Policy Directive

Department of Health, NSW
73 Miller Street North Sydney NSW 2060
Locked Mail Bag 961 North Sydney NSW 2059
Telephone (02) 9391 9000 Fax (02) 9391 9101
http://www.health.nsw.gov.au/policies/

Children and Infants with Bronchiolitis - Acute Management

Document Number PD2005_387

Publication date 27-Jan-2005

Functional Sub group Clinical/ Patient Services - Baby and child
Clinical/ Patient Services - Medical Treatment

Summary Basic clinical practice guidelines for the treatment of infants and children with bronchiolitis.

Author Branch Primary Health and Community Partnerships

Branch contact Dr Elisabeth Murphy 9391 9475

Applies to Area Health Services/Chief Executive Governed Statutory Health Corporation, Board Governed Statutory Health Corporations, Affiliated Health Organisations - Non Declared, Community Health Centres, Divisions of General Practice, Government Medical Officers, NSW Ambulance Service, NSW Dept of Health, Private Hospitals and Day Procedure Centres, Public Hospitals

Distributed to Tertiary Education Institutes

Review date 27-Jan-2010

File No. 04/5528

Previous reference 2004/64

Issue date 21-Dec-2004

Status Active

Director-General

NSW HEALTH DEPARTMENT

CIRCULAR

	File No	04/5528
	Circular No	2004/64
	Issued	21 December 2004
	Contact	Ms Mary Crum (02) 9391 9100 Clinical Policy Branch Dr Elisabeth Murphy (02) 9391 9475 Primary Health and Community Partnerships Branch

Acute Management of Infants and Children with Bronchiolitis

The attached clinical practice guideline applies to all facilities where paediatric patients are managed and were prepared for the NSW Health Department by an expert clinical reference group under the auspice of the Statewide Paediatric Steering Committee. Area Health Services are required to have local guidelines in place in all hospitals and facilities likely to be required to assess or manage children with acute bronchiolitis. In developing local guidelines other relevant Departmental circulars should also be considered eg. *NSW Health Department Guidelines for the Hospitalisation of Children Revised July 1998* (State Health Publication SWS 980088).

It should be noted that this document reflects what is currently regarded as a safe and appropriate approach to care. 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 judgment to each individual presentation.

In early 2004 the NSW Institute of Clinical Excellence commenced a Children's Emergency Care Project, which involves working with a number of pilot sites to implement the clinical practice guidelines. Contact details are: Marilyn Cruickshank, Project Manager, Children's Emergency Care Project, NSW Institute for Clinical Excellence, GPO Box 1614, SYDNEY 2001, Phone: (02) 9382 7658, Fax: (02) 9382 7615.

Robyn Kruk
Director-General

Distributed in accordance with circular list(s):

A	**B**	**C**	**D**	**E**
F	**G**	**H**	**I**	**J**
K	**L**	**M**	**N**	**P**

73 Miller Street North Sydney NSW 2060
Locked Mail Bag 961 North Sydney NSW 2059
Telephone (02) 9391 9000 Facsimile (02) 9391 9101

NSW HEALTH

Acute management of infants and children with acute bronchiolitis

Clinical Practice Guidelines

NSW DEPARTMENT OF HEALTH
73 Miller Street
NORTH SYDNEY NSW 2060
Tel. (02) 9391 9000
Fax. (02) 9391 9101
TTY. (02) 9391 9900
www.health.nsw.gov.au

SHPN (SSD) 040154
ISBN 0 7347 3703 3
Circular No: 2004/64

For more copies contact:
Better Health Centre – Publications Warehouse
Locked Mail Bag 5003
Gladesville NSW 2111
Tel. (02) 9816 0452
Fax. (02) 9816 0492
TTY. (02) 9391 9900

Further copies of this document can be downloaded from the NSW Health website: www.health.nsw.gov.au

A revision of this document is due in December 2006.

December 2004

Contents

Introduction

These Guidelines are aimed at achieving the best possible paediatric care in all parts of the State. The document should not be seen as a stringent set of rules to be applied without the clinical input and discretion of the managing professionals. Each patient should be individually evaluated and a decision made as to appropriate management in order to achieve the best clinical outcome.

