

## Clinical Practice Guideline: Bronchiolitis

### **Preface:**

This guideline provides evidence based recommendations on the, diagnosis, investigation, treatment, management and infection control of bronchiolitis within Princess Margaret Hospital for Children.

The guideline is designed for the care of children of less than 12 months of age who have a diagnosis of bronchiolitis, outside of the neonatal period. It may be possible to use the guideline for those children between 12 months to 2 years however other factors need to be considered and this should be discussed with the consultant.

This guideline has been written following a review of many available guidelines for the care of children with bronchiolitis. The Scottish Intercollegiate Guidelines Network Guideline 91 – ‘Bronchiolitis in Children’ <sup>(1)</sup> is the major source of information.

### **Diagnosis, clinical features and natural history**

**Bronchiolitis is a clinical diagnosis.** The diagnosis of bronchiolitis is based on the typical history and results of physical examination. The typical history is of breathing difficulty, cough and poor feeding. Apnoea may be a presenting sign of viral respiratory infection such as Respiratory Syncytial Virus (RSV). There is often a prodrome of coryzal symptoms. This history, together with the clinical finding of wheeze with or without crackles on the respiratory examination is usually sufficient to make the diagnosis

Fever is often present in children with bronchiolitis although not usually high grade. Children who present with a fever greater than 39°C should have a careful evaluation to exclude other diagnoses before a diagnosis of bronchiolitis is made.<sup>(2)</sup> Typically symptoms of bronchiolitis are most severe on days 3-5 then gradually improve. Cough may persist for a few weeks.

Bronchiolitis is a viral illness. It occurs more commonly in the winter months, but can be seen all year round. The most common causative organism is RSV causing around 75% of cases<sup>(3)</sup>

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Clinical Practice Guideline  
Bronchiolitis

Princess Margaret Hospital  
Perth Western Australia

**This document should be read in conjunction with disclaimer in the introduction to these guidelines**



Most children with bronchiolitis will not require hospital admission. These guidelines are aimed to assist in the decisions regarding management in primary care, admission, inpatient/ambulatory care, and hospital review.

### **Assessment of Severity**

	<i>Mild</i>	<i>Moderate</i>	<i>Severe</i>
Respiratory Rate	Normal to slightly increased	Increased	Markedly increased RR>70 <6 months RR>60 6-12 months RR>40 >12 months <sup>(4)</sup>
Respiratory Effort	Mild chest wall retraction	Tracheal tug Nasal flare Moderate chest wall retraction	Marked chest wall retraction Nasal flare Grunting
Oxygen Saturations	No supplemental oxygen requirement O <sub>2</sub> saturations >95%	Saturations 90-95%	Saturations <90%, may not be corrected by O <sub>2</sub>
Feeding	Normal to slightly decreased	50 -75% of normal feeds	<50 % of feeds, unable to feed
Apnoea	Nil	May have brief episodes	May have increasing episodes

### **Admission Criteria**

The decision to admit is made on the basis of the clinical history and physical examination. Investigations are not required to make that decision, however if performed the results should be considered. The need for admission is based on the above assessment of severity, but also needs to take into account social factors and co-morbidity as well as the length of time the child has been unwell. Typically bronchiolitis is most severe between days 3-5 and this should be considered in the decision to admit.

Generally speaking children with *mild bronchiolitis* do not need admission to hospital but should be referred back to their GPs. Their parents should be given the [Bronchiolitis Parent Information Sheet](#) (Emergency Department Version) and asked to represent to hospital if there are signs of worsening respiratory distress, apnoeas, decreased feeding or the child has less than 3 wet nappies in a 24 hours period.

Children with one or more features of *moderate bronchiolitis* (see above table) MAY be managed at home if there is no oxygen requirement. They should, however, be admitted to hospital if they are early in their illness (before day 3), if they have any co-morbidities (see below) or if there are concerning social factors. **These children can be considered for transfer and management at a general hospital.**

All children with one or more features of *severe bronchiolitis* (see above table) require hospital admission. They may require ICU review – see below.



## Comorbidities

The children who have been shown to be more at risk of developing more severe bronchiolitis require special consideration and should be discussed with a senior doctor. These children include:

- Children born at <36 weeks gestation
- Children with congenital heart disease
- Children with chronic respiratory disease
- Children with immunodeficiency
- Children less than 12 weeks of age

These children, when admitted will need special monitoring – see below

## ICU Referral

Children need to be reviewed by ICU if:

- Developing features of severe respiratory distress
- Frequent or prolonged apnoeic episodes with oxygen desaturation (O<sub>2</sub> less than 90%)
- Requiring greater than 50% oxygen to maintain oxygen saturations greater than 92%
- Showing fatigue, poor respiratory effort, maximal accessory muscle use/exhaustion or altered conscious state.
- Developing circulatory compromise

Blood gas measurements MAY be taken at this stage depending on the clinical circumstance, HOWEVER a capillary blood gas measurement is not a criteria for either ICU review or admission. ICU admission can be decided only by clinical examination by an experienced clinician.

