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6-2023

Bronchiolitis

Children's Mercy Kansas City

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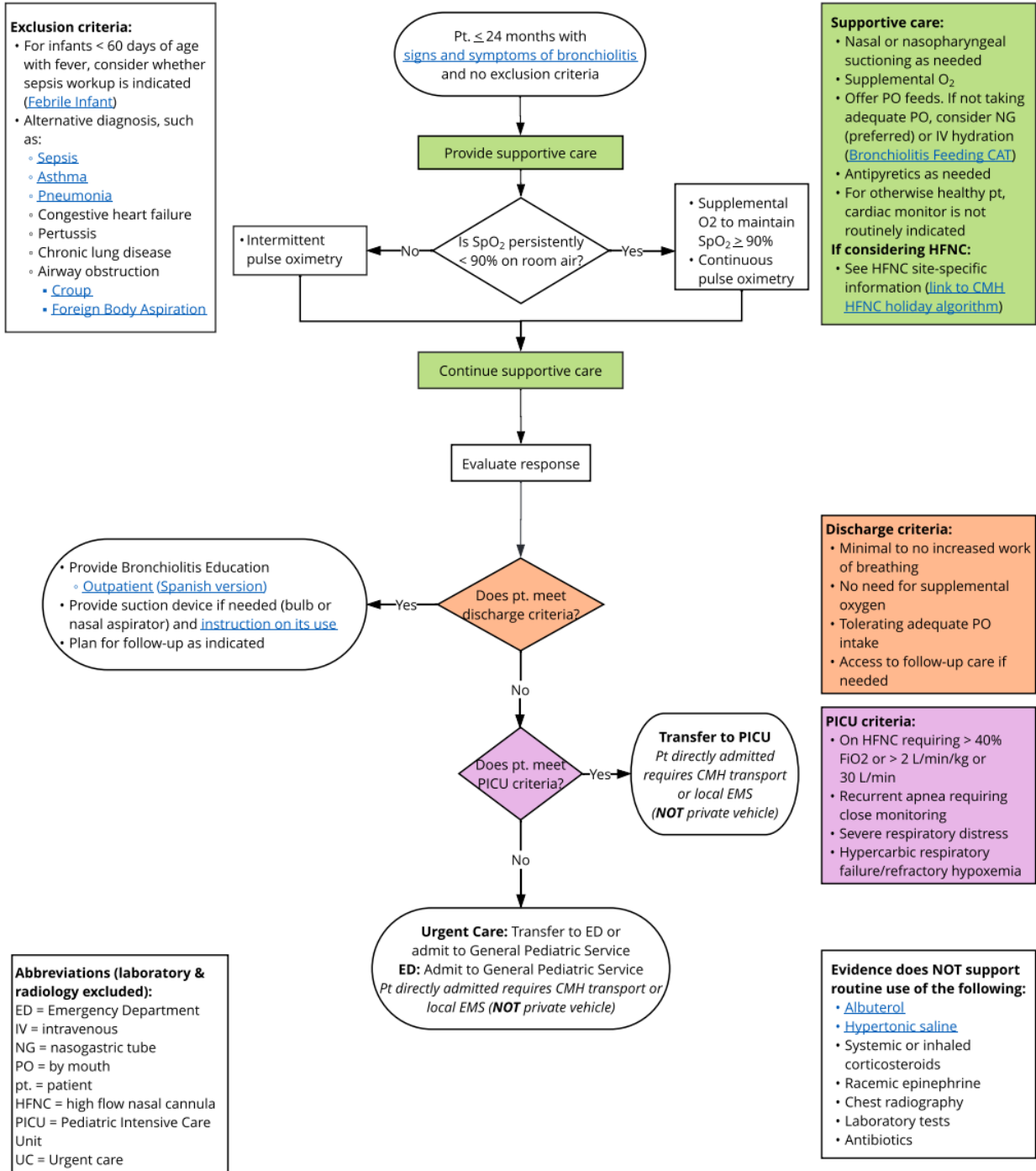
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Bronchiolitis Clinical Practice Guideline Synopsis