The formal definition of clinical practice guidelines comes from the National Health and Medical Research Council:

> *'systematically developed statements to* ***assist*** *practitioner and patient decisions about appropriate health care for specific clinical circumstances.' (National Health and Medical Research Council* A Guide to the Development, implementation and evaluation of Clinical Practice Guidelines*, Endorsed 16 November 1998, available from www.nhmrc.gov.au/publications/synopses/cp65syn.htm)*

It should be noted that this document reflects is currently regarded as a safe and appropriate approach to care. 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 authorative statement of procedures to be followed in respect of each individual presentation. It does not replace the need for the application of clinical judgment to each individual presentation.

This document represents basic clinical practice guidelines for the acute management of bronchiolitis. Further information may be required in practice; suitable widely available resources are included at page 10.

Each Area Health Service is responsible for ensuring that local protocols based on these guidelines are developed. Area Health Services are also responsible for ensuring that all staff treating paediatric patients are educated in the use of the locally developed paediatric guidelines and protocols.

In the interests of patient care it is critical that contemporaneous, accurate and complete documentation is maintained during the course of patient management from arrival to discharge.

Parental anxiety should not be discounted: it is often of significance even if the child does not appear especially unwell.

Overview

Viral bronchiolitis of infancy is a lower respiratory infection which produces small airway obstruction with air trapping and respiratory difficulty in infants mostly aged less than 12 months. Respiratory Syncytial Virus (RSV) is the cause in >90 per cent of infants. Viral bronchiolitis is the most common severe respiratory infection of infancy. Nevertheless, it is usually a self-limiting condition, often requiring no treatment.
For the minority of infants who require treatment, mainstays of good care include oxygen, adequate fluids, and careful observation to detect the few infants who will need major intervention. A major source of confusion over therapies, especially in older infants, arises from the fact that viral bronchiolitis can be hard to distinguish from asthma with associated viral respiratory infection.

Diagnosis

Viral bronchiolitis is a clinical diagnosis.

Most cases occur between late autumn and early spring, with sporadic cases any time.

Clinical features are quite variable and may include some or all of the following:

- Nasal obstruction +/– rhinorrhea, and an irritating cough are noticed first.
- After one to three days there follows increasing tachypnoea and respiratory distress. The chest is often overexpanded.
- Auscultatory signs are very variable: fine inspiratory crackles are often heard early, becoming coarser during recovery; expiratory wheeze is often present, initially high-pitched, with prolonged expiration.
- Respiratory distress may be mild, moderate or severe
- Fever of 38.5°C or greater is seen in about 50 per cent of infants with bronchiolitis
- Apnoea may be the presenting feature, especially in very young, premature or low-birthweight infants. It often disappears, to be replaced by severe respiratory distress.

