Preventing RSV

(modified June 2024)

--Please see the October 23, 2023 CDC Health Alert Network (HAN) Health Advisory for US recommendations to manage the limited supply of nirsevimab at https://emergency.cdc.gov/han/2023/han00499.asp.).--

RSV is a common virus that infects most children before the age of two years.[1,2] Infection does not confer long-term immunity, which leads to continual reinfection throughout a patient's lifetime.[1] This FAQ answers common questions about severe RSV infection risk and the products used to prevent it.

Question	Answer/Pertinent Information
What is **RSV**?	• Respiratory syncytial virus (RSV) typically causes mild, self-limiting (one to two weeks) cold-like symptoms.[3] • Serious RSV infections can cause respiratory distress, bronchiolitis, pneumonia, hospitalization, and death.[2,4] • The typical season for RSV is from fall through late winter (i.e., October/November to March/April).[2,5]

Who is at risk of **severe RSV disease**?	• Those at risk of severe RSV disease include:
	  • Infants and children less than two years.
	  ○ Up to 40% of first RSV infections in children under one year result in bronchiolitis.[4]
	  ○ RSV is a leading cause of hospitalization of infants in the US and Canada.[5,21,22]
	  • Children with lung disease (e.g., congenital airway anomalies, chronic lung disease of prematurity, cystic fibrosis), congenital heart disease, neuromuscular disorders, Down syndrome, immunosuppressive disorders, and some infants in remote communities (e.g., American Indian, Alaska Native children).[2,4,6-8]
	  • Older adults and patients with chronic lung disease, heart disease, or immunosuppressive disorders.[2]

How can RSV be **prevented**?	• RSV is transmitted via respiratory droplets (inhaled and from contact with contaminated surfaces).[5,9]
	  ○ Prevent transmission of RSV (and other respiratory illnesses) by:[9]
	  ▪ coughing or sneezing into a tissue or your shirt sleeve/elbow (not your hands).
	  ▪ washing hands with soap and water for at least 20 seconds.
	  ▪ avoiding close contact with people (i.e., stay at home) when you feel ill (i.e., cold-like symptoms).
	  ▪ cleaning frequently touched surfaces (e.g., doorknobs, mobile devices).
	• Monoclonal antibody formulations are available to prevent RSV in infants and young children (see below for details).
	  ○ Provide passive immunization.
	  ○ Protection wanes over time.
	  ○ Must be administered in a clinic or hospital.
	• RSV vaccines are available for pregnant patients and adults over 60 years (see below for more details).
	• Infants can be protected with either maternal immunization OR monoclonal antibodies (see sections below for preferred choices). **Most infants do not need both**.[21]

Question	Answer/Pertinent Information

Who should get the monoclonal antibody, **nirsevimab** (*Beyfortus*)?	• Nirsevimab is FDA- and Health Canada-indicated for the prevention of RSV infection in:[6,11]
	  o all infants born during or entering their first RSV season.
	  o children up to 24 months of age who are at risk of severe RSV disease during their second RSV season.
	• **US recommendations**: ACIP recommends nirsevimab for infants <8 months born during or entering their first RSV season and children aged 8 to 19 months who are at increased risk of severe RSV disease entering their second RSV season.[5,20,c]
	  o If RSV prevention has been initiated with palivizumab and less than five doses of palivizumab have been administered, the infant should receive one dose of nirsevimab. No further palivizumab should be administered.[20]
	  o Nirsevimab should be administered during season two (as indicated) regardless of which monoclonal antibody was administered during season one.
	• In **Canada**, NACI recommends nirsevimab for infants, prioritized as follows:[19]
	  o Priority 1:
	  ▪ Infants born during or entering their first RSV season who are at increased risk of severe RSV disease.[d]
	  ▪ Infants entering their second RSV season who are at continued increased risk of severe RSV disease.[e]
	  o Priority 2:
	  ▪ Consider for any infant less than 8 months of age born during or entering their first RSV season.

Who should get the monoclonal antibody, **palivizumab** (*Synagis*)?	• Nirsevimab is preferred over palivizumab.[19]
	• Palivizumab is indicated for the prevention of RSV infection in **high-risk infants and toddlers**.[9,10,12]
	• If nirsevimab is not available or not feasible to administer, palivizumab can be administered to high-risk patients (see guidelines for specific high-risk indications for palivizumab use).[19,20]
	  o For example, the American Academy of Pediatrics recommends palivizumab (if nirsevimab is not available) for patients:[12,23]
	  ▪ born before 29 weeks gestation and younger than 12 months at the beginning of RSV season.
	  ▪ with chronic lung disease of prematurity during the first year of life. During the second year of life, palivizumab can be considered if these children continue to require medical support during the six months prior to RSV season.
	  ▪ palivizumab can also be considered for patients:[12,23]
	  • younger than 24 months who are profoundly immunocompromised during RSV season.
	  • with a pulmonary or neurological abnormality that impairs clearance of upper airway secretions and who are younger than 12 months.
	  • who have hemodynamically significant congenital heart disease and who are 12 months or younger.

