Management of Bronchiolitis in Infants

1.0 Introduction

This Clinical Practice Guideline (CPG) has been adapted from the Cincinnati Children's Hospital Medical Center CPG, Evidence based care guideline for management of bronchiolitis in infants 1 year of age or less with a first time episode, (2010) and the American Academy of Paediatrics CPG, Diagnosis and management of bronchiolitis (2006) using the Adapte Framework. The development process is discussed in detail in section 4 of this document.

Not all recommendations from the Cincinnati Children's Hospital Medical Center (CCHMC) CPG, Evidence based care guideline for management of bronchiolitis in infants 1 year of age or less with a first time episode, (2006, 2010) and the American Academy of Paediatrics CPG, Diagnosis and management of bronchiolitis (2006) were adopted for the SickKids Management of Bronchiolitis in Infants Clinical Practice Guideline. Recommendations that were relevant to the care offered within SickKids were either (i) adopted (taken verbatim from CCHMC/AAP), or (ii) adapted (taken from CCHMC/AAP with slight modifications for use at SickKids. When any recommendation was adapted, the change noted in parentheses. In addition, there are a select number of SickKids consensus recommendations that were included that were not taken from the CCHMC/AAP guideline and these are clearly identified by "SickKids Consensus" in parentheses throughout the guideline text. The research considered when developing the recommendations are discussed in the original publications. Please click the links at the beginning of this paragraph to access the original publications for more detailed information.

Bronchiolitis is an acute inflammatory disease of the lower respiratory tract, resulting from obstruction of small airways. It is initiated by infection of the upper respiratory tract by any one of a number of seasonal viruses, the most common of which is respiratory syncytial virus (RSV).¹

There is considerable confusion and variability with respect to the clinical management of infants with bronchiolitis. Typical bronchiolitis in infants is a self-limited disease, usually due to an acute viral infection that is little modified by aggressive evaluations/interventions, use of antibiotics or other therapies. Most infants who contract bronchiolitis recover without sequelae; however, up to 40% may have subsequent wheezing episodes through five years of age and approximately ten percent will have wheezing episodes after age five.¹

Several studies on the use of clinical guidelines for the management of infant bronchiolitis have shown a reduction in unnecessary resource utilization with a streamlining of medical care for these infants.¹
1.1 Target Population

**Inclusion:** This clinical practice guideline (CPG) is intended primarily for use in children age less than 12 completed months of age (but may apply to children 12 - 18 months of age) and presenting for the first time with bronchiolitis typical in presentation and clinical course.

**Exclusion:** This CPG is not intended for use in children:
- admitted to an intensive care unit
- requiring ventilator care
- with severe co-morbid conditions complicating care (including, but not limited to, cystic fibrosis (CF), bronchopulmonary dysplasia (BPD), and immunodeficiencies).

1.2 Target Users

Include, but are not limited to:
- Emergency Medicine physicians, nurses, nurse practitioners, and trainees
- Inpatient physicians, nurses, nurse practitioners, and trainees
- Respiratory Therapists
- Pharmacists
- Patients and families

1.3 Objectives

In the target population, the objectives of this guideline are to:
- decrease the use of unnecessary diagnostic studies
- decrease the use of medications and respiratory therapy without observed improvement
- improve the rate of appropriate admission
- decrease the rate of healthcare associated infection (HAI)
- improve the use of appropriate monitoring activities
- decrease length of stay

2.0 Guideline Recommendations

Table 1 serves as a guideline to the hierarchy of evidence available; with RCT or meta-analysis considered to be the highest level of evidence and expert opinion considered to be the lowest level of evidence that can be used to support each recommendation in this CPG.

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<thead>
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Purpose and Scope: This CPG is intended primarily for use in children age less than 12 completed months of age (but may apply to children 12 - 18 months of age) and presenting for the first time with bronchiolitis typical in presentation and clinical course. This CPG is not intended for use in children: admitted to an ICU; requiring ventilator care; and/or with severe co-morbid conditions complicating care.

