

# Bronchiolitis: An Evidence Based Approach to Acute Management

Kristy Perkowski, DO FAAP

UNECOM CME Weekend 2014

October 12, 2014

# Disclosures

- Nothing to disclose

You've seen this before...

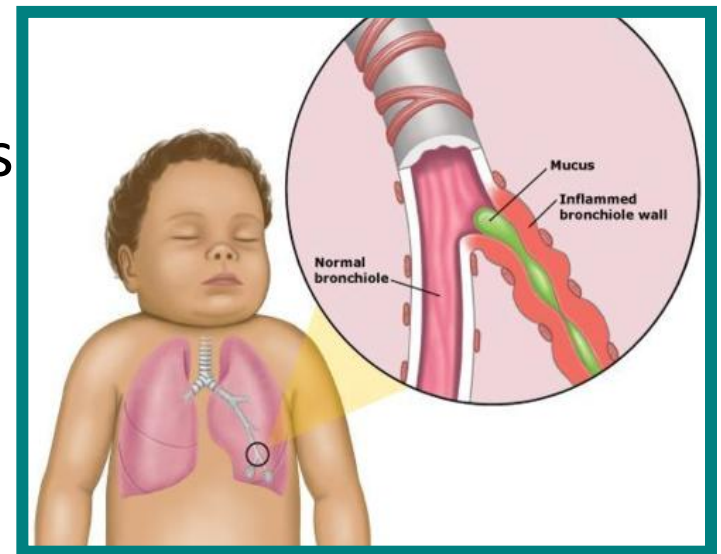


# Objectives

- Brief overview of bronchiolitis and epidemiology
- Understand the burden of Bronchiolitis
- Review the AAP clinical guidelines (2006) and pertinent evidence supporting the guidelines
  - Making the diagnosis / work-up
  - Use of bronchodilators and corticosteroids
  - Use of antivirals / antibiotics / RSV prophylaxis
  - Chest PT
  - Use of IV fluids and supplemental oxygen
  - Prevention
- Demonstrate the need for an objective scoring system for bronchiolitis
- Newer research – questions to be answered in 2014 clinical guidelines
- Safely doing less

# Definition - Bronchiolitis

- Bronchiolitis is a disorder most commonly caused in infants (< 24 months) by viral lower respiratory tract infection (most commonly RSV).
- It is the most common lower respiratory infection in this age group.
- Characterized by acute inflammation, edema, and necrosis of epithelial cells lining the small airways, increased mucus production, and bronchospasm.
- Clinically manifests as rhinorrhea, cough, wheezing, crackles, fever, respiratory distress, and hypoxemia – can also present with apnea



# Bronchiolitis

- Viral: Respiratory Syncytial Virus (50-80%)
- Other viruses
  - Parainfluenza
  - Influenza
  - Human Metapneumovirus
  - Rhinovirus
  - Adenovirus
  - **Enterovirus D68**
    - More than half of the children with lab-confirmed EV-D68 in 2014 have a history of asthma or wheezing
- Bacterial:
  - Occasionally associated with Mycoplasma
- Coinfection possible, with rates of multiple pathogens noted at 6-30% in some studies

# Bronchiolitis - Epidemiology

- Highest incidence December-March
- >90% infected with RSV by 3 years of age
- Transmission
  - Via direct contact with patient or secretions
  - Young children shed up to 1 month
- Course of symptoms
  - Begins with a URI, progresses in 3-6 days to LRI
  - Variable and dynamic course
  - Lasts ~2-4 weeks
  - Self-limited unless co-morbidities present
- Reinfection is common
- RSV can persist on surfaces for several hours and has been identified in the air up to 22 feet from the patient's bed.

# Bronchiolitis - Complications

- Respiratory
  - Apnea (~3%)
    - Higher risk if premature
  - Respiratory failure
- Bacterial complications are generally uncommon
  - Otitis media most common
- Serious bacterial complications rare
  - When present, most likely UTI\*
  - Pneumonia uncommon
- Fewer than 400 deaths annually
  - Most deaths in those 6 months of age and younger



# Why Discuss Bronchiolitis?

- Bronchiolitis is the most common reason for infant hospital admission – 7% of pediatric discharges are due to bronchiolitis
- The cost of hospitalizing children < 1 year of age for bronchiolitis is > \$700 million annually.
- Hospital admissions for bronchiolitis have almost doubled over the past 10 to 15 years in both Canada and the United States
- Clinical practice guidelines by the AAP published in 2006 – new guidelines anticipated later this year
  - No major changes anticipated with 2014 guidelines
- Significant and widespread variation in care has been documented;
- Over-treatment

# Bronchiolitis Quality Improvement Project

- **A Quality Collaborative for Improving Hospitalist Compliance with the AAP Bronchiolitis Guideline (B-QIP)**
- The Value in Inpatient Pediatrics Network
- Collaborative QI project which emerged out of the AAP Section on Hospitalist Medicine
- **Goal: Reduce the percentage of patients receiving overtreatment for bronchiolitis while balancing outcome measurements (LOS, readmission, ect)**

# Clinical Practice Guidelines

American Academy  
of Pediatrics



DEDICATED TO THE HEALTH OF ALL CHILDREN™

CLINICAL PRACTICE GUIDELINE

## Diagnosis and Management of Bronchiolitis

Subcommittee on Diagnosis and Management of Bronchiolitis

Endorsed by the American Academy of Family Physicians, the American College of Chest Physicians, and the American Thoracic Society.

