

Respiratory Syncytial Virus (RSV) Prophylaxis

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Learning Objectives



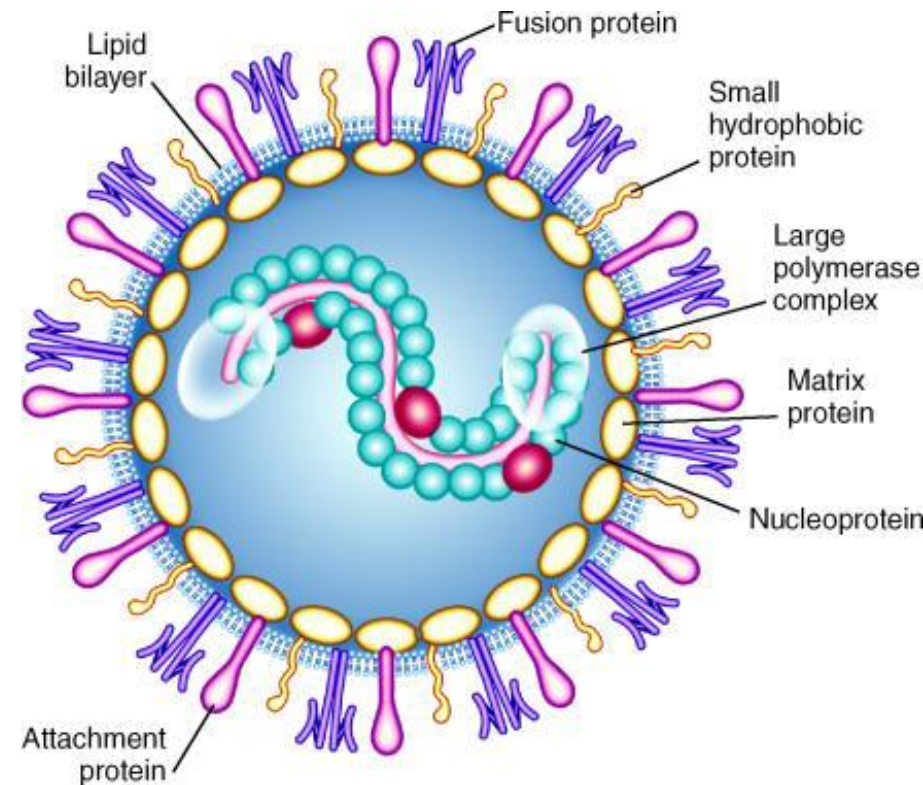
- Understand RSV and its impact on neonatal and pediatric populations
- Describe effective patient and family education strategies
- Understand RSV prevention strategies
- Understand indications and contraindications for using Beyfortus[®]
- Review appropriate intramuscular (IM) injection sites for the administration of Beyfortus[®]
- Examine the RSV Prophylaxis Medical Directive 44015
- Identify adverse reactions to Beyfortus[®]
- Review required documentation to comply Medical Directive

What is RSV?

- Respiratory Syncytial Virus (RSV) is a single stranded RNA pneumovirus that infects respiratory epithelial cells
- RSV invades the respiratory epithelial cells causing inflammation, edema, **syncytial formation (fused infected cells)**, and sloughing in airways
- The consequences are small airway obstructions and plugging by mucous cellular debris and DNA
- RSV is the most common infection in infancy and early childhood
- RSV is highly contagious and is a major cause of lower respiratory tract infections (LRTI's), bronchiolitis and pneumonia in children less than 1 year of age

RSV Strains

- There are two strains of RSV; *Strain A* and *Strain B*
- It's possible to get an infection from both strains during the same season



