1.0 Introduction

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).

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 whose clinical course is not generally altered by aggressive evaluations/interventions, use of antibiotics, or other therapies. Most infants who contract bronchiolitis recover without sequelae; however, rates of admissions have increased from 1% to 3% of all infants.

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.

Objectives

In the target population, the objectives of this guideline are to:

- decrease the use of unnecessary diagnostic studies;
- decrease the use of medications;
- provide guidance on the use of appropriate respiratory therapy;
- improve the rate of appropriate admission;
- improve the use of appropriate monitoring activities; and
- decrease length of stay.

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

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2.0 Clinical Recommendations

Target Population:

- **Inclusion:** This management pathway is intended primarily for use in children age < 24 months of age, corrected, and presenting with bronchiolitis typical in presentation and clinical course.
- **Exclusion:** This pathway is not intended for use in children:
  - born prematurely (<35 weeks gestation)
  - <3 months old (post-natal) at the age of presentation
  - with hemodynamically significant cardio/pulmonary disease
  - with immunodeficiency, with severe comorbidities; or
  - Those who have complex medical histories.

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

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.

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:
|                 | - the careful monitoring of clinical status with frequent reassessment
|                 | - maintenance of a patent airway (through positioning, suctioning, and mucus clearance)
|                 | - maintenance of adequate hydration, nutrition, 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 consensus of the guideline committee using best available evidence recommends starting supplemental oxygen when the saturation is consistently < 88% while asleep; and < 90% when awake while breathing room air.

| Respiratory Therapy | The infant should receive oral or nasal suctioning when clinically indicated.
|                    | Heated High Flow can be considered for severe respiratory distress. It is **NOT** a substitute for non-invasive ventilation. CCRT consult should be considered in children requiring HHF therapy.
|                    | Routine respiratory care therapies, such as cardiopulmonary (chest) physiotherapy (CPT), cool mist therapy, and aerosol therapy with saline should **NOT** be used, as they have not been found to improve clinical outcomes.

| Bronchodilator    | Scheduled or serial Salbutamol aerosol therapies are not recommended.
|                  | **HOWEVER,** a single trial inhalation of Salbutamol may be considered as an option, particularly when there is a family history for allergy, asthma, or atopy.
|                  | Inhalation therapy should not be continued if there is no documented improvement in respiratory rate and effort between 15-30 minutes after a trial inhalation therapy.
Management of Bronchiolitis in Infants

Antibiotics
- Antibiotics should not be used in the absence of an identified bacterial focus.

Ribavirin
- Ribavirin should not be used routinely in children with bronchiolitis.

Steroid Therapy
- Steroid therapy should not routinely be given by any route.

Monitoring:
- Repeated clinical assessment should be conducted, as this is the most important aspect of monitoring for deteriorating respiratory status
- Follow Bedside PEWS criteria for monitoring
- If the patient is off oxygen, improving, and PEWS are ≤ 4, spot saturation monitoring is sufficient q4-6 hrs.
- Weaning of oxygen, based on oxygenation (SpO₂), and flow rate, based on work of breathing (if on HHF) should be discussed on rounds and reassess frequently throughout the day.

Discharge:
- The interdisciplinary team should begin discharge planning on admission.
- Refer to Discharge Criteria
Management of Bronchiolitis in Infants

ED Management Recommendations

- Consider ICU consult if:
  - < 3 months
  - < 12 months
  - 1 to 2 years
  - > 2 years

- Treat emergently, not guideline eligible. Consider ICU consult if applicable.

- History, symptoms, and signs of viral bronchiolitis:
  - Breathing, upper respiratory illness and/or fever
  - First episode of respiratory distress within 24 hours of initial illness
  - Irritability, grunting, stridor, accessory muscle use, abnormal or noisy breathing
  - Nasal flaring, retractions, or need for nasal oxygen
  - Cough, wheezing, chest physiotherapy
  - Naso/oropharyngeal swabs for respiratory multiplex PCR

- Groups at higher risk for severe disease:
  - Immunosuppression
  - Immune deficiency
  - Hemodynamically significant cardiopulmonary disease
  - Immunodeficiency
  - Medically complex child
  - Severe coryza (i.e., masuminular disease)

- Ward Admission Criteria (may include any of):
  - Supplemental O2 requirements to keep SpO2 > 94% during ED observation
  - Intubation for severe disease and/or with severe respiratory distress as per severity and high risk criteria above
  - Signs of distress: grunting, nasal flaring, marked accessory muscle use
  - Evidence of dehydration
  - Oxygen requirements to keep SpO2 > 94%
  - Need to rule out alternative diagnoses
  - Significant social concerns about adequacy or safety of home environment