Organizational Principles to Guide and  
Define the Child Health Care System and/or  
Improve the Health of All Children

Pediatrics, 2006

# Bronchiolitis – Making the Diagnosis

**McHUMOR** by T. McCracken



"Off hand, I'd say you're suffering from an arrow through your head, but just to play it safe, I'm ordering a bunch of tests."

# Bronchiolitis: Recommendation 1

## Diagnosis

- **Diagnose bronchiolitis by history and physical exam**
  - HISTORY
    - Viral URI prodrome followed by worsening respiratory symptoms
  - PHYSICAL EXAM:
    - Respiratory distress: tachypnea, grunting, flaring, retractions
    - Auscultation: Prolonged expiratory phase, wheezes, crackles
    - Variation in exam findings
      - Severity of symptoms may seem to change often due to intermittent clearance of obstruction
      - Try nasal suctioning

# Bronchiolitis: Recommendation 1

## Diagnosis

- **Do not order labs routinely**
  - Occurrence of SBI (including UTI, sepsis, meningitis) is VERY low
    - All febrile infants less than 28 days require full sepsis evaluation
    - Febrile infants 29 – 60 days old: UA and urine culture
  - CBC is NOT useful in diagnosing bronchiolitis or guiding therapy
  - Viral testing doesn't alter management decision or outcome
    - Exception is when influenza is a likely possibility given treatment available
    - May be useful for cohorting patients

# Bronchiolitis: Recommendation 1

## Diagnosis

- **Do not order X-rays routinely**
  - Useful when:
    - hospitalized child does not improve at expected rate
    - Severity of symptoms requires further evaluation
    - Another diagnosis is suspected
- In prospective studies (including 1 RCT) children with suspected LRTI who received x-rays were more likely to receive antibiotics without any difference in time to recovery.
- Many infants with bronchiolitis have atelectasis and other abnormalities on CXR, but data do not demonstrate that these abnormalities correlate with disease severity or disease course.

# Routine CXRs are not recommended



“there may be an area of pneumonia or atelectasis, correlate clinically...”



# *Journal of Pediatrics, 2007*

## **Evaluation of the Utility of Radiography in Acute Bronchiolitis**

SUZANNE SCHUH, MD, AMINA LALANI, MD, UPTON ALLEN, MBBS, DAVID MANSON, MD, PAUL BABYN, MD, DEREK STEPHENS, MSc, SHANNON MACPHEE, MD, MATTHEW MOKANSKI, RN, SVETLANA KHAKIN, RN, AND PAUL DICK, MDCM, MSc

**Objectives** To determine the proportion of radiographs inconsistent with bronchiolitis in children with typical presentation of bronchiolitis and to compare rates of intended antibiotic therapy before radiography versus those given antibiotics after radiography.

**Study design** We conducted a prospective cohort study in a pediatric emergency department of 265 infants aged 2 to 23 months with radiographs showing either airway disease only (simple bronchiolitis), airway and airspace disease (complex bronchiolitis), and inconsistent diagnoses (eg, lobar consolidation).

**Results** The rate of inconsistent radiographs was 2 of 265 cases (0.75%; 95% CI 0-1.8). A total of 246 children (92.8%) had simple radiographs, and 17 radiographs (6.9%) were complex. To identify 1 inconsistent and 1 complex radiograph requires imaging 133 and 15 children, respectively. Of 148 infants with oxygen saturation >92% and a respiratory disease assessment score <10 of 17 points, 143 (96.6%) had a simple radiograph, compared with 102 of 117 infants (87.2%) with higher scores or lower saturation (odds ratio, 3.9; 95% CI, 1.3-14.3). Seven infants (2.6%) were identified for antibiotics pre-radiography; 39 infants (14.7%) received antibiotics post-radiography (95% CI, 8-16).