RSV Season

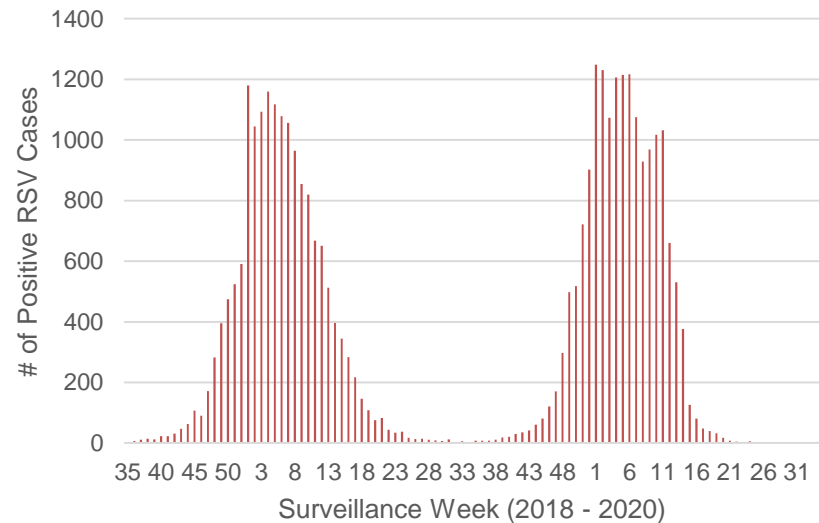
RSV is Seasonal: Peak Incidence Varies by Region¹

Canada

Typically, **November to March**, with more northern areas shifted to later (**December to April or May**)



Number of positive respiratory virus tests³



- The season start and end in Ontario are announced by the Ministry of Health based on RSV activity in the Province

Spread of RSV



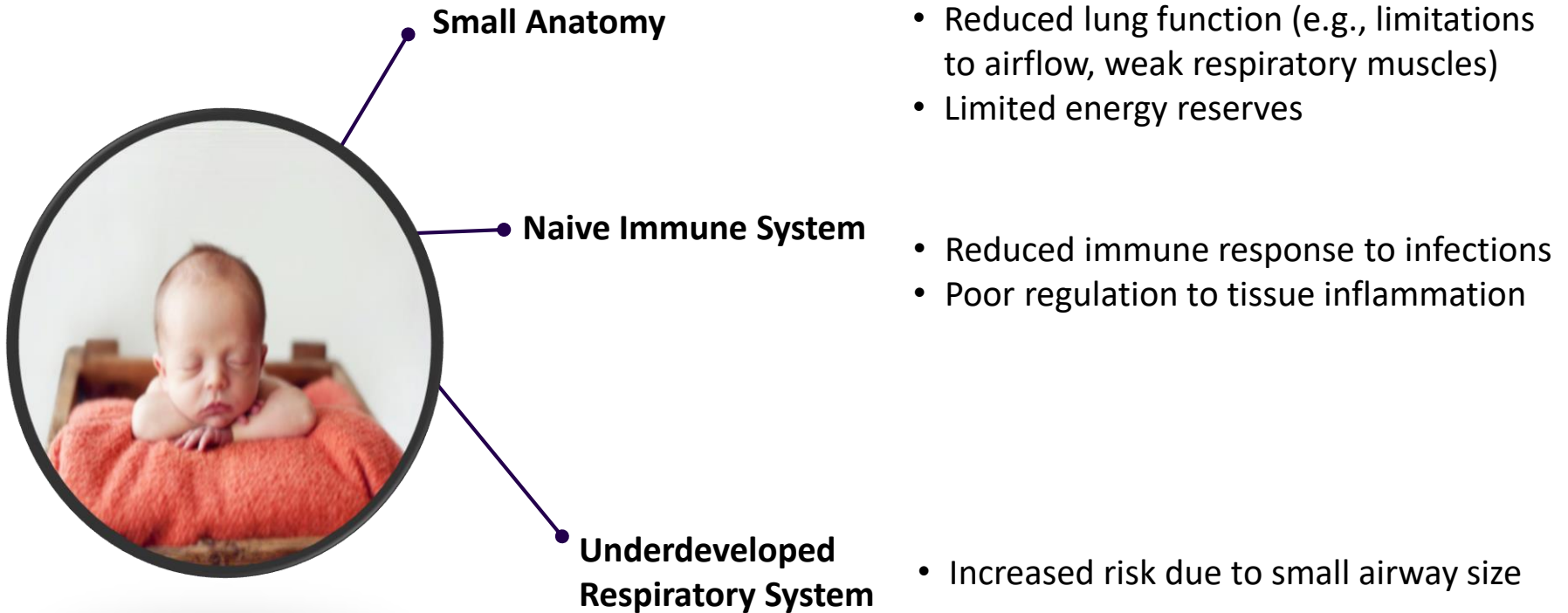
- RSV is highly contagious
- The incubation period is 2-8 days with the mean incubation being 4-6 days
- Transmission of RSV occurs primarily through contact with large droplets and contaminated surfaces
- RSV viral RNA can linger on non-porous surfaces for up to 6-7 hours
- Porous surfaces (i.e. hospital gowns) for 2 hours, and the skin for 20-30 minutes