Can monoclonal antibodies be **given with vaccines**?	• Nirsevimab can be given at the same time as routine childhood vaccines.[20] Give in separate syringes and at different injection sites.

Question	**Answer/Pertinent Information**		
How do the available **RSV monoclonal antibodies compare**?		**Palivizumab (*Synagis*)**[9,10]	**Nirsevimab (*Beyfortus*)**[6,11]
	How Supplied	Single-dose vials: 50 mg/0.5 mL, 100 mg/1 mL	Single-dose prefilled syringes: 50 mg/0.5 mL, 100 mg/1 mL
	Storage	• Refrigerate (2°C to 8°C). • Opened vials may be kept (refrigerated) for up to 6 hours.[7] • Store in original packaging. • Do not shake.	• Refrigerate (2°C to 8°C). • May be kept at room temperature for up to 8 hours. • Store in original packaging to protect from light. • Do not shake.
	Dosing	• 15 mg/kg IM **monthly** throughout the RSV season. • Give an additional dose to children following cardiopulmonary bypass surgery (even if less than one month since last dose).[7,9] • It is recommended to stop monthly palivizumab if a child has an RSV hospitalization.[7,12] • Usual duration is four to five months.[7,9]	• **First RSV season**: o Less than 5 kg: 50 mg IM **x one dose** o 5 kg or more: 100 mg IM **x one dose** • **Second RSV season**: o 200 mg IM **x one dose** • Give an additional dose to children following cardiopulmonary bypass surgery. See footnote "b" for dosing.
	Adverse Effects	• Rash, fever, severe hypersensitivity reactions	• Rash, injection site reactions. • Potential for serious hypersensitivity reactions.
	Usual Admin Site	• Anterolateral thigh preferred. • Avoid the gluteal muscle.	• Anterolateral thigh preferred. • Avoid the gluteal muscle.
	Cost (US)[a]	$1,800/dose	$495/dose
Who should get an **RSV vaccine**?	• **Recommendations for *Abrysvo***: o **Pregnant patients** (32 weeks through 36 weeks gestation) to prevent RSV disease in newborns: ▪ ACIP (US) recommends *Abrysvo* for seasonal use (usually September through January).[21] ▪ NACI (Canada) recommends shared decision making (taking into account gestational timing and RSV season) rather than routine vaccination.[19] o Patients **60 years and** older: ▪ ACIP (US) recommends shared decision making.[16] ▪ NACI (Canada) recommendations are pending as of the publication date of this chart.[7] • **Recommendations for *Arexvy***: o ACIP (US) recommends shared clinical decision making to determine which patients (over 60 years) are vaccinated.[14] o NACI (Canada) recommendations for the use of *Arexvy* are pending as of the publication date of this chart.[7]		

Question	**Answer/Pertinent Information**		
How do the available **RSV vaccines compare**?		***Abrysvo***[13,24]	***Arexvy***[17,18]
	Vaccine type	• non-adjuvanted	• adjuvanted (with $AS01_E$ to boost immunity).
	Approved indications	• for the prevention of RSV in: ○ pregnant patients, 32 to 36 weeks gestation (to prevent RSV in newborns via placental transfer of antibodies). ○ patients 60 years and older.	• for the prevention of RSV in patients 60 years and older.
	Dosing	• 0.5 mL IM x one dose	• 0.5 mL IM x one dose
	Use in pregnant patients	• There is a potential risk of preterm birth with *Abrysvo*. To avoid this risk, do **not** administer *Abrysvo* prior to 32 weeks gestation. Patients at risk of preterm birth were generally excluded from the studies.	• There are no data on the administration of *Arexvy* in pregnant patients.
	Storage	• Refrigerate (2°C to 8°C) in the original packaging to protect from light.	• Refrigerate (2°C to 8°C) in the original packaging to protect from light.
	Reconstitution and stability	• Reconstitute with the diluent provided. Use immediately or keep at room temperature (15°C to 30°C) and use within **four hours**.	• Reconstitute with the diluent provided. Use immediately or refrigerate (2°C to 8°C) and use within **four hours**.
	Efficacy	• Data show moderate to high efficacy of one dose of *Abrysvo* in **older adults** for the prevention of RSV-associated symptomatic LRTD and medically attended LRTD over two RSV seasons [Evidence Level A-1].[14] ○ Data on the prevention of hospitalization, severe illness, and death are lacking.[14] • Infants born to pregnant patients who were given *Abrysvo*, had a significantly reduced risk of severe LRTD at both 90 days and 180 days after birth [Evidence Level A-1].[15]	• Data show moderate to high efficacy of one dose of *Arexvy* in older adults for the prevention of RSV-associated symptomatic LRTD and medically attended LRTD over two RSV seasons [Evidence Level A-1].[14] ○ Data on the prevention of hospitalization, severe illness, and death are lacking.[14]
	Cost[a]	**Per dose**: • $295 (US) • $250 (Canada)	**Per dose**: • $280 (US) • $250 (Canada)

