

DST-FC-402 Cardio-Respiratory Assessment: Pediatric

Nurses with RN First Call Certified Practice designation (RN(C)s)¹ are able to conduct an assessment and must consult with and/or refer to a physician or NP as appropriate.

The following assessment must be completed and documented. As a complete respiratory exam includes a cardiovascular exam, these two examinations have been combined.

ASSESSMENT

History of Present Illness and Review of System

General

The following characteristics of each symptom should be elicited and explored:

- Onset – sudden or gradual
- Location – radiation
- Duration – frequency, chronology
- Characteristics – quality, severity
- Associated symptoms
- Aggravating and precipitating factors
- Relieving factors
- Current situation (improving or deteriorating)
- Effects on Activities of Daily Living (ADL)
- Previous diagnosis of similar episodes
- Previous treatments and efficacy

Cardinal Signs and Symptoms

In addition to the general characteristics outlined above, additional characteristics of specific symptoms should be elicited, as follows:

Cough

- Quality
- Severity
- Timing
- Duration: greater than 2 weeks screen for Tuberculosis (TB)

Sputum

- Colour
- Amount
- Consistency
- Purulence, odour, foul taste
- Time of day worse

Hemoptysis

- Amount of blood

¹ RN(C) is an [authorized title](#) recommended by CRNBC that refers to CRNBC-certified RNs, and is used throughout this Decision Support Tool (DST).

- Frank blood or mixed with sputum
- Association with leg pain, chest pain, shortness of breath

Shortness of Breath

- Tachypnea, grunting, nasal flaring or retractions
- Shortness of breath at rest
- Posture - orthopnea or tripodding
- Association with paroxysmal nocturnal dyspnea

Cyanosis

- Central vs peripheral
- When does it occur
- Any recent changes in pattern of
- Associated wheeze

Exercise Intolerance

- Infants:
 - Eats slowly, tires during feeding
 - Cyanosis appears with feeding
 - Often described by parents or caregiver as a "good baby": always quiet, sleeps a lot
- Children:
 - Exercise intolerance, inability to keep up with other children same age

Wheeze

- Timing

Chest Pain

- Relation to effort, exercise, meals, bending over
- Explore the pain carefully. Include quality, radiation, severity, timing

Fainting or Syncope

- Weakness, light-headedness, loss of consciousness
- Relation to postural changes, vertigo or neurological symptoms

Other Associated Symptoms

- Fever
- Malaise
- Fatigue
- Anorexia
- Night sweats
- Weight loss
- Palpitations
- Nausea and vomiting
- GI reflux
- Runny nose

- Sore throat
- Stridor

Medical History (Specific to Cardio-Respiratory System)

- Allergies, including seasonal and environmental
- Medications currently used (over the counter (OTC), birth control pills (BCP) and prescription including nasal sprays and inhaled medication (puffers), antihistamines, hormones, steroids, antacids)
- Herbal / traditional preparations
- Growth rate – if failure to thrive, children often exhibit slow weight gain relative to height
- Immunization status including pneumococcal and influenza
- Medical conditions
 - Frequency of colds and respiratory infections, recent viral illness, joint pain or swelling
 - History of rheumatic fever
 - Nasal polyps, chronic sinusitis, asthma (Appendix 1), bronchitis, pneumonia, chronic obstructive pulmonary disease (COPD), TB (disease or exposure), cancer, cystic fibrosis
 - Diabetes mellitus, thyroid disorder, renal disease
 - Cardiac murmurs, valvular heart disease
 - Down's syndrome
- Admissions to hospital and/or surgery for respiratory or cardiac illness
- Date and result of last Mantoux test and chest x-ray
- Communicable diseases: measles, chickenpox (varicella), herpes simplex
- Birth and prenatal history if age appropriate
- Exposure to substances while in utero
- Blood transfusion

Family History (Specific to Cardio-Respiratory System)

- Others at home with similar symptoms
- Allergies, atopy
- Asthma (Appendix 1), TB, cystic fibrosis, bronchitis
- Diabetes mellitus
- Sudden Infant Death (SIDS)
- Heart disease

Personal and Social History (Specific to Respiratory System)

- Smoking history (number of packages/day, number of years)
- Exposure to second-hand cigarette smoke, wood smoke, pets, mould
- Crowded living conditions
- Poor personal or environmental cleanliness
- High stress levels
- Institutional living
- Substance use – alcohol, caffeine, street drugs, including injection and inhaled drugs / solvents
- Human immunodeficiency virus (HIV)
- Obesity
- Immigration or travel abroad

PHYSICAL ASSESSMENT

Examination of the ear, nose, and throat should also be carried out because of the interrelatedness between these systems and structures and the functioning of the lower respiratory tract.

