Queensland Paediatric Guideline

Emergency

Bronchiolitis - Emergency management in children

Purpose

This document provides clinical guidance for all staff involved in the care and management of an infant (age 0-12 months) presenting to an Emergency Department (ED) in Queensland with symptoms suggestive of bronchiolitis.

This guideline has been developed by senior ED clinicians and Paediatricians across Queensland and endorsed for statewide use by the Queensland Emergency Care of Children Working Group in partnership with the Queensland Emergency Department Strategic Advisory Panel and the Healthcare Improvement Unit, Clinical Excellence Queensland.

Key points

- Bronchiolitis is a lower respiratory tract illness in infants (0-12 months) caused by a viral illness that is usually self-limiting within 7-10 days (peaking day two to three).
- In most cases, no investigations are required, and treatment is supportive.
- High flow oxygen via nasal cannulae is recommended for infants with bronchiolitis who are hypoxic.
- Medications such as beta-2-agonists (e.g. salbutamol), corticosteroids, and hypertonic saline are **not** indicated.
- Refer to the Pre-school Wheeze Guideline for the management of wheeze in children aged 1-5 years.

Introduction

Bronchiolitis is a clinical diagnosis, based on history and examination. It typically begins with an acute upper respiratory tract infection followed by onset of respiratory distress and fever. Illness usually resolves without intervention in 7 – 10 days, with peak severity two to three days post onset. The cough may persist for weeks. Bronchiolitis most commonly occurs in the winter months but can be seen throughout the year.

This guideline is based on the Australasian Bronchiolitis Guideline which has been developed by the Paediatric Research in Emergency Department International Collaborative (PREDICT) research network to provide an evidence-based clinical framework for the management of infants (0-12 months) with bronchiolitis.

Assessment

A diagnosis of bronchiolitis requires a history of an upper respiratory tract infection followed by onset of respiratory distress with fever and at least one of the following:

- cough
- tachypnoea
- retractions
- diffuse crackles or wheeze on auscultation

History

History should include specific information on:

- recent respiratory symptoms
- feeding including:
  - duration of feeds (feeding more difficult with more severe illness)
  - breast feeding
- underlying medical conditions including chronic lung disease, congenital heart disease and chronic neurological conditions
- chromosomal abnormalities including Trisomy 21
- indigenous status
- prematurity
- post-natal exposure to cigarette smoke

Examination

Assessment of severity of acute bronchiolitis			
	Mild	**Moderate**	**Severe**
Behaviour	Normal	Some/intermittent irritability	Increasing irritability and/or lethargy, fatigue
Respiratory rate	Normal - mild tachypnoea	Increased	Marked increase or decrease
Use of accessory muscles	Nil to mild chest wall retraction	Moderate chest wall retractions Tracheal tug Nasal flaring	Marked chest wall retractions Marked tracheal tug Marked nasal flaring
Oxygen saturations in room air	SpO2 >92%	SpO2 90-92%	SpO2 <90% May not be corrected by O_2
Apnoeic episodes	None	May have brief apnoea	May have increasingly frequent or prolonged apnoea
Feeding	Normal	May have difficulty with feeding or reduced feeding	Reluctant or unable to feed

Consider seeking senior emergency/paediatric advice as per local practice for infant with moderate bronchiolitis.

Seek senior emergency/paediatric advice as per local practice for a child with severe bronchiolitis.

Risk factors for severe disease

- gestational age less than 37 weeks
- chronological age at presentation less than 10 weeks
- chronic lung disease
- congenital heart disease
- chronic neurological conditions
- Indigenous ethnicity
- failure to thrive
- Trisomy 21
- post-natal exposure to cigarette smoke
- breast fed for less than 2 months

Differential diagnoses

Whilst bronchiolitis is the most common cause of respiratory distress in infants, less common diagnoses, or dual diagnoses must be considered in all children.

