

Bronchiolitis Care Map

Go directly to [Care Map Flowchart](#)



When accessing a document, please use the browser return arrow (upper left-hand corner) to return to the Care Map

Care Map Symbols

Links to more information or returns to a previous page.

Start of a Care Map Segment

Decision Point

Stop and Evaluate

Care Map Step
Blue underlined text is a hyperlink

Progression of care – Patient Improving



Source Reference



Education Module



Hospital Policy



Hospital Reference



Provider Information



Download File

Bronchiolitis Care Map

Go directly to [Care Map Flowchart](#)

Quick Overview: Bronchiolitis Epidemiology, Pathophysiology, and Treatment

The Evolution of Bronchiolitis Care at ETCH (2007-2014)

Suggested Inclusion Criteria for Bronchiolitis Care Map

- Age <48 months with peak age range 3-6 months.
- A constellation of clinical signs and symptoms occurring in children typically younger than 2 years, including a viral upper respiratory tract prodrome followed by increased respiratory effort and wheezing. Clinical signs and symptoms of bronchiolitis consist of rhinorrhea, cough, tachypnea, wheezing, crackles, and increased respiratory effort manifested as grunting, nasal flaring, and intercostal and/or subcostal retractions.
- Risk factors for severe disease which include a history of prematurity, age <12 weeks, underlying cardiopulmonary disease, or immunodeficiency should be assessed.



This care map document does not supersede the clinical judgment of a provider regarding the care that is ultimately ordered for a given patient. [Click to see full disclaimer.](#)



[Executive Summary](#)



[American Academy of Pediatrics 2014 Bronchiolitis Treatment Guidelines](#)



[Why does ETCH include patients ages 24-48 months in our Care Map when most hospitals would not?](#)



Bronchiolitis Care Map

Go directly to [Care Map Flowchart](#)

Quick Overview: Bronchiolitis Epidemiology, Pathophysiology, and Treatment

The Evolution of Bronchiolitis Care at ETCH (2007-2014)

Potential Reasons to Avoid Bronchiolitis Care Map

- Cardiac disease requiring baseline medication
- Anatomic airway abnormalities
- Neurologic disease processes
- Immunodeficiency
- Chronic lung disease



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[Executive Summary](#)



[American Academy of Pediatrics 2014 Bronchiolitis Treatment Guidelines](#)



[Why does ETCH include patients ages 24-48 months in our Care Map when most hospitals would not?](#)



The Bronchiolitis Respiratory Scoring Grid

- This grid is a tool used to help determine the airway care a bronchiolitis patient receives while at ETCH.
- The original grid has been modified for use at ETCH to include RR values for patients in the 2-4 year age range.
- The grid is used by RC for patients they treat in both the ED and on the general care floors.
- The grid is *not* used by RN's in the ED to assess patients for treatment.
- The grid is used by RN's for all bronchiolitis patients admitted to the floors.
- All patients are to be scored every assessment visit, and re-scored after any airway intervention has been performed.

RESPIRATORY RATE			
<2 mos. 2-12 mos. 12-24 mos. >24-48mos	≤60 ≤50 ≤40 <35	61-69 51-59 41-44 35-39	≥70 ≥60 ≥45 40 or greater
	1	2	3
RETRACTION SIGNS			
None	<u>Subcostal and/or suprasternal</u>	<u>Subcostal with intercostals and/or substernal indrawing</u>	<u>Subcostal/intercostal, nasal flaring, grunting, and/or chest wall indrawing</u>
0	1	2	3
WHEEZING			
None	End of expiration	Throughout expiration	Audible without stethoscope
0	1	2	3



Example: [How to use the scoring grid.](#)



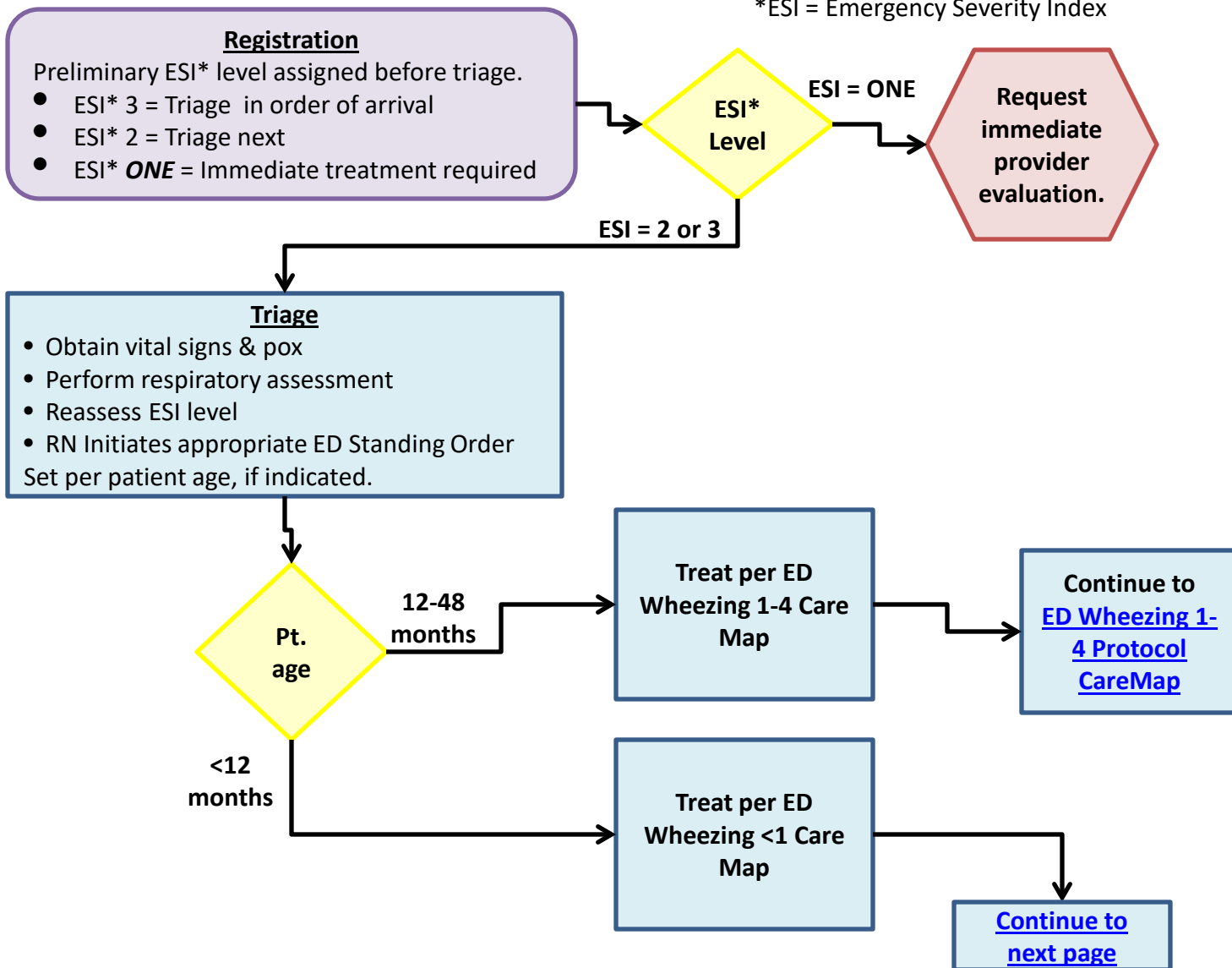
Original grid sourced from: [Inter-Observer Agreement Between Physicians, Nurses, and Respiratory Therapists for Respiratory Clinical Evaluation in Bronchiolitis.](#) V. Gajdos, L. Beydon, B. Pellegrino, L. de Pontual, S. Bailleux, P. LaBrune, J. Bouyer. *Pediatric Pulmonology.* 44:754-762, 2009.

