



CentraCare<sup>®</sup>



RSV & Bronchiolitis  
Review

A close-up photograph of a woman with blonde hair holding a newborn baby. The woman is looking down at the baby with a gentle expression. The baby is wearing a white blanket and a pink bow in her hair. The background is softly blurred.

Respiratory  
Syncytial Virus  
(RSV)

# Respiratory Syncytial Virus (RSV)

- ▶ Respiratory virus affecting people of all ages, most commonly impacts infants and toddlers
- ▶ Symptoms of RSV include
  - Runny nose
  - Decreased appetite
  - Coughing
  - Sneezing
  - Low-grade fever
  - Wheezing
- ▶ Can lead to more severe infections such as bronchiolitis and inflammation of the airways
- ▶ “Almost all children will have had an RSV infection by their second birthday” CDC
- ▶ Peak of illness is seen on day 5-6

# Respiratory Syncytial Virus (RSV)

Each year in the United States, RSV leads, on average, to—

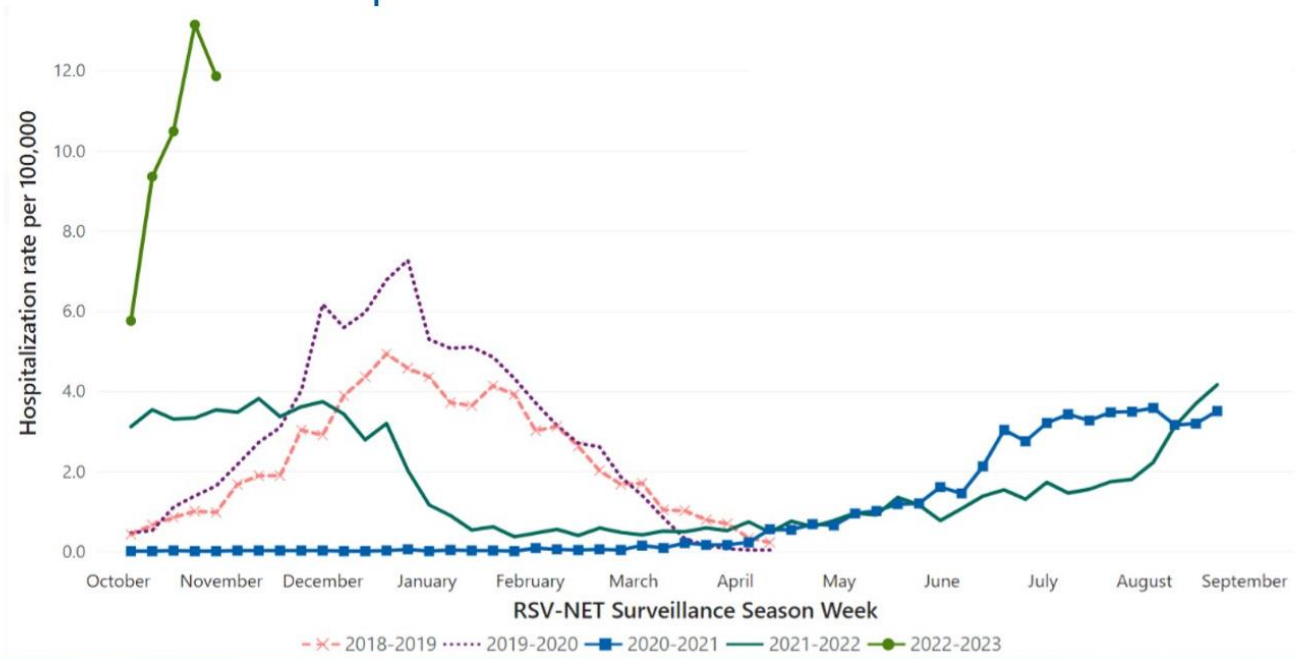
- ▶ 2.1 million outpatient visits among children younger than 5 years old<sup>1</sup>
- ▶ 57,527 hospitalizations among children younger than 5 years old<sup>1</sup>
- ▶ 177,000 hospitalizations among adults older than 65 years<sup>2</sup>
- ▶ 14,000 deaths among adults older than 65 years<sup>2</sup>