Less common causes of respiratory distress in infants	
Respiratory	• bacterial pneumonia, including pertussis • aspiration of milk/formula or foreign body • tracheo/bronchomalacia • cystic fibrosis
Other	• congestive cardiac failure • sepsis • intrathoracic mass • allergic reaction

Congenital cardiac disease

ALERT – Consider cardiac disease presenting with congestive cardiac failure in infants with no precipitating viral illness, hypoxia out of proportion to severity of respiratory disease and/or presence of abnormal or unequal peripheral pulses, cardiac murmur or hepatomegaly.

Congenital cardiac diseases affect approximately 1% of infants with up to one third diagnosed at over 12 weeks of age. Infants with congestive cardiac failure may present with respiratory distress and decreased feeding. Note that decompensation may be triggered by an intercurrent viral illness.

Investigations

Investigations are not routinely recommended. Respiratory viral PCR has no role in the management of individual patients (cohorting infants based on virological testing has not been shown to improve outcomes). Chest X-rays (CXR) may lead to unnecessary antibiotic treatment.

ALERT – Children aged less than three months with respiratory symptoms and fever ≥38ºC may have a concurrent bacterial infection. Refer to Fever Guideline for guidance on investigations and management.

Management

Refer to Appendix 1 for a summary of the emergency management for children presenting with symptoms of bronchiolitis.

The primary treatment of bronchiolitis is supportive. This involves ensuring appropriate oxygenation and maintenance of hydration.

Seek urgent paediatric critical care advice (onsite or via Retrieval Services Queensland (RSQ)) for infants with any of the following:

- significant or recurrent apnoeas
- persistent desaturations despite oxygen
- severe disease who are failing to improve with initial treatment
- moderate bronchiolitis with congenital heart disease or chronic lung disease

Oxygen and respiratory support

Administer oxygen for children with saturations persistently below the target oxygen saturations (SpO2) as per local guidelines. Oxygen therapy is not recommended for infants with only brief episodes of mild/moderate desaturation.

There is no definitive evidence to determine the optimal target saturations. The Australasian Bronchiolitis Guideline recommends target oxygen saturation (SpO2) of ≥92% but lower saturations may be tolerated depending on institutional practice. A study on infants aged less than one year with bronchiolitis found that a target SpO2 >90% was as safe and as clinically effective as 94%.[1]

Consider seeking senior emergency/paediatric advice as per local practice if unsure of oxygen requirement for a child with bronchiolitis.

Low flow oxygen

Low flow oxygen for infants with bronchiolitis by method of delivery	
Nasal prongs	**Hudson mask**
Maximum flow rate of 2 L/min	Commence at a minimum flow rate of 4 L/min to ensure adequate delivery if oxygen requirement is greater than 2 L/min

High flow nasal cannula oxygen (HFNC) Therapy

Consider HFNC therapy in infants with bronchiolitis who are hypoxic (SpO2 <92%) with moderate to severe work of breathing.

The positive airway pressure provided improves oxygenation and relieves work of breathing. HFNC therapy applied early in the hospital admission in infants with bronchiolitis has been shown to be beneficial.[2] It may help avoid intubation but can also provide pre-oxygenation whilst preparation for inevitable intubation is underway.

HFNC therapy is not recommend for infants without hypoxia.

Follow local policies and procedures for nursing ratios and ward location. View CHQ Nasal High Flow Therapy Guideline.

Continuous positive airways pressure (CPAP)

Nasal CPAP therapy for infants with bronchiolitis may also be considered but is rarely used.

Monitoring

Observations should occur in line with local hospital guidelines and Early Warning Tools (EWTs). Continuous pulse oximetry is not routinely recommended for non-hypoxic infants or stable infants receiving oxygen.

Hydration/nutrition

- small frequent feeds are recommended for infants with mild bronchiolitis
- nasal saline drops may be considered prior to the time of feeding
- suctioning of the nares may assist feeding in infants with moderate distress

ALERT – Deep suctioning of the nasopharynx is not recommended as may cause oedema and irritation of the upper airway resulting in increased length of illness.