**Conclusions** Infants with typical bronchiolitis do not need imaging because it is almost always consistent with bronchiolitis. Risk of airspace disease appears particularly low in children with saturation higher than 92% and mild to moderate distress. (*J Pediatr* 2007;150:429-33)

265 children age 2 – 23 months seen in ED with clinical diagnosis of bronchiolitis

All children had CXR done

ED providers were asked about intended use of antibiotics and dispo plan before and after CXR

All children received a follow-up phone call 1 week later

# *Journal of Pediatrics, 2007*

## *Evaluation of the Utility of Radiography in Acute Bronchiolitis*

- 2/265 (0.75%) CXR were **inconsistent** with bronchiolitis (lobar consolidation)
- Decision to admit vs discharge home was the same pre and post CXR
- > 5 times as many children received antibiotics post-CXR
  - Seven infants (2.6%) were identified for antibiotics pre-radiography; 39 infants (14.7%) received antibiotics post-radiography (95% CI, 8-16).
- **All children recovered uneventfully**
- **CONCLUSION:** Infants with typical bronchiolitis do not need imaging because it is almost always consistent with bronchiolitis, especially in children with saturation higher than 92% and mild to moderate distress.

# If you want to read more and decide for yourself...



## **BET 4: Chest x-rays in bronchiolitis**

*Emerg Med J* 2012 29: 514-515

doi: 10.1136/emmermed-2012-201374.5

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Updated information and services can be found at:

<http://emj.bmj.com/content/29/6/514.full.html>

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### **Clinical bottom line**

Routine chest radiography is not indicated in infants presenting with simple bronchiolitis.

# Bronchiolitis: Recommendation 1

## Diagnosis

- Clinicians should **assess risk factors** for severe disease when making decisions about evaluation and management of children presenting with bronchiolitis:
  - Age less than 12 weeks
  - History of prematurity
  - Underlying cardiopulmonary disease
  - Immunodeficiency

# Bronchiolitis – Diagnosis

**Keep the differential broad** - Consider especially for the child with severe respiratory symptoms, lack of preceding viral symptoms, or frequent/recurrent episodes

- Viral-triggered asthma
- Infection
  - Pneumonia
  - Pertussis
- Irritant
  - GER
  - Aspiration
- Anatomic
  - Foreign body aspiration
  - Congenital airway anomaly
- Congestive heart failure

# Recommendation 2

## Bronchodilators – it's controversial

- **Bronchodilators should not be routinely used in the management of bronchiolitis**
  - RCTs have failed to demonstrate a consistent benefit
    - At MOST 1 in 4 children may have a transient improvement in clinical score\*
  - A carefully monitored trial of alpha and beta adrenergic medication is an option and **continued ONLY if there is a documented positive clinical response to the trial using and objective means of evaluation**
- Studies assessing the impact of bronchodilators on long-term outcomes have found no impact on the overall course of illness

# Pediatric Bronchiolitis Score (PBS): 0 – 2 yo

<b>Score</b>	<b>1</b>	<b>2</b>	<b>3</b>
<b>Resp Rate</b> <b>0-6 months</b> <b>6-18 months</b> <b>18-24 months</b>	<b>&lt; 60</b> <b>&lt; 50</b> <b>&lt; 45</b>	<b>&gt; 60</b> <b>&gt; 50</b> <b>&gt; 45</b>	
<b>Retractions</b>	<b>Zero/subcostal</b>	<b>Subcostal/intercostal</b>	<b>Neck/abdominal muscles use</b>
<b>Air Movement*</b>	<b>Normal</b>	<b>Localized decrease or crackles</b>	<b>Multilobar decrease or crackles</b>
<b>Wheeze</b>	<b>No wheeze</b>	<b>Expiratory</b>	<b>Expiratory and inspiratory</b>

\*Assess the following 4 chest areas: left front, right front, left back, right back  
**Mild 4 - 6, Moderate 7 - 8, Severe 9 -11**

# Show me the evidence!

## 2006

### Bronchodilators for bronchiolitis (Review)

Gadomski AM, Bhasale AL



**THE COCHRANE**

Cochrane review to evaluate published RCTs comparing bronchodilators (other than epi) with placebo for bronchiolitis



# Bronchiolitis and Albuterol

22 clinical trials studying 1428 infants with bronchiolitis

- No consistent improvement in clinical score
- When there is improvement, it is not sustained
- No improvement in oxygenation
- No reduction in hospitalization rates
- No reduction in LOS

# Nebulized albuterol for infants: where does it go?

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## $\beta$ -Agonist Aerosol Distribution in Respiratory Syncytial Virus Bronchiolitis in Infants

Israel Amirav, MD<sup>1</sup>; Ivgenia Balanov, MD<sup>2</sup>; Miguel Gorenberg, MD<sup>3</sup>; Anthony S. Luder, MD<sup>2,4</sup>; Michael T. Newhouse, MD<sup>5</sup>; and David Groshar, MD<sup>4,6</sup>

