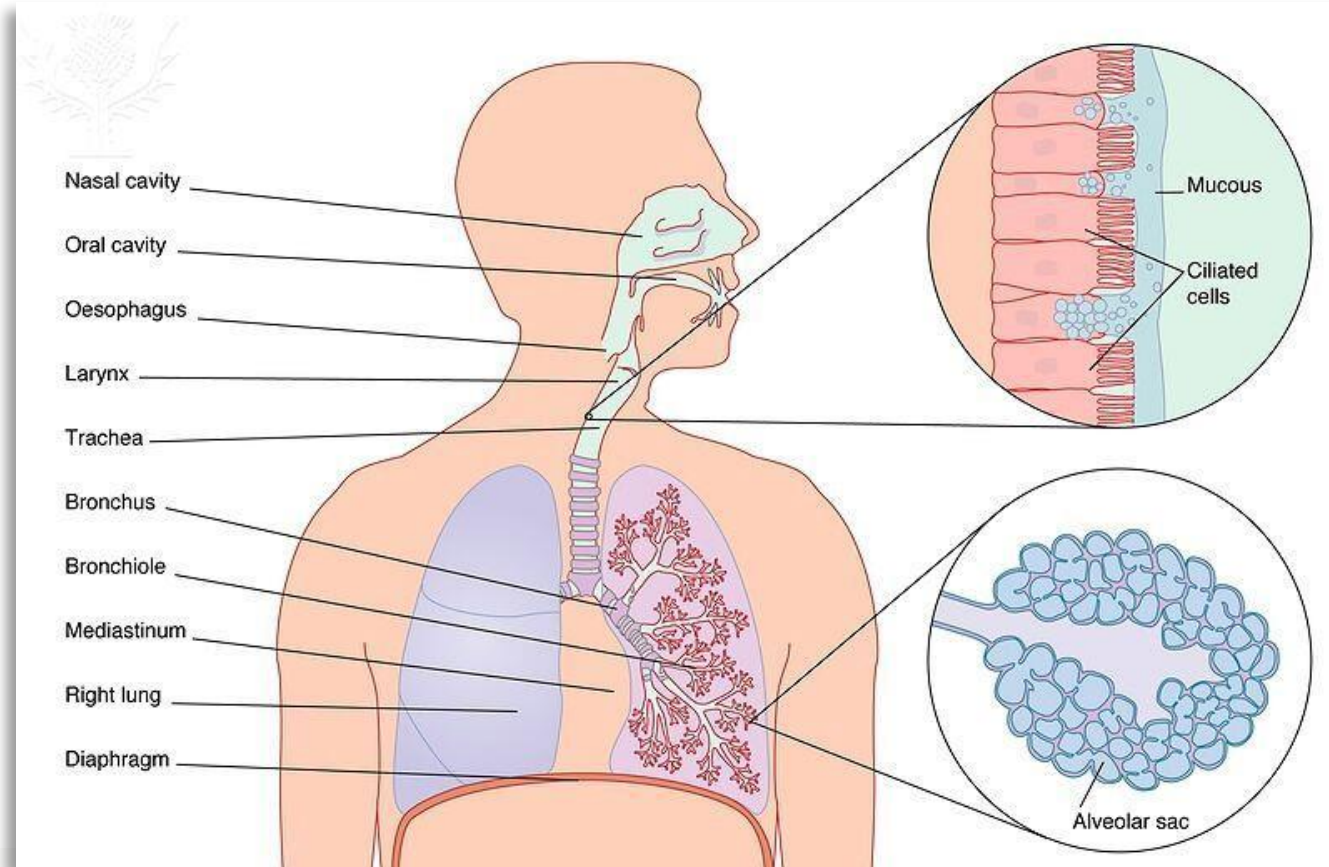


Viral Respiratory Tract Infections

Malik Sallam

Main Topics

- Rhinosinusitis (common cold).
- Pharyngitis.
- Laryngitis/Croup.
- Bronchiolitis.
- Pneumonia.



A man in profile, wearing a light-colored shirt, is coughing into his elbow. A spray of white droplets is visible coming from his mouth. The background is dark and textured.