Bronchiolitis- Urgent Care & Emergency Department Algorithm



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Bronchiolitis- Inpatient Algorithm

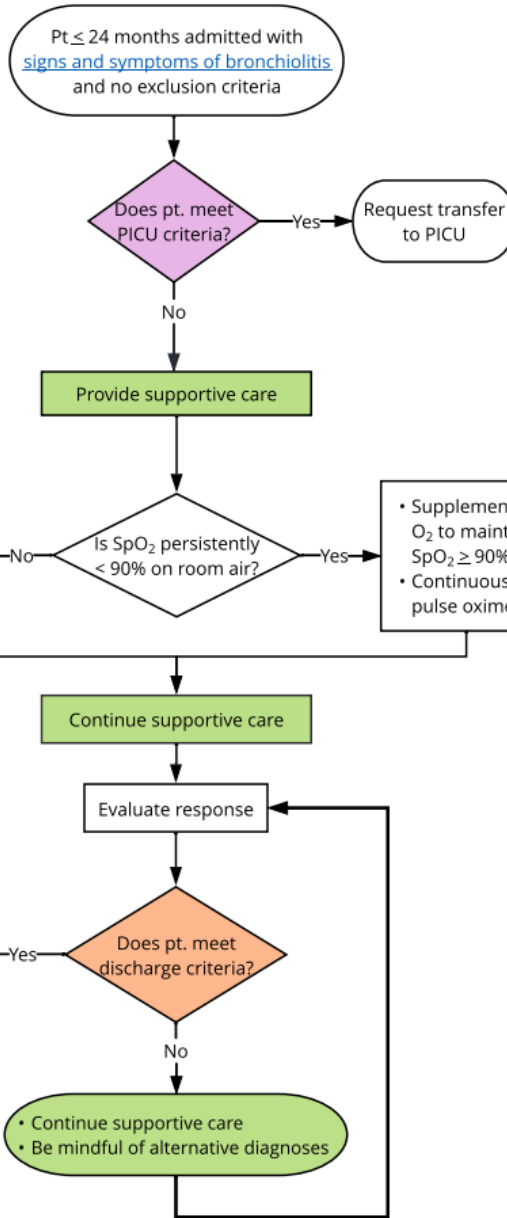
- Exclusion criteria:**
- For infants < 60 days of age with fever consider whether sepsis workup is indicated (link to [Febrile Infant](#))
 - Alternative diagnosis, such as:
 - [Sepsis](#)
 - [Asthma](#)
 - [Pneumonia](#)
 - Congestive heart failure
 - Pertussis
 - Chronic lung disease
 - Airway obstruction
 - [Croup](#)
 - [Foreign Body Aspiration](#)

- PICU criteria:**
- On HFNC requiring > 40% FIO2 or > 2 L/min/kg or 30 L/min
 - Recurrent apnea requiring close monitoring
 - Severe respiratory distress
 - Hypercarbic respiratory failure/refractory hypoxemia

- Supportive care:**
- Nasal or nasopharyngeal suctioning as needed
 - Supplemental O₂
 - Offer PO feeds. If not taking adequate PO, consider NG (preferred) or IV hydration ([Bronchiolitis Feeding CAT](#))
 - Antipyretics as needed
 - For otherwise healthy pt, cardiac monitor is not routinely indicated
- If considering HFNC:**
- See HFNC site-specific information ([link to CMH HFNC holiday algorithm](#))

- Discharge criteria:**
- Minimal to no increased work of breathing
 - No need for supplemental oxygen
 - Tolerating adequate PO intake
 - Access to follow-up care if needed

- Evidence does NOT support routine use of the following:**
- [Albuterol](#)
 - [Hypertonic saline](#)
 - Systemic or inhaled corticosteroids
 - Racemic epinephrine
 - Chest radiography
 - Laboratory tests
 - Antibiotics



- Abbreviations (laboratory & radiology excluded):**
- IV = intravenous
 - NG = nasogastric tube
 - PO = by mouth
 - pt. = patient
 - HFNC = high flow nasal cannula
 - PICU = Pediatric Intensive Care Unit

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Objective of Guideline

The objective of the Bronchiolitis Clinical Practice Guideline (CPG) is to provide care standards for the patient presenting with signs and symptoms of bronchiolitis. The aim of the Bronchiolitis CPG is to minimize variation of care through guidance for evaluation, diagnosis, and treatment.