<sup>1</sup>Department of Pediatric Pulmonology, Rebecca Sieff Governmental Hospital, Safed, Israel; <sup>2</sup>Department of Pediatrics, Rebecca Sieff Governmental Hospital, Safed, Israel; <sup>3</sup>Department of Nuclear Medicine, Rebecca Sieff Governmental Hospital, Safed, Israel; <sup>4</sup>Department of Nuclear Medicine, Bnai Zion Medical Center, Haifa, Israel; <sup>5</sup>Barnett Medical Aerosol Research Laboratory, St. Joseph Hospital, McMaster University, Hamilton, Ontario, Canada; and <sup>6</sup>Faculty of Medicine, Technion-Israel Institute of Technology, Haifa, Israel

12 infants ages 1-14 mo admitted with RSV+ bronchiolitis received <sup>99m</sup>Tc-albuterol neb;  $\gamma$ -Scintigraphy was used to assess body and lung deposition and pulmonary distribution.

# Infants and albuterol neb:

- 1.5 % reached the right lung
- 0.6 % penetrated into the peripheral lung zone
- 7.8 % was deposited in the upper respiratory and GI tracts
- 12 % remained on the face
- The rest was found within the tubing and face mask
- Poor aerosol deposition in infants may be related to their small conducting airways and narrowed airways secondary to infection

# What if we improve the delivery?

*Journal of Asthma*, 2012; 49(7): 688–696  
Copyright © 2012 Informa Healthcare USA, Inc.  
ISSN: 0277-0903 print/1532-4303 online  
DOI: 10.3109/02770903.2012.685541

**informa**  
healthcare

## PHYSIOLOGY

### **Pulmonary Mechanics Following Albuterol Therapy in Mechanically Ventilated Infants with Bronchiolitis**

CHRISTOPHER L. CARROLL, M.D., M.S.,\* KATHLEEN SALA, M.PH., AARON R. ZUCKER, M.D., AND  
CRAIG M. SCHRAMM, M.D.

*Department of Pediatrics, Connecticut Children's Medical Center, Hartford, CT, USA.*

- 54 infants intubated for bronchiolitis.
- Albuterol was administered into the vent circuit
- Respiratory system resistance was measured/calculated before and every 5 minutes for 30 minutes after albuterol

# Albuterol effect on intubated infants with bronchiolitis

- 26 % of babies had improved pulmonary resistance after albuterol
- There was no association between response to albuterol and age, gender, race/ethnicity, FH of asthma, previous h/o wheezing or h/o prematurity.
- Response to albuterol had no association with duration of intubation, PICU LOS or hospital LOS

**Hospitalization rates:**  
9 studies over 600  
patients... RCT placebo vs  
bronchodilators

**LOS:**  
6 studies over 300  
patients...  
RCT

**Changes in Clinical Score:**  
8 inpatient studies with over 300 patients  
11 outpatient studies with over 500 patients...  
RCT

No  
significant  
clinical  
difference

# Epinephrine: the other bronchodilator

2011

## Epinephrine for bronchiolitis (Review)

Hartling L, Bialy LM, Vandermeer B, Tjosvold L, Johnson DW, Plint AC, Klassen TP, Patel H, Fernandes RM



# Epinephrine: the other bronchodilator

## Author's Conclusions:

- Systematic review of 19 studies and 2256 children that received epinephrine for treatment of bronchiolitis in the acute care setting.
- When comparing epinephrine to placebo, no differences were found for length of hospital stay
- There was *some* evidence that receiving epinephrine in the ED decreased hospital admission in some patients
- *Exploratory evidence from one high quality trial suggests that combination therapy with systemic dexamethasone and epi may significantly reduce hospital admission*
  - *Awaiting further data*
- Racemic epinephrine has no definite benefit over albuterol for the treatment of inpatients with bronchiolitis and should not be used routinely
- **There is insufficient evidence to support the use of epinephrine for the treatment of bronchiolitis among children admitted to the hospital.**
- Epinephrine may be preferred bronchodilator trial in the ED – anticipated in the 2014 clinical practice guidelines



# Atrovent (ipratropium): no controversy



“There is no justification for using anti-cholinergic agents, either alone or in combination with  $\beta$ -adrenergic agents, for viral bronchiolitis”.

