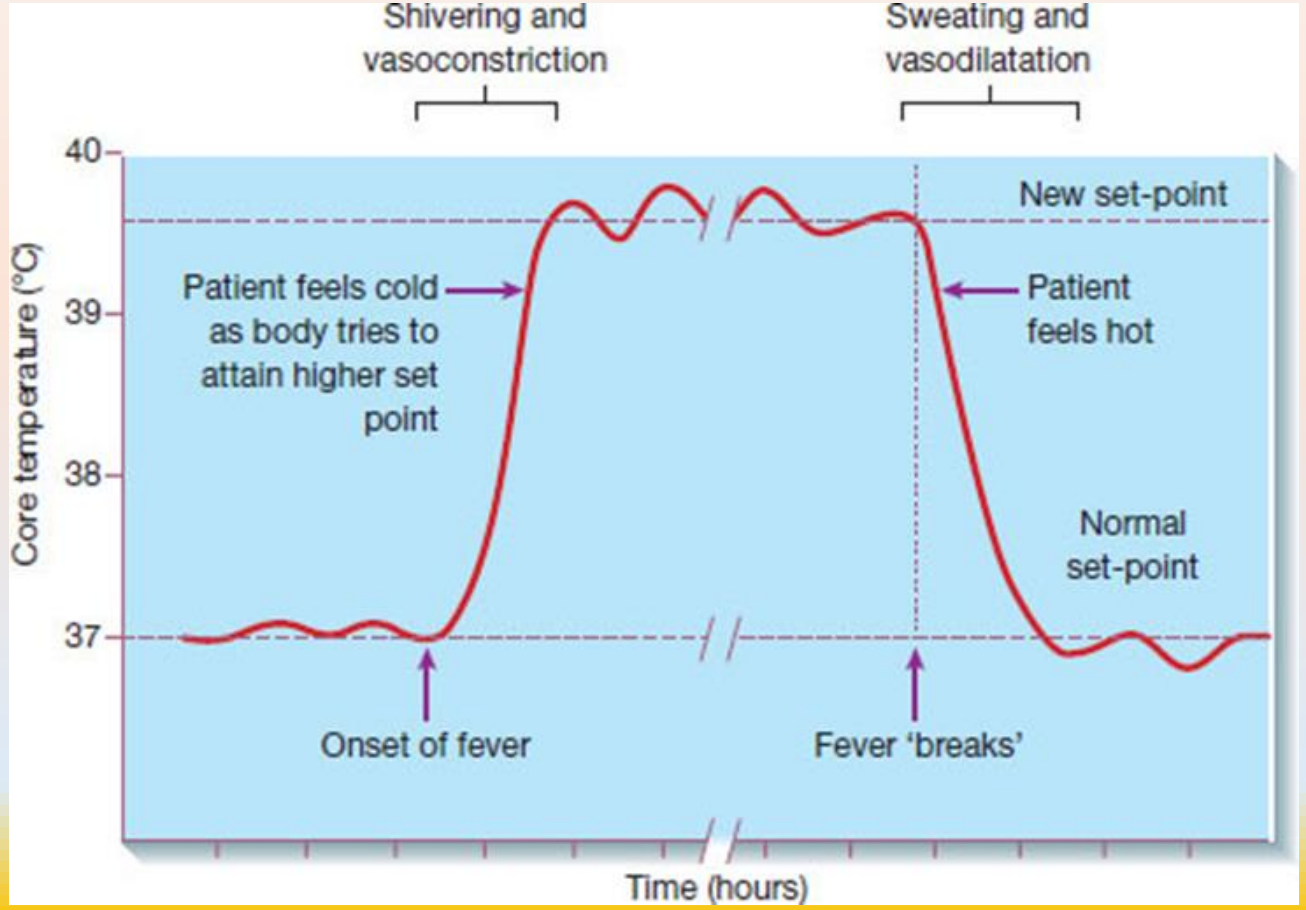

Figure 2. The tie course of a typical febrile episode (Pococock & Richards, 2018)

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Physical assessment (I)

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Check life-treating features:

✓Difficulty breathing or severe respiratory distress

✓Cyanosis of the lips, tongue, or extremities

✓Altered level of consciousness (lethargy, confusion, unresponsiveness)

✓Seizures or convulsions

Measure temperature, heart rate, respiratory rate, and capillary fill time and assess for dehydration.

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Physical assessment (II)

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Other points to consider

✓Shivering/Sweating

✓Skin colour

✓Urine output

✓Level of consciousness

Management

✓Medication administration, paracetamol or ibuprofen

✓Extra fluid

✓Clothing

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Additional Steps for Comprehensive Assessment (I)

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- **Voice Quality**: Assess the patient's voice for hoarseness or changes in pitch, which can indicate laryngeal issues.
- **Swallowing Assessment:** Ask the patient to swallow and observe for any difficulty or pain, which might suggest oesophagal or throat problems.
- **Breathing Sounds:** Listen for abnormal sounds, such as stridor, which may indicate airway obstruction.

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Additional Steps for Comprehensive Assessment (II)

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- **Discuss Findings**: If needed, explain any findings to the patient and suggest further tests or referrals.
- **Documentation:** Record your findings in the patient's medical record with detailed notes on observations and any recommendations.

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