Epidemiology

Bronchiolitis is a common infection of the lower respiratory system and is one of the most frequent causes of hospitalization for patients under the age of 12 months (Pelletier et al., 2021). Infection is due to viral agents, most commonly respiratory syncytial virus (RSV), and results in inflammation and edema of the bronchioles, leading to mucus production (Ralston et al., 2014). Typical symptoms of bronchiolitis include coughing and rhinitis initially, sometimes progressing to wheezing, tachypnea, and increased work of breathing, which may manifest as use of accessory muscles or nasal flaring (Ralston et al., 2014).

According to the American Academy of Pediatrics (AAP) CPG authored by Ralston et al. (2014), bronchiolitis is diagnosed based on the patient’s clinical history and physical symptoms while considering risk factors for severe illness, such as prematurity or comorbidities. Patients with severe disease may experience increased work of breathing, apnea, or the need for supplemental oxygen or intravenous (IV) hydration and have higher rates of morbidity and mortality (Ralston et al., 2014). The aim of the Bronchiolitis CPG is to provide guidance for evidence based, standardized diagnoses of and care for patients presenting with signs and symptoms of bronchiolitis.

Target Users

- Physicians (Emergency Department, Urgent Care, Hospital Medicine, Ambulatory, Fellows, Residents)
- Nurse Practitioners
- Nurses
- Respiratory Therapists

Target Population

Inclusion Criteria

- Infants up to 24 months of age presenting with bronchiolitis

Exclusion Criteria

- Infants less than 60 days of age with fever (see [Febrile Infant Clinical Practical Guideline](#))
- Patients with alternative diagnoses, such as:
 - Sepsis
 - Asthma
 - Pneumonia
 - Congestive heart failure
 - Pertussis
 - Chronic lung obstruction
 - Airway obstruction (croup, foreign body aspiration, etc.)

AGREE II

The Bronchiolitis Clinical Practical Guideline of the American Academy of Pediatrics (AAP) provided guidance to the Bronchiolitis CPG committee (Ralston et al., 2014). See Table 1 for AGREE II.

Table 1

AGREE II^a Summary for the AAP Bronchiolitis Clinical Practical Guideline, Ralston et al., (2014)

Domain	Percent Agreement	Percent Justification [^]
Scope and purpose	100%	The aim of the guideline, the clinical questions posed and target populations were identified.
Stakeholder involvement	87%	The guideline was developed by the appropriate stakeholders and represents the views of its intended users.
Rigor of development	96%	The process used to gather and synthesize the evidence, the methods to formulate the recommendations and to update the guidelines were explicitly stated.
Clarity and presentation	87%	The guideline recommendations are clear, unambiguous, and easily identified; in addition, different management options are presented.

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Applicability	53%	The guideline did not fully address implementation barriers and facilitators, utilization strategies, nor resource costs associated implementation.
Editorial independence	96%	The recommendations were not biased with competing interests.
Overall guideline assessment	90%	
See Practice Recommendations		

Note: Three EBP Scholars completed the AGREE II on this guideline.

^Percentage justification is an interpretation based on the Children's Mercy EBP Department standards.

Practice Recommendations

Please refer to the American Academy of Pediatrics (AAP) Clinical Practice Guideline: The Diagnosis, Management, and Prevention of Bronchiolitis (Raltson et al., 2014) for full practice recommendations, evaluation, and treatment recommendations.