## Footnotes

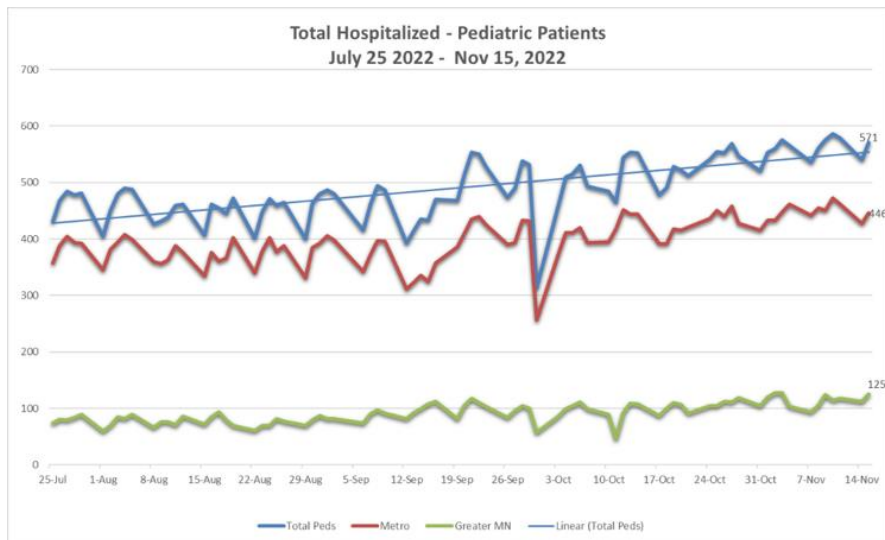
<sup>1</sup>Hall CB, Weinberg GA, Iwane MK, Blumkin AK, Edwards KM, et al. [The burden of respiratory syncytial virus infection in young children](#)External. *New Engl J Med.* 2009;360(6):588-98.

<sup>2</sup>Falsety AR, Hennessey PA, Formica MA, Cox C, Walsh EE. [Respiratory syncytial virus infection in elderly and high-risk adults](#)External. *New Engl J Med.* 2005;352(17):1749-59.

# Inpatient RSV Trend – National



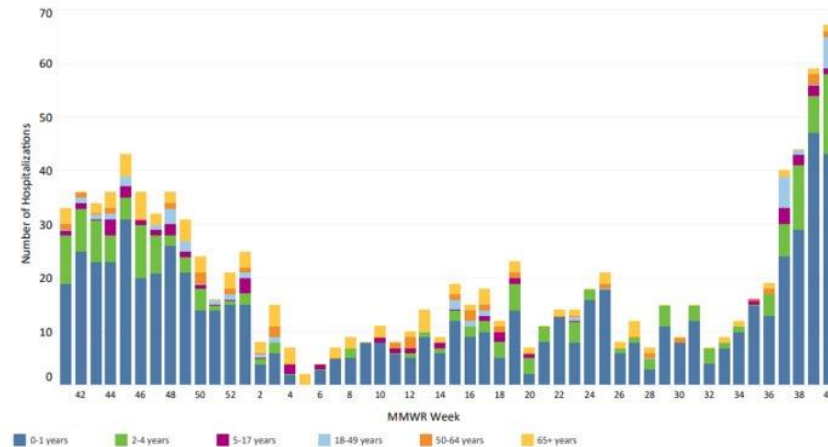
# Inpatient Pediatrics Update - MN



## Hospitalized RSV Surveillance

Surveillance for respiratory syncytial virus (RSV) began in September 2016. Hospitalized inpatients of all ages who reside in the 7-county Twin Cities metropolitan area (Anoka, Carver, Dakota, Hennepin, Ramsey, Scott, and Washington) with laboratory-confirmed RSV are reportable. Due to the need to confirm reports and reporting delays, consider current week data preliminary.