RSV Impact

- Almost all children are infected with RSV by age 2
- In Canada, approximately 1% of all infants are hospitalized with RSV in their first year of life
- In some remote communities, RSV hospitalization rates have been as high as 20% to 50% of all live births
- Impact reduction strategies have focused on reducing disease severity

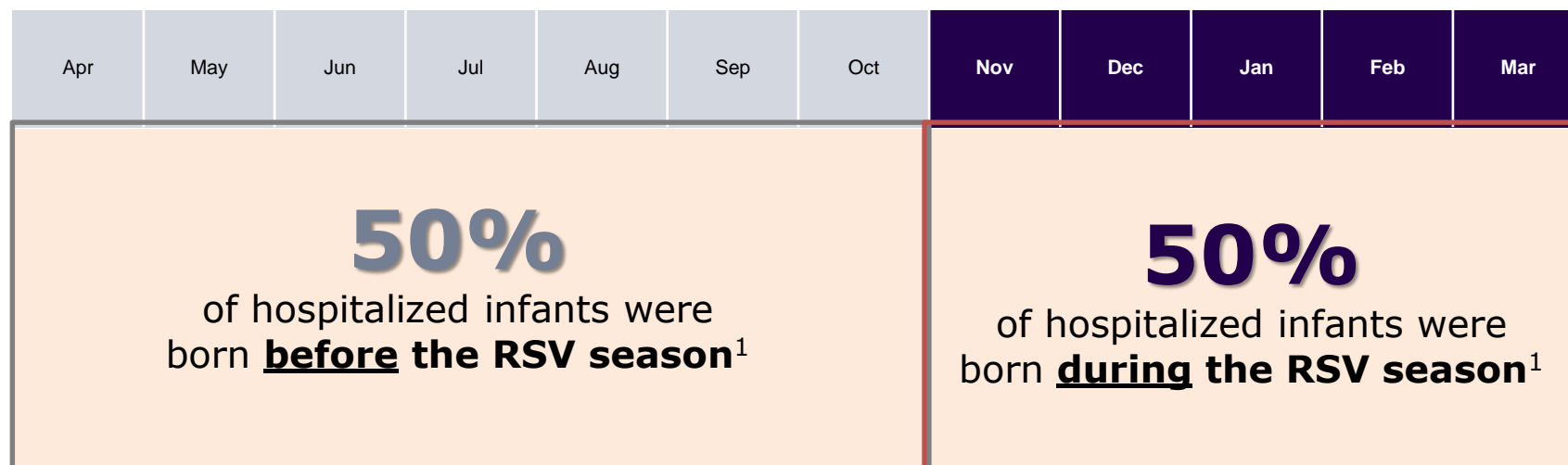
Infants and RSV

All infants are at increased risk for RSV



Infants and RSV

All Infants are at Risk of RSV Regardless of Birth Month and Require Protection



- Infants born before RSV season starts (i.e. spring/summer) also benefit from protection prior to entering their first RSV season
- RSV is a major cause of hospitalization, with the highest rates in infants younger than six months

1. Reeves RM et al. *J Infect.* 2019;78(6):468-475. 2. Tregoning JS, Schwarze J. *Clin Microbiol Rev.* 2010;23(1):74-98. 3. Drajac C, et al. *J Immunol Res.* 2017;2017:8734504. 4. Abrams EM, Doyon-Plourde P, Davis P, Brousseau N, Irwin A, Siu W, Killikelly A. Burden of disease of respiratory syncytial virus in infants, young children and pregnant women and people. *Can Commun Dis Rep* 2024;50(1/2):1-15. <https://doi.org/10.14745/ccdr.v50i12a01>.