Assessment: Clinical history and physical examination should be the basis for a diagnosis of bronchiolitis. *(A)*

Laboratory & Radiological Tests: Routine diagnostic studies such as chest x-rays, cultures, capillary or arterial blood gases and nasopharyngeal swab for viral PCR need NOT be performed to guide clinical management, to determine viral infection status or to rule out serious bacterial infections. *(A)*

### Management

#### Basic Management

The basic management of typical bronchiolitis is anchored in the provision of therapies that assure that the patient is clinically stable, well oxygenated, and well hydrated. The main benefits of hospitalization of infants with acute bronchiolitis are: *(B,C)*

- the careful monitoring of clinical status with frequent reassessment
- maintenance of a patent airway (through positioning, suctioning, and mucus clearance)
- maintenance of adequate hydration and oxygenation
- parental education

#### Oxygen

- There is a lack of evidence to specify an oxygen saturation (by pulse oximetry) threshold below which supplemental oxygen is indicated. The SickKids Development Groups suggests starting supplemental oxygen when the saturation is consistently less than 88% while asleep and less than 90% when awake while breathing room air. *(F)*

#### Bronchodilator

- Scheduled or serial Salbutamol aerosol therapies are not recommended. *(M)*
- HOWEVER, a single administration trial inhalation using epinephrine or Salbutamol may be considered as an option, particularly when there is a family history for allergy, asthma, or atopy. *(A)*
- Inhalation therapy should not be repeated nor continued if there is no documented improvement in respiratory rate and effort between 15 to 30 minutes after a trial inhalation therapy. *(A)*

#### Antibiotics

- Antibiotics should not be used in the absence of an identified bacterial focus. *(P)*

#### Ribavirin

- Ribavirin should not be used routinely in children with bronchiolitis. *(M)*

#### Steroid Therapy

- Steroid therapy should not routinely be given by any route. *(M)* See 2.2.1 for more details.

#### Respiratory Therapy

- The infant should receive oral or nasal suctioning when clinically indicated. *(M)*
- Routine respiratory care therapies should NOT be used, as they have not been found to be helpful. These include: (i) Cardiopulmonary (chest) physiotherapy (CPT) *(M)* (ii) cool mist therapy *(M)* (iii) aerosol therapy with saline *(M)*

#### Monitoring:

- Repeated clinical assessment should be conducted, as this is the most important aspect of monitoring for deteriorating respiratory status
- Consider scheduled spot checks of pulse oximetry (q 4-6 hr) in infants with bronchiolitis *(M)*

#### Discharge (See table 3 for Bronchiolitis Discharge Checklist)

- The interdisciplinary team should begin discharge planning on admission. *(C)*
### Table 3. Bronchiolitis Discharge Criteria Checklist

<table>
<thead>
<tr>
<th>Category</th>
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<tr>
<td><strong>Respiratory Status</strong></td>
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<td></td>
<td>- oxygen saturation is in an acceptable range on room air (greater than 88% when sleeping and greater than 90% when awake)</td>
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<td><strong>Nutritional Status</strong></td>
<td>- the patient is on oral feedings sufficient to prevent dehydration</td>
</tr>
<tr>
<td><strong>Parent &amp; Family Education</strong></td>
<td>- nature of illness and expected clinical course of bronchiolitis</td>
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<td></td>
<td>- to call their primary care provider or return to the ED when the following signs of worsening clinical status are observed (Parent friendly language in parentheses)</td>
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<td>- increasing respiratory rate and/or work of breathing as indicated by accessory muscle use</td>
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<td></td>
<td>- i.e. breathing very fast and/or skin sucking in around the neck or ribs with each breath</td>
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<td></td>
<td>- inability to maintain adequate hydration (i.e. unable to feed or drink by mouth or has not had a wet diaper in more than 6 to 8 hours)</td>
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<td>- worsening general appearance (has new symptoms not present while in the hospital such as vomiting or fever, looks lethargic or does not respond normally to touch or sound, change in baby's colour)</td>
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<td>- importance of handwashing before and after contact with the child to prevent spread of disease</td>
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<td></td>
<td>- provide a general information printout See ==&gt; About Kids Health – Bronchiolitis Fact Sheet for parents</td>
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<tr>
<td></td>
<td>- language skills to understand discharge instructions</td>
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<tr>
<td><strong>Social</strong></td>
<td>- parent or guardian is competent and confident they can provide care at home</td>
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<tr>
<td></td>
<td>- parents have purchased and demonstrated correct use of bulb suction</td>
</tr>
<tr>
<td><strong>Follow-up</strong></td>
<td>- instructions of when to follow-up with own primary care provider (generally 1-2 days)</td>
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2.1 Assessment and Diagnosis

