Infants and Children - Acute Management of Bronchiolitis

Summary This guideline provides the best evidence based, clinical direction for clinicians in the acute management of bronchiolitis in infants.

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Audience Emergency Departments, Medical, Clinicians, Nursing

NSW GOVERNMENT Health

GUIDELINE SUMMARY

INFANTS AND CHILDREN - ACUTE MANAGEMENT OF BRONCHIOLITIS

PURPOSE

This Clinical Practice Guideline provides evidence based clinical direction for clinicians in the acute management of bronchiolitis in infants. It is aimed at achieving the best clinical care in the assessment, escalation and management of acute bronchiolitis in infants.

KEY PRINCIPLES

This Guideline applies to all facilities where paediatric patients are managed. It requires the Chief Executives of all Local Health Districts and Specialty Health Networks to determine where local adaptations are required or whether it can be adopted in its current format in all hospitals and facilities required to manage acute bronchiolitis in infants.

The Clinical Practice Guideline reflects what is currently regarded as a safe and appropriate approach to the management of acute bronchiolitis in infants. However, as in any clinical situation there may be factors which cannot be covered by a single set of guidelines. This document should be used as a guide, rather than as a complete authoritative statement of procedures to be followed in respect of each individual presentation. **It does not replace the need for the application of clinical judgement to each individual presentation.**

USE OF THE GUIDELINE

Chief Executives must ensure:

- This Guideline is adopted or local protocols are developed based on the *Infants and Children: Acute Management of Bronchiolitis,* Clinical Practice Guideline
- Local protocols are in place in all hospitals and facilities likely to be required to manage paediatric patients with bronchiolitis
- Ensure that all staff treating paediatric patients are educated in the use of the locally developed paediatric protocols.

Directors of Clinical Governance are required to inform relevant clinical staff treating paediatric patients of this revised guideline.

REVISION HISTORY

Version	Approved by	Amendment notes
January 2018 (GL2018_001)	Deputy Secretary, Strategy and Resources	Changes to thresholds for adequate oxygenation; parameters for use of continuous oximetry; inclusion of high flow nasal cannulae oxygen in management; viral identification not recommended; bronchodilators not recommended.
PD2012_004	Deputy Director-General Strategic Development	Second Edition
PD2005_387	Director General	New Policy

ATTACHMENTS

1. Infants and Children - Acute Management of Bronchiolitis

Infants and Children - Acute Management of Bronchiolitis

NSW GOVERNMENT Health

GUIDELINE

Issue date: January 2018

GL2018_001

CONTENTS

1 BACKGROUND

1.1 About this document

This Guideline is aimed at establishing the best possible evidence based paediatric clinical care in NSW. The target audience is medical and nursing staff providing care for infants (0-12 months) who present to hospital with suspected bronchiolitis. Application of this guideline for children over 12 months may be relevant but there is less diagnostic certainty in the 12-24 month age group.

In 2016, the Australasian Bronchiolitis Guideline was developed by the Paediatric Research in Emergency Departments International Collaborative (PREDICT) [1]. PREDICT undertook a comprehensive review of the evidence for the diagnosis and management of bronchiolitis for the purpose of improving health outcomes. A full reference list and clinical recommendations evidence summaries has not been included in this guideline and is available in the Australasian Bronchiolitis Guideline.

Following permission from the PREDICT Development Committee, the NSW Ministry of Health convened an expert group to align the recommendations for use in NSW. The expert group focused on retaining exact wording and information contained within the Australasian Bronchiolitis Guideline where possible, to maintain the integrity of the advice provided.

This Guideline does not replace the need for the application of clinical judgement to each individual presentation.

1.2 Changes from previous clinical practice guideline

The following list identifies the key changes to the document:

- Thresholds/targets for adequate oxygenation
- Parameters for use of continuous oximetry
- Inclusion of High Flow Nasal Cannulae (HFNC) in management
- Viral identification is **not** recommended
- Bronchodilators are **not** recommended

1.3 Key definitions

Age - all references to age refer to chronological age unless stated otherwise

BTF- between the flags

CERS - clinical emergency response systems

CPAP - continuous positive airway pressure

EDs - emergency departments

HFNC - heated humidified high flow oxygen/air via nasal cannulae

IV - intravenous

IM - intra muscular

NG - nasogastric

NPO_2 - nasal prong oxygen

PICU - paediatric intensive care unit

SPOC - standard paediatric observation chart

1.4 Legal and legislative framework

All NSW Health staff and in particular frontline staff, have a legal responsibility and a unique opportunity to identify and respond appropriately to the vulnerabilities, risks and needs of families, children and young people.

The legal and policy responsibilities of health staff are outlined in the NSW Policy Directive, PD 2007_007 Child Wellbeing and Child Protection Policies and Procedures for NSW Health.