Symptoms of RSV

- In most children, RSV usually causes symptoms similar to the common cold:
 - stuffy or runny nose
 - cough
 - ear infections
 - low-grade fever
 - sore throat

- **Warning signs of a serious RSV infection**
 - trouble breathing (ex. Indrawing)
 - fast, rapid breathing
 - wheezing
 - deeper and more frequent coughing
 - blue lips or fingernails
 - dehydration (decreased wet diapers)
 - difficulty breast feeding or bottle-feeding (irritable, sleepy)

Clinical Manifestations of RSV

Early Signs & Symptoms

- The illness often begins with mild symptoms similar to a common cold, such as a runny or stuffy nose, sneezing, or fever
- In some children, these symptoms can quickly worsen

Progression

Signs of the illness progressing to the lower respiratory tract include:

- Rapid breathing (tachypnea)
- Chest hyperinflation and retractions
- Fine crackles, with or without wheezing

Anatomical Changes

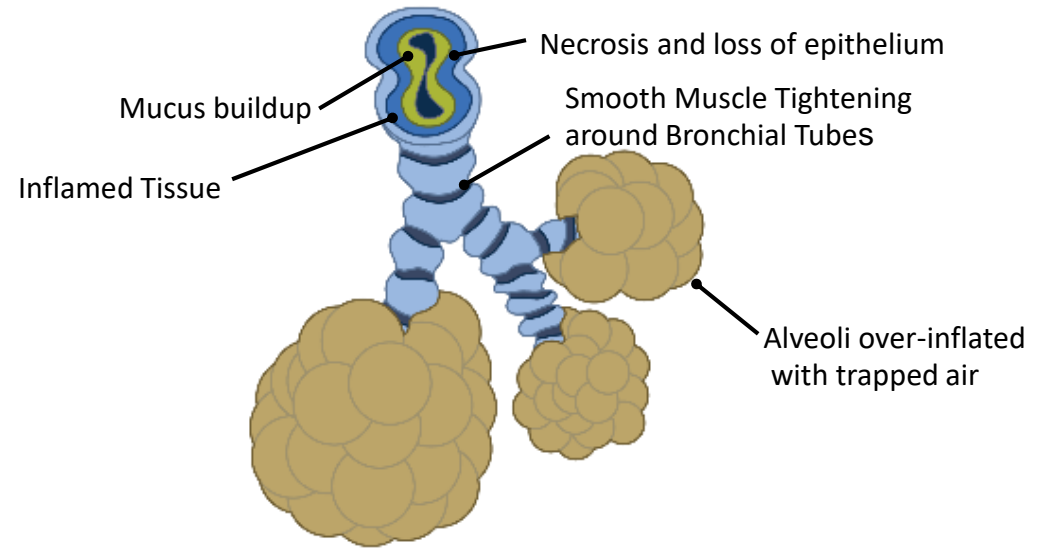
- Pathological examination of the lungs may reveal predominantly mononuclear cell infiltration in the airway walls
- Additional changes may also involve the sloughing of the respiratory epithelium, swelling of the airway walls (edema), and mucus plugging in the airways

Clinical Manifestations of RSV

**Normal
Bronchial Tubes**



**Bronchial Tube During
Bronchiolitis¹**



- RSV invades the epithelial cells in the respiratory tract causing inflammation, edema, and sloughing/shedding of infected epithelium
- This leads to buildup and accumulation in the lumen, causing the airways to functionally narrow resulting in typical RSV LRTI signs and symptoms (wheezing, coughing, difficulty breathing, nasal flaring, etc.)

1. Cleveland Clinic. Accessed 28 July 2022. <https://my.clevelandclinic.org/health/diseases/8272-bronchiolitis> 2. Health Canada. Respiratory syncytial virus: Canadian Immunization Guide. <https://www.canada.ca/en/public-health/services/publications/healthy-living/canadian-immunization-guide-part-4-active-vaccines/respiratory-syncytial-virus.html>

Teaching Families Prevention Strategies



Wash your hands

Practice frequent hand washing with soap and water – especially before you touch your baby. And make sure siblings and visitors wash their hands as well.