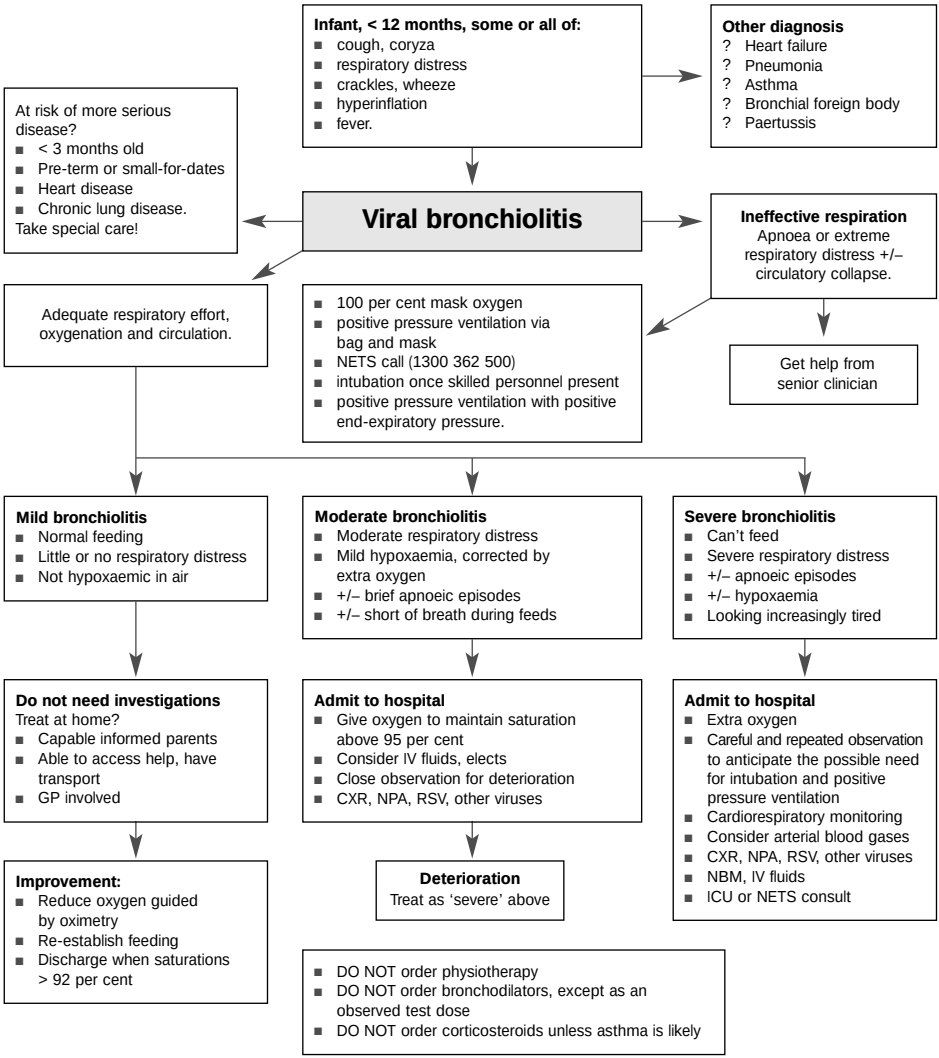
Differential diagnosis

A number of other conditions may share some presenting features with viral bronchiolitis. These can usually be excluded via an accurate history, a thorough physical examination and, where indicated (see below) chest x-ray.
Some such conditions include:

- acute asthma, associated with viral lower respiratory infection
- congestive heart failure
- pneumothorax
- pneumonia
- bronchial foreign body
- pertussis.

Assessment and management

Flowchart for the management of viral bronchiolitis in infants



Severity assessment

Mild bronchiolitis

Manage at home if appropriate.

- Normal ability to feed.
- Little or no respiratory distress.
- No requirement for oxygen therapy – ie oxygen saturation 95 per cent or more.
- Fever >38.5ºC, in ~50 per cent of infants.
- Will recover fully in one to two weeks.

Moderate bronchiolitis

Admit to hospital; involve a paediatrician or seek advice via NETS.

- May appear short of breath during feeding.
- Moderate respiratory distress, with some chest wall retractions, nasal flaring.
- May have apnoeic episodes, usually brief, self-limiting.
- Usually hypoxaemic, corrected (to SaO_2 95 per cent or higher) by extra oxygen.
- Fever >38.5ºC in ~50 per cent of infants.

Severe bronchiolitis

Will usually require transfer to a tertiary paediatric intensive care unit.

- May be reluctant, or unable to feed.
- Severe respiratory distress, with marked chest wall retractions, nasal flaring and grunting.
- May have increasingly frequent or prolonged apnoeic episodes.
- Will have hypoxaemia, which may not be corrected by extra oxygen.
- May appear increasingly tired.

Warning: High risk of serious illness

Infants in these groups are more prone to rapid deterioration and are more likely to need extra oxygen and ventilatory assistance; consider hospital admission even if assessed as mild.

- Full-term infants up to about three months of age.
- Infants who are premature or of low-weight for gestational age.
- Infants with chronic lung disease eg bronchopulmonary dysplasia (BPD), congenital lung abnormalities.
- Infants with congenital heart disease, especially with L→R shunt.
- Infants with pulmonary congestion of any cause.

Treatment at home

This is often possible and preferable, with mild bronchiolitis. Requirements include:

- appropriately informed, competent parent/s
- out-of-hours access to help, telephone, transport
- an involved general practitioner.

Tests

No tests are needed in mild bronchiolitis. Otherwise consider:

- nasopharyngeal aspirate (NPA) for RSV and viral culture
- chest x-ray – if moderate (or worse) respiratory difficulty, or if diagnostic uncertainty
- full blood count – any sick child
- electrolytes – especially if needing IV fluids
- blood culture – if temperature > 38.5°C
- blood gases – criteria as per ICU consultation – see following.