2 FRAMEWORK FOR DECISION MAKING

2.1 Factors to be considered in decision making

- Decision-making should include children and accompanying parent/guardian.
- NSW Health covers a large geographical area and includes multiple acute public health facilities across metropolitan, regional, rural and remote regions. It is not possible for all services to be provided by all facilities and at times children may need to be transferred to a different facility for appropriate and necessary treatment.
- In this situation, hospitals must have clear and agreed guidelines about which children should be transferred, in line with NSW Policy PD2010_031 Inter-Facility Transfers of Children and Adolescents, and referral mechanisms should be jointly understood by both hospitals and promote a tiered network of services within the Health Service.

2.2 Information to enable shared decision-making

- Effective communication between clinicians, children, parents/guardians and families is essential. Information should be directed to the child and their accompanying parent/guardian in a manner that enables shared decision-making and informed consent.
- Engaging with the child at a developmentally appropriate level will promote trust and cooperation.

Parental anxiety should not be discounted.

It is often of significance even if the child does not appear especially unwell.

- Respecting the difference – be aware of cultural differences and factors influencing the health of Aboriginal people. Refer to your local Aboriginal liaison or for further information see NSW Health Communicating positively – A guide to appropriate Aboriginal terminology.

2.3 Documentation

- All documentation in children's medical records should be in line with PD2012_069 Health Care Records-Documentation and Management.

3 BRONCHIOLITIS

3.1 Overview

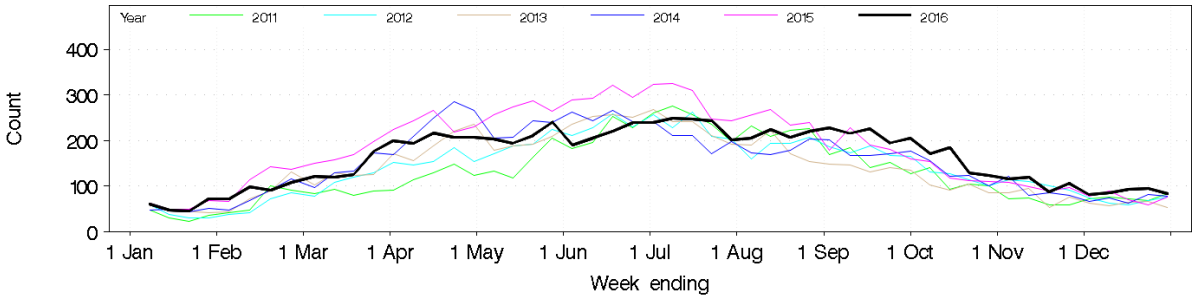
Viral bronchiolitis of infancy is a lower respiratory tract infection associated with inflammation resulting in distal trapping of air and respiratory difficulty. It predominantly presents in infants aged less than 12 months of age. It is a self-limiting condition, often requiring no treatment. A small number of infants may require treatment for reduced hydration and respiratory distress. Bronchiolitis may occur repeatedly in infants and children as infection does not induce lasting immunity[2].

A major source of confusion over therapies, especially in older children, arises from the fact that viral bronchiolitis can be hard to distinguish from asthma with associated viral respiratory infection.

3.2 Bronchiolitis in NSW

Infants less than 1 year old may present with bronchiolitis to emergency departments (EDs) throughout the year but the incidence rises from March and peaks in July, which is a month before the influenza season begins[3].

Figure 1. Emergency Department presentations for bronchiolitis for the previous 6 years- Infants aged less than 1 year across 60 NSW hospitals



Source: Public Health Rapid Emergency, Disease and Syndromic Surveillance (PHREDSS) system, held by the NSW Ministry of Health.

According to the last six years of data, infants less than 1 year old account for more than 75% of all bronchiolitis presentations to EDs in NSW. 50% of these infants are subsequently admitted to wards. The majority of these admissions occur from May to August. Approximately 1% of presentations will be admitted to critical care units[4].

3.3 Infectious Agents

Viral bronchiolitis is the most common severe respiratory infection of infancy. Respiratory Syncytial Virus (RSV) is the most common cause but other viruses include metapneumovirus, rhinovirus, influenza, parainfluenza and adenovirus.

4 DIAGNOSIS AND FEATURES

4.1 Diagnosis

Viral bronchiolitis is a clinical diagnosis based on typical history and examination. It usually begins with an acute upper respiratory tract infection. Peak severity usually occurs at around day 2 or 3 but may extend to day 5 of the illness with resolution over 7-10 days. The cough may persist for weeks.