*Common Cold (Coryza;
Acute Rhinosinusitis)*

Common Cold (Coryza; Acute Rhinosinusitis)



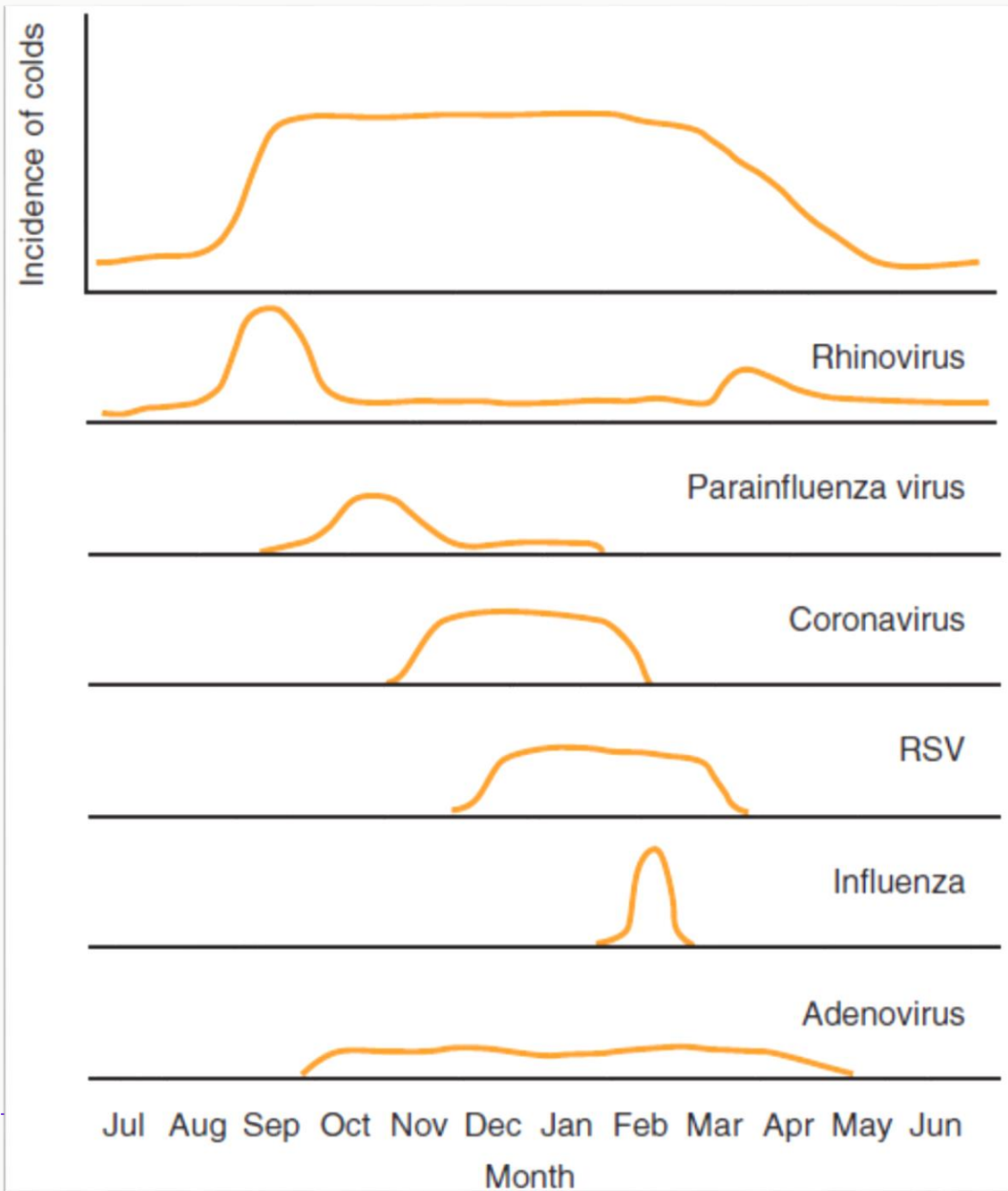
Characteristics of Viral Colds in Adults and Young Children

