



## RESPIRATORY SYNCYTIAL VIRUS

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Respiratory syncytial virus (RSV) is the most common cause of acute lower respiratory tract infections in small children. RSV is a single-strained RNA virus, belonging to the pneumovirus genus of the Paramyxoviridae family. The virus is divided into two types, A and B, each of which has several subtypes.

**Occurrence**

RSV was isolated for the first time from American children with lower respiratory tract infections in 1957. A total of 90% of all children have had one, and 50% have had two RSV infections before the age of two. Every year during the RSV season, from November to May, approx. 1,500 Danish children are admitted with RSV infection, and many more are seen in general practice or looked after at home because of the infection. A study from eastern Denmark showed that 3.4% of all children < 6 months were admitted with RSV infection during the winter season 1995-96. At special risk of a course of illness requiring admission are premature children, children with chronic respiratory illness, congenital heart disease and immunodeficient children. In a Danish study comprising 240 children with a birth weight under one kilogram or gestational age less than 28 weeks, it was found that the risk of admission for RSV infection during the first two years of life was 18%. However, most children with RSV infection requiring admission are otherwise healthy and born at term. Risk factors among these children are age < 6 months, male gender, low socioeconomic status, many people per square metres in the home, tobacco smoke, siblings, nursery care and possibly familial predisposition to allergic illness. In western countries, the mortality among children as a result of RSV infection is very low, < 1%. RSV also causes illness among adults and among the elderly even death. In connection with a project currently in progress, data has been collected for all persons investigated for RSV infection in Denmark since 1995. During the period 1998-2000, 19,495 specimens were investigated for RSV, of which 5,695 (29%) were positive. Age and gender distribution of these is shown in [table 1](#). Since older children and adults are not often investigated for RSV infection, data for these age groups is scarce in the table.

**Table 1. No. of specimens positive for respiratory syncytial virus (RSV) by age, M/F ratio and incidence per 10<sup>5</sup>, 1998-2000**

| Age (yrs) | No.  | M/F ratio | Incidence per 10 <sup>5</sup> |
|-----------|------|-----------|-------------------------------|
| <1        | 3782 | 1.4       | 1892.6                        |
| 1         | 1336 | 1.3       | 659.1                         |
| 2         | 337  | 1.4       | 162.6                         |
| 3-4       | 114  | 1.1       | 27.1                          |
| 5-9       | 30   | 1.0       | 3.0                           |
| 10-19     | 13   | 1.6       | 0.7                           |
| 20-29     | 16   | 1.7       | 0.7                           |
| 30-39     | 13   | 0.3       | 0.5                           |
| 40-64     | 24   | 1.7       | 0.5                           |
| 65+       | 7    | 1.3       | 0.3                           |
| Unknown   | 23   | -         | -                             |
| Total     | 5695 | 1.3       | 35.7                          |

**Transmission**

Virus is secreted up to three weeks after onset of illness. Infection usually takes place by inoculation in the nose and eyes with secretion droplets from RSV-infected people, or with secretions deposited on surfaces. Virus-containing secretions can remain infectious for more than six hours on a smooth surface, and on cloth and paper for around 30 minutes.

**Symptoms**

Incubation time is two to eight days. The primary infection is seldom asymptomatic, and the most common manifestation is upper respiratory tract infection with rhinitis, but otitis media and laryngitis also occur. Among 25-40% of primarily infected children, the infection spreads to the lower airways leading to bronchiolitis or pneumonia with dyspnoea, wheezing, intercostal and subcostal recession, and in the smallest children possibly apnoeic episodes. The disease usually lasts two to three weeks. Complications may appear in the form of bacterial pneumonia or otitis media. Up to 20% of children who have had a serious RSV infection are readmitted within a few years with asthmatic symptoms. It is undecided whether the relation between serious RSV infection and hyperreactive airways is causal or whether there exists a common predisposition.

**Diagnosis**

The best test material for detection of RSV is obtained by nasopharyngeal suction or nasal lavage. Nasal secre-

tions collected by nasal suction or swab can be used, but this method is less sensitive. RSV is detected in clinical microbiological departments by immunofluorescence, ELISA and PCR. Quick tests (20 minutes) are a little less sensitive.

**Treatment**

There is no sure and efficient treatment for RSV infection. Ribavirin has been used for the treatment of children at risk of severe course of the infection, particularly in United States, but serious questions have been raised about the effect. This agent is currently used in Denmark only in RSV infection in patients with severe immune deficiency. Treatment of patients with adequate immune function consists of suction, adequate nutrition and respiratory support. In the event of bronchospasm, a beta-2 agonist can be tried, and antibiotics are given in the event of secondary bacterial infection.