- NGT insertion is highly recommended for infants on HFNC. Advantages include:
  - gastric decompression
  - ability to feed without interrupting HFNC
  - avoid potential for worsening of respiratory symptoms during feeding
- NG or IV hydration is recommended for infants with moderate -severe bronchiolitis who are feeding inadequately (less than 50% over 12 hours)
- if using IV route, isotonic IV fluids (Sodium Chloride 0.9% with glucose, or similar) are recommended
- the volume of fluids required to maintain hydration is unclear

Treatments NOT recommended

- beta 2 agonists (e.g. salbutamol) regardless of a personal/family history of atopy
- corticosteroids
- adrenaline (nebulised, IM, or IV) except in peri-arrest or arrest situation
- hypertonic saline
- antibiotics
- antivirals
- deep nasal suction
- chest physiotherapy

Escalation and advice outside of ED

Child is critically unwell or rapidly deteriorating

Includes children with the following (as a guide)

• ongoing hypoxia despite oxygen therapy
• persistent apnoeic events
• moderate or severe respiratory distress
• congenital heart disease or chronic lung disease
• physiological triggers including:
  ○ RR >50
  ○ HR <90 or >170
  ○ sBP <65
  ○ SpO2 <93% in oxygen or <85% in air
  ○ GCS ≤12

Reason for contact	Who to contact
For immediate onsite assistance including airway management	The most senior resources available onsite at the time as per local practices. Options may include: • paediatric critical care • critical care • anaesthetics • paediatrics • Senior Medical Officer (or similar)
Paediatric critical care advice and assistance	Onsite or via Retrieval Services Queensland (RSQ). If no onsite paediatric critical care service contact RSQ on **1300 799 127**: • for access to paediatric critical care telephone advice • to coordinate the retrieval of a critically unwell child RSQ (access via QH intranet) **Notify early of child potentially requiring transfer.** **Consider early involvement of local paediatric/critical care service.** In the event of retrieval, inform your local paediatric service.

Non-critical child

May include child with:
• moderate disease • mild to moderate and risk factors for severe disease (see Assessment) • any other significant clinical concern

Reason for contact	Who to contact
Advice (including management, disposition or follow-up)	Follow local practices. Options: • onsite/local paediatric service • Queensland Children's Hospital experts via Children's Advice and Transport Coordination Hub (CATCH) on 13 CATCH (13 22 82) (24-hour service) • local and regional paediatric videoconference support via Telehealth Emergency Management Support Unit TEMSU (access via QH intranet) on 1800 11 44 14 (24-hour service)
Referral	First point of call is the onsite/local paediatric service

Inter-hospital transfers

Do I need a critical transfer?	• discuss with onsite/local paediatric service • view Queensland Paediatric Transport Triage Tool
Request a non-critical inter-hospital transfer	• contact onsite/local paediatric service • contact RSQ on 1300 799 127 for aeromedical transfers • contact Children's Advice and Transport Coordination Hub (CATCH) on 13 CATCH (13 22 82) for transfers to Queensland Children's Hospital

Non-critical transfer forms	• QH Inter-hospital transfer request form (access via QH intranet)
	• aeromedical stepdown (access via QH intranet)
	• commercial aeromedical transfers:
	  ○ Qantas
	  ○ Virgin
	  ○ Jetstar

When to consider discharge from ED

There is insufficient evidence to recommend absolute discharge criteria for infants attending the ED with bronchiolitis. Consider discharge for the following infants:

- able to maintain adequate oxygen saturations in room air
- feeding adequately
- parent/caregiver can safely manage the infant at home (consider time of day, parent/carer comprehension and compliance, access to transport and distance to the local hospital)

Admission for a further period of observation may be considered for infants who meet the above criteria but are early in their illness and have risk factors for more severe disease (refer to Assessment).

On discharge, parent/caregiver should be provided with a Bronchiolitis factsheet and advised to seek medical help prior to next appointment if worsening symptoms and inability to feed adequately.