Characteristic	Adults	Children <6 Years
Frequency	2–4 per year	One per month, September–April
Fever	Rare	Common during first 3 days
Nasal manifestations	Congestion	Colored nasal discharge
Duration of illness	5–7 days	14 days

Viral Etiology of Common Cold

Virus	Percentage of cases (%)
Rhinovirus	30–50
Coronavirus	10–15
Influenza virus	5–15
Respiratory syncytial virus	5
Parainfluenza virus	5
Adenovirus	< 5
Metapneumovirus	± 2
Undiscovered virus	20–30

Epidemiology of Common Cold



Transmission/Incubation Period

	Mode of transmission	Incubation period
Rhinovirus	airborne/by large particle aerosol	2–7 days
Coronavirus	possibly airborne	2–4 days
Influenza	airborne/by small-particle aerosol	1–4 days
RSV	large-particle aerosol/direct contact with self-inoculation	4–5 days
PIV	large-particle aerosol/direct contact with self-inoculation	3–10 days
Adenovirus	airborne/direct contact with self-inoculation	4–14 days

Pathophysiology of Common Cold

- Host response to the virus plays a greater role compared to direct virus destruction of the nasal mucosa
 - Immune response with influx of polymorphonuclear leukocytes, cytokine release, and vascular leak

Immunity
to
Common
Cold
Viruses

Virus	No. of Serotypes
LONG-LASTING IMMUNITY NOT PRODUCED BY INFECTION^a	
Respiratory syncytial virus (RSV)	1
Parainfluenza virus	4
Human coronavirus	2
IMMUNITY PRODUCED BY INFECTION^b	
Rhinovirus	>100
Adenovirus	≥33
Influenza	3 ^c
Echovirus	31
Coxsackievirus group A	3
Coxsackievirus group B	6

^aRepeated infection with the same serotype is usual.

^bReinfection with the same serotype is uncommon.

^cType A subtypes change.