# Recommendation 3 - Corticosteroids

- **Corticosteroid medications should not be used routinely in the management of bronchiolitis**
- Reports indicate that up to 60% of infants admitted for bronchiolitis receive steroids
- Systematic review and meta-analyses of RCTs involving ~1200 children with viral bronchiolitis have not shown sufficient evidence to support the use of steroids

# Corticosteroids in Bronchiolitis

*The* NEW ENGLAND  
JOURNAL *of* MEDICINE

ESTABLISHED IN 1812

JULY 26, 2007

VOL. 357 NO. 4

## A Multicenter, Randomized, Controlled Trial of Dexamethasone for Bronchiolitis

Howard M. Corneli, M.D., Joseph J. Zorc, M.D., Prashant Mahajan, M.D., M.P.H., Kathy N. Shaw, M.D., M.S.C.E.,  
Richard Holubkov, Ph.D., Scott D. Reeves, M.D., Richard M. Ruddy, M.D., Baqir Malik, M.D.,  
Kyle A. Nelson, M.D., M.P.H., Joan S. Bregstein, M.D., Kathleen M. Brown, M.D., Matthew N. Denenberg, M.D.,  
Kathleen A. Lillis, M.D., Lynn Babcock Cimpello, M.D., James W. Tsung, M.D., Dominic A. Borgialli, D.O., M.P.H.,  
Marc N. Baskin, M.D., Getachew Teshome, M.D., M.P.H., Mitchell A. Goldstein, M.D., David Monroe, M.D.,  
J. Michael Dean, M.D., and Nathan Kuppermann, M.D., M.P.H., for the Bronchiolitis Study Group  
of the Pediatric Emergency Care Applied Research Network (PECARN)\*

- Double-blind, randomized trial of a single dose of oral dexamethasone vs placebo
- 600 children 2 to 12 months old with a first episode of wheezing
- Diagnosed in the emergency department as moderate-to-severe bronchiolitis

# Dexamethasone in Bronchiolitis

## ED study

- There was no difference in hospitalization rate overall
  - Or in sub-analysis of infants with eczema or FH of asthma
- There was no difference in respiratory score overall
  - Or in sub-analysis of infants with eczema or FH of asthma
- There was no difference in LOS for admitted infants
- There was no difference in admission within 7 days

# Steroids in Bronchiolitis

## *The* NEW ENGLAND JOURNAL *of* MEDICINE

ESTABLISHED IN 1812

JANUARY 22, 2009

VOL. 360 NO. 4

### Oral Prednisolone for Preschool Children with Acute Virus-Induced Wheezing

Jayachandran Panickar, M.D., M.R.C.P.C.H., Monica Lakhanpaul, M.D., F.R.C.P.C.H., Paul C. Lambert, Ph.D., Priti Kenia, M.B., B.S., M.R.C.P.C.H., Terence Stephenson, D.M., F.R.C.P.C.H., Alan Smyth, M.D., F.R.C.P.C.H., and Jonathan Grigg, M.D., F.R.C.P.C.H.

- Randomized, double-blind, placebo controlled trial of **5 day course** of prednisolone vs placebo
- 687 patients, ages 10 – 60 months old, presented to UK hospitals or EDs and diagnosed with wheezing caused by viral infection
- All children received albuterol MDI

## Steroids in preschool-aged children with viral-induced wheezing: ED and inpatient study

- There was no difference in LOS
- No difference in respiratory scores
- No difference in parent-assessed 7-day mean symptom scores
- No difference in 30 day re-admission rate

This held true when analysis was done for children identified as high-risk for asthma.

# Hot off the press – Glucocorticoids and Bronchiolitis

- 2013 Cochrane review: Glucocorticoids for Acute Viral Bronchiolitis in Infants and Young Children
- 17 trials (2596 participants) – “Glucocorticoids did not significantly reduce outpatient admissions when compared to placebo...There was no benefit in LOS for inpatients”
- “Current evidence does not support a clinically relevant effect of systemic or inhaled glucocorticoids on admissions or length of hospitalization”
- *Combined dexamethasone and epinephrine may reduce outpatient admissions (limited to 1 study) but results are exploratory and safety data limited – future research needed (Plint AC, et al. 2009)*

# Recommendation 4

## Antiviral Medication

- **Clinical practice guidelines recommend against the routine use of ribavirin in children with bronchiolitis**
- Study designs and outcomes measured were varied and inconsistent
- Consider ribavirin in highly selected situations involving documented RSV bronchiolitis with severe disease or in those at risk for severe disease
  - Immunocompromised
  - Hemodynamically significant cardiopulmonary disease



# Recommendation 5 - Antibiotics

- **Antibiotics should be used only in those infants who have specific indications of a coexisting bacterial infection**
  - Infants < 28 days old
  - Infants 28 – 60 days old
  - CXR findings
  - Acute otitis media – may be due to a virus, but no way to differentiate bacterial from viral
- Several studies have identified low rates of SBI in patients with bronchiolitis
- When SBI is present, it is more likely to be a UTI than bacteremia or meningitis
  - One large study of almost 2400 infants with RSV bronchiolitis, 69% of the 39 patients with SBI had UTI
  - 3 studies of SBI in patients with bronchiolitis showed that 100% of SBIs in infants between 29 and 60 days of age were UTIs.