Oxygen

- Aim at 95 per cent (or higher) saturation (via pulse oximeter) during acute phase.
- During recovery, accept 90–92 per cent, if not distressed, and feeding well, as sufficient for cessation of oxygen and discharge, (but not with chronic lung disease infants).
- Use nasal prongs, (maximum flow rate 2L/min); facemask or head box.
- Use humidified oxygen, where possible.
- Persisting hypoxaemia +/– severe distress, despite high oxygen flow, requires immediate assessment for ventilatory assistance ie consult ICU or NETS.

Important nursing issues

- Most importantly, recognition of deterioration, requiring changes in treatment: increasing fatigue, increasing effort of breathing, 'tiring', increasing difficulty with feeding.
- Maintaining continuity of oxygen therapy, saturation and heart rate monitoring.
- Minimising impact of procedures eg cannulation.
- Caution with feeding.
- Parent support and education.
- Wherever possible, nurses caring for infants with moderate or severe bronchiolitis should have paediatric training.

Fluid therapy

Continue oral feeding, if tolerated well, in infants with not more than moderate respiratory distress.

- Use IV fluids if there is:
  - moderate-to-severe or severe respiratory distress (marked retractions, nasal flaring)
  - marked tachypnoea (>60/min)
  - apnoeic episodes
  - tiring during feeds.
- Generally, use normal maintenance volumes, N/2 or N/4 dextrose saline.
- Increase fluid volumes (by up to 20 per cent) if there is frequent or persistent fever (>38.5°C) and/or markedly increased respiratory effort.
- Measure serum electrolytes at the same time as commencing IV fluids – if abnormal, consult!
- Reserve IG feeds for the recovery phase.

Drugs

- In general, don't use bronchodilators in infants less than six months old. If for any reason it is decided that a trial of a bronchodilator is appropriate, in any infant, proceed as outlined in the next sentence.
- If asthma is considered a possibility, in infants aged six to 12 months, order a standard stat dose, (eg salbutamol via a nebuliser, or via a metered dose aerosol with spacer device), watch it being given and assess the effects, before deciding whether to order more.
- Don't use corticosteroids or ipratropium bromide, except in older infants, when asthma is considered a substantial possibility, or in infants with chronic neonatal lung disease.
- Generally don't use antibiotics, but consider in the most unwell infants, especially those with gross CXR changes, high fever, toxicity.
- Don't use antiviral drugs (eg ribavirin) or RSV antibodies.

Physiotherapy

Physiotherapy is contraindicated in viral bronchiolitis.

ICU consultation

Consider ICU consultation if there is:

- progression to severe respiratory distress, especially in at-risk group
- any significant apnoeic episodes eg associated with desaturation, or > 15 seconds, or frequent recurrent brief episodes
- persistent desaturation despite oxygen
- where blood gases have been done, and show evidence of respiratory failure: ie on arterial blood: pO_2 < 80mm Hg; pCO_2 > 50mm Hg; pH < 7.25.

Discharge criteria

- Minimal respiratory distress, feeding well.
- Oxygen saturation above 90 per cent, without supplemental oxygen, except infants with chronic lung disease, heart disease, or other risk factors: discuss individually, with consultant.
- Parents aware of any particular concerns and follow-up arrangements.

Prevention of RSV cross-infection

- RSV cross-infection is common, serious, largely preventable.
- RSV is spread by nose/face → hands → hands or face of another individual.
- Adequate frequent hand washing by nursing, medical, other staff and parents will minimise this problem.
- Avoid nursing infants with bronchiolitis (RSV positive, or awaiting RSV results) in rooms with high-risk infants (unless the latter are also RSV positive).

Key points

- Oxygen (preferably humidified) is the most important treatment.
- Careful and repeated observation by experienced nurses is crucial.
- Fluid requirements may be increased.
- Bronchodilators should not be used in infants less than six months old.
- Corticosteroids should not be used unless asthma is likely.
- Antibiotics are not routinely used.
- Take special care – infants at risk of severe illness.

Parent information sheet – bronchiolitis

Disclaimer: This fact sheet is for educational purposes only. Please consult with your doctor or other health professional to make sure this information is right for your child.