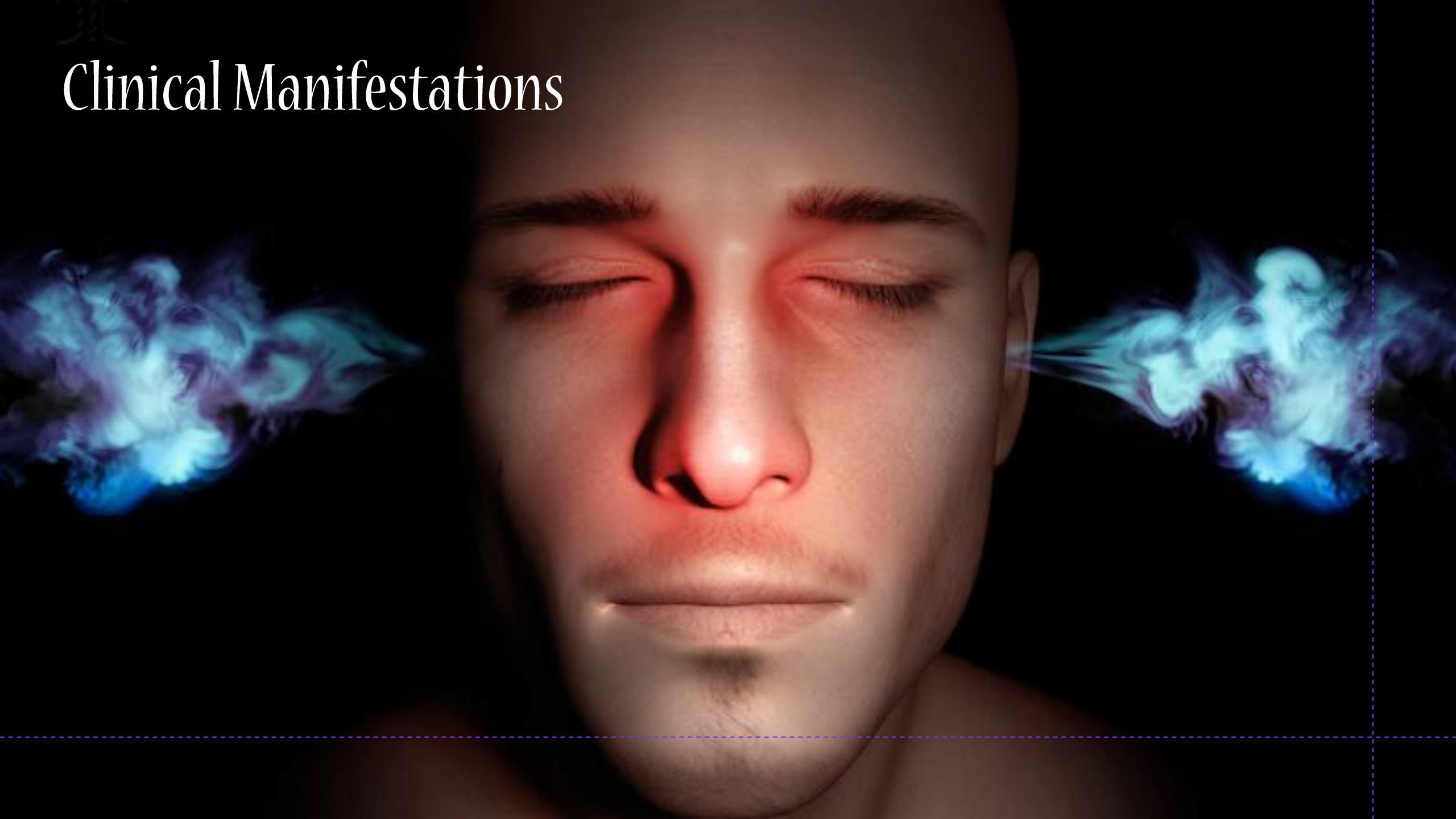


Clinical Manifestations

Clinical Manifestations



Clinical Manifestations



Viral

Adenovirus*
Coronavirus HKU1*
Coronavirus NL63*
Coronavirus 229E*
Coronavirus OC43*
Human metapneumovirus*
Rhinovirus*
Enterovirus*
Enterovirus D68*
Influenza A (Pan)*
Influenza A/H1-2009*
Influenza A/H3*
Influenza B (Pan)*
Parainfluenza 1*
Parainfluenza 2*
Parainfluenza 3*
Parainfluenza 4*
Respiratory Syncytial Virus A*
Respiratory Syncytial Virus B*
Bocavirus*
Epstein-Barr virus (EBV)*
SARS-CoV
MERS-CoV
Mumps
Measles
Cytomegalovirus*
Human herpesvirus 6 (HHV-6)*
Varicella zoster virus (VZV)*
Parechovirus

