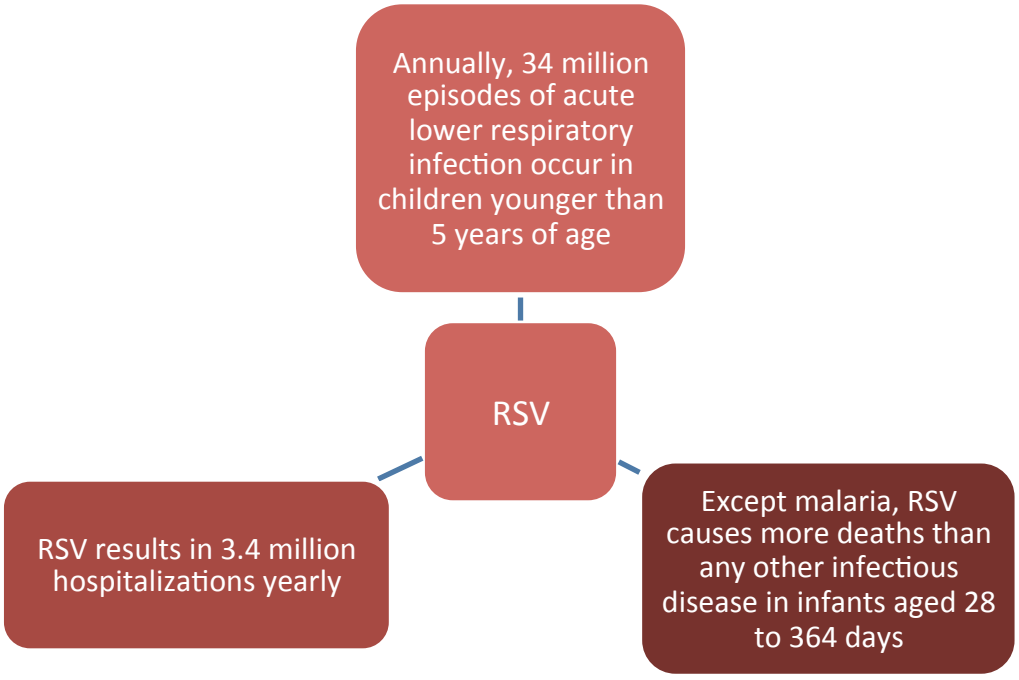
Respiratory syncytial virus (RSV)

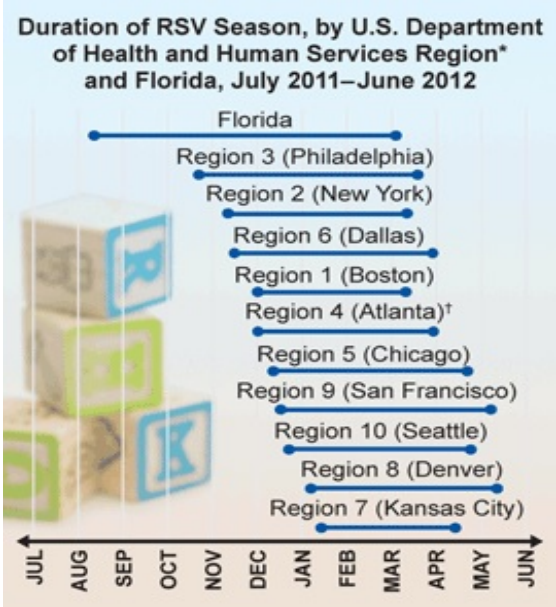
Global Epidemiology and Surveillance:[1,2]

- RSV is the most common cause of lower respiratory tract infections in infants aged <12 months.
- Nearly all children are infected by the age of 2 years and re-infection is common. Re-infection in older children or adults typically manifests as upper airway disease and is less severe.



References: 1. Pickering Lea. Red Book®: 2012 Report of the Committee on Infectious Diseases. *AAP Red Book*: Rittenhouse Book Distributors, Inc; 2012. 2. al Be. Respiratory syncytial virus infection: Clinical features and diagnosis. *UpToDate* 2014. 3. Brady MT, et al. *Pediatrics.* 2014;134(2):e620-e638. Last reviewed Nov. 2014

The Centers for Disease Control and Prevention (CDC) assesses seasonal trends in RSV at the national, regional, and state levels.