4.2 Clinical Features

Bronchiolitis typically begins with an acute upper respiratory tract infection followed by onset of respiratory distress and fever and one or more of the following:

- Cough
- Tachypnoea
- Chest wall retractions
- Widespread crackles or wheeze.

4.3 Differential Diagnosis

A number of other conditions may share some presenting features with viral bronchiolitis. These conditions can usually be excluded via an accurate history, a thorough physical examination and, where clinically indicated, a chest X-ray. Such conditions include:

- Pneumonia
- Congestive heart failure
- Pertussis
- Pneumothorax
- Bronchial foreign body

When there is diagnostic uncertainty in a sick infant, refer to the Clinical Excellence Commission Paediatric Sepsis Pathway and/or PD2010_063 Children and Infants with Fever-Acute Management.

5 RISK FACTORS FOR MORE SERIOUS ILLNESS

- Gestational age <37 weeks
- Chronological age at presentation <10 weeks of age
- Postnatal exposure to cigarette smoke
- Breast fed for less than 2 months
- Failure to thrive
- Chronic lung disease
- Congenital heart disease
- Chronic neurological conditions
- Immunodeficiency
- Indigenous ethnicity - Aboriginal, Torres Straight Islanders, Pacific and Maori infants.

Infants with any of these risk factors are at increased risk of rapid deterioration and require escalation of care and consideration of hospital admission even if assessed with mild symptoms.

6 ACUTE BRONCHIOLITIS - Assessment and Management Algorithm

As part of the systematic A-G structured approach to physical assessment of the patient, the following algorithm has been developed specifically for the assessment and management of patients presenting with bronchiolitis. For further information on the A-G assessment, refer to PD2013_49 Recognition and Management of Patients who are Clinically Deteriorating.

Algorithm on Following Page

Bronchiolitis Algorithm

Initial Assessment

This table is meant to provide guidance in order to stratify severity. The more symptoms the infant has in the moderate-severe categories, the more likely they are to develop severe disease.

Symptoms	Mild	Moderate	Severe
Behaviour	Normal	Some/intermittent irritability	Increasing irritability and/or lethargy /fatigue
Respiratory Rate	Normal – mildly increased respiratory rate	Increased respiratory rate	Marked increase or decrease in respiratory rate
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 Saturation **Oxygen Requirement**	O_2 saturations >92% (in room air)	O_2 saturations 90 - 92% (in room air)	O_2 saturations < 90% (in room air) Hypoxemia, may not be corrected by O_2
Apnoeic Episodes	None	May have brief self-limiting apnoea	Increasingly frequent or prolonged apnoea
Feeding	Normal or slightly decreased	Difficulty feeding but able to take > 50% of normal feeds	Significant difficulty feeding with intake < 50% of normal feeds
Management			
Likelihood of Admission	Suitable for discharge Consider risk factors	Likely admission, may be able to be discharged after a period of observation Management should be discussed with a paediatrician	Requires admission and consider need for transfer to an appropriate children's facility/PICU Referral is determined by: -Senior review -Local **CERS** response
Observations Vital signs (respiratory rate, heart rate, O2 saturations, temperature)	Assessment in ED prior to discharge (minimum two sets of observations on SPOC)	Hourly Referring to SPOC	Continuous cardiorespiratory and oximetry monitoring and assessment
Hydration/Nutrition	Small frequent feeds	Not feeding adequately (< 50% over 12 hours), Administer NG or IV hydration	Not feeding adequately (< 50% over 12 hours) or unable to feed, Administer NG or IV hydration
Oxygen	Nil requirement	Administer O_2 to maintain saturations ≥ 92%	Administer O_2 to maintain saturations ≥ 92%
Respiratory Support		If a trial of NPO_2 is ineffective consider HFNC after paediatrician review	Consider HFNC or CPAP after paediatrician review
Disposition/Escalation	Consider further medical review if early in the illness and any risk factors are present or if child develops increasing severity after discharge	Decision to admit should be supported by clinical assessment, social and geographical factors and phase of illness	Requires admission or transfer, escalate as per local **CERS** if: -Severity does not improve -Persistent desaturations -Significant or recurrent apnoeas with desaturation

If no improvement consult NETS 1300 36 2500

Investigations have no usual role in the management of bronchiolitis (see page 7)

Provide advice on the expected course of illness & when to return - Parent Fact sheets should be given to parent/ carer

7 INVESTIGATIONS

In most infants and children presenting to hospital and/or hospitalised with bronchiolitis, **NO** investigations are required.

Chest x-ray (CXR)

- Is not routinely indicated in infants presenting with bronchiolitis and may lead to unnecessary treatment with antibiotics and subsequent risk of adverse events.

Blood tests (including full blood count (FBC), blood cultures)

- Have no role in management.

Virological testing (nasopharyngeal swab or aspirate)

- Has no role in management of individual patients.