### Hospitalized RSV Cases by Age, Minnesota



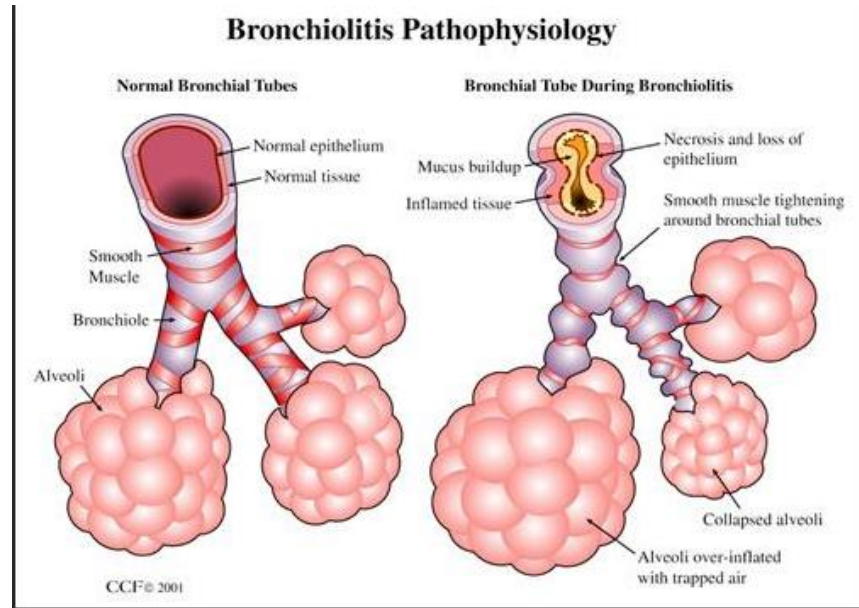


Bronchiolitis



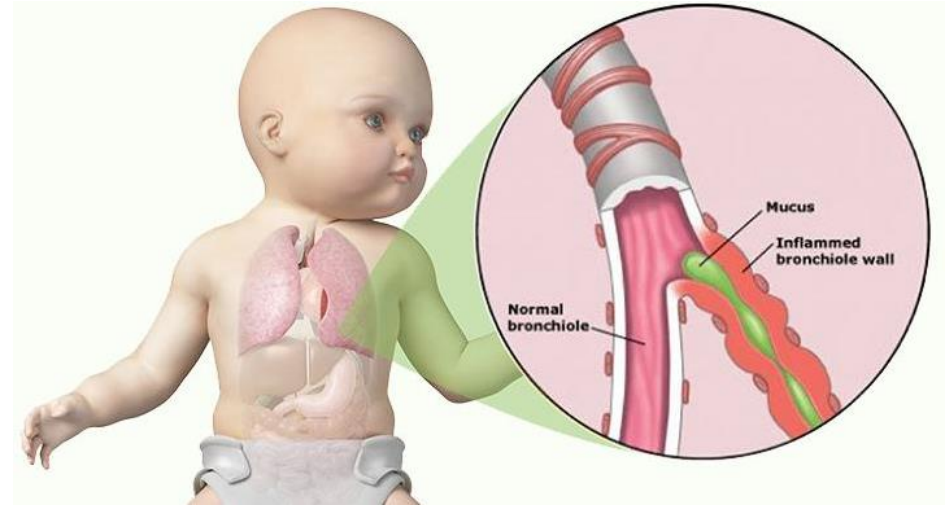
# Bronchiolitis

- Begins with an upper respiratory infection after appx 3 days.
- Most commonly caused by RSV and upper respiratory infections.
- Causes inflammation, smooth muscle tightening and mucus plugging. Resulting in hyperinflation and or collapse of the alveoli.