Diagnosis

Diagnosis

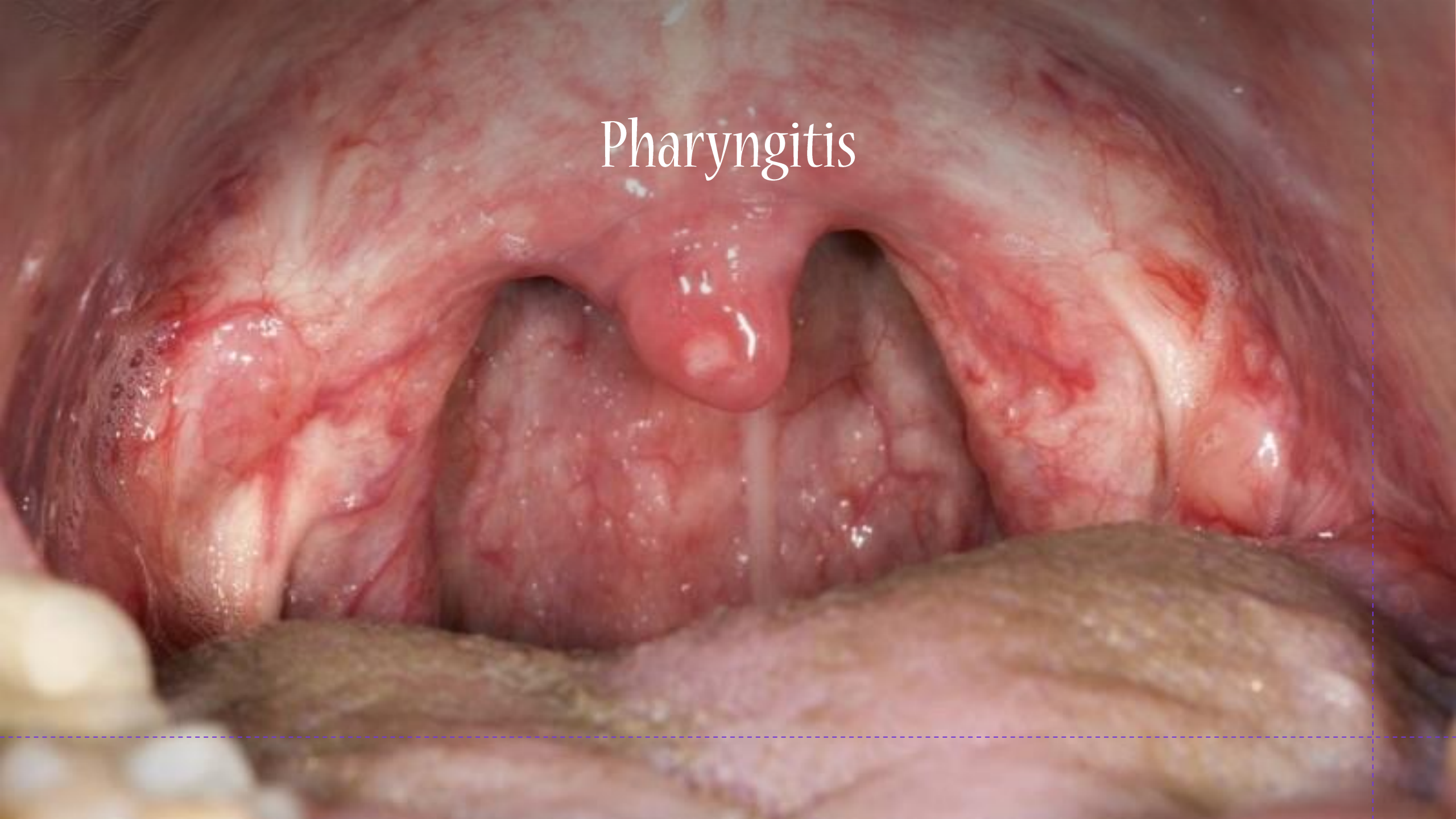
Pathogen	Classification (genome type)
Influenza A	Orthomyxovirus (RNA)
Influenza A, subtype H1N1/2009/pdm09	Orthomyxovirus (RNA)
Influenza A subtype H1	Orthomyxovirus (RNA)
Influenza A subtype H3	Orthomyxovirus (RNA)
Influenza B	Orthomyxovirus (RNA)
Coronavirus 229E	Coronavirus (RNA)
Coronavirus HKU1	Coronavirus (RNA)
Coronavirus NL63	Coronavirus (RNA)
Coronavirus OC43	Coronavirus (RNA)
SARS-CoV-2	Coronavirus (RNA)
Parainfluenza virus 1	Paramyxovirus (RNA)
Parainfluenza virus 2	Paramyxovirus (RNA)
Parainfluenza virus 3	Paramyxovirus (RNA)
Parainfluenza virus 4	Paramyxovirus (RNA)
Respiratory Syncytial Virus A/B	Paramyxovirus (RNA)
Human Metapneumovirus A/B	Paramyxovirus (RNA)
Adenovirus	Adenovirus (DNA)
Rhinovirus/Enterovirus	Picornavirus (RNA)
<i>Mycoplasma pneumoniae</i>	Bacterium (DNA)
<i>Chlamydia pneumoniae</i>	Bacterium (DNA)
<i>Bordetella pertussis</i>	Bacterium (DNA)

Note: Enterovirus and Rhinovirus are both detected, but not differentiated, with the QIAstat-Dx Respiratory SARS-CoV-2 Panel.