# Recommendation 6a

- **Assess hydration status and ability to take in oral fluids**
  - Feeding may be compromised if:
    - RR > 60-70
    - Copious nasal secretions
  - Risk for aspiration with significant respiratory distress
- Possibility of fluid retention related to production of ADH has been reported in patients with bronchiolitis
  - Monitor fluid status carefully if initiating IVF
  - Oral rehydration preferred when possible

# Recommendation 6b

## Chest PT

- **Chest PT should not be routinely used**
- Bronchiolitis is associated with airway edema and sloughing of the respiratory epithelium into the airways resulting in hyperinflation
- Atelectasis is not characteristic
  - Though it can be seen on occasion
- 3 RCTs (2006) evaluating benefit of chest PT found no clinical benefit using vibration or percussion techniques
- No evidence to support deep suctioning
- SUCTIONING OF THE NARES PROVIDES TEMPORARY RELIEF (and allow for oral feeding)

# Chest physiotherapy for acute bronchiolitis in paediatric patients between 0 and 24 months old.

## Cochrane Database of Systematic Reviews 2012

- Nine clinical trials including 891 participants were included comparing chest PT with no intervention.
  - Five trials (246 participants) evaluated vibration and percussion techniques
  - Four trials (645 participants) evaluated passive expiratory techniques.
- Chest physiotherapy does not improve the severity of the disease, respiratory parameters, or reduce length of hospital stay or oxygen requirements in hospitalized infants with acute bronchiolitis (not on mechanical ventilation).
  - Since the last publication of this review new good-quality evidence has appeared, strengthening the conclusions of the review.

# Nasal Bulb Suctioning – it works

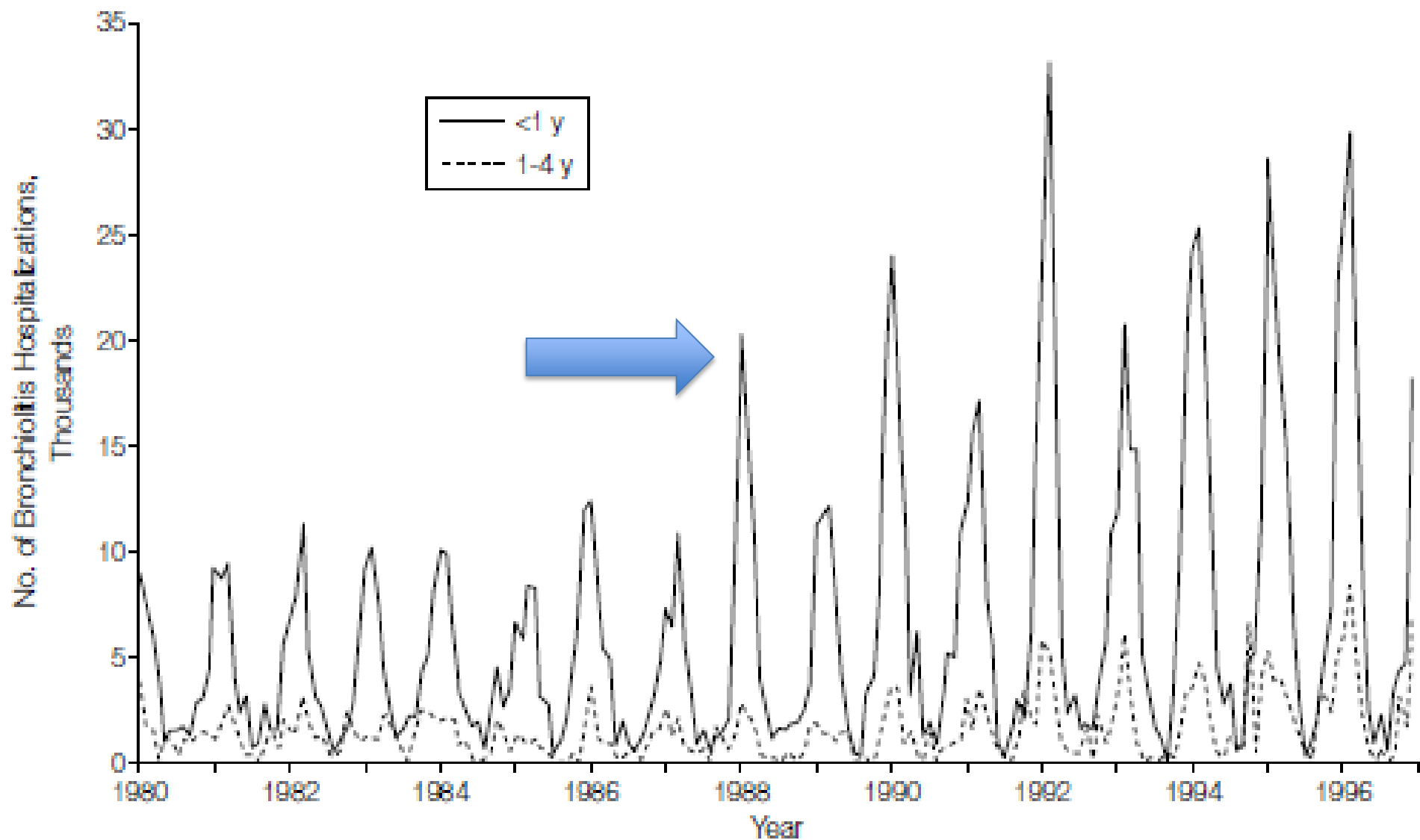
- Suctioning is not discussed often in the literature but is generally considered an important part of the supportive care of infants with bronchiolitis
- Used to clear secretions from the nares/airway that the child is unable to clear himself/herself.
- Generally thought to reduce work of breathing and improve oral intake.
- Olive tip and bulb suctioning are considered equivalent and should be tried prior to any attempt at nasopharyngeal suctioning.
- Nasopharyngeal suctioning should only be attempted if bulb/olive tip suction does not improve the child's clinical status (as evidenced by an improvement in respiratory score).
- The response to suctioning should be DOCUMENTED, with a respiratory score recorded before and after all types of suctioning.
- The child's family should be trained on how and when to use bulb suction at home.