Bronchiolitis is a chest condition caused by an infection with a virus. It occurs in infants in the first year of life and it usually happens in the cooler months. The virus attacks the small breathing tubes (bronchioles) of the lungs and they become blocked.

Generally, the infant first develops symptoms of a cold, such as a runny nose, a cough and fever. Over the next day or so, the coughing becomes worse and there is a wheezing sound on breathing out – sometimes the infant finds it hard to breathe. These children may look as if they have asthma, and may also have difficulty with feeding and sleeping. The wheezing sound usually lasts for two to three days. As the wheezing settles, the child gradually improves. However, the cough may last up to a month.

Home management

Because this is a viral infection, there is no medicine that will 'cure' it and antibiotics will not help. Paracetamol (eg Tempra, Dymadon or Panadol) in the recommended dose may be used to control the temperature if the child has a fever. Sometimes, other medication such as Ventolin or Bricanyl may be prescribed to open up the airways and settle the wheezing, but these may not be effective in infants under 12 months of age.

Your child will need lots of fluids. Give an extra bottle or two per day, or give more frequent breastfeeds. Feeding may be difficult, so try offering smaller feeds more frequently.

When to see your doctor

Poor fluid intake

An easy way to tell if your child is not taking enough fluids is to check nappies. If there are fewer wet nappies than usual, it probably means that child is not getting enough fluid. If he/she is refusing to feed, consult your doctor.

Worsening cough and wheeze

If the breathing is becoming more laboured or if there is any blueness around the lips, seek help immediately. Most children with bronchiolitis can be treated at home, and they get better within a week to 10 days. However, if your child is not sleeping, or is having difficulty breathing, he/she may need to go to hospital. In hospital, he/she may need oxygen and tube feeding by fluid into a vein.

Will it happen again?

Maybe. It is possible to have bronchiolitis again, but most babies will only have it once. If wheezing keeps happening, your child may have asthma. You should consult your doctor for different treatment.

Does it cause future problems?

Some children who have symptoms of bronchiolitis may eventually develop asthma. Doctors are not sure whether the virus causes asthma or whether it simply uncovers an inherited tendency to develop asthma.

Bronchiolitis gets better in a week to 10 days. It is a viral infection, so medications may not help. Your child often needs extra fluid.

Consult your doctor if your child has difficulty with breathing, feeding or sleeping. Some children develop asthma after having bronchiolitis.

This parent information was developed by The Children's Hospital at Westmead, Sydney Children's Hospital, Randwick and John Hunter Children's Hospital.

Evidence base for acute management of viral bronchiolitis

In the management of viral bronchiolitis of infancy:

- extra oxygen is the single most useful therapy
- extra fluids, special care with feeding and minimal interference are often required with more unwell infants
- careful observation is necessary with high-risk and more unwell infants, to facilitate optimal use of ventilatory support in the small number of infants who will need it.

All of the above are supported more by 'first principles' and common sense, than by published evidence. Most published evidence relates to the use of drugs, especially bronchodilators and corticosteroids, given in an attempt to modify the course of bronchiolitis. Such agents are widely used, more often in North America than Australia, despite a lack of evidence of benefit, as set out below.

Much of the confusion over bronchodilators and corticosteroids in bronchiolitis relates to the fact that bronchiolitis and asthma may produce similar clinical features, especially in infants aged over six months.

The following reference includes review of the evidence base of therapies in acute viral bronchiolitis:

> Fitzgerald DA, Kilham HA. Bronchiolitis: assessment and evidence based management. MJA 2004; 180:399–404.

Other references

Bronchodilators

In viral bronchiolitis, bronchodilators do not improve oxygen saturation, or affect rate or duration of hospitalisation. The study (below) showed only a clinically-irrelevant, modest short-term improvement in clinical scores.

- Kellner JD, Ohlsson A, Gadomski AM, Wang EE. Bronchodilator therapy in bronchiolitis (*Cochrane Review*, Issue 4). The Cochrane Library, Oxford, 1998.