Clinical History and Physical Examination

2.1a Clinical history and physical examination should be the basis for a diagnosis of bronchiolitis. (Adapted from CCHMC, 2010 Rec #3) [Grade A]

NOTE: The diagnosis of bronchiolitis and its severity is rooted in the clinician's interpretation of the constellation of characteristic findings and is not dependent on any specific clinical finding or diagnostic test [Bordley 2004]. Infants with acute bronchiolitis may present with a wide range of clinical symptoms and severity, from mild upper respiratory infections (URI) to impending respiratory failure.

Presenting features for bronchiolitis include, but are not limited to, the following:

- Preceding upper respiratory illness and/or rhinorrhea (Adapted from CCHMC, 2010 Rec #3)
- First episode of respiratory distress associated with the following signs
  - Wheezing (Adapted from CCHMC, 2010 Rec #3)
  - Accessory muscle use, lower chest wall indrawing (SickKids Consensus)
  - Crepitations (SickKids Consensus)
  - Low \(O_2\) saturation (Adapted from CCHMC, 2010 Rec #3)
  - Elevated respiratory rate for age (Adapted from CCHMC, 2010 Rec #3)
  - Colour change (Adapted from CCHMC, 2010 Rec #3)
  - Nasal flaring (SickKids Consensus)
  - Fever (SickKids Consensus)
- Signs of dehydration
- Exposure to persons with viral upper respiratory infection (Adapted from CCHMC, 2010 Rec #3)
- Presentation typically between November and April

Admission criteria

2.1b Patients should be considered for critical care admission if: [SickKids Consensus] [Grade C]

- Recurrent apneas (Ralston, 2009)
- Concern regarding impending respiratory failure, increasing oxygen requirements
- High or increasing \(pCO_2\)

2.1c Patients should be considered for hospitalization if: [SickKids Consensus] [Grade C]

- An infant with high risk criteria:
  - history of prematurity (<34 weeks),
  - weight under 4kg,
  - age less than 7 weeks,
  - respiratory rate greater than 80/min,
  - heart rate over 180/min
- Signs of severe distress such as grunting, nasal flare, marked chest retractions, inappropriate lethargy
- Evidence of dehydration
- Refusal to feed or poor oral intake
- Major co-morbidity (e.g. Cardiopulmonary or immunodeficiency)
- Need to rule out alternative diagnosis
- Significant social concerns about adequacy or safety of home management
- There is no strong evidence available at this time upon which to recommend a particular oxygen saturation as an indication for hospital admission. However, it is reasonable to admit infants with oxygen saturation that is persistently below 88-90% after observation in the ED.
Laboratory and Radiologic Studies

2.1d  Routine diagnostic studies need not be performed to guide clinical management, to determine viral infection status or to rule out serious bacterial infections. Such studies are not generally helpful and may result in increased rates of unnecessary admission, further testing, and unnecessary therapies.


