RSV (Respiratory Syncytial Virus)
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Disease etiologic agent
Respiratory syncytial virus (RSV) is a member of the family Paramyxoviridae and the subfamily Pneumovirinae. It is an enveloped RNA virus with 10 proteins encoded by the genome. There are two strains; A and B, with the most severe forms of RSV produced by strain A. [1][4]

Disease Transmission
RSV is spread through virus-containing air droplets which linger in the air after an infected person coughs or sneezes. Contact with these droplets on one’s nose, mouth or eyes could lead to infection. The virus can also be spread by direct or indirect transmission. RSV can survive for many hours on hard surfaces. Touching a contaminated surface can cause an infection if the person then touches their eyes, nose or mouth; this is indirect. An example of direct contact would be kissing someone whom is previously infected. [2][3]

Reservoirs
The only reservoirs for Respiratory Syncytial Virus are humans. There are animal versions of RSV, including bovine RSV (BRSV) and pneumonia virus of mice (PVM), suggesting that species jumping occurred during the evolution of these viruses. However, there is no animal reservoir for human RSV. [6]

Specific Microbial Characteristics of RSV, include taxonomy
RSV is a lipid enveloped RNA virus that consists of three Envelope Proteins, G, F, and SH and Matrix Proteins, M and M2. The genome has one strain of RNA compromised of 10 viral proteins, including two non-structural proteins, NS1 and NS2. Viral attachment to the cell is completed by the RSV G protein. The F protein is responsible for fusion of viral and cell membranes and the fusion of infected and adjacent cell membranes resulting in the formation of syncytia. The role of the SH protein continues to be unknown. It does facilitate fusion, but is not part of replication or syncytium formation. Infection begins with the G protein binding to the host cell, followed by F protein-mediated fusion of the viral and cell membranes and penetration of the nucleocapsid complex into the cytoplasm. The F and G glycoproteins are the major targets of neutralizing antibodies. [4][5][6]

Specific tests for identification
The four methods of diagnosis include viral culture, antigen detection, and immunofluorescence assay (IFA) or enzyme immune assay (EIA), RNA detection by reverse RT-PCR or serology. These tests can be run on a variety of specimens including nasopharyngeal swabs, nasal washes, sputum, or bronchoalveolar lavages. If a patient is suspected to have RSV, a combined nasal and pharyngeal specimen by nasal swabbing should be collected for laboratory testing. [5]
Signs and symptoms of disease
Upper respiratory symptoms including a cough, runny nose and low grade fever are seen in most cases. The incubation period for RSV is 4-6 days after exposure. A few days after the upper respiratory symptoms have begun, lower respiratory symptoms like dyspnea and wheezing will begin. RSV bronchiolitis will cause a rapid respiratory rate due to air trapping and in more serious cases RSV can lead to respiratory failure and hypoxia. Though most RSV infections are seen in children, it is a significant cause of upper respiratory infections in all ages. [9]

Historical information
Respiratory syncytial virus (RSV) was discovered in 1956 by Dr. Robert Chance from a chimpanzee with an upper respiratory infection. [5]

Virulence factors
Once the infection is established, it replicates in the nasal passages. The virus then spreads from the upper respiratory tract to the lower respiratory tract via the respiratory epithelium and through the aspiration of nasal secretions. With starting cell fusion and syncytium formation, RSV is able to spread from cell to cell. The bronchiole mucosa begins to swell and lumina fill with mucus and exudate. The shedding of dead epithelial cells is caused by inflammatory cells infiltrating the area, which causes obstruction of bronchiole passages. [6][7]

Control/Treatment
Aerosolized ribavirin is the only licensed antiviral medication for the treatment of RSV and its use is limited to infants. Treatment is generally symptomatic and includes fluids, oxygen and fever reducers, as needed. According to the Oxford Journal, treatment options for severe disease have not progressed much since Cook and Reynolds commented in 1963 that: “oxygen is vitally important in bronchiolitis and there is little evidence that any other treatment is useful”. [4][5]

Prevention/Vaccine info/New Trials
There is ongoing research in both antiviral therapy and vaccine creation, though neither are available now. These include inactivated virus, purified proteins, and live attenuated vaccines. However, infants at high risk for serious disease can receive a monthly injection of a commercial RSV-neutralizing monoclonal antibody, palivizumab (Synagis), which provides a 55% reduction in RSV-associated hospitalization. While it cannot help cure or treat children already infected, the drug can help prevent development of serious RSV disease. The number one prevention for the spread of RSV is hand washing. [3][5][6]

Current outbreaks / cases locally
In the United States, most children become infected with RSV by age 2, with 75,000 to 125,000 of them hospitalized each year. RSV season varies widely in Texas by region, with the activity increasing in September or October and hitting its peak in December or January.
Through the National Respiratory and Enteric Virus Surveillance System (NREVSS) sponsored by the Centers for Disease Control and Prevention (CDC), RSV cases are voluntarily reported by sentinel Texas laboratories on a weekly basis. Both the number of tests submitted and the number of positive tests are reported by these providers.

Week ending 2/20/2016 reported approximately 700 RSV antigen tests submitted in Central Texas. Of those 700 tests, approximately 200 were positive. This is a decrease from the week ending 1/30/2016, the peak of the season, with approximately 300 cases testing positive. [8][12]

**Current outbreaks/cases globally (with prevalence/incidence)**

On a global scale, the only current outbreaks are noted in Green Bay, Wisconsin and Springfield, Missouri. It is common to see a rise in RSV cases during this time of year, the number of cases that require hospital care have increased compared to last year. Last year, as of February 2015, HSHS [Hospital Sisters Health System], St. Vincent, and St. Mary's Hospitals had 70 cases of RSV. This year, they have seen 102 cases. It is estimated that RSV affects 64 million people and causes 160,000 deaths each year worldwide.[10][11][12]