Ipratropium bromide has not been shown to be useful in bronchiolitis:

- Wang EEL, Milner R, Allen U, Maj H. Bronchodilators for treatment of mild bronchiolitis: a factorial randomised trial. *Arch Dis Child* 1992; 67: 289–293.
- Henry RL, Milner AD, Stokes GM. Ineffectiveness of iprotropium bromide in acute bronchiolitis. *Arch Dis Child* 1983; 58: 925–6.
- Everard ML, Kurian M. Anti-cholinergic therapy for treatment of wheeze in children under the age of two years (*Cochrane Review*, Issue 4). The Cochrane Library, Oxford, 1998.
- Seidenberg J, Masters B, Hudson A, Olinsky A, Phelan PD. Effect of ipratropium bromide on respiratory mechanics in infants with acute bronchiolitis. *Austr Paediatr* J 1987; 23: 169–172.

Corticosteroids

Multiple studies have failed to demonstrate efficacy of corticosteroids in viral bronchiolitis. A meta-analysis of corticosteroids in bronchiolitis failed to show sufficient benefit to change current accepted practice ie that corticosteroids should not be routine therapy in viral bronchiolitis:

- Garrison MM, Christiakis DA, Harvey E, Cummings P, Davis RL. Systemic corticosteroids in infant bronchiolitis: a meta–analysis. *Paediatrics* 2000; 105:E44.

A recent study showing a benefit with high-dose oral dexamethasone in outpatients aged two to 24 months with bronchiolitis should not, also, alter practice, prior to substantiation in the most important population (infants less than six months) with viral bronchiolitis, and further demonstration that benefits are significant and that safety is established:

- Schula S, Coates AL, Binnie R, Allin T, Goia C, Corey M, Dick PT. Efficacy of oral dexamethasone in outpatients with acute bronchiolitis 2002; *J Paediatr* 140: 27–32.

Ribavirin

The use of ribavirin, an antiviral agent with activity against RSV, is not supported by evidence of significant benefit. Moreover, it is accompanied by major practical problems in administration, occupational health and safety concerns, and great expense.

- Randolph AG, Wang EEL. Cochrane Library, 1998, Issue 2, 1–9 (L1).

RSV Prophylaxis

RSV immunoglobulin (Respigam) and monoclonal RSV immunoglobulin (synagis) have been advocated to reduce the frequency and severity of bronchiolitis, especially in high-risk infants. There is concern about the safety of the former drug in infants with congenital heart disease, and neither drug is considered cost-effective, in this recent review.

- Numa A. Outcome of respiratory syncytial virus infection and a cost–benefit analysis of prophylaxis. *J Paediatr Child Health* 2000; 36: 422–427.

Bronchiolitis clinical expert reference group

A/Prof Henry Kilham(*Co-chair*) ....Respiratory physician, CHW

Dr Dominic Fitzgerald(*Co-chair*)...Respiratory physician, CHW

Linda Cheese .....Clinical nurse consultant, JHCH

Dr Jane Cocks.....Emergency Department physician, CHW

Dr Chris Cooper.....Department of General Practice, Sydney University

Dr Penny Field.....Respiratory physician, SCH and CHW

Maureen Fitzpatrick .....Planning manager/network coordinator

Helen Gosby .....Emergency Department nurse practitioner, CHW

Dr Jodi Hilton.....Respiratory physician, JHCH

Dr Jason Hort.....Paediatrician, Nepean and Blue Mountains Hospitals

Sharon Hunt .....Clinical nurse consultant, CHW

Di Jolley .....Paediatric ward nursing unit manager, Nepean Hospital

Lexi Kellam .....Consumer representative

Dr David McDonald .....Paediatrician, Port Macquarie Base Hospital

Sandra Moffat .....Paediatric ward nursing unit manager, Port Macquarie Base Hospital

Dr Tony O'Connell .....Paediatric ICU physician, CHW

Dr Matthew O'Meara .....Emergency Department director, SCH

Karen Rankin .....Clinical nurse consultant, CHW

Amanda Thomsen .....A/clinical nurse consultant, SCH

A/Prof Peter van Asperen .....Respiratory physician, CHW

Dr Peter Wyllie.....Emergency Department physician, Liverpool and Fairfield Hospitals

---

CHW = The Children's Hospital at Westmead

JHCH = John Hunter Children's Hospital

SCH = Sydney Children's Hospital at Randwick

SHPN (SSD) 040154