# Recommendation 7

## Supplemental Oxygen

- **Supplemental O<sub>2</sub> is indicated for O<sub>2</sub> saturations persistently less than 90% (in previously healthy infants)**
  - Supplemental O<sub>2</sub> may be discontinued if saturation is at or above 90% AND infant feeding well with minimal respiratory distress
  - Studies have shown little to be gained to maintain sats greater than 90%
    - OK to tolerate sats at 88% while sleeping, and brief, self-resolving desats into the 80s while sleeping
- As the child's clinical course improves, continuous measurement of SpO<sub>2</sub> is not routinely needed
  - Decrease hospital LOS

**Figure 1.** Bronchiolitis Hospitalizations Among US Children Younger Than 1 Year or 1 to 4 Years, by Month and Year of Discharge, 1980-1996



# Why have hospitalization rates increased?

- ? Increased survival of children with comorbidities
- ? Virulence
- ? Increase in daycare
- **Changes in hospitalization criteria**





# Recommendation 8 – RSV prophylaxis

- **Administration of monoclonal antibody, palivizumab (Synagis), in selected patients as prophylaxis**
  - Consider for infants:
    - Less than 24 months of age WITH chronic lung disease within 6 months before the start of RSV season (November)
    - Infants born at 32 weeks gestation or earlier even if they do not have CLD
    - Infants with hemodynamically significant cyanotic or acyanotic CHD
  - Data are limited as to if it is effective when used in the 2<sup>nd</sup> year of life

# Recommendation 9

- **Hand cleansing is most important step in preventing nosocomial spread of RSV**
  - Alcohol-based rubs are preferred
- You probably don't need the evidence to be convinced of this one!

# Recommendation 10

- **Infants should not be exposed to passive smoking**
  - Passive smoking increases the risk of having an RSV infection
- **Breastfeeding is recommended to decrease a child's risk of having lower respiratory tract disease**
  - Breast milk with immunoprotective factors for RSV
  - Formula fed infants are 3 times more likely to be admitted to the hospital for LRTI than breast fed

# Recommendation 11 - CAM

- **Physicians should inquire about the use of CAM** (no formal AAP recommendations regarding the use of CAM, including OMT, for bronchiolitis)
- Area for potential future research for DOs!
  - Rib raising techniques?
  - Cranial techniques for improved nasal drainage/clearance since nasal suctioning is so effective

# Hypertonic Saline?

## Where is the research?

- Hypertonic saline is thought to increase mucociliary clearance and is hypothesized to help with clearing of secretions.
  - Has been known to induce bronchospasm in older children
- Cochrane review – 2013:
  - 11 trials involving 1090 infants with mild to moderate acute viral bronchiolitis; half received NS nebs and half received HS
  - Patients treated with nebulized 3% saline had a significantly shorter mean LOS compared to those treated with NS
  - The hypertonic saline group also had a significantly lower post-inhalation clinical score than NS group in the first three days of treatment
  - The effects of improving clinical score were observed in both outpatients and inpatients.
  - Four emergency department-based trials did not show any significant short-term effects (30 to 120 minutes) of up to three doses of nebulized 3% saline in improving clinical score and oxygen saturation.
  - No significant adverse events related to hypertonic saline inhalation were reported.