[Grade A]

These diagnostic studies include:

- chest X-rays
  [Grade A]

- cultures
  (Adopted from CCHMC, 2010, Rec #21)
  [Grade A]

- capillary or arterial blood gases
  (Adopted from CCHMC, 2010, Rec #21)
  [Grade B]

- nasopharyngeal swab for viral PCR

NOTE 1: The risk of serious bacterial infection in children over 2 months of age with bronchiolitis is less than 2%.
However, consider co-existent UTI particularly in toxic-appearing or febrile young infants

NOTE 2: One exception is that nasopharyngeal swab for viral PCR results may be used for the purpose of cohorting admitted patients as per SickKids Infection Prevention and Control practices.

NOTE 3: Another consideration is that rapid viral testing (not currently available at SickKids) has been shown to decrease inappropriate antibiotic use in children with bronchiolitis. (Byington 2002.)

2.1e  Chest X-rays may be obtained as clinically indicated when the diagnosis of bronchiolitis is not clear and the presentation is atypical.

(Swingler 1998 [A], El-Radhi 1999 [B], Schuh 2007) (Adopted from CCHMC, 2010 #21, SickKids addition: “and presentation is atypical”) [Grade A]

NOTE 1: For infants with typical bronchiolitis, omitting radiography is cost saving without compromising diagnostic accuracy of alternative diagnoses and of associated pneumonia.3[B] The rate of superimposed bacterial pneumonia is extremely low and infiltrates/atelectasis associated with RSV alone often result in over-reads and unnecessary antibiotics. In one study of 265 children with “simple” bronchiolitis, routine radiography identified findings inconsistent with bronchiolitis in only 2 cases, and in neither case did the findings change acute management. After reviewing the radiographs, clinicians were more likely to treat with antibiotics, although the findings did not support treatment.

(Schuh, 2007)

NOTE 2: Examples of when a chest X-ray may be useful is when the hospitalized child does not improve at the expected rate, if the severity of disease requires further evaluation, or if another diagnosis is suspected. (SickKids Consensus) [Grade C]

2.2  Management

General

2.2a  The basic management of typical bronchiolitis is anchored in the provision of therapies that assure that the patient is clinically stable, well oxygenated, and well hydrated. The main benefits of hospitalization of infants with acute bronchiolitis are:

(Klassen 1997 [B], Lugo 1993 [B], Panizzi 1993 [B], Nicolai 1990 [B]) (Adopted from CCHMC 2010, pg. 2 General Section) [Grade B,C]

- the careful monitoring of clinical status with frequent reassessment See Vital Signs Monitoring =>>

- maintenance of a patent airway (through positioning, suctioning, and mucus clearance)

- maintenance of adequate hydration and oxygenation

- parental education

See Breastfeeding Support =>>

See Use of a Lactation Aid to Support Breastfeeding =>>
NOTE 1: Breastfeeding without interruption should be encouraged for all breastfed infants who are able to feed. Some issues for the team to consider are (SickKids Consensus):

- the safety of oral feeding should be carefully assessed among infants with respiratory rates above 60 breaths per minute, copious oral secretions, or a history suggestive of possible swallowing dysfunction or pulmonary aspiration. For infants who cannot breastfeed during the acute illness, lactating mothers should be encouraged to express breast milk to be provided to the infant by alternate routes (e.g., nasogastric tube).

- nasogastric tube feeding may be considered in infants who are clinically stable enough to tolerate enteral feeds, but whose elevated respiratory rate precludes safe or efficient oral feeding. However, there is no evidence for or against the use of nasogastric tube feeding in infants with bronchiolitis. (Kennedy 2005)

- appropriate intravenous maintenance fluids (D5 & 0.9 NaCl) should be provided to infants who cannot tolerate oral or enteral feeds. See Fluid & Electrolyte Administration in Children. See Fluid & Electrolyte Administration in Children.

- among infants in whom intravenous fluids are initiated, the safety of resuming oral feeding should be frequently reassessed to avoid delays in restarting feeds.

