

Bronchiolitis: when to reassure and monitor, and when to refer

KEY PRACTICE POINTS:

- Bronchiolitis should be diagnosed clinically; blood tests, analysis of sputum, testing for the underlying virus or chest X-rays are not routinely recommended
- Bronchiolitis is managed with supportive care; there are no medicines or interventions that can be administered in primary care which are effective at reducing symptoms or the likelihood of deterioration. Ongoing research and clinical trials confirm that there is no role for bronchodilators, corticosteroids or antibiotics.
- When management at home is appropriate, provide caregivers with information regarding the course of the disease, ensure they understand red flags which suggest urgent review is necessary and reinforce messages such as avoiding smoking around the infant
- Infants with symptoms of moderate severity may require referral to hospital after taking into account factors such as the time course of illness, risk factors for more severe illness and home circumstances
- Infants with severe symptoms should be sent to hospital via ambulance

Bronchiolitis is a lower respiratory tract infection, most often caused by Respiratory Syncytial Virus (RSV). In severe illness it is associated with increased respiratory effort, difficulty feeding, dehydration and cyanosis. Bronchiolitis typically affects infants aged under 12 months, with young infants or those born premature at greater risk of severe illness. For infants with mild illness and without risk factors for deterioration, caregivers can be reassured that conservative treatment is appropriate. Infants with more severe symptoms or underlying conditions which predispose them to deterioration may require referral to hospital.

Bronchiolitis: an increasing problem in New Zealand

Rates of hospitalisation for bronchiolitis in New Zealand have increased by approximately 50% since 2000.¹ Between 2009 – 2013, approximately 6000 children per year were hospitalised with bronchiolitis.² Hospitalisation rates are four to five times higher for children of Māori or Pacific ethnicity than children of European ethnicity, and five times higher for children from the lowest socioeconomic areas than children from the highest socioeconomic areas.¹

A number of risk factors predispose infants to more severe bronchiolitis

Risk factors for developing more severe bronchiolitis include:^{1,3,4}

Young age or prematurity:

- Age under 10 weeks
- Premature birth (under 37 weeks)

Co-morbidities:

- Chronic lung disease
- Congenital heart disease
- Cystic fibrosis
- Immunodeficiency
- Down syndrome
- Neuromuscular disorders

Other risk factors:

- Household members who smoke
- Breast fed for less than two months
- Lower socioeconomic living circumstances
- Māori or Pacific ethnicity

Diagnosis and assessing severity

Bronchiolitis is a lower respiratory tract infection, usually caused by Respiratory Syncytial Virus. It is characterised by cough, wheezing and in more severe cases, increased respiratory effort.

Diagnosis of bronchiolitis is based on symptoms and signs (Table 1*). During a clinical examination, clinicians will be forming a diagnosis and simultaneously assessing severity based on the presence and extent of symptoms and signs.

The course of illness in infants with bronchiolitis can vary, although it often begins with symptoms similar to a cold, lasting approximately three days, which worsen as the infection spreads into the lower respiratory tract. Symptoms usually peak after three to five days of illness and then resolve over the following week. Infants can have an ongoing cough for up to three weeks.^{3,4}

Infants with mild bronchiolitis characteristically have cough, wheezing, nasal discharge, and chest recession with wheeze and crackles audible on chest auscultation.^{3,5} In more severe cases, infants can have signs of increased respiratory effort such as nasal flaring and the use of accessory breathing

muscles, as well as reduced oxygen saturation and cyanosis (Table 1). Increased respiratory effort in infants with more severe bronchiolitis can result in difficulty feeding, reduced fluid intake and dehydration.³

Age is also a key factor in establishing a diagnosis of bronchiolitis, as 85% of cases in New Zealand are in infants aged under 12 months.² Clinicians should consider a diagnosis of bronchiolitis in an infant aged under 12 months with symptoms of lower respiratory tract infection during winter.^{3,4} There is less diagnostic certainty in children aged over 12 months.⁴

The symptoms and signs of bronchiolitis can overlap with other conditions

Features which may indicate that an infant has a condition other than bronchiolitis include:^{3,6}

- Cough as the **predominant** symptom; a number of conditions could cause cough without the changes in respiratory effort, nasal discharge or findings on chest auscultation characteristic of bronchiolitis^{7,8}
- Differences from the usual onset of symptoms:
 - Infants with a sudden onset of wheeze may have a foreign body blocking the airways
 - In infants with slow onset, persistent or prolonged symptoms, consider signs such as a cardiac murmur, failure to thrive or pulmonary oedema which could suggest congestive heart failure
- Recurrent wheezing, or previous diagnoses of recurrent bronchiolitis; consider whether another diagnosis, such as aspiration, bronchiectasis, immune deficiency or cystic fibrosis may better explain recurrent symptoms and signs

