

Respiratory Syncytial Virus

Incidence and Geographical Distribution

RSV has a seasonal pattern. It is reported in a recent article published in *Open Forum Infectious Diseases* journal, 2021, that the global burden of RSV study of 2016, estimated that RSV is responsible for 24.8 million acute respiratory tract infections (ARI) episodes and 76,600 deaths each year. Nearly 60%-70% of the children below the age of one have been infected with RSV and 2%–3% of these infections result in hospitalization. Thus, RSV is a leading cause of mortality and morbidity in children age below five years, particularly in low- and median-income countries. The incidence of RSV is lower in adults, however it has been increasingly recognized as an important cause of respiratory disease in adults. The articles also has data from 15 participating countries which report the median cases per season and the care level (hospitalized or community care). The data from the 15 countries found that the majority (55%) of RSV cases occurred in the <1-year-olds, with 8% of cases reported in those aged ≥65 years.

Table 13
Estimates of Number of RSV Cases per Season for 15 Participating Countries, 2000-2020

Region	Country	Median Cases per Season	Median cases per season at Care Level
Africa	South Africa	604	Community (81), Hospitalized (693)
	Cameroon	22	Community (22), Hospitalized (NA)
Americas	US	18,007	Community (NA), Hospitalized (NA)
	Chile	4,923	Community (138), Hospitalized (4,773)
	Ecuador	482	Community (NA), Hospitalized (482)
	Brazil	2,208	Community (NA), Hospitalized (2,208)
Europe	Portugal	529	Community (13), Hospitalized (NA)
	The Netherlands	1,980	Community (73), Hospitalized (1,959)
	The Czech Republic	233	Community (22), Hospitalized (213)
	Spain	2,060	Community (NA), Hospitalized (2,060)
	Russian Federation	133	Community (66), Hospitalized (67)
South-East Asia	Bhutan	98	Community (NA), Hospitalized (41)
Western Pacific	Singapore	1,786	Community (90), Hospitalized (1,710)
	New Zealand	610	Community (101), Hospitalized (466)
	Vietnam	39	Community (39), Hospitalized (NA)
Average		1,463	Community (78), Hospitalized (747)

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Risk Factors

Susceptibility of RSV infection is high in the following cases:

- Premature delivery or having an underlying condition, such as congenital heart or lung disease.
- Low birth weight.
- Infants in crowded daycare settings or with older siblings suffering from the infection.
- Children with weakened immune system such as those undergoing chemotherapy, transplantation or HIV positive.
- Adults with asthma, congestive heart failure or COPD.

Transmission of the virus occurs through infectious respiratory secretions, such as coughing or sneezing. The virus can also live for hours on objects, so the infection can spread via this route as well. The virus enters the body of a new host through the eyes, nose or mouth.

Etiology and Symptoms

Symptoms of RSV infection appear four to six days after the infection. In adults or older children, symptoms resemble those of the common cold and include a congested or runny nose; dry cough; low-grade fever; sore throat; and mild headache.

A severe RSV infection can lead to lower respiratory tract illness such as pneumonia or bronchiolitis. Symptoms may include a fever, severe cough, wheezing, shallow or difficult breathing, and cyanosis, which is a bluish color of skin due to lack of oxygen.

Infants are most severely affected by RSV infection and subsequent complications. Hospitalization may be required in babies born premature, newborn with symptoms, or adults who have chronic heart or lung problems.

Socioeconomic Burden

RSV causes acute bronchiolitis and lower respiratory tract infections. Severe infections can cause complications in preterm infants, in individuals with severe congenital heart disease, bronchopulmonary dysplasia, malformations, neuromuscular diseases and immunological disorders. It is thus observed that along with pediatric burden of the disease, there has been increased hospitalizations and mortality among frail adult patients as well.

Table 14
Death Rates of RSV-Infected Patients, by WHO Region, 2019

WHO Region	Death Rate (Per 100,000)
Africa	9.28
Americas	4.29
Europe	4.25
South-East Asia	4.52
Western Pacific	2.33
Eastern Mediterranean	2.27

Source: WHO Global Burden of Disease Study 2019; Institute of Health Metrics and Evaluation

Diagnosis

Medical practitioners suspect RSV infection based on physical examination, presence of wheezing or any other severe symptom. Other techniques such as pulse oximetry to check levels of oxygen in bloodstream, blood tests to check for white cell counts, chest X-rays, etc. are also used.

The virus is detected by techniques that detect the virus, viral antigens or virus specific nucleic acid sequences in respiratory secretions. Antigen-based tests are often quick but have less sensitivity and specificity. Other methods such as isolation in cell culture or highly sensitive and specific nucleic acid amplification assays are used more often. RT-PCR was the first, and is still the most frequently used, nucleic acid-based assay.

Treatment

Treatment of RSV infection is usually directed toward symptomatic relief. Over-the-counter medications can be used to treat fever, while doctors may prescribe antibiotics if there is an added bacterial infection such as bacterial pneumonia. Rehydration therapy is administered in cases of dehydration. To ease breathing, infants may be administered a nebulized form of antiviral or bronchodilator.

Currently, there is no licensed vaccine available to prevent RSV infection in children. However, the pipeline has several vaccine candidates in clinical development. Two goals of vaccine development proposed by WHO include:

- Maternal or passive immunization to prevent the disease in infants less than six months old.
- Active pediatric immunization for infants and young children.