Emergency Department Care: Chief Complaint = Respiratory/Wheezing <4 years (Registration & Triage)



Diagnostic testing & therapies not routinely recommended:

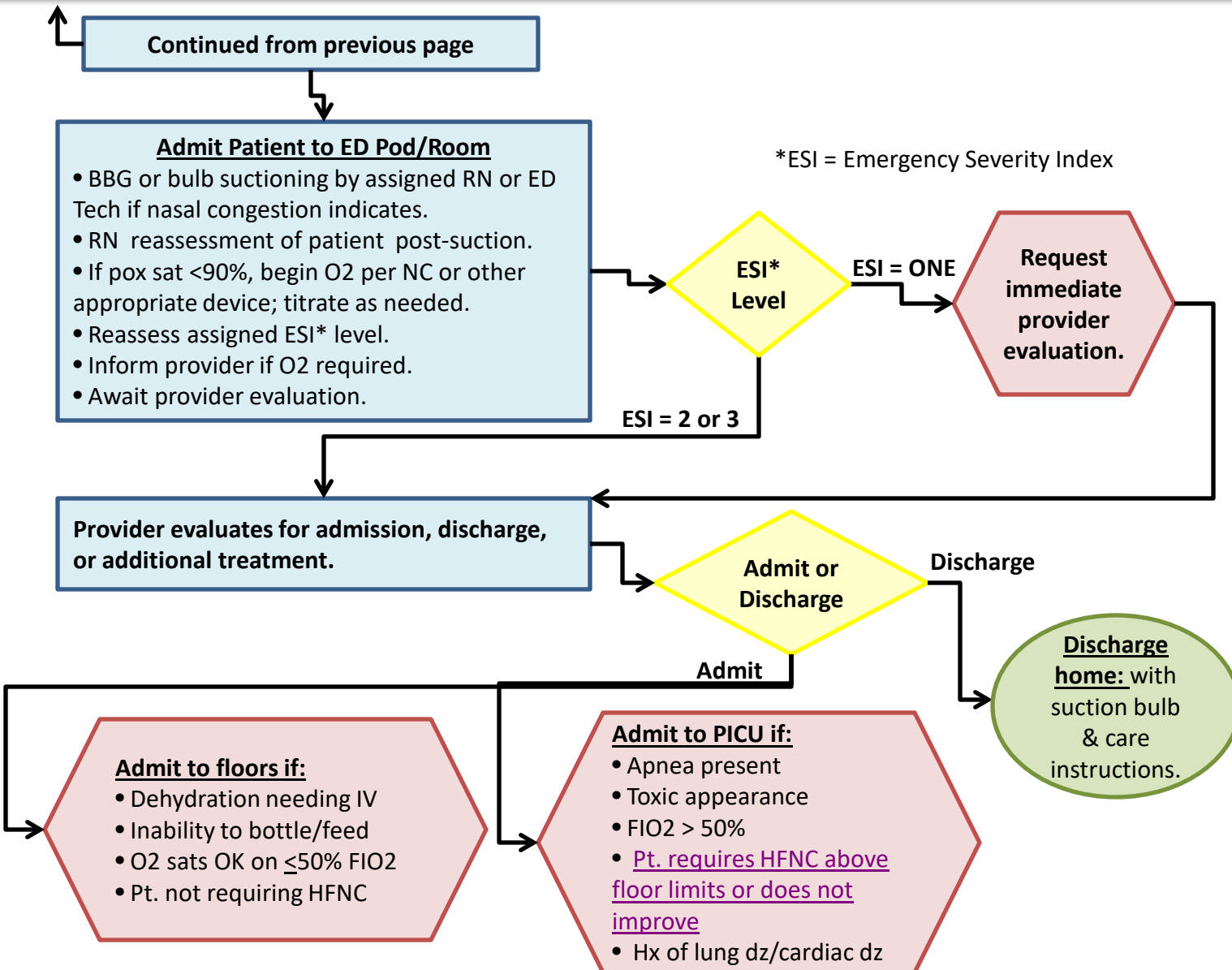
- [Albuterol](#)
- [Racemic Epi](#)
- [Hypertonic Saline \(ED\)](#)
- [Hypertonic Saline \(In-Pt\)](#)
- [Corticosteroids](#)
- [Chest Physiotherapy](#)
- [Nasopharyngeal Suction](#)
- [Singulair](#)
- [Antibiotics](#)
- [Chest X-rays](#)
- [Routine viral testing](#)



Emergency Department Care: ED Wheezing <1 Year Care Map



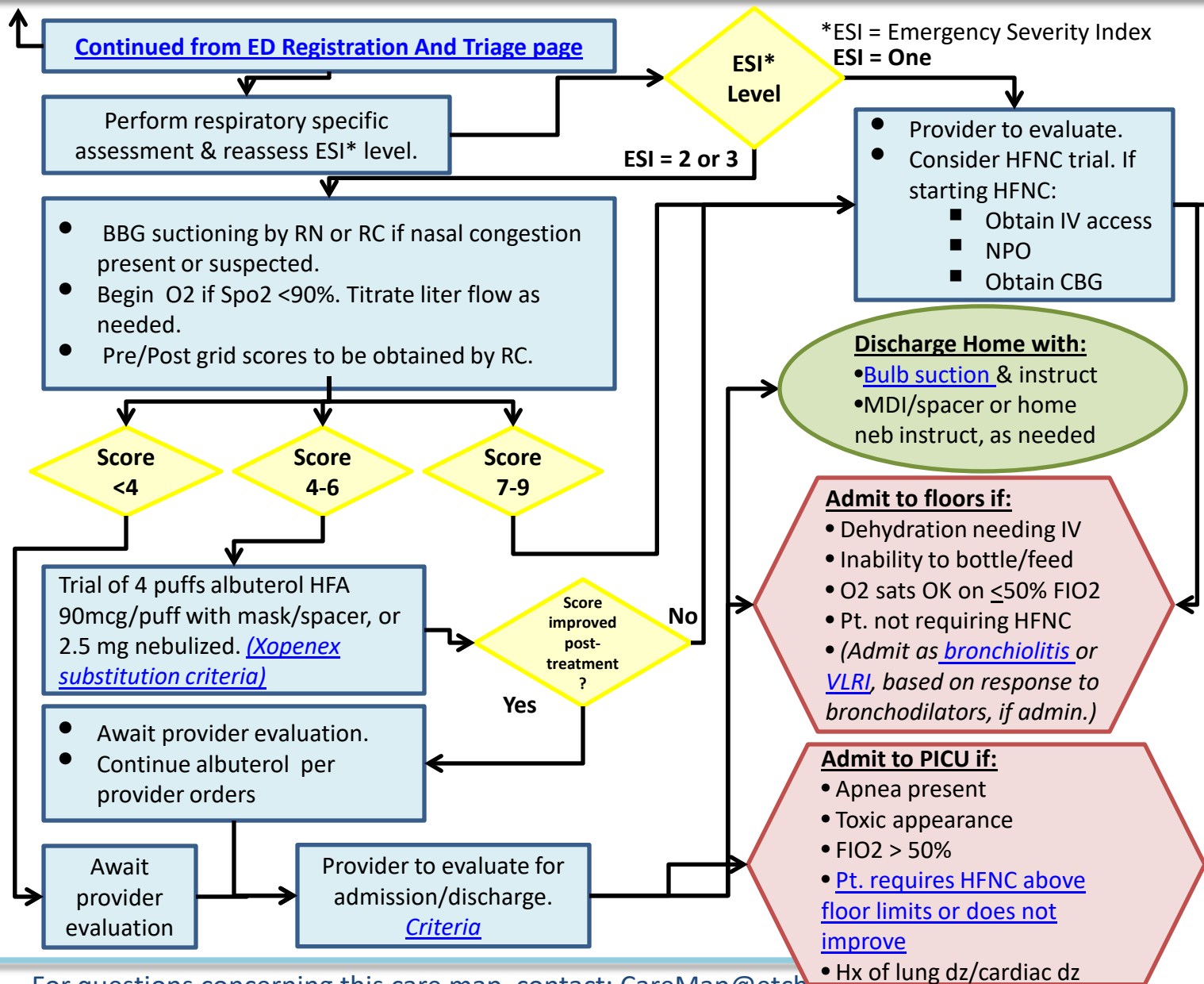
- Diagnostic testing & therapies not routinely recommended:**
- [Albuterol](#)
 - [Racemic Epi](#)
 - [Hypertonic Saline \(ED\)](#)
 - [Hypertonic Saline \(In-Pt\)](#)
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 - [Chest Physiotherapy](#)
 - [Nasopharyngeal Suction](#)
 - [Singulair](#)
 - [Antibiotics](#)
 - [Chest X-rays](#)
 - [Routine viral testing](#)