*The decision to admit a patient to ICU needs to be discussed with the patient's consultant or the admitting medical consultant if the former is unavailable.*

## Investigations

There are **no routine** investigations required for the diagnosis of children with bronchiolitis. <sup>(1)</sup>

**NPA:** For viruses only, should be performed on all patients admitted to hospital for the purpose of *cohorting and infection control only* (see below). Testing will be conducted as follows:

All NPA specimens will be tested for: RSV, influenza A & B, adenovirus, & parainfluenza 1, 2, 3 by rapid immunofluorescence. If results are negative further testing will be done according to the PMH Microbiology protocol.
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Refer to the [Infection Control Manual](#) for more information



**Chest X Ray:** This is NOT indicated on a routine basis. CXR should only be performed where the diagnosis is unclear to exclude other illnesses.

**Blood Investigations:** There is no indication to perform any routine blood tests on children with mild or moderate clinically typical bronchiolitis. This includes FBP, U&E, CRP and blood cultures

**Blood Gas:** This is not routinely indicated. Blood gas may be performed in the event that a patient is deteriorating however the decision to involve ICU is based purely on clinical parameters and NOT on a blood gas

**Other investigations:** Concurrent invasive bacterial infection during bronchiolitis is infrequent and should not be routinely sought. Consideration of a clean catch urine and blood cultures should be made according to the clinical picture, including high or prolonged fevers or toxicity.<sup>(5)</sup>

## **Medications**

Although there have been multiple trials of medication in bronchiolitis, there are no data demonstrating significant benefit.<sup>(1)</sup>

**Bronchodilators:** These should not be used in the routine management of bronchiolitis. If the child is greater than six months of age and there is a strong family history of asthma, a single dose of salbutamol (6 puffs or 2.5mg via nebuliser) can be trialled. Observe for response. If no response, do not repeat dose.<sup>(6)</sup>

**Corticosteroids:** These are not indicated in bronchiolitis<sup>(7)</sup>

**Antibiotics:** These are not **routinely** indicated in bronchiolitis.<sup>(8)</sup> Consider using in the severely ill child, eg ICU admission

**Antiviral Agents:** These are not indicated in bronchiolitis<sup>(1)</sup> unless significant immunosuppression. Seek expert advice.

There is no evidence to support the **routine** use of:

- Hypertonic (3%) Saline Nebulisation <sup>(9)</sup>
- Saline Nebulisation
- Adrenaline Nebulisation <sup>(10)</sup>
- Caffeine/Aminophylline <sup>(11)</sup>

Consultation with a senior doctor is recommended.

## **Oxygen**

Oxygen therapy should be started when oxygen saturations are *persistently* below 92% or if the child shows significant respiratory distress (see signs for severe bronchiolitis in table).

If the oxygen saturations are 92% or above and the child is feeding well with mild – moderate distress, oxygen therapy is not necessary.

Oxygen therapy can be given via nasal prongs if the child's nose is not blocked by copious secretions. The maximum oxygen that can be delivered by nasal prongs is 2.5L/min. Oxygen can also be given via a head box and



should be considered when a child has copious secretions and/or is significantly distressed when using nasal prongs.

Refer to Section 7.2 of the [Paediatric Nursing Practice Manual](#) for more information on oxygen therapy

Patients receiving supplemental oxygen therapy will need to be monitored as per the monitoring section below.

### **Home Oxygen Therapy through HiTH**

This can be considered for the patients meeting the criteria below, who should be admitted for a minimum of 12 hours prior to being discharged to HiTH. Ensure that the parents are given with the [HiTH information sheet](#).

#### **EXCLUSION CRITERIA**

1. Pre-existing cardiac, pulmonary (eg BPD), neuromuscular disorders
2. History of apnoea
3. Prematurity <34 weeks (may be less relevant if a child is >12 months)
4. Children requiring >12 hourly beta-2 agonists (children with asthma or bronchial hyper-responsiveness should **not** receive home oxygen)

#### **INCLUSION CRITERIA**

1. >2 months of age (corrected gestation)
2. Clinical diagnosis of acute bronchiolitis or other lower respiratory tract infection (eg pneumonia)
3. Adequate feeding and hydration (>50% normal feed)
4. Oxygen saturation  $\geq 92\%$  on <1litre/minute nasal cannula oxygen
5. No signs of deteriorating respiratory status
6. Consultant paediatrician agrees that child is fit for home oxygen therapy

### **Monitoring**

**Apnoea Monitoring** is indicated for any child admitted considered at risk of apnoea or bradycardia eg:

- Children with moderate/severe respiratory distress with co-morbidities as defined above
- Those with a recent past history of apnoea

**Pulse Oximetry**: An child requiring Oxygen who has mild to moderate Bronchiolitis without apnoeas **does not** need to have **continuous** oxygen saturation monitoring<sup>(12)</sup>. The condition of the child will determine frequency of monitoring.