Distinguishing bronchiolitis from pneumonia or asthma

A high fever (> 39°C) and focal crackles on chest auscultation are consistent with the infant having pneumonia rather than bronchiolitis.³ Wheeze is less common in infants with pneumonia, however, the presence or absence of wheeze alone is insufficient to distinguish between bronchiolitis and pneumonia.⁹

If infants have wheeze without crackles on chest auscultation then clinicians may wonder if a diagnosis of asthma is appropriate. However, for infants aged under 12 months with wheeze, bronchiolitis is the most likely diagnosis, rather than asthma. Asthma becomes increasingly possible with older age, and children are likely to have persistent wheeze which lasts longer than would be expected for a diagnosis of bronchiolitis, a history of recurrences and a family history of atopy.³ If there is diagnostic uncertainty in children aged over 12 months, clinicians may consider a trial of salbutamol to assist diagnosis; a bronchodilator would not improve symptoms in a child with bronchiolitis.³⁻⁵

* Table 1 shows the framework advocated in the Australasian Bronchiolitis Guideline by the Paediatric Research in Emergency Departments International Collaborative (PREDICT).⁴ Other similar frameworks are in use in clinical practice, such as the Bronchiolitis Assessment Tool (BAT).

Table 1: Symptoms and signs of mild, moderate and severe bronchiolitis. Adapted from the Paediatric Research in Emergency Departments International Collaborative (PREDICT) research network and Turner *et al.*^{4,6}

	Mild*	Moderate*	Severe*
Behaviour	Normal behaviour	Some or intermittent irritability	Increasing irritability or lethargy Fatigue
Respiration			
Respiratory rate	Normal to mild tachypnoea	Increased respiratory rate	Marked increase or decrease in respiratory rate
Signs of increased respiratory effort	No to mild chest wall retraction	Moderate chest wall retraction Tracheal tug Nasal flaring	Marked chest wall retraction Marked tracheal tug Marked nasal flaring
Oxygen saturation (SpO ₂) in room air	> 92%	90 – 92%	< 90%
Apnoeic episodes	None	May have brief apnoea	Increasingly frequent or prolonged apnoea
Feeding and hydration**	Normal	May have difficulty with or reduced feeding, minor dehydration	Reluctant or unable to feed Marked dehydration e.g. < 50% of normal fluid intake, no wet nappy for 12 hours
Initial management	Management at home by caregivers is usually appropriate. Referral may be appropriate for infants in the early stages of illness with risk factors for deterioration	Either referral to hospital or management at home may be appropriate; see text for details	Send infant to hospital via ambulance Monitor infant until ambulance arrives‡

* Criteria can be used to stratify severity; infants with a larger number of symptoms and signs in the moderate and severe categories are more likely to develop severe disease and require treatment in secondary care

** Examine the infant for signs such as dry nappy, dry mucosa and eyes, capillary refill time, sunken eyes or fontanelle and altered skin elasticity³

‡ If infants are in rural areas, or there is likely to be a delay in reaching hospital, discuss initial management options with a paediatrician or emergency department physician

Investigations are unnecessary

The management of bronchiolitis is the same regardless of the causative virus. Blood tests or analysis of sputum samples are not recommended.⁴ Chest X-ray is not routinely recommended, nor is it recommended to distinguish bronchiolitis from pneumonia as radiographic findings can be similar between infants with these conditions.³

Referral, or reassurance and monitoring?

Infants with severe symptoms or signs should be sent to hospital via ambulance. This includes moderate to severe dehydration, apnoea (either observed by a health professional or reported by caregivers) or symptoms which cannot be managed in primary care, e.g. an oxygen saturation (SpO₂) of less than 92% on room air (Table 1).^{4,5}

Infants with mild to moderate symptoms or signs may be able to be managed at home or may require referral to hospital, depending on their specific circumstances and the likelihood of deterioration.

The decision of whether an infant can be managed at home should take into account the following factors:³

- Severity at clinical examination
- The timing of the clinical examination in relation to the course of illness
- Risk factors for severe illness (see above)
- The circumstances of the caregiver and whether they can provide adequate care for the infant
- Distance from or access to healthcare if the infant's condition were to deteriorate
- Living circumstances, e.g. whether the family live in cold or overcrowded housing, the presence of smokers in the household, whether they have a phone

Management of infants being cared for at home

Management is largely supportive

There are no medicines or interventions that can be administered in primary care which are effective at reducing symptoms or the likelihood of deterioration. This includes bronchodilators, inhaled or oral corticosteroids, nebulised saline or adrenaline, montelukast or chest physiotherapy; these have been studied in clinical trials and found to be ineffective.^{4,10–12}

Antibiotics are not indicated

Infants with a viral syndrome such as bronchiolitis are reported to have a less than 1% chance of concurrent bacterial infection.¹³