- The following tests are NOT routinely ordered in bronchiolitis unless there is a specific clinical indication:
  - Chest X-ray [only ordered if not following expected clinical course, pending ICU admission]
  - Bloodwork including: CBC, CPK, blood gas, cultures [only if patient is following sepsis pathway, pending ICU admission, and/or concern about respiratory failure]
  - Naso/oropharyngeal swabs for respiratory multiplex PCR testing [only if SARS-CoV-2 present]
  - Rapid flu point of care testing in winter season [only if fever criteria for Oseltamivir treatment]

- The following therapies should NOT be ordered routinely for children admitted with bronchiolitis:
  - Nebulized Epinephrine
  - Nebulized Ipratropium
  - Nebulized Albuterol
  - Nebulized Corticosteroids
  - Antibiotics [if not following expected clinical course (i.e., examination/imaging consistent with bacterial pneumonia/tamperiment)]
  - Chest Physiotherapy

- ED Discharge Criteria:
  - Discharged with parent education
  - Provide follow-up plan
  - Patient bed is available

- Initiate bronchiolitis medical management in ED and consult with intake medical team.

- Continue to monitor in ED until in patient bed is available.

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**Management of Bronchiolitis in Infants**

### Inpatient Management Recommendations

**Child < 24 months admitted to Peds Medicine with bronchiolitis**

- **Initiate/continue treatment for bronchiolitis including:**
  - Follow BPEWs criteria for monitoring
  - If patient off oxygen, improving, and BPEWs ≤ 4 then spot saturation monitoring is sufficient q 4–6h
  - Droplet/Contact precautions
  - Oxygen to maintain saturations >95% when awake; >88% when asleep
  - Heated High Flow (HHF) for severe respiratory distress as per SickKids guidelines (if indicated).
  - Maintenance of hydration
  - Nutrition: consider more frequent feeds at lower volumes
  - Consider placement of NGT if moderate to severe respiratory distress (based on severe criteria) to minimize risk of aspiration
  - IVF (DSW 0.9 NaCl) can be used as an alternative to NG feeds at clinician/family discretion. Refer to IV Fluid Management guidelines

- **Treating typical bronchiolitis:**
  - Respiratory: Oxygen and hydration
  - Evidence based: Fluid flushing
  - Not recommended: Salbutamol, Epinephrine nebulization, 3% hypertonic saline nebulization, corticosteroids, antibiotics, antifungals, and chest physiotherapy

- **For HHF note the following:**
  - HHF is only to be used in consultation with RT. Refer to SickKids Guidelines
  - If on HHF weaning Bronchiolitis/FiO2 is based on work of breathing and RR, to be done by RT in conjunction with primary care team
  - HHF used is a substitute for non-invasive ventilation
  - ORT consult should be considered if child requires HHF

**If patient off oxygen**

- **Consider a CCRT consult. Refer to Sepsis Pathway (if applicable)**

**Does the child have severe respiratory distress or appear septic/tox?”**

- **Discharge with parent education**
- **Provide follow up plan**
- **Refer to Discharge Checklist**

**Does child meet discharge criteria?**

- **Discharge with parent education**
- **Provide follow up plan**
- **Refer to Discharge Checklist**

**Discharge Criteria**

- Respiratory status: consistently improving, hygienic and work of breathing have improved; and SpO2 is in an acceptable range on room air: SpO2 >95% when sleeping and SpO2 >90% when awake
- Nutritional criteria: child on sufficient oral feeds to prevent depletion
- Social: parent or guardian can provide care at home
- Parent and Family education completed
- Follow-up instructions provided
- Follow-up with primary care provider based on individual needs

**SickKids In-patient Management Pathway**

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3.0 Implementation and Evaluation Plan

Implementation Plan

- Education and awareness building by Paediatric Medicine and ED Divisions’ practice champions during resident/fellow orientation, resident educational rounds, and nursing orientation/staff meetings.
- ED and Inpatient Medical Director to communicate any updates in practice to ED and Paediatric Medicine Divisions respectively.

Evaluation Plan

- Baseline pre-implementation (n=20) and 6 months post-implementation (n=20), retrospective chart review by Peds Quality Leader to evaluate the following in ED and Peds unit:
  - Number (#) of patients on Heated High Flow (HHF); and appropriateness;
  - # of patients who get chest x-rays and np swabs; and appropriateness;
  - # of patients treated with steroids and antibiotics; and appropriateness; and
  - # of patients who are getting continuous O2 saturation monitoring when on RA; and appropriateness

4.0 Guideline Group and Reviewers

Guideline Group Membership:

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3. Lynn Mack, 7BCD Quality Leader
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4.0 References


### Management of Bronchiolitis in Infants

| Version: 2 |


**Attachments:**

- bronchiolitis ED June 29.pdf
- Summary of Recommendations.pdf
- Discharge Checklist Bronchiolitis June 29.docx
- bronchiolitis inpatient June 29.pdf

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