**Prevention**

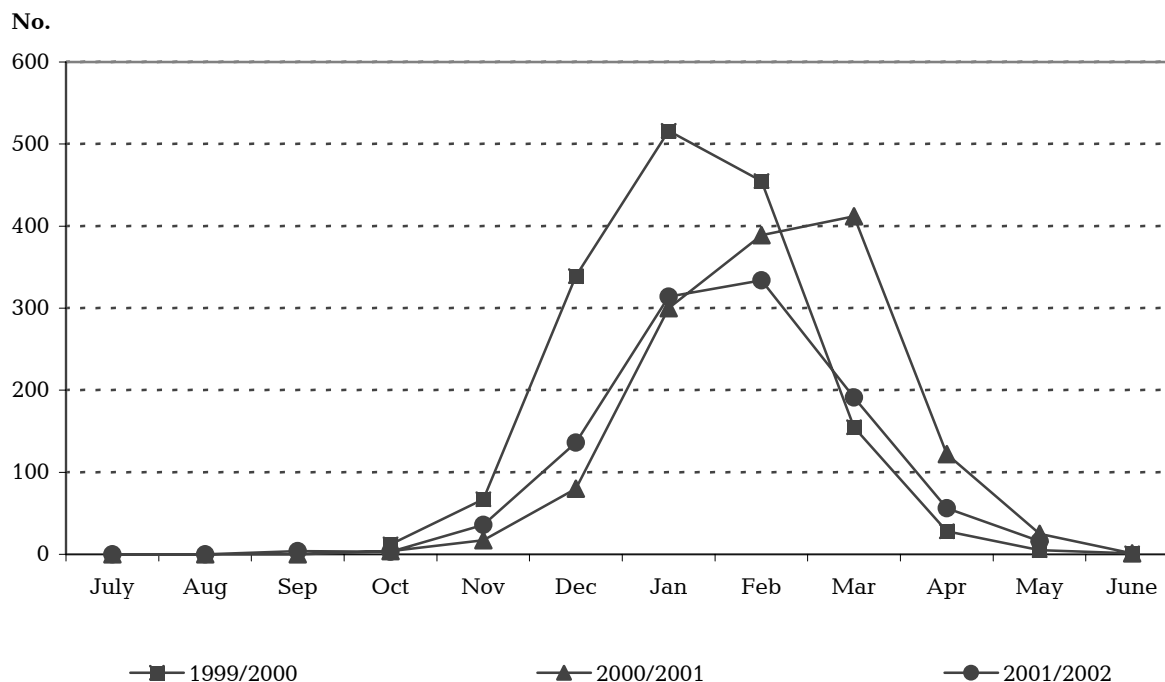
A safe and effective vaccine is not yet available. However, the addition of specific antibodies may reduce the risk of admission of children at risk of severe course of illness. Studies have shown that nosocomial infection with RSV can be reduced by hand washing and/or spraying with spirit, use of aprons and gloves and by isolation of RSV-infected patients during admission. It may be appropriate to wash items such as toys and stethoscopes, or to spray them with spirit, as these may function as vectors for micro-organisms.

(L. G. Stensballe, Department of Epidemiology Research, K. Kristensen, Paediatric Clinic II, Copenhagen University Hospital)

**Surveillance**

Since October 1998, a number of clinical microbiological departments have monthly reported laboratory-confirmed RSV infections to the Department of Epidemiology. The result of the reports for 1999-2002 is shown in the diagram on the back. From this it can be seen that the epidemic curve peaked in the period January-March. This voluntary reporting is important, partially because interest in RSV infection is increasing. (G. H. Kock-Hansen, S. Samuelsson, Department of Epidemiology)

## Patients with laboratory-diagnosed RSV, 1999-2002



Reported from the following Clinical Microbiology Departments:

Aalborg Hospital (South), Aarhus Municipal Hospital, Herning Central Hospital, Hvidovre Hospital, Odense University Hospital, Slagelse Central Hospital, Viborg Hospital, Dept. of Virology, Statens Serum Institut.

## Patients with confirmed *Listeria monocytogenes* infection

1st quarter of 2002 compared with 1st quarter of 2001, and 2001, whole year

|              | 1st quarter<br>2002 | 1st quarter<br>2001 | Whole year<br>2001 |
|--------------|---------------------|---------------------|--------------------|
| Mother/child |                     |                     |                    |
| infection    | 2                   | 1                   | 3                  |
| Septicaemia  | 3                   | 5                   | 25                 |
| Meningitis   | 0                   | 2                   | 10                 |
| Other        | 0                   | 0                   | 0                  |
| Total        | 5                   | 8                   | 38                 |

(Dept. of G-I Infections, Dept. of Clinical Microbiology)