Avoid exposure to infection

If you have a cold or fever, avoid kissing your baby, and limit your infant's exposure to people who have a contagious illness.



Keep surfaces clean

The RSV virus can live on surfaces for hours, so make sure countertops and bathroom surfaces are cleaned regularly with cleanser – especially when someone in the family has a cold. Also, make sure to clean toys regularly, and always after a child with a cold has played with them.



Avoid second-hand smoke

Don't smoke around your baby and don't let others do so either. Exposure to tobacco smoke can increase your baby's risk of contracting RSV and the risk of more severe symptoms if he/she does contract the virus.



Avoid crowds

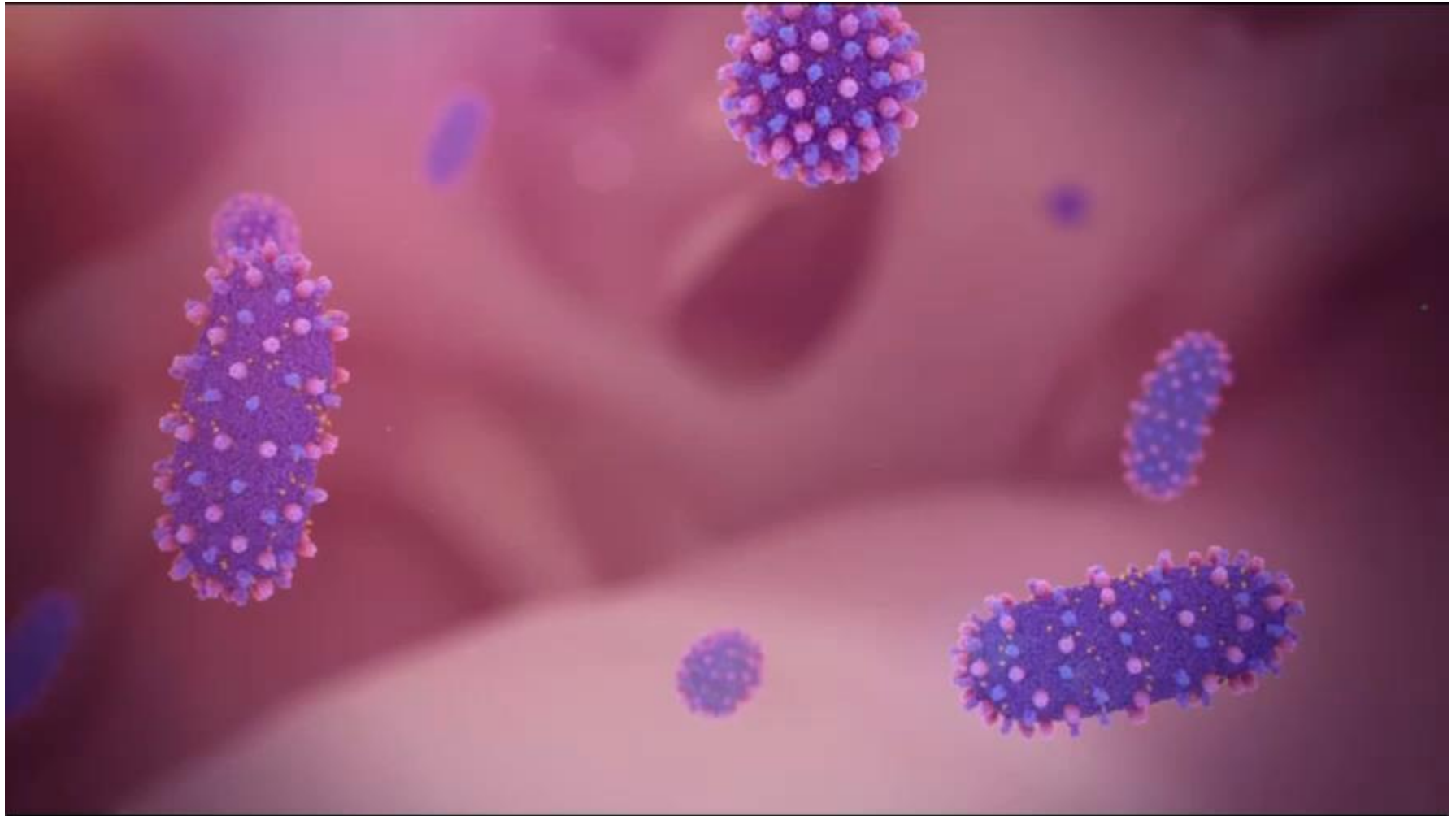
Try to avoid crowded places such as shopping centres, daycares and large family gatherings where your baby will come into contact with lots of people – and their germs.