Vital Signs

- Temperature
- Pulse
- Respiratory rate
- SpO₂
- Blood pressure
- Peak flow if able to follow the directions
- Weight for all children younger than 12 years old for medication calculations

Source: Wedro, B. C. (Ed.). (2013). *Pediatric vital signs*.

Age	Heart Rate (beats/min)	Blood Pressure (mm Hg)	Respiratory Rate (breaths/min)
Premature	120-170 *	55-75/35-45 \pm	40-70 \pm
0-3 months	100-150 *	65-85/45-55	35-55
3-6 months	90-120	70-90/50-65	30-45
6-12 months	80-120	80-100/55-65	25-40
1-3 years	70-110	90-105/55-70	20-30
3-6 years	65-110	95-110/60-75	20-25
6-12 years	60-95	100-120/60/75	14/22
12 \geq years	55-85	110-135/65/85	12-18

General Appearance

- Acutely or chronically ill
- Degree of comfort or distress
- Appears stated age and within growth parameters (use growth charts if necessary)
- Position for comfort and to aid respiration (e.g., tripod)
- Diaphoresis
- Ability to speak a normal-length sentence without stopping to take a breath
- In infants, character of cry
- Colour
- Nutritional status
- Hydration status
- Activity level
- Mental status
- Degree of cooperation, consolability
- Emotional reaction to parent (or caregiver) and examiner
- Hygiene

- Bruising, contusions, abrasions (suggestive of trauma)

Inspection

- Anxious appearance or respiratory distress
- Colour, cyanosis
 - Acrocyanosis may be normal in infants (< 1month)
- Shape of chest
 - An infant's chest is barrel shaped slowly becoming adult like by 6 yrs
- Symmetry of chest movement
- Rate, rhythm and depth of respiration
- Tripoding, nasal flaring, drooling, grunting
- Intercostal indrawing, tracheal tug
- Accessory muscle use and respiratory distress
- Precordium: visible pulsations may be normal
- Chest wall scars, bruising, signs of trauma
- Tingling
- Leg cramps or pain at rest
- Clubbing of the fingers
- Rashes or eczema
- Audible grunting, wheezing
- Hands - cyanosis, clubbing, nicotine stains, cap refill (<3 seconds)
- Edema

Palpation

- Not as useful in children less than 3 years
- Tracheal position (midline)
- Chest wall tenderness or crepitus
- Respiratory excursion and tactile fremitus in older children
- Spinal abnormality
- Nodes (axillary, supraclavicular, cervical)
- Masses
- Apical beat:
 - Point of maximum impulse (PMI) in infants and toddlers at fourth intercostal space and just left of midclavicular line
 - PMI in child 7 yrs and older is at fifth intercostals space and just right of midclavicular line
- Identify and assess pulsations and thrills
- Hepatomegaly
- Assess peripheral pulses – radial, brachial, femoral, popliteal, posterior tibial, dorsalis pedis.
 - Capillary refill
 - Edema – degree of pitting
 - Skin temperature, turgor

Percussion

- Useful in children greater than 2 yrs
- Resonance

- Increased resonance over hyperinflated areas
- Dullness to percussion over areas of consolidation

Auscultation

- Listen for sounds of normal air entry before trying to identify abnormal sounds
- Degree of air entry throughout the chest (should be equal)
- Quality of breath sounds- vesicular, bronchovesicular and bronchial
 - Broncho-vesicular sounds are heard throughout the peripheral lung field up to 5-6 years
- Ratio of inspiration to expiration
- Adventitious Sounds:
 - Wheezes (rhonchi), crackles (rales), pleural rub, stridor, decreased breath sounds
- Transmitted upper airway sounds such as nasal congestion are commonly noted in small children
- Listen to normal heart sounds before trying to identify murmurs
- Auscultate at aortic, pulmonic, Erb's point, tricuspid, and mitral. Attempt to identify:
 - Rate and rhythm.
 - S1 and S2 sounds and their intensity
 - Added heart sounds (S3 and S4), rubs, splitting of S2 and relation to respiration
 - Murmurs and if noted, relation to position
- Auscultate carotid arteries, abdominal aorta, renal arteries, iliac arteries, and femoral arteries for bruits

Note: Fifty percent of children develop an innocent murmur at some time in their lives

Associated Systems

- A complete cardio-respiratory assessment includes the ENT system
- Consider GI/GU assessment if appropriate.

Symptoms requiring urgent referral or consultation

Children less than six months require consultation

The first step is to differentiate between acute cardio-respiratory distress and conditions that can be managed safely by RN(C)s.