# Bronchiolitis

- Lower respiratory tract infection in infants and young children
- Most commonly caused by RSV
- Exact mechanism is unclear
- Leads to necrosis of the epithelial cells in the small airways
- Results in mucus plugging the bronchioles causing hyperinflation and atelectasis.



# Bronchiolitis – Clinical Presentation

- Known history of exposure to virus(s) (daycare, school, siblings)
- Usually present with two to four day history of upper respiratory symptoms
  - Cough, sneezing, wheeze, increased WOB
  - Decreased urine output
  - Not bottling as frequently
  - Increased work of breathing with feeding
  - Low grade temps
- Moderate to severe cases will present as:
  - Increased WOB
  - Retractions, head-bobbing, nasal flaring
  - Large amounts of nasal secretions
  - Coarse lung sounds
  - Wheezing
  - Increased HR, RR and increased oxygen needs

# Bronchiolitis and RSV at Risk Population

- ▶ Under one year of age
- ▶ Prematurity
- ▶ Presence of chronic respiratory disease
- ▶ Bronchopulmonary Disease (PBD)
- ▶ Cystic Fibrosis (CF)
- ▶ Primary Ciliary Diskinesia (PCD)
- ▶ Presence of congenital heart defect
- ▶ Single Ventricle, R to L Shunt
- ▶ Pulmonary hypertension
- ▶ Autoimmune Deficiency



# Diagnosis

- ▶ History and Physical
- ▶ Clinical presentation of illness
- ▶ RSV/Influenza lab testing – Nasal Swab
- ▶ Chest x-ray

# Interventions

## Hydration

- IV access
- Fluids

## Oxygenation

- Low flow oxygen
- Heated high flow oxygen
- CPAP
- Mechanical ventilation (Non-Invasive or Invasive)

## Secretion clearance

- Suctioning
- Repositioning
- Mucolytics – if indicated
- Chest PT for presence of mucus plugging
  - Vibration
  - Manual CPT
  - In-line IPV if intubated

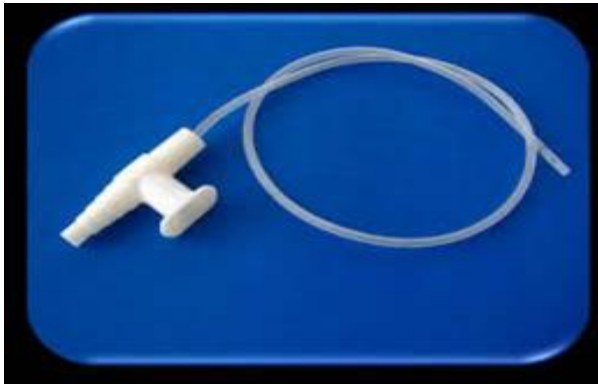
# Interventions Continued...

- Special considerations in patients with history of CLD include but not limited to:
  - Bronchodilators
    - Albuterol, Xopenex neb therapy indicated in patients with a history of reactive airway disease and or chronic lung/BPD
    - Neb therapy is given via Neo-Tee and aerogen for patients requiring NIV support
  - Mucolytics
    - 3% Normal Saline “hypertonic saline” nebs
      - Breaks up and loosens mucus, induces cough response
    - Pulmozyme
      - Loosens secretions. Most commonly used in patients with chronic mucus plugging and thick secretions.
  - IV/Oral/Nebulized corticosteroids
    - Used to treat inflammation

A dark blue, irregular ink splatter shape is centered on a white background. The splatter has a textured, watercolor-like appearance with some lighter blue and white areas at the edges. The text is centered within this dark blue area.