Urine microscopy and culture

- May be considered to identify urinary tract infection if a temperature over 38 degrees in an infant less than two months of age with bronchiolitis.

8 MANAGEMENT

8.1 Respiratory Support

- Oxygen therapy should be administered when oxygen saturations are persistently less than 92%.
- Brief desaturations are not a reason to commence oxygen therapy. It is appreciated that infants with bronchiolitis will have brief episodes of mild/moderate desaturations to levels less than 92% which do not necessarily indicate the need for oxygen.
- Oxygen should be discontinued when oxygen saturations are persistently greater than or equal to 92%.
- **Heated humidified high flow oxygen/air via nasal cannulae** (HFNC) can be considered in the presence of hypoxia (oxygen saturations less than 92%) and moderate to severe chest wall recessions.

8.2 Monitoring

- Observations should be made with special consideration of risk factors listed in **section 5: Risk Factors for more Serious Illness**, which may cause unexpected deterioration. Observations should be recorded in relevant Standard Paediatric Observation Chart/Standard Paediatric Emergency Department Observation Charts which are designed to identify deterioration and appropriate responses.

- **Continuous oximetry** should not be routinely used to dictate medical management unless disease is severe.

8.3 Hydration/Nutrition

- When non-oral hydration is required, either intravenous (IV) or nasogastric (NG) hydration is appropriate.
- If IV fluid is used it must follow the NSW Standard for Paediatric Intravenous Fluids (2nd Edition) IB2014_066 recommendations.
- The ideal daily volume of IV or NG fluids remains unknown. Between 60-100% of maintenance fluid is an appropriate volume to initiate based on clinical examination, prior fluid intake and urine output.

8.4 Medication

- **Beta 2 agonists –** do not administer beta 2 agonists (including to those with a personal or family history of atopy).
- **Corticosteroids –** do not administer systemic or local glucocorticoids (nebulised, oral, intramuscular (IM) or IV.
- **Adrenaline –** do not administer adrenaline (nebulised, IM or IV) except in peri-arrest situation.
- **Hypertonic saline –** do not administer nebulised hypertonic saline.
- **Antibiotics – including Azithromycin** are not indicated in bronchiolitis.
- **Antivirals –** are not indicated.

8.5 Nasal Suction

- **Nasal suction** is not routinely recommended. Superficial nasal suction may be considered in infants with moderate disease in order to assist feeding.
- **Nasal saline drops** may be considered at time of feeding. 2 drops (0.1ml) per nare are recommended.

8.6 Chest Physiotherapy

- Is not indicated.

9 ONGOING MANAGEMENT

HFNC or Nasal Continuous Positive Airway Pressure (CPAP) therapy may be considered in appropriate ward settings. Refer to local practices.

10 DISCHARGE PLANNING AND COMMUNITY BASED MANAGEMENT

- Infants can be discharged when oxygen saturations are greater than or equal to 92% in air and they are feeding adequately.
- Factors associated with an increased risk of representation:
  - Gestational age <37 weeks
  - Chronological age at presentation <10 weeks
  - Exposure to cigarette smoke
  - Breast fed for less than 2 months
  - Failure to thrive
  - Chronic lung disease
  - Congenital heart disease
  - Chronic neurological conditions
  - Immunodeficiency
  - Indigenous status - Aboriginal, Torres Strait Islanders, Pacific and Maori infants
- Follow up and review as per local practice

11 EDUCATION (Parent/care-giver/guardian)

- A Bronchiolitis information sheet should be provided.
- Parents should be educated about the illness, the expected progression and when and where to seek further medical care.

12 SAFETY INITIATIVES - (Infection Control)

- Use simple infection control practices. Hands must be washed before and after each patient interaction to avoid transfer of viruses by skin contact.
- **Cohorting** of infants (based on virological testing) has not been shown to improve outcomes.

13 WORKING PARTY MEMBERS

Name	Title
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14 ATTACHMENT

A NSW Bronchiolitis factsheet had been developed and aligned to the Paediatric Research in Emergency Departments International Collaborative (PREDICT) factsheet by the John Hunter Children's Hospital, Sydney Children's Hospital and Children's Hospital at Westmead and can be found here:https://www.schn.health.nsw.gov.au/files/factsheets/bronchiolitis-en.pdf

Information in the factsheet has been republished with permission from the Paediatric Research in Emergency Departments International Collaborative (PREDICT), 7/8/2017.

15 REFERENCES

1. Paediatric Research in Emergency Departments International Collaborative (PREDICT), 2016. Australasian Bronchiolitis Guideline (Complete Version). Accessed from http://www.predict.org.au/download/Australasian-bronchiolitis-guideline.pdf on 15th May 2017.
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