*Continuous Oxygen saturation* monitoring should be used only:

- As adjunct to apnoea monitoring as ordered by Medical Team
- If child is experiencing apnoeas and /or bradycardia
- If child is in severe respiratory distress
- If child is requiring  $\geq 50\%$  inspired oxygen
- For 4 hours during a trial in room air

If monitored continuously, reposition the probe 4 hourly. If monitored less frequently, probe should be removed after use or repositioned after 4 hours.



**It is the responsibility of all staff to respond to monitor alarms.**

Monitoring should be discontinued once it is no longer indicated.

## **Fluid Requirements**

Clinicians should assess child closely for the ability to maintain adequate intake and hydration based on the degree of tachypnoea, exhaustion and the nature and amount of nasal secretions.

**Fluid restriction is recommended in the acute phase (usually 2/3 maintenance) due to the potential risk of Syndrome of Inappropriate Antidiuretic Hormone Secretion (SIADH)/ fluid retention.**<sup>(13, 14)</sup>

Oral feeds can be continued if the child is able to take greater than 50% of usual feeds without significantly increased work of breathing. Feeding 2 – 3 hourly with decreased volumes may be helpful.

If unable to manage oral feeds:

Commence child on 2<sup>nd</sup> hourly bolus nasogastric feeds.

If the child is breastfed and requires nasogastric feeding the first choice of fluid should be breast milk. In children with **moderate** illness there is no evidence to suggest that the use of the intravenous route has any advantage over the nasogastric route.<sup>(15)</sup>

If child develops worsening respiratory distress and cannot tolerate oral/ NG fluids, then commence intravenous fluids and give nil by mouth.

Check electrolytes prior to commencing IV fluids and then at least daily according to the results and clinical situation.

2.5% dextrose & 0.45% saline is recommended with supplemental potassium if the infant goes long periods without feeds. Higher concentrations of dextrose may be required in smaller/younger infants.

### **Breast Feeding Mothers**

Provide equipment and encourage to express breast milk regularly if child is not tolerating breast feeds or on reduced oral intake

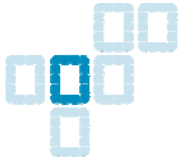
It is also important for breast feeding mothers to maintain their own oral fluids and dietary intake to prevent a reduction in the supply of breast milk.

## **Adjunctive Therapy**

**Normal Saline** nose drops should be administered to unblock the nasal passages before suction is considered.

**Suction:** Suction should not be performed routinely but may be considered to clear significant secretions when there is increasing respiratory distress.

**Physiotherapy:** This is not recommended as routine therapy<sup>(16)</sup>



## **Infection Control**

(see also [Infection Control Manual](#) for more information on respiratory viruses)

Patients admitted with symptoms of bronchiolitis are to be placed:

- In a single room or cohorted with patients with the same infection.<sup>(1)</sup>
- For RSV, hMPV, PIV 1 & 2 ONLY Place in multi bed room with the following patients:
  - >12 months age
  - No cardiac disease
  - No chronic respiratory disease
  - Not immunosuppressed

Respiratory droplet (Light Blue Isolation Card) precautions are to be taken. These include:

- **Hand hygiene** – use alcohol gel before & after every contact with a patient or their environment. Wash hands first if soiled.
- **Gown & gloves** if clothing or hands are likely to be contaminated with respiratory secretions<sup>(17)</sup>
- **Face shield** if respiratory droplets are likely to contaminate face.
- **Equipment:** use patient dedicated, disposable or disinfect with hypochlorite 0.125% or alcohol wipe
- **Environment:** detergent daily; hypochlorite 0.125% terminally

Patients will need to continue isolation precautions for the period of infectivity if still an inpatient.

### **Period of infectivity for winter respiratory viruses**

<b>Virus</b>	<b>Period of infectivity</b>
Influenza A & B	24 hours before to 14 days after symptom onset
Para influenza 1, 2,	4 days before to 14 days after symptom onset
Para influenza 3	4 days before to 28 days after symptom onset
RSV & hMPV	3 days before to 21 days after symptom onset
Adenovirus	2 days before to 14 days after symptom onset

NB: Immunocompromised patients will excrete these viruses for longer periods



## **Discharge Criteria**

A child can be safely discharged from hospital once they are able to maintain oxygen saturations of greater than 92% in air, maintain adequate oral hydration (>75% of usual intake), the family is confident of providing care to the child and social/travel circumstances have been considered.

The child should be observed for at least 4 hours after cessation of oxygen (including a sleep period).

Parents should be informed that their child may continue to have some symptoms of bronchiolitis (mainly cough) for up to 4 weeks from diagnosis.

A patient discharge [Information Sheet](#) is available for families.

LINKS:

[Reference List](#)

[Evidence Guide](#)

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