Additional Questions Posed by the CPG Committee

1. [For hospitalized infants ≤ 24 months of age with bronchiolitis receiving treatment with high flow nasal cannula \(HFNC\), does oral feeding vs. no oral feeding \(nasogastric tube \[NGT\] feeds or intravenous \[IV\] fluids with no enteral feeds\) impact patient outcomes?](#)
2. [For hospitalized children ≤ 24 months of age with bronchiolitis, does use of nebulized 3% hypertonic saline \(HS\) impact patient outcomes?](#)
3. [For children ≤ 24 months of age with bronchiolitis, does the use of albuterol versus not using albuterol impact the outcomes of oxygen saturation, clinical severity score, length of stay, time to resolution, and readmission rates when managed in either the inpatient or outpatient environments?](#)

Recommendation Specific for Children's Mercy

Children's Mercy adopted most of the practice recommendations made by the AAP Clinical Practice Guideline: The Diagnosis, Management, and Prevention of Bronchiolitis (Raltson et al., 2014). Deviations include:

*A **conditional recommendation** is made against use of nebulized 3% HS. Eleven randomized control trials showed a shorter length of stay for patients receiving treatment with HS, MD = -6.47 hours, 95% CI [-12.72, -0.22], p = .04. There was no difference in the need for oxygen supplementation, duration of oxygen supplementation, or improvement of clinical severity scores for patients receiving treatment with HS when compared to no treatment with HS. The potential for shorter length of stay was balanced against the associated costs (monetary and otherwise). See Critically Appraised Topic for substantiation of recommendations.*

Measures

Outcome:

- The percentage of patients with bronchiolitis undergoing/receiving one or more of the process measures listed below

Process measure:

- Provider orders for bronchiolitis education
- Power plan utilization
- Viral testing (rapid RSV or respiratory panel PCR)
- CBC testing
- Blood culture
- Chest x-ray
- Patients receiving albuterol
- Patients receiving systemic steroids
- Patients receiving antibiotic(s)

Balancing measure:

- Length of stay
- Readmissions within 72 hours
- Cost

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Value Implications

The following improvements may increase value by reducing healthcare costs and non-monetary costs (e.g., missed school/work, loss of wages, stress) for patients and families and reducing costs and resource utilization for healthcare facilities.

- Decreased risk of overdiagnosis
- Decreased risk of overtreatment (i.e., treatment with hypertonic saline, antibiotics, or albuterol when not indicated)
- Decreased frequency of admission
- Decreased inpatient length of stay
- Decreased unwarranted variation in care

Organizational Barriers and Facilitators

Potential Barriers

- Variability of acceptable level of risk among providers
- Challenges with follow-up faced by some families

Potential Facilitators

- Collaborative engagement across care continuum settings during CPG development
- High rate of use of CPG
- Standardized order set for Urgent Care Clinic, Emergency Department, Hospital Medicine, and Pediatric Intensive Care

Diversity/Equity/Inclusion

Our aim is to provide equitable care. These issues were discussed with the Committee, reviewed in the literature, and discussed prior to making any practice recommendations.

Power Plans

- EDP Bronchiolitis CPG
- Inpatient Bronchiolitis CPG

Associated Policies

- Airway Care and Suction Standing Order
- High Humidity/High Flow Nasal Cannula Administration
- Inpatient Respiratory Care Plan Manual
- Oxygen Administration
- Cardio-Respiratory and Continuous Pulse Oximetry Monitoring Guidelines

Education Materials

- Bronchiolitis Education for Outpatients
 - Brochure intended for distribution to patients' caregivers
 - Available in [English](#) and [Spanish](#)
- Bronchiolitis Education for Inpatients
 - Brochure intended for distribution to patients' caregivers
 - Available in [English](#) and [Spanish](#)
- How to use a manual nasal aspirator
 - Handout intended for distribution to patients' caregivers
 - Available in [English](#) and [Spanish](#)

Guideline Preparation

This product was prepared by the Evidence Based Practice (EBP) Department in collaboration with the Bronchiolitis CPG Committee composed of content experts at Children's Mercy Kansas City. Literature analysis for additional questions posed by the Bronchiolitis CPG Committee was performed by EBP Scholars and the EBP team. The development of this product supports the Quality Excellence and Safety initiative to promote care standardization that is evidenced by measured outcomes. If a conflict of interest is identified, the conflict will be disclosed next to the committee member's name.