RSV Prophylaxis: *Beyfortus*®



- **Beyfortus**® is the trade name for the medication **Nirsevimab**
- **Beyfortus**® is a long-acting monoclonal antibody used to prevent serious lower respiratory tract infections caused by RSV
- This medication is available to all infants entering their first RSV season and for children up to 24 months of age who remain vulnerable to severe RSV disease in their second season
- The extended half-life of **Beyfortus**® allows single dosing of the product offering up to 6 months of protection
- Evidence from randomized controlled trials indicates that the protection against severe illness lasts approximately 150 days
- **Beyfortus**® does not interfere with routine childhood immunizations and vaccines

Beyfortus[®] Mechanism of Action



While admitted to hospital



- Infants during their first RSV Season may receive prophylaxis prior to discharge home
- Infants who are clinically stable greater than or equal to 30 weeks + 0 days corrected gestational age and weigh greater than 1800 grams without contraindications to nirsevimab may receive prophylaxis
- At McMaster Children's Hospital, newborns may receive RSV prophylaxis upon discharge home from post partum, the midwifery care unit (MCU), Neonatal Intensive Care unit (NICU) or, in some cases, Labour & Delivery
- Infrequently, depending on reason for admission, prophylaxis may also be offered to infants in pediatric units

After discharge home



- Infants during their first RSV Season may receive prophylaxis
- Children up to 24 months of age who remain vulnerable to severe RSV disease (entering their second RSV season) as a result of the following conditions:
 - Chronic lung disease of prematurity (CLD/bronchopulmonary dysplasia)
 - Hemodynamically significant congenital heart disease (CHD)
 - Immunocompromised conditions
 - Down syndrome
 - Cystic fibrosis
 - Neuromuscular disease
 - Congenital airway anomalies
- For high-risk patients greater than 24 months of age, requests will be approved or denied through an internal adjudication process
- High-risk infants are followed through the High Risk RSV Clinic at MCH

Contraindications



- RSV prophylaxis is not recommended if:
 - The child's SDM does not consent to this procedure
- **BEYFORTUS® (nirsevimab) is contraindicated:**
 - have a history of severe hypersensitivity reactions, including anaphylaxis, to this drug or to any ingredient in the formulation, including any non-medicinal ingredient, or component of the container
 - Infant has a fever; if nurse has clinical concerns about a patient's clinical stability, notify physician MRP (if admitted) or have patient report to Emergency Department or Urgent Care Centre or community health care provider for assessment as appropriate (if infant home)
 - Infant is thrombocytopenic, has any coagulation/bleeding disorder such as hemophilia, or is on anticoagulation therapy and physician MRP has advised patient should not have IM injections