Isolation Precautions

2.2b Droplet/Contact precautions are to be followed when caring for a patient with bronchiolitis. (SickKids Consensus)

[Grade C] See Enhanced Droplet/Contact Precautions

Oxygen

2.2c There is a lack of evidence to specify an oxygen saturation threshold (by pulse oximetry) below which supplemental oxygen is indicated. The SickKids Bronchiolitis Guideline Group suggests to consider starting supplemental oxygen when the saturation is consistently less than 88% while asleep and less than 90% when awake while breathing room air. (SickKids Consensus)

[Grade C]

NOTE 1: Time for suctioning and repositioning should be allowed prior to starting supplemental oxygen. However, clinical judgement should be used if consistent suctioning is required or if the infant is asleep.

NOTE 2: Different thresholds may be appropriate in infants with relevant chronic underlying conditions, oxygen therapy should be started at a higher O₂ saturation or earlier in the illness course.

NOTE 3: If oxygen is delivered, it should be done using a method that enables quantification of the amount of oxygen and titration to the minimum required (e.g., nasal prongs, mask, head box rather than "blow by").

See General Oxygen Therapy

See Electronic Patient Monitoring

See Vital Signs Monitoring

Medications


[Grade A]

NOTE 1: In the majority of cases the use of inhalation therapies and other treatments effective for treating the bronchospasm characteristic in asthma will not be efficacious for treating the airway edema typical of bronchiolitis.

NOTE 2: Two meta-analyses of randomized, controlled trials have not shown dramatic effects on clinical scores or hospitalization rates from therapy with nebulized Salbutamol in children with bronchiolitis.

2.2e A single administration trial inhalation using epinephrine or salbutamol may be considered as an option, particularly when there is a family history for allergy, asthma, or atopy.
A respiratory assessment including oxygen saturation, respiratory rate, auscultatory findings, and work of breathing must be assessed before and 15-30 minutes after an inhalation treatment is administered. (SickKids Consensus) [Grade C]

NOTE 1: Nebulized racemic epinephrine was shown to result in better improvement in pulmonary physiology and clinical scores compared with albuterol (salbutamol) or placebo in several studies and one systematic review. These effects predominated in mildly ill children and were transient (30 to 60 minutes) in duration. (Langley 2005, Hartling 2003 [A], Wainwright 2003 [A], Numa 2001, Hartling 2011) [A] (Adopted from CCHMC 2010, Rec. #7, Note 2)

2.2f Inhalation therapy should not be repeated nor continued if there is no documented improvement in respiratory rate and effort between 15 to 30 minutes after a trial inhalation therapy. [Grade A]

2.2g The use of nebulized 3% saline may be considered. [Grade A]

NOTE 1: A meta-analysis and systematic review suggest that 3% saline significantly reduces length of hospital stay and improves clinical severity score in infants with bronchiolitis. (Zhang, 2008) [A]

NOTE 2: Historically it has been recommended that RTs be present for the first dose to ensure the patient can tolerate this treatment. If patients tolerate the first dose, the RT does not have to be present during subsequent treatments. The incidence of significant adverse events (i.e. bronchospasm) with nebulized saline is approximately 0.3%. (Ralston, 2010)

2.2h Antibiotics should not be used in the absence of an identified bacterial focus. [Grade A]

NOTE 1: The incidence of serious bacterial illness (SBI) has been reported to be less than 2% in bronchiolitis patients 60 days of age or younger. (Friis 1984 [A], Kuppermann 1997 [B], Purcell 2004 [B], Purcell 2002 [B], Liebelt 1999 [B], Antonow 1998 [B]). (Adapted from CCHMC 2010, Rec. #17. SickKids change in text, not content)

The most common infection is a UTI. Be cautious in interpretation of chest x-rays findings in bronchiolitis since bacterial pneumonia is rarely seen and RSV itself may cause pulmonary infiltrates and/or atelectasis.