Emergency Department Care: ED Wheezing 1-4 Years Care Map



- Diagnostic testing & therapies not routinely recommended:**
- [Albuterol](#)
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 - [Hypertonic Saline \(ED\)](#)
 - [Hypertonic Saline \(In-Pt\)](#)
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Medical Floor Initial Care: Bronchiolitis & VLRI Order Sets



Diagnostic testing & therapies not routinely recommended:

- [Albuterol](#)
- [Racemic Epi](#)
- [Hypertonic Saline \(ED\)](#)
- [Hypertonic Saline \(In-Pt\)](#)
- [Corticosteroids](#)
- [Chest Physiotherapy](#)
- [Nasopharyngeal Suction](#)
- [Singulair](#)
- [Antibiotics](#)
- [Chest X-rays](#)
- [Routine viral testing](#)

Pt. admitted on either Bronchiolitis or VLRI order set

- Explain [details of care plan & pox tips to family](#).
- Suction/Score/Suction by either/both RN/RC Q2H, or @ initial freq. ordered by provider.
- Continuous Pox for first 24-hours of admit.
- Consider need for IV fluids if RR consistently >60
- RC & RN to consider weaning of assessment/sxn freq. per weaning policy guidelines if grid scores are ≤ 4 . (RN assessment freq. may not wean to greater than Q4H. RC assessments may be weaned out to Q12H per [weaning protocol guidelines](#), if pt scores and condition allow.)
- Wean O2 if Pox >90% awake, or >88% sleeping.

Patient improving and/or stable with score ≤ 6

Yes

[Continue to next page](#)

No

Escalation of Care

- Call provider to evaluate if pt. condition &/or scores are worsening. (*Consider need for [Rapid Response Team](#). Call ext. 8911*)
- NP suction X1, but only if pt's WOB not improving with BBG suction.
- If [bronchiolitis](#) admission, may consider trial of racemic epi (with MD approval) for scores ≥ 4 .
- If [VLRI](#) admission, may consider trial of ordered PRN aerosol for scores ≥ 4 .
- Consider [High Frequency Nasal Cannula](#) trial.



[Admission Order Set: Bronchiolitis Care Map](#)



[Admission Order Set: Viral Lower Respiratory Illness \(VLRI\) Care Map](#)



Quick Reference: [Guidelines for Weaning of RC Assessments to Q-shift](#)



Quick Reference for RNs' floating to the Medical floors: [An RSV Survival Packet](#)

Medical Floor Care - Bronchiolitis & VLRI Order Sets (Patient Score ≤ 6)



Diagnostic testing & therapies not routinely recommended:

- [Albuterol](#)
- [Racemic Epi](#)
- [Hypertonic Saline \(ED\)](#)
- [Hypertonic Saline \(In-Pt\)](#)
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- [Singulair](#)
- [Antibiotics](#)
- [Chest X-rays](#)
- [Routine viral testing](#)

[Continued from Medical Floor Initial Care page](#)

- Suction/Score/Suction by RN Q3-4H as tolerated; assess by RC @ Q12H freq. per protocol, if appropriate. All pts to get nasal suction at least Q4H until assessed as able to handle secretions with less frequent interventions.
- Wean to Pox spot checks after first 24-hours of admit if pt. is off O2. (Probe can be left on pt. for sleep checks, if desired.)
- Wean O2 if Pox >90% awake, or >88% sleeping.
- Pt. to remain on RA if Pox >90% awake, or >88% sleeping.
- RC & RN to consider further weaning of assessment/sxn frequencies if pt. grid scores ≤ 4 . (RN assessments to be done per nursing care plan. RC assessments may be weaned to Q12H [per guidelines](#), if tolerated & appropriate.)
- Assess ability of pt. for bottle/oral feeds.
- Begin parent/caregiver teaching for [bulb suctioning](#).
- If MDI or neb meds administered, RC to teach/review optimal technique to pt. caregivers.



[Admission Order Set: Bronchiolitis Care Map](#)



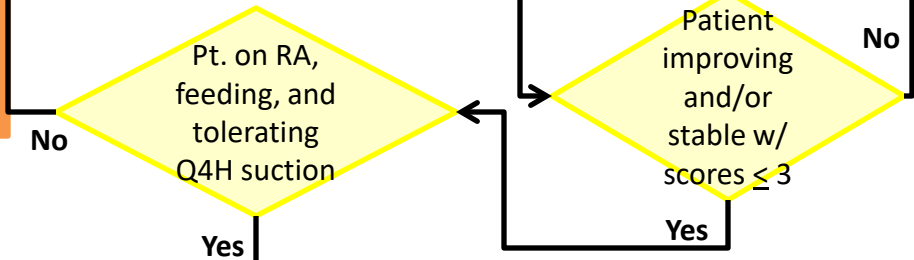
[Admission Order Set: Viral Lower Respiratory Illness \(VLRI\) Care Map](#)



Quick Reference: [Guidelines for Weaning of RC Assessments to Q-shift](#)



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Escalation of Care

- Consider need to increase assessment/suction freq.
- Call provider to evaluate if pt. condition &/or scores are worsening & worrisome.
- If [bronchiolitis admission](#), may consider trial of racemic epi (with MD approval) for scores ≥ 4 .
- If [VLRI](#) admission, may continue aerosols, or consider trial of ordered PRN med for scores ≥ 4 .
- Consider NP suction X1.