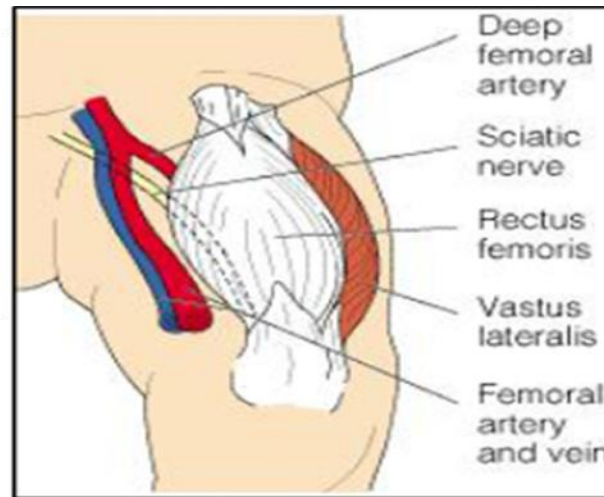
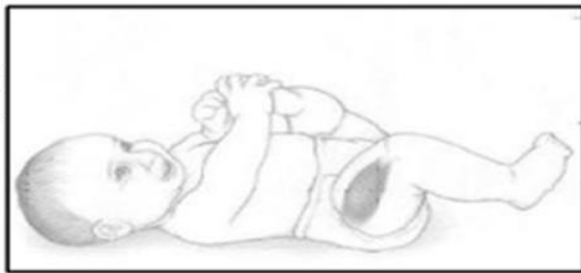
Beyfortus® Dosing

- Beyfortus® is supplied in pre-filled syringes
- Attach BD Safety Glide Needle (25G x 5/8")
- Dosing:
 - Less than 5kg - **50mg** (50mg/0.5mL)
 - Greater than or equal to 5kg - **100mg** (100mg/mL)
 - Children who remain vulnerable to severe RSV disease entering their second RSV Season aged less than or equal to 24 months; the recommended dose is a single dose of **200 mg** given as two intramuscular injections (2 x 100mg/mL)



IM Injection Site

- Landmark: **Vastus Lateralis (muscle)**
- Palpate to find greater trochanter and knee joints; divide vertical distance between these two landmarks into thirds; inject into middle one third



Pain Management

- Two minutes prior to IM injection, Sucrose 24% (as per your unit protocols) to the tip of the infant's tongue and post procedure as needed
- Provide non-pharmacological pain measures eg. soother, skin-to-skin holding
- **Note:** Sucrose is not a substitute for comfort measures. The administration of oral Sucrose 24% is intended for transiently reducing pain response during a minor painful procedure
- Ideally, plan ahead with parents/caregivers timing for injection which allows for parental/caregiver presence to buffer pain during procedure

Management of Untoward Outcomes

Patient reaction	Patients admitted to hospital	Patients in clinic setting
Anaphylaxis The Nurse, Physician Assistant, Midwife will:	Take vital signs as appropriate Call Code Pink for newborn/neonatal inpatients (Infants in NICU/Level 2 NICU, MUMC L&D, 4C, Midwifery Care Unit and WLMH Obstetrics Unit) Notify MRP/Authorizing Physician and Manager	Take vital signs as appropriate Call a Pediatric Code Blue for infants in clinic setting Notify MRP/Authorizing Physician and Manager
Local or minor reactions The Nurse, Physician Assistant, Midwife will:	Observe patient response, document according to professional standards, report reaction to MRP	Advise the SDM to contact community health care provider if minor/local symptoms persist longer than 2 days, and that they may be having a reaction to BEYFORTUS®

Anaphylaxis: Immediate allergic reactions such as skin rash (hives) pruritus, dyspnea, facial and peripheral edema, bronchospasm, stridor, chest tightness and pain and or hypotension following immunization

Local reaction: soreness, tenderness, swelling at the site that lasts less than 2 days.

Minor reactions: These include fever and a possible rash.

Medical Directive 44015

- A medical directive is a tool utilized to apply an intervention to a number of patients when specific conditions are met and specific circumstances exist to support timely, consistent, effective and efficient care
- Review **RSV Prophylaxis Medical Directive 44015**
- RNs, Physician Assistants and Midwives utilizing the medical directive are required to complete a quiz to ensure adequate knowledge to provide safe care

MCH Resources

Questions related to RSV can be directed to:

- Unit Education and Practice Clinicians
- RSV Clinic Manager 905.521.2100 ext. 73500
- RSV Clinic Coordinator 905.521.2100 ext. 73908



Resources

- [Provincial Council for Maternal and Child Health](#)
- [Immunize Canada](#)
- [Infant and high-risk children RSV prevention program – MOH](#)
- [Beyfortus Monograph](#)



McMaster Children's Hospital RSV Clinic
Website which includes direct links to multiple
reputable resources