2.2i Ribavirin should not be used routinely in children with bronchiolitis. [Grade A]

2.2j Steroid therapy should not routinely be given by any route. [Grade A]

NOTE: One well-conducted systematic review found a reduction in length of stay of 0.43 days (95% CI 0.8 to 0.05) with steroid therapy for bronchiolitis (Garrison 2000 [C]). However, when only the more methodologically rigorous studies with more specific definitions of bronchiolitis were analyzed in this meta-analysis, there was no significant effect of steroids on clinical status or length of stay. Recent evidence suggests that patients who received dexamethasone combined with 2 doses of nebulized epinephrine results in a lower admission rate. (Plint, 2009) Further study is needed to determine if the small treatment effect seen can be reproduced and warrant widespread recommendation. (Zorc, 2010)

Respiratory Care Therapy

2.2k The infant should receive oral or nasal suctioning when clinically indicated. [Grade C]

- before feedings
- on a 'PRN' basis
- prior to inhalation treatment
- at clinical discretion
2.2l  Routine respiratory care therapies should NOT be used, as they have not been found to be helpful.  
[Adopted from CCHMC 2006, Rec. #13]  
These include:  
- cardiopulmonary (chest) physiotherapy (CPT)  
  [Parrotta 2005]  
  [Grade A]  
- cool mist therapy  
  [Gibson 1974]  
  [Grade A]  
- aerosol therapy with saline  
  [Grade A]

2.3 Monitoring  

2.3a Repeated clinical assessment to be conducted, as this is the most important aspect of monitoring for deteriorating respiratory status.  
[Adapted from CCHMC 2010, Rec. #4]  
[Grade C]  
See Vital Sign Monitoring Policy ==>

2.3b Consider scheduled spot checks of pulse oximetry (q 4-6 hr) in infants with bronchiolitis.  
Assessments for oxygen weaning should be conducted at this time as well, when applicable.  
[Adapted from CCHMC 2010, Rec. #9. SickKids added (q)]  
[Grade C]  
See Electronic Patient Monitoring ==>

NOTE 1: Continuous monitoring of oxygen saturation by pulse oximetry is not routinely required in the inpatient management of infants with bronchiolitis, and may contribute to longer hospital stays.  
[Adapted from CCHMC 2010, Rec. #9, Note 2]  

2.3c Consider pulse oximetry, cardiac and continuous respiratory rate monitoring in hospitalized patients during the early (i.e. first 4-6 hours) stage of bronchiolitis, for patients with meeting high risk criteria (see recommendation 2.1c) and/or major comorbidities, when the risk of apnea and/or bradycardia is greatest.  
[Sickkids Consensus]  
[Grade C]

2.4 Discharge Criteria  

2.4a The interdisciplinary team should begin discharge planning on admission.  
[Adapted from CCHMC 2010, Rec. #13]  
[Grade C]  
i. Respiratory Status  
- respiratory status is consistently improving  
  [SickKids change: removed specific resting respiratory rate]  
- tachypnea and increased work of breathing are normal, mild or moderate  
  [SickKids Consensus]  
- oxygen saturation is in an acceptable range on room air (greater than 88% when sleeping and greater than 90% when awake)  
  [SickKids change: O2 Saturation percentage changed to SickKids Consensus]  

ii. Nutritional Stats  
- the patient is on oral feedings sufficient to prevent dehydration  
  [Adopted from CCHMC 2010]  

iii. Social  
- parent or guardian is competent and confident they can provide care at home  
  [Adopted from CCHMC 2010]  

iv. Follow-up  
- instructions of when to follow-up with own primary care provider (generally 1-2 days)  
  [SickKids changed to reflect own follow-up process]

v. Parent & Family Education  
The family should be educated on the following topics regarding prevention and the care of a child with bronchiolitis before discharge.  
[Adapted from CCHMC 2010, Rec. #10. SickKids addition “Before discharge”]  
[Grade C]  
i. basic pathophysiology and expected clinical course of bronchiolitis including lingering symptoms which may continue to disrupt child and family routines  
  [Adapted from CCHMC 2010]  
- NOTE 1: The median duration of illness for children < 24 months with bronchiolitis is 12 days;
after 21 days approximately 18% will have persistent symptoms (i.e. cough), and after 28 days 9% will have persistent symptoms (i.e. cough). (Swingler 2001[A])

ii. proper techniques for suctioning the nose and making breathing easier. (Adopted from CCHMC 2010) [Grade C]

iii. to call their primary care provider when the following signs of worsening clinical status are observed. (Adopted from CCHMC 2010) [Grade C]