Medical Floor Care - Bronchiolitis & VLRI Order Sets (Patient Score ≤ 3)

[Continued from Medical Floor Admission Care page](#)

- RN assessments to continue per nursing care plan. RC assessments may be weaned as far as Q12H per [guidelines](#), if tolerated & appropriate.
- Suction/Score/Suction by RN PRN if tolerated.
- Consider suction PRN with bulb syringe, if tolerated.
- Caregivers to be instructed & perform suctioning whenever feasible.
- Continue pox spot checks for distress/concerns.
- Pt. to remain on room air if Pox > 90% awake, or >88% sleeping.
- Monitor ability of pt. to bottle/take oral feeds.
- RC/RN to continue instruction of parents for MDI/spacer, home neb, &/or asthma educ. as needed.



[Admission Order Set: Bronchiolitis Care Map](#)



[Admission Order Set: Viral Lower Respiratory Illness \(VLRI\) Care Map](#)



Quick Reference: [Guidelines for Weaning of RC Assessments to Q-shift](#)



Quick Reference for RNs' floating to the Medical floors: [An RSV Survival Packet](#)

Diagnostic testing & therapies not routinely recommended:

- [Albuterol](#)
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- [Corticosteroids](#)
- [Chest Physiotherapy](#)
- [Nasopharyngeal Suction](#)
- [Singulair](#)
- [Antibiotics](#)
- [Chest X-rays](#)
- [Routine viral testing](#)

Consider for Discharge when:

- Score < 3 for 12 hours
- No need for suction for 4 hrs
- Wean O2 if Pox > 90% awake, or >88% sleeping.
- Off O2 for 12 hrs. w/ period of sleep
- No apnea for 48 hrs.
- Feeding/bottling adequately
- **Parent teaching completed**
- Smoking cessation needs fulfilled ([Cessation/SHS Teaching Tips](#))

Patient &/or scores stable ≤ 3 , or improving?

No

Escalation of Care

- Consider need to increase assessment/sxn frequency.
- Call provider to evaluate if pt. condition &/or scores are worsening & worrisome.
- If [Bronchiolitis](#) admission, may consider trial of racemic epi (w/ provider approval) for scores ≥ 4 .
- If [VLRI](#) admission, may continue aerosols, or consider trial of ordered PRN med for scores ≥ 4 .

Yes

Bronchiolitis Weaning Protocol(Refer to order)

1. At least two floor assessments with scoring will be performed for all patients by RC at the frequency specified in the admission orders.
2. For patients with no beta-agonists ordered except for a one-time racemic epi rescue treatment for scores > 7 :
 - a. If the patient is assessed a score of ≤ 4 for any two consecutive therapist assessments, RC assessments may be weaned by a two-hour interval.
 - b. At least one RC assessment will be performed at the new assessment frequency.
 - c. Once a patient reaches q-6 hour RC assessments, they may be weaned to q-12 hour assessments if scores remain ≤ 4 .
 - d. The maximum RC assessment interval is q-12 hours.
3. If any additional beta-agonist (albuterol or racemic epi) is ordered per protocol:
 - a. The patient may be weaned in 2-hour intervals as per 2(a) above if they do not receive a bronchodilator treatment after floor admission.
 - b. If a patient receives a beta-agonist and responds, as evident by improved scores:
 - i. If the patient scores ≤ 4 for two consecutive assessments following a bronchodilator aerosol, RC assessments may be weaned by a 2-hour interval.
 - ii. The new RC assessment frequency will remain in effect for at least one RC assessment.
 - iii. Weaning may continue by two-hour intervals for scores ≤ 4 .
 - iv. The maximum interval wean for any patient responsive by clinical score to beta-agonists is q-6 hours.
 - c. For patients not responding as evident by score to bronchodilators, weaning may occur as per 2(a-b) to a maximum interval of q-6 hours.
4. The therapist will enter all protocol RC assessment frequency changes in the patient's medical record.

Why Does ETCH Include Patients 24-48 Months of Age in our Bronchiolitis Care Map?

- In past years, a number of bronchiolitis patients at ETCH were excluded by age alone from what seemed a logical, effective protocol of care for their specific illness. This occasionally led to inconvenience and some inefficiency in overall care delivery.
 - Providers were forced to enter multiple, individual orders to cover all key elements of care, instead of a comprehensive protocol set.
 - Caregivers treated patients with identical diagnoses and symptoms, but differing sets of orders.
 - Extra caregiver/provider conversations were frequently needed to clarify provider intent
- Patients in the age range of 24 to 48 months were most often those presenting in this fashion.
- Three separate care pathways, each with an individualized order set, were developed in 2014-15 in an attempt to better serve the following patient groups:
 - Pure bronchiolitics
 - True asthmatics
 - The middle group of patients typically between the ages of 24-48 months whose history and symptoms often do not clearly place them in either a bronchiolitic or an asthmatic diagnostic category.

Return to Page 3: [Bronchiolitis Care Map](#)

Return to Page 4: [Bronchiolitis Care Map](#)

Nationwide:

- Bronchiolitis nationwide is the most common cause of hospitalization for children < 1 year of age, with peak admits occurring for infants 30-60 days of age.
- There are an estimated 100,000 admissions yearly to U.S. hospitals.
- The annual cost is 1.7 billion dollars to the U.S. healthcare system.
- Highest incidence is during the months of December-March.



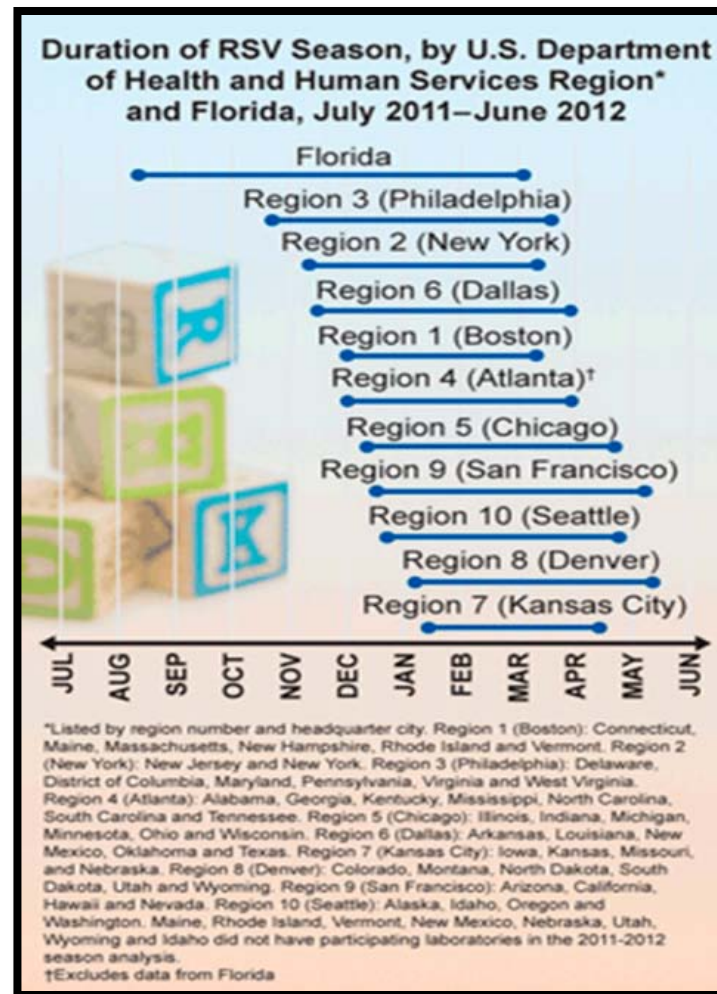
Link to AAP article
page 1476 – [Scope of
Bronchiolitis](#)