# Suctioning Pediatric Patients





# Suction Devices

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# Deep Suctioning

## ▶ Indications


- Patient with copious secretions
- Unable to clear secretions
- Thick and tenacious nasal secretions and difficulty bottling

## ▶ Complications

- Vagal stimulation
- Decreased HR
- Decreased SpO<sub>2</sub>
- Slow to recover
- Nasal trauma



# Deep Suctioning Procedure

- ▶ Pre-oxygenate
  - ▶ May need a second person to assist holding
  - ▶ Suction catheter
  - ▶ Sterile water/NS for lavage
  - ▶ Lubricant
  - ▶ Pulse Oximetry
- 

# Preparing For Discharge

- ▶ Encourage parents to only suction if they see something
- ▶ It's recommended that parents use a "NoseFrida" or electric suction device for best results.
- ▶ Can use clean bulb suction if one is available at home. Instruct parents on proper use of bulb suction before discharge.
- ▶ Encourage use of normal saline, a couple drops to loosen secretions before suctioning.





# Heated High Flow Nasal Cannula

What is High flow anyway?

# Background

- ▶ High Flow Nasal Cannula (HFNC) use has increased over the last 10 years.
- ▶ Debate is on going as to whether HFNC may reduce the use of Non-Invasive Positive Pressure Ventilation (NIPPV) or Mechanical Ventilation.
- ▶ First used in adult ICUs, then in Emergency Departments, then in NICUs and today used more broadly.
- ▶ Initiating HFNC is relatively simple
- ▶ Close monitoring is essential



# Indications For Use

- ▶ Increased WOB:  
retractions, grunting,  
periodic breathing, nasal  
flaring
- ▶ Clinical signs of hypoxia:  
increased HR, increased  
RR, diaphoresis, cyanosis
- ▶ Flow requirements  $>2$   
L/min
- ▶ Refer to Pediatric Oxygen  
Therapy Algorithm



# Heated High Flow

- ▶ High Flow Oxygen
  - Flow rates 2-25 L/min
  - Specific FiO<sub>2</sub>
  - Reduces inspiratory resistance and WOB
  - Provides end distending pressure to the lungs
  - Improves mucocilliary clearance by providing optimal heat and humidity
- ▶ Responders
  - Decreased HR
  - Decreased RR within one hour
  - Improved oxygenation
- ▶ Suggested starting points
  - Less than 10kg – 2L/kg/min max 8-12 L/min
  - Greater than 10 kg - 2L/kg/min for first 10kg + 0.5 L/kg/min max 50 L/min
  - Start at 6 L/min and titrate to goal flow rate





# Flow vs. FiO2



Flow – Work Of Breathing



FiO2 – Oxygenation

# Application

- Choose appropriate size cannula for patient.
- Cannula should be 50% the diameter of the nares.
- Monitor patient for redness and pressure injury on nose/septum.
- "Wiggle Pads" can be switched out if cannula is not staying in place.

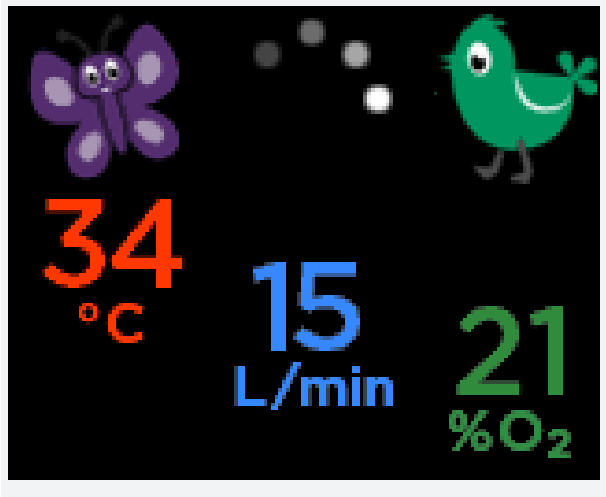


# Optiflow Junior Nasal Cannula Application



[Click Here](#)

# Airvo Instructional Video – Junior Mode



[Click Here For Video](#)

Click here for more videos and tip sheets.

[Airvo™ 2 Nasal High Flow/HFNC System \[2 - 60 L/min\] | Fisher & Paykel Healthcare \(fphcare.com\)](#)