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Bronchiolitis CPG Committee Members and Representation

- Amanda Nedved, MD | Urgent Care | Committee Chair
- Paul Bauer, MD | Critical Care Medicine | Committee Member
- Erin Scott, DO | Emergency Department | Committee Member
- Matthew Johnson, MD | Hospital Medicine | Committee Member
- Jonathan Hartley, DO | Hospital Medicine | Committee Member
- Megan Collins, MD, MPH | Hospital Medicine | Committee Member
- Jeremy Beyer, MD | Pediatric Resident | Committee Member
- Shautonja Woods, BHS, RRT | Respiratory Care | Committee Member
- Ginny Nyberg, MSN, RN | Clinical Practice and Quality | Committee Member
- Christine Claeys, RN, BSN, CCRN-K | Clinical Practice and Quality | Committee Member

EBP Committee Members

- Kathleen Berg, MD, FAAP | Hospitalist, Evidence Based Practice
- Megan Gripka, MT (ASCP) SM | Evidence Based Practice
- Kelli Ott, OTD, OTR/L | Evidence Based Practice

Guideline Model Development Funding

The development of this guideline was underwritten by the following departments/divisions: Urgent Care, Emergency Department, Hospital Medicine, Critical Care Medicine, Respiratory Care.

Conflict of Interest

The contributors to the Bronchiolitis CPG have no conflicts of interest to disclose related to the subject matter or materials discussed in this care process.

Approval Process

- This product was reviewed and approved by the Bronchiolitis CPG Committee, Content Expert Departments/Divisions, and the EBP Department; after which they were approved by the Medical Executive Committee.
- Products are reviewed and updated as necessary every 3 years within the EBP Department at CMKC. Content expert teams are involved with every review and update.

Review Requested

Department/Unit	Date Obtained
Critical Care Medicine	June 2023
Emergency Department	June 2023
Hospital Medicine	June 2023
Respiratory Care	June 2023
Urgent Care	May 2023

Version History

Date	Comments
October 2016	Version one
July 2023	Version two

Date for Next Review:

- July 2026

Implementation & Follow-Up

- Once approved, the guideline was presented to appropriate care teams and implemented. Care measurements will be assessed and shared with appropriate care teams to determine if changes need to occur.
- Order sets/power plans consistent with recommendations were created or updated for each care setting
- Additional institution-wide announcements were made via email, hospital website, and relevant huddles.
- Metrics will be assessed and shared with appropriate care teams to determine if changes need to occur.

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Disclaimer

When evidence is lacking or inconclusive, options in care are provided in the guideline and the power plans that accompany the guideline.

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References

- Pelletier, J. H., Au, A. K., Fuhrman, D., Clark, R. S. B., & Horvat, C. (2021). Trends in Bronchiolitis ICU Admissions and Ventilation Practices: 2010-2019. *Pediatrics*, *147*(6), e2020039115. <https://doi.org/10.1542/peds.2020-039115>
- Ralston, S., Hill, V., & Martinez, M. (2010). Nebulized hypertonic saline without adjunctive bronchodilators for children with bronchiolitis. *Pediatrics*, *126*(3), e520-e525.
- Ralston, S. L., Lieberthal, A. S., Meissner, H. C., Alverson, B. K., Baley, J. E., Gadomski, A. M., Johnson, D. W., Light, M. J., Maraga, N. F., Mendonca, E. A., Phelan, K. J., Zorc, J. J., Stanko-Lopp, D., Brown, M. A., Nathanson, I., Rosenblum, E., Sayles, S., 3rd, Hernandez-Cancio, S., & American Academy of P. (2014). Clinical practice guideline: the diagnosis, management, and prevention of bronchiolitis. *Pediatrics*, *134*(5), e1474-1502.

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