The use of antibiotics in infants with bronchiolitis does not improve rates of complications or the length of illness.^{3,5}

Providing a “safety net” for diagnostic uncertainty and to reassure caregivers

To ensure infants who deteriorate receive appropriate medical support, discuss with caregivers:

1. Advice for caring for the infant and the expected course of illness
2. Signs of worsening illness which warrant further action
3. Follow-up and additional contact

1. Management advice and expected time course

Some parents or caregivers may express concern that they are being “sent home” with a sick child without enough clinical intervention or investigation. Reassure caregivers that antibiotics are not an appropriate treatment for a virus, that there are no medicines which can be prescribed to hasten the resolution of symptoms, and that laboratory tests or chest X-rays are not recommended.^{3,4,6}

Smaller, more frequent milk feeds or meals can help infants with mild illness maintain adequate hydration and nutritional intake. Ask if there are any smokers in the household and highlight that exposure to smoke increases the infant's risk of developing severe symptoms; use this opportunity to encourage smoking cessation.³

Inform caregivers that symptoms typically last one to two weeks and the infant may have a cough which continues for up to three weeks.³ Paracetamol or ibuprofen can be used for infants with fever and discomfort, if necessary. See NZFC for dosing guidance:

- Ibuprofen: www.nzfchildren.org.nz/nzf_5524
- Paracetamol: www.nzfchildren.org.nz/nzf_2439

Bronchiolitis is highly infectious. Keeping hands clean is the most important step caregivers can take to reduce the risk of transfer to others in the house. Alcohol-based rubs are the preferred method (soap and water is an acceptable alternative), and should be used frequently, such as before and after handling the infant or contact with objects such as toys.¹³

 Information for caregivers of infants with bronchiolitis is available at: www.healthnavigator.org.nz/health-a-z/b/bronchiolitis

2. Ensure caregivers are aware of signs of worsening or severe illness

Discuss signs of worsening or severe illness with caregivers (Table 1). They should seek urgent assistance if the infant has:^{3,6,14}

- No wet nappy or a fluid intake of less than half of normal over 12 hours

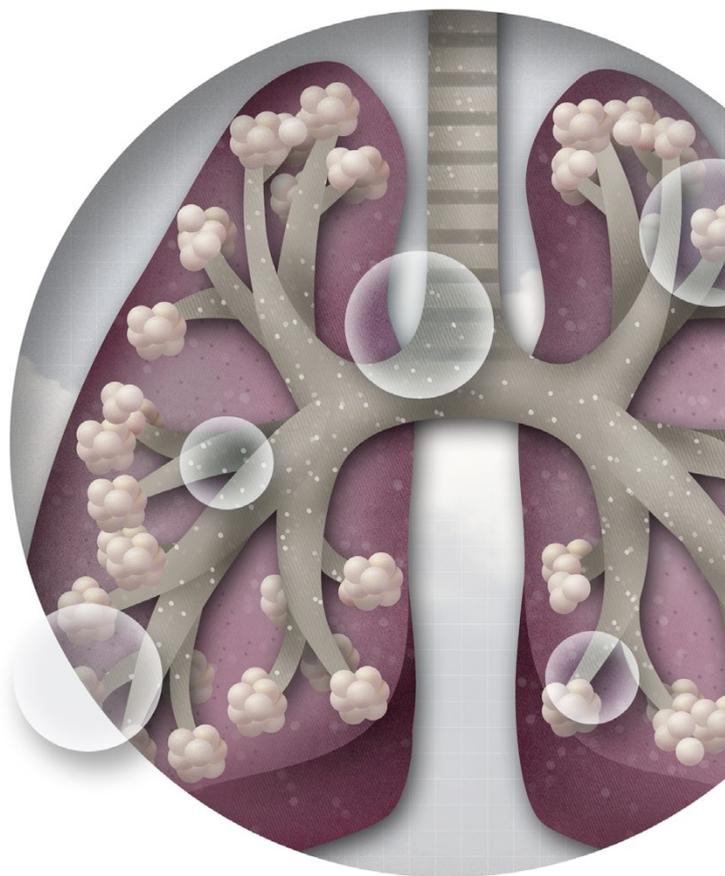
- Periods of irregular breathing or pauses in breathing
- Nasal flaring, grunting or marked chest recession during breathing
- Signs of cyanosis, such as blue lips or tongue
- Are difficult to wake or do not respond normally to cues

Encourage caregivers to contact the general practice if they are concerned about worsening symptoms or symptoms which are not improving in the expected timeframe.

3. Arrange follow-up and additional contact for reassurance

Arranging a review or phone follow-up, e.g. in one to two days, is a useful strategy to mitigate the clinical uncertainty of whether an infant will deteriorate, as well as provide reassurance to caregivers.⁶

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