

VIRAL RESPIRATORY TRACT INFECTION:

1- RHINOVIRUS:

- **Nonenveloped**, Icosahedral, **+Sense single strand RNA virus**
- 3 species (A, B & C) based on sequence analyses.
- enter through the **upper respiratory tract**.
- **Replication:** epithelium of the nasal mucosa
- Histopathologic changes: submucosa + epithelium (edema and mild cellular infiltration)
- **There's a direct correlation between the amount of virus in secretions and the severity of illness.**

33°C

Divided into:
major: use (ICAM-1) as receptor
and
minor: bind (LDLR) family.

The incubation period: 2 to 4 days. / Acute illness: 7 days / Nonproductive: 2–3 weeks.

- Cause **upper respiratory tract infections**, common cold syndrome.
- half of **acute asthma exacerbations**.
- **Symptoms in Adults:** sneezing, nasal obstruction, nasal discharge, and sore throat. headache, mild cough, malaise, and a **chilly sensation**. There is generally little or no fever. **Mucosal Changes:** The nasal and nasopharyngeal mucosa exhibit redness and swelling.
- **SECONDARY BACTERIAL INFECTIONS:** acute otitis media, sinusitis, bronchitis, or pneumonitis, especially **in children**.

2- CORONAVIRUS:

- **enveloped**, **+ss RNA**, helical capsid
- The Coronaviridae contain six genera (Alphacoronavirus, Betacoronavirus, Gammacoronavirus, Deltacoronavirus, Bafinivirus, and Torovirus).
- **Pathogenesis:** Often displaying tropism for epithelial cells in the respiratory or gastrointestinal tract
- **In Vivo Infections:** In vivo, coronavirus infections can either be disseminated, as seen with mouse hepatitis virus, or localized. In humans, coronavirus infections typically, though not always, remain limited to the upper respiratory tract.
- **Diseases: common cold, SARS**(2003→ was detected not only in the respiratory tract but also in other organs such as the kidney, liver, small intestine, and stool/ **COVID-19**), **MERS** (2012→ pneumonia and respiratory failure, with most fatalities occurring in patients with medical comorbidities. , originated in bats and became widespread in camels)
- **Diagnosis:** RT-PCR + (NAAT)

SARS-CoV-2 and COVID-19: Asymptomatic/ Common symptoms:
fever, dry cough, shortness of breath, and fatigue. More specific:
anosmia and dysgeusia.

Complications: (ARDS), hypercoagulability (including cryptogenic and/or ischemic stroke), shock, organ failure, and death.

Risk Factors: increasing age (strongest).

• **Transmission:** respiratory droplets and aerosols. entry occurs through the attachment of the viral spike protein to the **ACE2 receptor** on cell membranes.



• **Immunity and Vaccination:** Anti-spike protein antibodies confer immunity. Vaccination induces both humoral and cellular immunity.

• **Treatment:** supportive/ O₂/ Dexamethasone, remdesivir, and IL-6 pathway inhibitors

3- **ADENOVIRUS:**

• **Nonenveloped, ds DNA,** Icosahedral capsid • replication in oropharynx

• **Typical Symptoms:** Common symptoms of respiratory diseases include cough, nasal congestion, fever, and sore throat.

• Group C virus types 1, 2, and 5 -> respiratory diseases in infants and children.

types 3, 7, and 21 in 10–20% of childhood pneumonias.

• Infections with types 3, 4, and 7 -> in adolescents and adults.

MILITARY RECRUIT RESPIRATORY SYNDROME: fever, sore throat, nasal congestion, cough, and malaise, with the potential to progress to pneumonia/ Epidemics occur among young military recruits, particularly under conditions of fatigue, stress, and crowding/ Type 4 and 7 are type 3 may also contribute to the syndrome.

4- **PARAINFLUENZA:**

✓ Reinfections

• **enveloped, -ss RNA,** helical capsid

• Types 1 and 3 belong to the genus **Respirovirus**

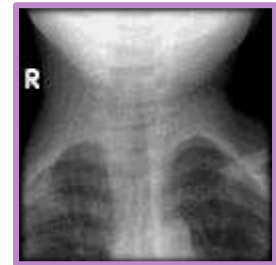
• Types 2, 4 a and 4b belong to the genus **Rubulavirus**

• replication in immunocompetent hosts is primarily limited to respiratory epithelia.

• types 1 and 2, involving the larynx and upper trachea, leading to **croup** (laryngotracheobronchitis), bark-like cough

• Deeper spread to the **lower** trachea and bronchi, causing pneumonia or bronchiolitis type 3, albeit at a lower frequency than observed with RSV.

• virus-specific IgE is associated with disease severity.



Primary Infections in Young Children:

• rhinitis and pharyngitis, often accompanied by fever and some bronchitis. Ranging from laryngotracheitis and croup (**types 1 and 2**) to bronchiolitis and pneumonia (type 3).

• Severe illness associated with type 3 -> in infants under 6 months

• croup or laryngotracheobronchitis is more likely in children aged 6 months to 18 months.

• type 4 typically does not cause serious disease

• **Common Complication:** otitis media.

Immunocompromised children and adults -> severe parainfluenza virus infections.

Mortality rates after parainfluenza infection in bone marrow transplant recipients **range from 10% to 20%**.

5- RESPIRATORY SYNCYTIAL VIRUS:

- **enveloped, -ss RNA**, helical capsid
- leading cause of **lower respiratory tract illness** in infants and young children, particularly responsible for **bronchiolitis** and pneumonia in those under 1 year.
- is a significant cause of otitis media
- begins in epithelial cells of the nasopharynx.
- **incubation period** : 3–5 days/ **Viral shedding** :1–3 weeks in infants and young children, while **adults**: 1–2 days.
- reinfections usually involve the upper respiratory tract.
- Viral antigens can be identified in the upper respiratory tract and in shedding epithelial cells
- Patients with impaired **cell-mediated immunity** may become persistently infected with RSV, shedding the virus for extended periods, even months
- Progression -> rapid, potentially culminating in death. Mortality rate in normal infants is low / In the presence of preexisting diseases like congenital heart disease, mortality rates may be high.
- **Treatment: Supportive measures** (removal of secretions and the administration of oxygen.)

Antiviral Medication - Ribavirin: of lower respiratory tract, aerosol form over 3–6 days / **X Oral**

Globulin and Monoclonal Antibodies (palivizumab)

- RSV vaccine is available for pregnant ladies

6- METAPNEUMOVIRUS: 2001/ all ages/ wide range of respiratory illnesses

- Detected using a molecular approach on clinical samples from children with respiratory illnesses but with negative test results for known respiratory viruses.

Done by: mariam qussay