Region	States
1	CT, ME, MA, NH, RI, VT
2	NJ, NY
3	DE, DC, MD, PA, VA, WV
4	AL, GA, KY, MI, NC, SC, TN
5	IL, IN, MI, MN, OH, WI
6	AR, LA, NM, OK, TX
7	IA, KS, MO, NE
8	CO, MT, ND, SD, UT, WY
9	AZ, CA, HI, NV
10	AL, ID, OR, WA

http://www.cdc.gov/rsv/research/us-surveillance.html

Northeast US

- RSV season typically occurs between November and April

Other US Regions

- Native infants in southwestern Alaska tend to experience higher hospitalization rates and a more prolonged season

Special Populations

- Navajo and White Mountain Apache infants and children may be 2 to 3 times as likely to be hospitalized for RSV
- Otherwise, RSV season tends to be consistent with that of the Northeast

References: 1. Pickering Lea. Red Book®: 2012 Report of the Committee on Infectious Diseases. *AAP Red Book*: Rittenhouse Book Distributors, Inc; 2012. 2. al Be. Respiratory syncytial virus infection: Clinical features and diagnosis. *UpToDate* 2014. 3. Brady MT, et al. *Pediatrics.* 2014;134(2):e620-e638. Last reviewed Nov. 2014

Risk Factors

- Age <6 months, especially at the onset of the RSV season and a daycare attendant*
- Underlying lung or heart disease
- Pre-term birth
- Immunocompromised

Transmission

- Direct contact is the most common method
- Large aerosol droplets across short distances
- 3 to 8 day viral shedding period
- 4 to 6 day incubation period

Infection

- RSV replicates in the nasopharynx, then infects the smaller bronchiolar epithelium followed by type 1 and 2 alveolar pneumocytes in the lung
- 2 subtypes: A and B. Both are present in most outbreaks, although A is typically responsible for severe disease
- Various genotypes exist; dominant strains shift yearly

*Chronologic age is the most important risk factor for RSV hospitalization. Other factors may also contribute but are not independently associated.

Diagnosis[1,2]

The presentation of RSV is similar to that of the common cold. RSV should be suspected in patients younger than 12 months who present with:

- Lethargy, irritability, and poor feeding
- Lower respiratory tract disease during the winter months
- Apnea and wheezing

Analysis of secretions may confirm the diagnosis and a definitive diagnosis may be made by isolating the virus in HEp-2-cells. This is not always necessary.

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Prophylaxis[3]

Agent	Class	MoA	Dosing	Notes
FDA-approved				
Palivizumab	Humanized murine immunoglobulin monoclonal antibody	Binds the RSV fusion protein in the lower respiratory tract preventing viral envelope fusion with the host	15 mg/kg IM monthly x max of 5 doses prior to the start of/throughout the RSV season	Eligible patients: Less than 12 months of age and: • Born <28 weeks gestation • Pre-term with chronic lung disease • Congenital heart disease Patients may possibly be considered eligible if: • <12 months of age with pulmonary or neuromuscular abnormalities that impair clearance of secretions • <24 months of age and immunocompromised at season onset
Investigational				
Motavizumab	Second generation humanized murine monoclonal antibody	Same as palivizumab; also acts in the upper respiratory tract	Not established	FDA rejected NDA in 2010
MEDI-559	Live-attenuated vaccine	Vaccination	Not established; intranasal administration	Phase I as of June 2014; initiation in the fourth quarter of 2008

RSV=respiratory syncytial virus, IM=intramuscular, FDA=Food and Drug Administration, NDA=new drug application

Eligible patients only require a sufficient amount of doses to carry them through the RSV season. Infants born during the season may therefore require fewer doses.

Native Americans, Native Alaskans, and inhabitants of certain regions may experience a prolonged season with more severe symptoms, and these prophylaxis guidelines may not be as stringent in these areas

Non-pharmacologic options[2]:

Preventive measures include reduction of environmental risk factors such as:

- Smoke exposure
- Large group daycare facilities
- Encouragement of breastfeeding

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Treatment[1,2]

When RSV occurs in a facility, contact isolation is recommended as well as increased awareness of personal hygiene to limit transmission

Treatment Options	Recommendation
Supportive care (respiratory and fluid status)	• Oxygen saturation should be monitored and supplemental oxygen or mechanical ventilation may be used as needed • Upper airway suction and intubation may also be necessary
Hypertonic saline via nebulizer	• Associated with improvement in clinical outcomes; however, data are limited
Beta-adrenergic agents (e.g., albuterol)	• May be used if an initial dose elicits improvement in respiratory function • Not recommended for routine use, as they are not likely to alter the clinical course of the disease.
Corticosteroids	• Have not been shown to alter the clinical course of the disease
Ribavirin	• Has demonstrated in vitro activity against RSV • Aerosolized ribavirin should be reserved for patients with potentially life-threatening infection • Due to administration difficulties, toxicity concerns, and conflicting data on efficacy, routine use is not recommended
Antibacterial agents	• Not recommended unless there is evidence of a secondary bacterial infection

References: 1. Pickering Lea. Red Book®: 2012 Report of the Committee on Infectious Diseases. *AAP Red Book*: Rittenhouse Book Distributors, Inc; 2012. 2. al Be. Respiratory syncytial virus infection: Clinical features and diagnosis. *UpToDate* 2014. 3. Brady MT, et al. *Pediatrics.* 2014;134(2):e620-e638. Last reviewed Nov. 2014