Follow-up

- with GP within two to three days or earlier if symptoms worsen.

When to consider admission

The decision to admit should be supported by clinical assessment, social and geographical factors and phase of illness.

Facilities without a Short Stay Unit (SSU)

Admission is required for infants who present with severe disease and likely for those with moderate disease.

Despite meeting the clinical discharge criteria, admission may be considered for infants:

- with risk factors for severe disease
- social issues including those that are geographically isolated from a hospital or have social issues affecting the ability to safely manage the child at home

Facilities with a Short Stay Unit (SSU)

Consider admission to SSU for infants who are responding to treatment but require a brief period of observation or trial of feeding prior to discharge.

When to consider admission to inpatient ward from SSU

Admission to an inpatient paediatric service is recommended for children who are failing to improve (persistent/recurring or worsening symptoms) after 12 hours of care.

Related documents

Guidelines

- Australasian Bronchiolitis Guideline

Factsheet

- Bronchiolitis

References

1. Cunningham et al. Oxygen saturation targets in infants with bronchiolitis (BIDS): a double-blind, randomised, equivalence trial, Lancet 2015; 386: 1041–48.
2. Franklin et al. A Randomized Trial of High-Flow Oxygen Therapy in Infants with Bronchiolitis. N Engl J Med. 2018 Mar 22;378(12):1121-1131

Guideline approval

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Disclaimer

This guideline is intended as a guide and provided for information purposes only. The information has been prepared using a multidisciplinary approach with reference to the best information and evidence available at the time of preparation. No assurance is given that the information is entirely complete, current, or accurate in every respect. We recommend hospitals follow their usual practice for endorsement locally including presenting it to their local Medicines Advisory Committee (or equivalent) prior to use.

The guideline is not a substitute for clinical judgement, knowledge and expertise, or medical advice. Variation from the guideline, taking into account individual circumstances may be appropriate.

This guideline does not address all elements of standard practice and accepts that individual clinicians are responsible for:

- Providing care within the context of locally available resources, expertise, and scope of practice
- Supporting consumer rights and informed decision making in partnership with healthcare practitioners including the right to decline intervention or ongoing management
- Advising consumers of their choices in an environment that is culturally appropriate and which enables comfortable and confidential discussion. This includes the use of interpreter services where necessary
- Ensuring informed consent is obtained prior to delivering care
- Meeting all legislative requirements and professional standards
- Applying standard precautions, and additional precautions as necessary, when delivering care
- Documenting all care in accordance with mandatory and local requirements