Return to Page 3: [Bronchiolitis Care Map](#)

Return to Page 4: [Bronchiolitis Care Map](#)

For ETCH:

- Cases are seen year-round, but peak months are Dec – Mar.
- 2014 patient statistics for ETCH
 - Total bronchiolitis admits = 676
 - PICU admits for bronchiolitis = 49
 - Total patient charges for care = \$6.7 million
 - Insurer payments for care = \$2.7 million (30%)



Link to AAP article pages
1476 – [Scope Seasons](#)

Return to Page 3: [Bronchiolitis Care Map](#)

- Bronchiolitis is a lower respiratory tract disorder often caused by viral infection which may begin in the upper airway, especially the nose. The infection leads to acute inflammation, edema, increased mucous production, bronchospasm, hyperinflation and necrosis of epithelial cell lining of small airways leading to airflow obstruction. The most common viruses causing bronchiolitis, ranked in order of incidence, are :
 - RSV-76%
 - Rhinovirus-39%
 - Influenza- 10%
 - Metapneumovirus- 3%
 - Coronavirus-2%
 - Para influenza-1%
 - Co-infection sometimes occurs
 - Re-infection can also occur. No immunity is afforded by a first episode.



Link to AAP article pages
1476 – [Scope Definition](#)

Return to Page 3: [Bronchiolitis Care Map](#)

- Absence of effective hand hygiene is the most significant vectors for transmission, both in the hospital and at home.
- Virus survives best on hard surfaces, often for ≥ 6 hours.
- Virus can survive on paper or gowns for 20-30 min; on skin for 20 min.
- Use gloves & gowns as needed when handling any item in a patient's environment, not just when touching the patient or bed.
- Use masks when performing or anticipating cough/aerosol producing procedures such as airway suctioning.
- Alcohol-based hand rubs are more effective than soap/water if hands are not visibly soiled. Compliance is increased by availability and ease of use.
- An infected child can shed (and spread) viruses for a 1-2 week period.



Link to AAP article pages
1490 – [Bronchiolitis
Transmission](#)

Return to Page 3: [Bronchiolitis Care Map](#)

- The AAP has outlined the evidence for and against the administration of [palivizumab](#) to specific subsets of at-risk infants during the first year of life.
- Reinforce the importance of [good hand washing/hygiene](#) for all caregivers - family, professional, and others. Tell family to “**SPEAK UP**” if staff neglect hand hygiene.
- Encourage restricting a newborn’s contact with others during RSV season. Infants 30-60 days of age are the group most likely to develop illness requiring hospitalization.
- Encourage steps to protect infants from [environmental tobacco smoke](#).
- Exclusive [breastfeeding](#) for at least 6 months has been shown to confer protection against more serious episodes of respiratory infection, including bronchiolitis.



Link to [AAP article pages 1488 to 1491](#)

Return to Page 3: [Bronchiolitis Care Map](#)

- Episodes characteristics tend to be highly variable and dynamic.
- Episodes typically have high morbidity, but low mortality.
- Upper respiratory tract infections can progressively spread to the lower airways within a few days.
- Symptoms may last for 4 weeks or more.
- Intermittent apnea can be a sign of progressive respiratory distress as the disease progresses.
- At highest risk for a poor outcome are children with a history of prematurity, cardiac disease, chronic pulmonary disease, immunodeficiency, prior wheezing episodes, congenital anomalies, genetic abnormalities, in-utero smoke &/or nicotine exposure.



Link to AAP article pages
1479 – [Characteristics of
Bronchiolitic Episode](#)

Return to Page 3: [Bronchiolitis Care Map](#)

Initial

- Viral URI prodrome
 - Rhinorrhea (secretions can be copious & tenacious)
 - Cough

Progressing to

- Tachypnea
- Increased work of breathing
 - Retractions
 - Grunting
 - Nasal Flaring
- Adventitious breath sounds
 - Crackles
 - +/- Wheezing)
- Fever (can sometimes be caused by an increased WOB)
- Significant difficulty with feeds/bottling.

Severe cases may present with

- Significant apnea
- Respiratory failure
- Secondary bacterial infections



Link to AAP article pages
1479 – [Characteristics of
Bronchiolitic Episode](#)

Return to Page 3: [Bronchiolitis
Care Map](#)

- [Diagnosis](#) should be based solely on history and physical exam. A primary goal is to differentiate viral bronchiolitis from other, similarly presenting disorders.
- Assess disease [severity & other risk factors](#) which may point to disease progression. Assessment would include respiratory status, mental status, oral intake, hydration status.
- [Viral testing](#) should be used sparingly, only for
 - infants to be co-horted upon admission
 - infants receiving pavizumilab, if future doses may be cancelled
- [Radiographic and/or laboratory studies](#) should not be obtained routinely.



Link to [AAP article](#)
pages [1478 to 1480](#)

Return to Page 3: [Bronchiolitis Care Map](#)

- Regular (at least Q4H) initial [nasal suctioning](#)
- A trial of [HFNC therapy](#) can be considered for patients with WOB that is not improving or worsening.
- Consider not using, or limiting, the use of [continuous pulse oximetry](#) for infants not on supplemental O2.
- Administer [nasogastric and/or IV fluids](#) for infants and children unable to maintain oral hydration
- May consider [hypertonic saline](#) administration for hospitalized infants with the prospect of being admitted for >3 days.



Link to [AAP article](#)
pages [1482 to 1487](#)

Return to Page 3: [Bronchiolitis Care Map](#)



Diagnostic testing & therapies not routinely recommended:

- [Albuterol](#)
- [Racemic Epi](#)
- [Hypertonic Saline \(ED\)](#)
- [Hypertonic Saline \(In-Pt\)](#)
- [Corticosteroids](#)
- [Oxygen Saturation](#)
- [Chest Physiotherapy](#)
- [Singulair](#)
- [Antibiotics](#)
- [Chest X-rays](#)
- [Routine viral testing **only** if cohorting or receiving palivizumab](#)

- Administration of [beta-adrenergic bronchodilators](#) (albuterol)
- Administration of [racemic epinephrine](#)
- Administration of [systemic corticosteroids](#)
- Administration of [oxygen if saturation >90%](#)
- [Chest physiotherapy](#)
- Administration of [antibiotics](#)
- Administration of [hypertonic saline in the ED](#)
- Routinely ordered/repeated [nasopharyngeal suctioning](#)



Link to [Full AAP PDF Article](#)

Return to Page 3: [Bronchiolitis Care Map](#)

The findings of the two articles referenced below do not currently support the use of leukotriene inhibitors (Singulair) in the treatment of acute bronchiolitis.