(Parent friendly language in parentheses)

- increasing respiratory rate and/or work of breathing as indicated by accessory muscle use (i.e. breathing very fast and/or skin sucking in around the neck or ribs with each breath)
- inability to maintain adequate hydration (i.e. unable to feed or drink by mouth or has not had a wet diaper in more than 6 to 8 hours)
- worsening general appearance (i.e. has new symptoms not present while in the hospital such as vomiting or fever, looks lethargic or does not respond normally to touch or sound, change in baby's colour)

i. importance of handwashing by all caregivers before and after contact with the child to prevent spread of disease. (Hall 1981[A]) (Adapted from CCHMC 2010. SickKids Added "by all caregivers... of disease") [Grade A]

ii. limiting exposure to contagious settings and siblings (Celedon 1999) (Adopted from CCHMC 2010) [Grade C]

iii. wash clothing, toys, and eating utensils between uses by different children (SickKids Consensus) [Grade C]

iv. eliminating exposure to environmental smoking (Mahabee-Gittens 2002[A]) (Adopted from CCHMC 2010) [Grade C]

v. provide a general information printout (Adopted from CCHMC 2010) [Grade C] See ==> About Kids Health - Bronchiolitis Fact Sheet for parents

3.0 Development Process

3.1 CPG Search: A systematic search for existing Clinical Practice Guidelines was conducted in October 2009 using the Internet and the OVID database (MEDLINE, Embase) to search for CPGs. To be included as a potential CPG to adapt for use at SickKids, the CPG must have met the following criteria:

1. Published or updated within the past 5 years (2005 or after)
2. Included clearly articulated and directive recommendation statements (i.e. easily extracted for practice)
3. Included paediatric specific recommendations
4. Included at least one section relevant to:
   - Assessment/Diagnosis
   - Pharmacological/Non-Pharmacological Treatments
   - General Management
   - Education
   - Referral/follow-up

3.2 CPG Selection: Identified guidelines were screened to ensure that the clinical questions developed by the working group were covered within the retrieved guidelines. Cincinnati Children’s Hospital Medical Center CPG For medical management of Bronchiolitis in infants less than 1 year of age presenting with a first time episode, and the American Academy of Paediatrics CPG, Diagnosis and management of bronchiolitis (2006, update 2010) were selected and assessed using the AGREE tool. Group consensus was to adapt these 2 guidelines and modifications were discussed & agreed upon by consensus.

3.3 Adaptation Process: A small writing group of (physician, nurse, guideline developer) produced the first iteration of this guideline. The first draft was circulated to an interdisciplinary development group of health care professionals (see section 4.5) from within the emergency department and inpatient interprofessional teams for review and input. This group was also convened in June 2010 to discuss and finalize the guideline. Once internal consensus was obtained, the guideline was sent to external reviewers for review. Feedback from both internal and external reviewers was included in the final version. This group was convened again in June 2011 to review the literature from the past year and
make minor updates to the content prior to the planned roll-out of this CPG in the fall/winter of 2011/12.

Once the guideline has been in place for three years, the development team will reconvene to explore the continued validity of the guideline. This phase can be initiated at any point that evidence indicates a change is needed.

Table 1 serves as a guideline to the hierarchy of evidence available; with RCT or meta-analysis considered to be the highest level of evidence and expert opinion considered to be the lowest level of evidence that can be used to support each recommendation in this CPG.

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### 3.4 Guideline Group and Reviewers

**Guideline Group Membership:**
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