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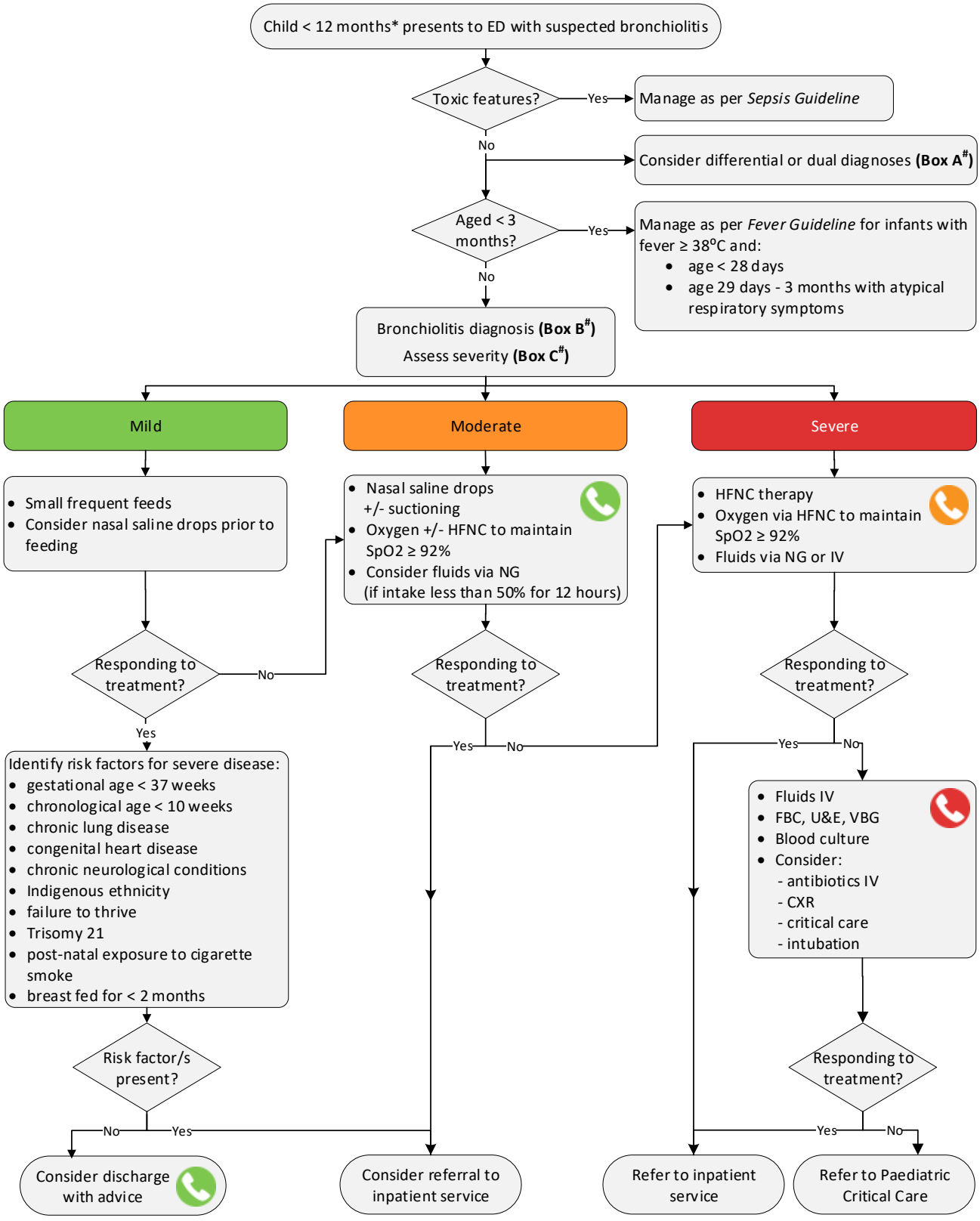

*Refer to the *Pre-school wheeze guideline* for children aged 1-5 years

See next page for **Box A, B and C**

Consider seeking senior emergency/paediatric advice as per local practices

Seek senior emergency/paediatric advice as per local practices. Consider contacting paediatric critical care

Seek urgent paediatric critical care advice (onsite or via Retrieval Services Queensland (RSQ) on 1300 799 127)

BOX A: Less common causes of respiratory distress in infants

Respiratory	Other
• bacterial pneumonia, including pertussis • aspiration of milk/formula or foreign body • tracheo/bronchomalacia • cystic fibrosis	• congestive cardiac failure • sepsis • intrathoracic mass • allergic reaction

Consider concurrent or alternative diagnosis of serious bacterial illness in child with high fevers.

ALERT – Consider cardiac disease in infants with the following:

- no precipitating viral illness
- hypoxia out of proportion to severity of respiratory disease
- +/- abnormal or unequal peripheral pulses, cardiac murmur or hepatomegaly

Keep in mind decompensation can be triggered by an intercurrent illness.

BOX B: Bronchiolitis diagnosis

Requires a history of an upper respiratory tract infection followed by onset of respiratory distress with fever and ≥1 of the following:

- cough
- tachypnoea
- retractions
- diffuse crackles or wheeze on auscultation

BOX C: Assessment of severity of acute bronchiolitis

	Mild	Moderate	Severe
Behaviour	Normal	Some/intermittent irritability	Increasing irritability and/or lethargy, fatigue
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