# Hypertonic Saline?

## Where is the research?

- Although some evidence exists that hypertonic saline may improve outcomes (reduced LOS, lower post-inhalation score), questions remain:
  - Which patients benefit most?
  - How best to administer it?
  - What is the true burden of risks and costs?
  - Awaiting 2014 guidelines

# Future Research

- New AAP guideline currently being developed and will be published this year
- Will not change the basic recommendations from the 2006 guideline but will be a little clearer about not routine using albuterol and what to trial
  - Addressing any new evidence regarding epi over albuterol
  - ?Hypertonic saline
- One of the difficulties with the bronchiolitis literature is the absence of consistent clinical scoring scales that are validated, objective, replicable and easily performed
- Quality improvement project in the works – using score and minimizing over treatment

## In summary...

AAP practice guideline: *Diagnosis and management of bronchiolitis. Pediatrics 2006;118(4):1774-93.*

- The diagnosis should be made clinically
- Bronchodilators are not recommended
- Corticosteroids are not recommended
- Ribavirin is not recommended
- Antibiotics are not recommended
- Chest physiotherapy is not recommended, oral rehydration is preferred
- Oxygen saturation threshold is 90% and continuous monitoring not necessary
- Prophylaxis is recommended for particular subsets of patients
- Hand hygiene with alcohol hand gel is preferred
- Secondhand smoke exposure is bad and should be addressed
- Ask about use of alternative medicine



# How do these guidelines help us?

- Eliminate the utilization of **unnecessary resources**
- Implementing an **objective scoring tool** will help to validate the effectiveness and the need for continuation of an intervention.

Safely doing less

# PEDIATRICS®

OFFICIAL JOURNAL OF THE AMERICAN ACADEMY OF PEDIATRICS

**Safely Doing Less: A Missing Component of the Patient Safety Dialogue**

Alan R. Schroeder, Stephen J. Harris and Thomas B. Newman

*Pediatrics* 2011;128:e1596; originally published online November 28, 2011;

DOI: 10.1542/peds.2011-2726

# Safely doing less: Barriers

- Doing more feels safer: “conservative” approach
  - “Just to be safe...”
- Pressure from families
- Pressure from colleagues: missing diagnosis gets more criticism than overdiagnosis
- Medico-legal fear: practice of “defensive medicine”
- It is more work to order less tests!
- Publication bias
- Economic incentives: more tests generate higher compensation; use of RVUs

# DIAGNOSIS AND TREATMENT: MANAGEMENT OF ACUTE VIRAL BRONCHIOLITIS IN INFANCY

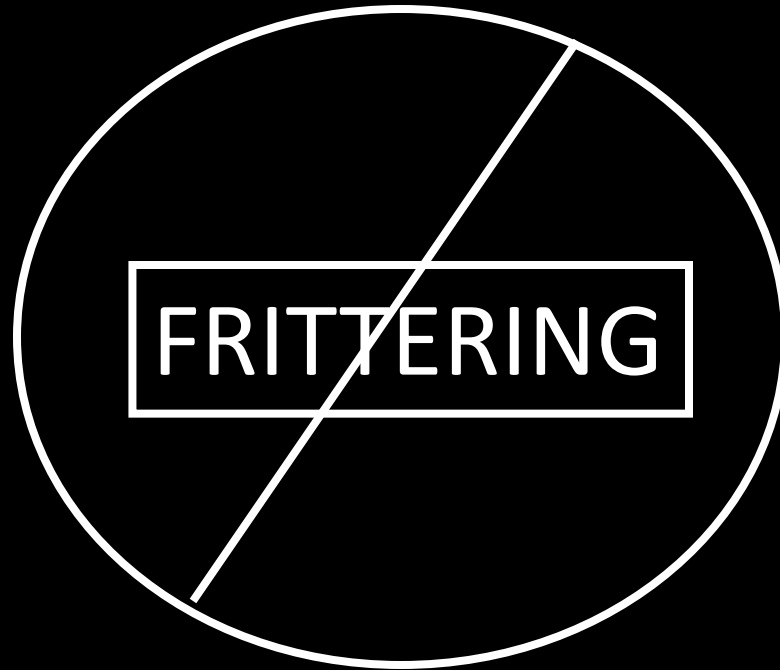
**F. Howell Wright, M.D., and Marc O. Beem, M.D.**

*Department of Pediatrics, University of Chicago*

INTRODUCTORY NOTE: A discussion of some common problem of pediatrics regularly appears as the last article preceding the "Experience and Reason" section. Usually contributed by a member of the Editorial Board, each of these short papers is intended to present his current practice in regard to diagnosis or therapy or both. The Editor will welcome suggestions for desirable topics.

“Since acute viral bronchiolitis is thus a self-limited disease of relatively good prognosis, the principle of *primum non nocere* should temper frustrated anxiety to do something-anything-to relieve severe dyspnea. Simple physical exhaustion may determine the fate of an infant laboring to meet his metabolic requirements for oxygen. His energies should not be frittered away by the annoyance of unnecessary or futile medications and procedures. Rest should be treasured.”

*Pediatrics*, 1965



And check out the 2014 guidelines when they are released!

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