- **A double-blind, placebo-controlled, randomized trial of montelukast for acute bronchiolitis.** Amirav I, Luder AS, Kruger N, Borovitch Y, Babai I, Miron D, Zuker M, Tal G, Mandelberg A. *Pediatrics*, 2008 Dec: 122(6):e1249-55.
 - *Montelukast (Singulair) did not improve the clinical course in acute bronchiolitis. No significant effect of montelukast on the T-helper 2/T-helper 1 cytokine ratio when given in the early acute phase could be demonstrated.*
- **Leukotriene inhibitors for bronchiolitis in infants and young children.** Liu F, Ouyang J, Sharma AN, Liu S, Yang B, Xiong W, Xu R. *Cochrane Database Syst Review*. 2015 March 16;3:CD010636.
 - *The current evidence does not allow definitive conclusions to be made about the effects of leukotriene inhibitors on length of hospital stay and clinical severity score in infants and young children with bronchiolitis. The quality of the evidence was low due to inconsistency (unexplained high levels of statistical heterogeneity) and imprecision arising from small sample sizes and wide confidence intervals, which did not rule out a null effect or harm. Data on symptom-free days and incidence of recurrent wheezing were from single studies only. Further large studies are required. We identified one registered ongoing study, which may make a contribution in the updates of this review.*

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Admission Criteria:

- Moderate/severe respiratory distress
- Hypoxemia with sats <90%
- Dehydration requiring ongoing IV fluids
- Apnea or a high risk for apnea
- Risks factors for more severe disease
 - age<12 weeks,
 - history of prematurity
 - underlying cardiopulmonary disease
 - immunodeficiency
- Family's ability to care for the child
- Family's ability to return for further evaluation if needed

Discharge Criteria:

- Respiratory distress only mild (respiratory scores< 3)
- No need for BBG suctioning q4h
- O2 sats >90% awake, >88% sleeping
- Off O2 a minimum of 12 hours (including a sleep time)
- No apnea for > 48 hours
- Feeding adequately
- Parent teaching completed
 - Suctioning
 - Signs of respiratory distress
 - Safe feeding
 - Second hand smoke exposure

Return to Page 8: [Emergency Department Care \(ED Wheezing 1-4 Protocol\)](#)

HFNC Floor Limits

- **Contraindications to the use of HFNC in non—critical care units:**
 - Apnea
 - History of severe GERD

- **Maximum HFNC flow rates and FIO2 on non-critical care units:**
 - Maximum FIO2 = 50%
 - Maximum flow rate:
 - Typical dosing starts at 1.5-2 lpm/kg
 - < 4kg-8 lpm
 - 4-8kg-15 lpm
 - >8 kg 15lpm

[ETCH High Flow Nasal Cannula in Non-Critical Care policy](#)

Return to Page 9: Medical Floor Admission Care - [Both Bronchiolitis & VLRI Order Sets](#)

ETCH Treatment Progression Through the Years (Admissions)

<u>Protocol Year</u>	<u># of Pts. Included</u>	<u>Readmit Rate (%)</u>	<u>Length of Stay</u>	<u>Pts. Given Aerosols (%)</u>	<u>Aerosol Tx. Admin./Pt.</u>	<u>Pts. Given Steroids (%)</u>	<u>Pts. w/ CPT (%)</u>	<u>Pts. w/ CXR (%)</u>	<u>Pts. RSV Tested (%)</u>
2007	282	0.71	3.25	93	16	21.6	47	73	67%
2008	367	1.09	3.13	93	13	17.2	47	73	61%
2009	401	1.80	2.90	82	9	17	43	80	60%
2010	441	0.91	2.60	70	6	19	18	79	51%
2011	406	2.45	2.94	74	4	7.9	12	75	48%
2012	581	1.72	2.64	74	3	10.5	20	78	56%
2013	462	0.65	2.54	70	2	13.4	17	76	49%
2014	402	1.24	2.64	72	2	11.2	18	73	47%

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Return to Page 4: [Bronchiolitis Care Map](#)

Inter-Observer Agreement Between Physicians, Nurses, and Respiratory Therapists for Respiratory Clinical Evaluation in Bronchiolitis

V. Gajdos, MD,^{1,2,3*} N. Beydon, MD,⁴ L. Bommenel, MD,² B. Pellegrino, MD,⁵
L. de Pontual, MD, PhD,^{6,7} S. Bailleux,² P. Labrune, MD, PhD,^{2,3} and J. Bouyer, PhD^{1,3,8}

Summary. Care providers for children with bronchiolitis use various tools to evaluate respiratory status. The use of a single tool by different types of care provider requires a high level of inter-observer agreement, an aspect rarely studied. This study, involving 82 physicians, nurses, and respiratory therapists aimed to evaluate inter-observer agreement for clinical evaluations in children hospitalized for a first episode of bronchiolitis. Respiratory evaluation included three frequently reported parameters of respiratory status: respiratory rate, retraction signs, and wheezing. The frequency of concordance for observers from the same and from different care provider groups was assessed using a weighted kappa statistic and considering all possible combinations of care providers. We also calculated inter-provider agreement as a function of patient age, regardless of care provider type. Overall inter-observer agreement for all provider pairs was 93.1%, with a weighted kappa statistic of 0.72 (95% CI, 0.66–0.78), indicating substantial agreement, with no difference as a function of pair composition. Inter-observer agreements for the various age groups ranged from 87% to 93%, with kappa scores ranging from 0.62 to 0.78. We conclude that a simple clinical evaluation for respiratory status assessment has a high level of inter-observer agreement within and between physicians, nurses and respiratory therapists. Thus, once the validity of this test has been confirmed in a large population sample, it should be possible to use this test to monitor children hospitalized with bronchiolitis and as an endpoint in clinical trials.

Pediatr Pulmonol. 2009; 44:754–762. © 2009 Wiley-Liss, Inc.



[Link to Full Scoring
Grid PDF Article](#)

[Return to Page 5: The Bronchiolitis
Respiratory Scoring Grid](#)

CPG Admission Order Set: Bronchiolitis (1 of 3)

Order SCH Status Start/Stop

Bronchiolitis Admission

Warning: Medication doses may calculate to a greater amount than the maximum dose, depending on the patient's weight.

Bronchiolitis/Non-Responder Admission Orders

Admit to

Inpatient

Observation

Please document additional diagnoses and modifiers within the problem list.

Isolation

Per Policy New Thu Feb 05 14:48 [Edit](#)

* Type of Isolation Per Policy

Condition

Critical

Fair

Good

Serious

Stable

Activity

Activity

Bedrest

Other

Up ad lib

Up to chair

Elevate HOB

Yes

Elevate HOB (<1yr)

Yes

Diet

Diet For Age (Provider Only)

Order SCH Status Start/Stop

Clear Liquid Non-Preop (Provider Only)

Advance as tolerated

Advance to Soft Diet

Clears Only

Sugar Free

NPO (Provider Only)

NPO after midnight

NPO Only

Enteral Feedings (Provider Only)

Yes

IV

D5 1/2 NS + 10 mEq KCl/Liter (Premix)

D5 1/2 NS + 20 mEq KCl/Liter (Premix)

Nursing

Vital Signs

Routine

N/R Q2H

N/R Q4H

I & O

Routine

Strict

INT

Yes

Pulse Oximeter

Continuous the first 24 hours New Thu Feb 05 14:51 [Edit](#)

O2 sat monitoring should be continuous the first 24 hours. Once the patient is stable, change to spot checks every <specify # of hours>, and prn respiratory distress.