Abbreviations: ACIP = Advisory Committee on Immunization Practices; admin = administration; CADTH = Canada's Drug and Health Technology Agency; IM = intramuscular; LRTD = lower respiratory tract disease; NACI = National Advisory Committee on Immunization; RSV = respiratory syncytial virus.

a. Pricing based on wholesale acquisition cost (WAC). US medication pricing by Elsevier, accessed September 2023.

b. Once infants are stable following cardiopulmonary bypass surgery, administer an additional dose of **nirsevimab** to ensure adequate serum levels. If it is the child's **first RSV season** and within 90 days of the initial nirsevimab dose, give a weight-based dose (<5 kg: 50 mg; ≥5 kg: 100 mg). If it has been more than 90 days since the initial nirsevimab dose, give a 50 mg dose. If it is the child's **second RSV season** and within 90 days of the initial nirsevimab dose, give a 200 mg dose. If it has been more than 90 days since the initial nirsevimab dose, give a 100 mg dose.[6,11]

c. In the US, nirsevimab is recommended for children between the ages of 8 and 19 months, entering their second RSV season, with increased risk of severe RSV disease:[5]
   - chronic lung disease of prematurity, requiring medical support during the six months prior to RSV season.
   - severe immunocompromise.
   - cystic fibrosis with manifestations of severe lung disease OR abnormalities on chest imaging that persist when stable OR weight-for-length rate is less than the 10th percentile.
   - American Indian or Alaska Native children.

d. In Canada, nirsevimab is recommended for infants during their **first** RSV season with increased risk of severe RSV disease:[19]
   - all infants born at less than 37 weeks gestational age.
   - chronic lung disease (including bronchopulmonary dysplasia) requiring ongoing assisted ventilation, oxygen therapy, or chronic medical therapy in the six months prior to RSV season.
   - cystic fibrosis with respiratory involvement and/or growth delay.
   - haemodynamically significant chronic cardiac disease.
   - severe immunodeficiency.
   - severe congenital airway anomalies that impair the clearing of respiratory secretions.
   - Down syndrome.
   - infants whose transportation for treatment of severe RSV is complex (e.g., remote communities) and/or if risk intersects with established social and structural health determinants (e.g., some First Nations, Metis, and Inuit populations).

e. In Canada, nirsevimab is recommended for infants during their **second** RSV season with ongoing risk of severe RSV disease:[19]
   - All risks listed in footnote "d" above **except** for infants born prior to 37 weeks gestational age and infants with Down syndrome.

Users of this resource are cautioned to use their own professional judgment and consult any other necessary or appropriate sources prior to making clinical judgments based on the content of this document. Our editors have researched the information with input from experts, government agencies, and national organizations. Information and internet links in this article were current as of the date of publication.

Levels of Evidence

In accordance with our goal of providing Evidence-Based information, we are citing the **LEVEL OF EVIDENCE** for the clinical recommendations we publish.

Level	Definition	Study Quality
A	Good-quality patient-oriented evidence.*	1. High-quality randomized controlled trial (RCT) 2. Systematic review (SR)/Meta-analysis of RCTs with consistent findings 3. All-or-none study
B	Inconsistent or limited-quality patient-oriented evidence.*	1. Lower-quality RCT 2. SR/Meta-analysis with low-quality clinical trials or of studies with inconsistent findings 3. Cohort study 4. Case control study
C	Consensus; usual practice; expert opinion; disease-oriented evidence (e.g., physiologic or surrogate endpoints); case series for studies of diagnosis, treatment, prevention, or screening.	

***Outcomes that matter to patients** (e.g., morbidity, mortality, symptom improvement, quality of life).

[Adapted from Ebell MH, Siwek J, Weiss BD, et al. Strength of recommendation taxonomy (SORT): a patient-centered approach to grading evidence in the medical literature. Am Fam Physician. 2004 Feb 1;69(3):548-56. https://www.aafp.org/pubs/afp/issues/2004/0201/p548.html.]

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