- The following signs and symptoms require immediate referral to a physician or nurse practitioner:
 - Drooling and / or tripodding
 - Lethargy and fatigue
 - Inability to speak or cry
 - SOB and tachypnea greater than 60 breaths/minute
 - Diminishing respiratory effort
 - Tracheal shift
 - Tracheal tugging
 - Nasal flaring and head bobbing
 - Intercostal indrawing
 - Chest pain
 - SpO2 less than 92% on room air
 - Cyanosis (central cyanosis is not detectable until SaO2 is less than 85%)

- Silent chest
- Decreased level of consciousness, blackouts
- Immuno-compromised
- Poor feeding and weight gain in infants and young children
- Extra heart sounds or murmurs
- Apneic or hypoxic spells
- Persistent tachycardia

RN(C)s are able to conduct an assessment. Cardio-respiratory presentations must be assessed and treated in consultation with and/or referral to a physician or nurse practitioner as appropriate.

REFERENCES

More recent editions of any of the items in the Reference List may have been published since this DST was published. If you have a newer version, please use it.

- Ball, J. W., Dains, J. E., Flynn, J. A., Solomon, B. S., & Stewart, R. W. (Eds.). (2015). *Seidel's guide to physical examination* (8th ed.). St. Louis, MO: Elsevier.
- Burns, C. E., Dunn, A. M., Brady, M. A., Starr, N. B., & Blosser, C. G. (2009). *Pediatric primary care* (5th ed.). Philadelphia, PA: Elsevier.
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- Jarvis, C. (2014). *Physical examination and health assessment* (2nd Canadian ed.). Toronto, ON: Elsevier Canada.
- Provincial Health Services Authority. (2009). [*Asthma protocol: Health Authority acute asthma management toolkits*](#).
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APPENDIX 1

i. Asthma Triage Algorithm

(Laminated copy provided in toolkit).

Algorithm for patient presenting with shortness of breath/wheezing with a probable diagnosis of asthma

Determine initial treatment algorithm by assigning CTAS level using symptoms, signs and peak flow.

SYMPTOMS	MILD	MODERATE	SEVERE	NEAR DEATH
Breathless	While walking	While talking (infant – softer, shorter cry, difficulty feeding)	While at rest	Decreasing respiratory effort
Talking	In sentences	In phrases	In words	Unable to speak
Alertness	May be agitated	Usually agitated	Usually agitated	Confused or lethargic
SIGNS				
Respiratory Rate	Increased	Increased	Often > 30/min	> 30/min unless imminent resp. failure
Use of Accessory Muscles	Usually not	Commonly	Usually	Usually
Wheeze	Moderate	Loud throughout expiration	Loud throughout insp/exp or silent	Silent
Pulse/min(Adult)	< 100	100 - 120	> 120	> 120 or bradycardia if resp. failure
FUNCTIONAL ASSESSMENT				
SpO2 on room air	> 95%	92 - 94% 92 - 93%(child)	< 90% < 92%(child)	< 90% < 92% (child)
PEFR% predicted or % personal best	> 200 lpm	> 200 lpm	< 200 lpm	Unable
Time to Nurse Assessment	30 minutes	30 minutes	Immediate	Immediate
Time to Physician Assessment	30 minutes	30 minutes	15 minutes	Immediate
Initial Treatment Algorithm	CTAS Level 3	CTAS Level 3	CTAS Level 2	CTAS Level 1

CTAS Level 1 - Near death asthma – unable to speak, cyanosis, lethargic/confused, tachycardia or bradycardia, O2 sat < 90%

CTAS Level 2 - Severe asthma is best defined with a combination of objective measures (FEV1, PEFR, O2 saturation) and clinical factors which relate to the severity of symptoms, vital signs and history of previous severe episode. O2 saturation < 90% (O2 Saturation <92% child), PEFR < 40% of predicted or previous best, the patient is considered severe and requires prompt treatment and close observation until signs of improvement. In children who are unable to do spirometry, particularly those under age 6, clinical features and O2 saturation are used to estimate severity.

CTAS Level 3 - Mild/moderate SOB/OE, frequent cough or night awakening (unable to lie down flat without symptoms) and PEFR 40 – 60 % predicted or previous best and O2 sat > 92-94%. Mild asthma is PEFR > 60% and O2 saturation ≥ 95%. Mild asthmatics can have severe attacks and severe asthmatics can have mild attacks. Some documentation of meds and previous attack patterns (intubated, ICU, frequent admits) can help to identify high-risk individuals. These patients should be placed in an area where they can be observed and re-evaluated, and the patient or family should be advised to report deterioration to the emergency staff.

From PHSA (2009) Emergency Services Asthma Protocol Toolkits published online for each health authority at
<http://www.phsa.ca/Pages/Search.aspx?k=asthma>