Education by Nurse

Yes New Thu Feb 05 14:51 [Edit](#)

* Topic Other

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CPG Admission Order Set: Bronchiolitis (2 of 3)

Order	SCH	Status	Start/Stop
Education by Nurse			
<input checked="" type="checkbox"/> Yes		New	Thu Feb 05 14:51
* Topic: Other			
Provide written disease/medical condition education: Parent education on Bronchiolitis/suctioning/clinical assessment. Give Bronchiolitis handouts to caretaker.			
Suction			
<input checked="" type="checkbox"/> Bulb/BBG/NP/NT		New	Thu Feb 05 14:51
* Suction route: BBG, Bulb, Nasopharyngeal, Nasotracheal			
Before feedings, and with every assessment when necessary or at least every 4 hrs and prn congestion. May use saline drops as needed. Score patient pre and post suctioning.			
Notify Provider			
<input type="checkbox"/> Yes			
Additional Orders			
<input type="checkbox"/> Yes			
Education (Smoking Cessation)			
<input checked="" type="checkbox"/> Yes		New	Thu Feb 05 14:51
Respiratory			
Notify Provider			
<input type="checkbox"/> If score > 7			
If score is > 7 and this is a change from previous assessments.			
Oxygen			
<input checked="" type="checkbox"/> Yes		New	Thu Feb 05 14:51
Keep sats > 90% wean as tolerated.			
RC to assess respiratory status			
<input type="checkbox"/> N/R Q2H			

Order	SCH	Status	Start/Stop
RC to assess respiratory status			
<input type="checkbox"/> N/R Q2H			
<input type="checkbox"/> N/R Q3H			
<input type="checkbox"/> N/R Q4H			
Protocol (Bronchiolitis)			
<input checked="" type="checkbox"/> Wean per protocol		New	Thu Feb 05 14:51
Medications			
Hypertonic saline			
Consider 3% hypertonic saline nebulizer if this is patient's first episode of wheezing and patient does not have co-morbidities.			
Sodium chloride 3% inhalation			
<input type="checkbox"/> 4 ml INH Q8 inh	SCH		
Bronchodilators			
If patient status deteriorates as indicated by clinical score and it does not improve with suctioning, RT may give:			
Racipinephrine 2.25%			
<input type="checkbox"/> 0.25 ml INH ONCE neb.soln	ONE		
<input type="checkbox"/> 0.5 ml INH ONCE neb.soln	ONE		
Age < 6 months: 0.25 mL Age >= 6 months: 0.5 mL			
Alpha-Adrenergic Agent			
<input checked="" type="checkbox"/> Phenylephrine 0.125% [Neo-Synephrine 1/8%(Little Noses) Drops]			
<input checked="" type="checkbox"/> Phenylephrine HCl 0.25% [Neo-Synephrine 1/4% Nose Drops]			
Non-Opioid Analgesics			
Acetaminophen [Tylenol Liquid (160 mg/5 ml)]			
<input type="checkbox"/> 150 mg PO Q4HPRN liquid		PRN	
15 mg/kg Q4HPRN (160 mg/5 ml) Maximum Dose: 650 MG Per ETCH P&T Committee: The maximum single dose for oral or rectal acetaminophen is 650 mg per dose every 4 hours or a maximum 24 hour dose of 4000 mg.			

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CPG Admission Order Set: Bronchiolitis (3 of 3)

Order	SCH	Status	Start/Stop
Order			
Maximum Dose: 650 MG Per ETCH P&T Committee: The maximum single dose for oral or rectal acetaminophen is 650 mg per dose every 4 hours or a maximum 24 hour dose of 4000 mg.			
Ibuprofen [Motrin Suspension]			
<input type="checkbox"/> 100 mg PO Q6HPRN suspension	PRN		
10 mg/kg Q6HPRN (100 mg/5 ml) Maximum Dose: 800 MG Maximum dose of Ibuprofen should not exceed more than 800 mg every 6 hours. Use of Ibuprofen in children less than 6 months is not recommended.			
Laboratory			
RSV ANTIGEN (RAPID)			
<input type="checkbox"/> Routine			
Not routinely recommended except if received Synagis. Per hospital policy, RSV testing is available from October through April.			
Blood Gas			
<input type="checkbox"/> Stat			
<input type="checkbox"/> Routine			
<input type="checkbox"/> N/R PRN			
<input type="checkbox"/> N/R Q12H			
<input type="checkbox"/> N/R Q2H			
<input type="checkbox"/> N/R Q4H			
<input type="checkbox"/> N/R Q6H			
<input type="checkbox"/> N/R Q8H			
<input type="checkbox"/> N/R QAM			
Radiology			
<input checked="" type="checkbox"/> XR CHEST PA/AP AND LATERAL			
<input type="checkbox"/> Routine			
Consultations			
<input type="checkbox"/> Physician Consult			
<input type="checkbox"/> Yes			

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CPG Admission Order Set: VLRI (1 of 3)

Order	SCH	Status	Start/Stop
Viral LRI with Wheeze			
Warning: Medication doses may calculate to a greater amount than the maximum dose, depending on the patient's weight.			
Bronchiolitis/Responder Admission Orders			
Admit to			
<input type="checkbox"/> Inpatient			
<input type="checkbox"/> Observation			
Please document additional diagnoses and modifiers within the problem list.			
Isolation			
<input checked="" type="checkbox"/> Per Policy			
New			
Thu Feb 05 15:26			
* Type of Isolation			
Per Policy			
Condition			
Condition			
<input type="checkbox"/> Critical			
<input type="checkbox"/> Fair			
<input type="checkbox"/> Good			
<input type="checkbox"/> Serious			
<input type="checkbox"/> Stable			
Activity			
Activity			
<input type="checkbox"/> Bedrest			
<input type="checkbox"/> Other			
<input type="checkbox"/> Up ad lib			
<input type="checkbox"/> Up to chair			
Elevate HOB			
<input type="checkbox"/> Yes			
Elevate HOB (<1yr)			
<input type="checkbox"/> Yes			
Diet			
Diet For Age (Provider Only)			

Order	SCH	Status	Start/Stop
Clear Liquid Non-Preop (Provider Only)			
<input type="checkbox"/> Advance as tolerated			
<input type="checkbox"/> Advance to Soft Diet			
<input type="checkbox"/> Clears Only			
<input type="checkbox"/> Sugar Free			
NPO (Provider Only)			
<input type="checkbox"/> NPO after midnight			
<input type="checkbox"/> NPO Only			
Enteral Feedings (Provider Only)			
<input type="checkbox"/> Yes			
IV			
D5 1/2 NS + 10 mEq KCl/Liter (Premix)			
D5 1/2 NS + 20 mEq KCl/Liter (Premix)			
Nursing			
Vital Signs			
<input type="checkbox"/> Routine			
<input type="checkbox"/> N/R Q2H			
<input type="checkbox"/> N/R Q4H			
I & O			
<input type="checkbox"/> Routine			
<input type="checkbox"/> Strict			
INT			
<input type="checkbox"/> Yes			
Pulse Oximeter			
<input type="checkbox"/> Continuous the first 24 hours			
O2 sat monitoring should be continuous the first 24 hours. Once the patient is stable, change to spot checks every <specify # of hours>, and prn respiratory distress.			

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CPG Admission Order Set: VLRI (2 of 3)

Order	SCH	Status	Start/Stop
Education by Nurse			
<input checked="" type="checkbox"/> Yes		New	Thu Feb 05 15:26
* Topic: Other			
Provide written disease/medical condition education: Parent education on Bronchiolitis/suctioning/clinical assessment. Give Bronchiolitis handouts to caretaker.			
Suction			
<input checked="" type="checkbox"/> Bulb/BBG/NP/NT		New	Thu Feb 05 15:26
* Suction route: BBG, Bulb, Nasopharyngeal, Nasotracheal			
Before feedings, and with every assessment when necessary or at least every 4 hrs and prn congestion. May use saline drops as needed. Score patient pre and post suctioning.			
Notify Provider			
<input type="checkbox"/> Yes			
Additional Orders			
<input type="checkbox"/> Yes			
Education (Smoking Cessation)			
<input checked="" type="checkbox"/> Yes		New	Thu Feb 05 15:26
Respiratory			
Notify Provider			
<input checked="" type="checkbox"/> If score > 7		New	Thu Feb 05 15:26
* Comment: If score is > 7 and this is a change from previous assessments.			
If score is > 7 and this is a change from previous assessments.			
Oxygen			
<input checked="" type="checkbox"/> Yes		New	Thu Feb 05 15:26
O2 to keep sats >90%			

Order	SCH	Status	Start/Stop
RC to assess respiratory status			
<input type="checkbox"/> N/R Q2H			
<input type="checkbox"/> N/R Q3H			
<input type="checkbox"/> N/R Q4H			
Protocol (Bronchiolitis)			
<input checked="" type="checkbox"/> Wean per protocol		New	Thu Feb 05 15:26
Medications			
If no improvement in clinical score after suctioning patient and score > 3, the patient may have the following beta-agonist treatment:			
+ Albuterol Inhaler [Ventolin HFA]			
+ Albuterol 0.5% (2.5 mg/0.5 mL) [Ventolin 0.5% Neb Solution]			
+ Ralcepinephrine 2.25%			
+ Sodium chloride 3% Inhalation			
Consider 3% hypertonic saline nebulizer if this is patient's first episode of wheezing and patient does not have co-morbidities.			
Alpha-Adrenergic Agent			
+ Phenylephrine 0.125% [Neo-Synephrine 1/8% (Little Noses) Drops]			
+ Phenylephrine HCl 0.25% [Neo-Synephrine 1/4% Nose Drops]			
Non-Opioid Analgesics			
Acetaminophen [Tylenol Liquid (160 mg/5 ml)]			
<input type="checkbox"/> 150 mg PO Q4HPRN liquid		PRN	
15 mg/kg Q4HPRN (160 mg/5 ml)			
Maximum Dose: 650 MG			
For patients < 43 kg			
+ Acetaminophen [Tylenol Liquid (160 mg/5 ml)]			
For patients > 43 kg			
Per ETCH P&T Committee: The maximum single dose for oral or rectal acetaminophen is 650 mg per dose every 4 hours or a maximum 24 hour dose of 4000 mg.			

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CPG Admission Order Set: VLRI (3 of 3)

<input type="checkbox"/> Ibuprofen [Motrin Suspension]			
<input type="checkbox"/> 100 mg PO Q6HPRN suspension	PRN		<input type="checkbox"/>
10 mg/kg Q6HPRN (100 mg/5 ml)			
Maximum Dose: 800 MG			
Maximum dose of Ibuprofen should not exceed more than 800 mg every 6 hours. Use of Ibuprofen in children less than 6 months is not recommended.			
<input type="checkbox"/> Laboratory			<input type="checkbox"/>
<input type="checkbox"/> RSV ANTIGEN (RAPID)			
<input type="checkbox"/> Routine			
Per hospital policy, RSV testing is available from October through April			
Not routinely recommended except if received Synagis.			
<input type="checkbox"/> Blood Gas			
<input type="checkbox"/> Stat			
<input type="checkbox"/> Routine			
<input type="checkbox"/> N/R PRN			
<input type="checkbox"/> N/R Q12H			
<input type="checkbox"/> N/R Q2H			
<input type="checkbox"/> N/R Q4H			
<input type="checkbox"/> N/R Q6H			
<input type="checkbox"/> N/R Q8H			
<input type="checkbox"/> N/R QAM			
<input type="checkbox"/> Radiology			<input type="checkbox"/>
<input type="checkbox"/> XR CHEST PA/AP AND LATERAL			
<input type="checkbox"/> Routine			
<input type="checkbox"/> Consultations			
<input type="checkbox"/> Physician Consult			
<input type="checkbox"/> Yes			

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Key Risks to Children from Secondhand Smoke:

- Increased risk for sudden infant death (SIDS)
- Increased risk of developing asthma
- Increased risk of developing childhood leukemia
- Double the risk of developing pneumonia
- Four-times the risk of being admitted to the hospital for breathing difficulty
- Increased risk of developing ear infections (otitis media)
- Double the risk of having sinus or other nasal problems
- Double the chances of becoming a smoker themselves when they get older

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Key Points for Anyone Wanting to Quit Smoking:

- Children exposed to SHS are also smokers.
- Keep trying! You have lots of company in having failed a first quit attempt.
- The average number of quit attempts averages 5-7 before someone succeeds.
- Using nicotine replacement or other meds doubles the chances of quitting.
- Having good support doubles again the chances of successfully quitting.
- The Tennessee 1-800-QUITLINE is a free support service offered to all residents.
- Many private insurances now cover the cost of cessation meds for quit attempts.
- TennCare covers 24-weeks of cessation meds, both prescription meds and OTC's.

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Smoking Cessation/Second Hand Smoke

- ▣ **FEAR:** I can't talk to family members about smoking. *They'll get mad and throw me out of the room!!*
- ▣ **FACT:** No they won't. Not a single respiratory therapist has been thrown out of a room for discussing smoking in the past 5–6 years! Almost everyone is willing to listen, even if they do not act on the advice provided. For the few who are truly unwilling to listen, we simply move on before anyone becomes angry. Change will not occur till an individual is ready.

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How you can help the effort this year:



If you do nothing more than get some of the great information shown above into the hands of a family member, you will be helping. **Smart Move!** Is an American Cancer Society booklet for someone thinking about quitting eventually. **Set Yourself Free** is a companion ACS booklet with great tips for quitting – including detailed information on all approved cessation meds.

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Reference: Family instruction upon admission

- **Key points: Plan of care**

- Treatment may be primarily supportive -- monitoring oxygen needs/feeds & nasal suctioning
- Frequent RN/RC assessments initially, weaning with improvement
- Importance of hand hygiene & proper PPE use; help by SPEAKING UP if they witness poor technique
- Nasal suction at least Q4H initially, weaning with improvement.
- Bulb suction will be initiated, taught, & practiced by caregiver(s) before discharge.
- Clinical criteria determining readiness for discharge.
 - Eating/drinking
 - Less suction
 - Work of breathing
 - No oxygen

- **Key points: Pulse oximeter**

- Identification of HR & saturation numbers displayed on the monitor.
- Good probe placement = fewer alarms.
- Activity = erratic waveforms & false alarms.
- Leave sensor probe on your child as much as possible.
- Need to move beyond cable length? OK to disconnect probe at the connection to monitor cable.
- Call your nurse or therapist for any questions about the monitor.



Link to Sharing
Information
[Bronchiolitis RSV](#)



Link to Sharing
Information [Bronchiolitis
in the Hospital](#)

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Reference: Contraindications to Albuterol

- Contraindications to albuterol; possible substitution of Xopenex:
 - Patient has heart disease or a known cardiac dysrhythmia
 - Patient hypersensitivity/allergy to the S-component of racemic albuterol



Link to [Pharmacy Xopenex Auto Substitution Policy](#)

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Physician Disclaimers: Bronchiolitis Care Map

Medical Disclaimer

Medicine is an ever-changing science. As new research and clinical experience broaden our knowledge, changes in treatment and drug therapy are required.

The authors of this Care Map have checked with sources believed to be the most current and reliable in their efforts to provide information that is complete and generally in accord with the standards accepted at the time of publication.

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Contact and Revisions Number

- **For questions concerning this care map, contact: CareMap@etch.com**
- **Last Update: 11/19/15**
- **Revision Number: 0901152**