Management of Common Cold



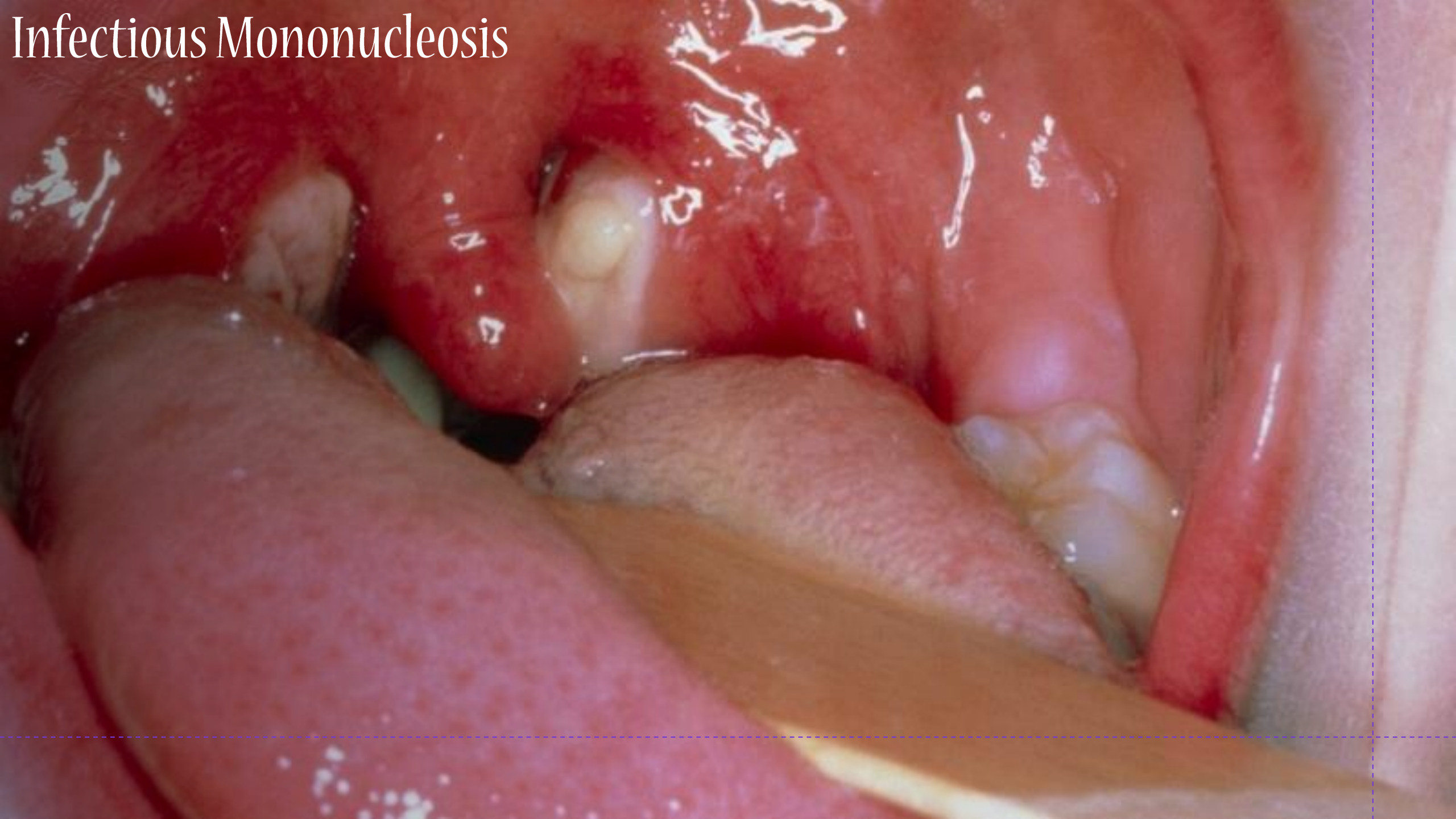
Pharyngitis

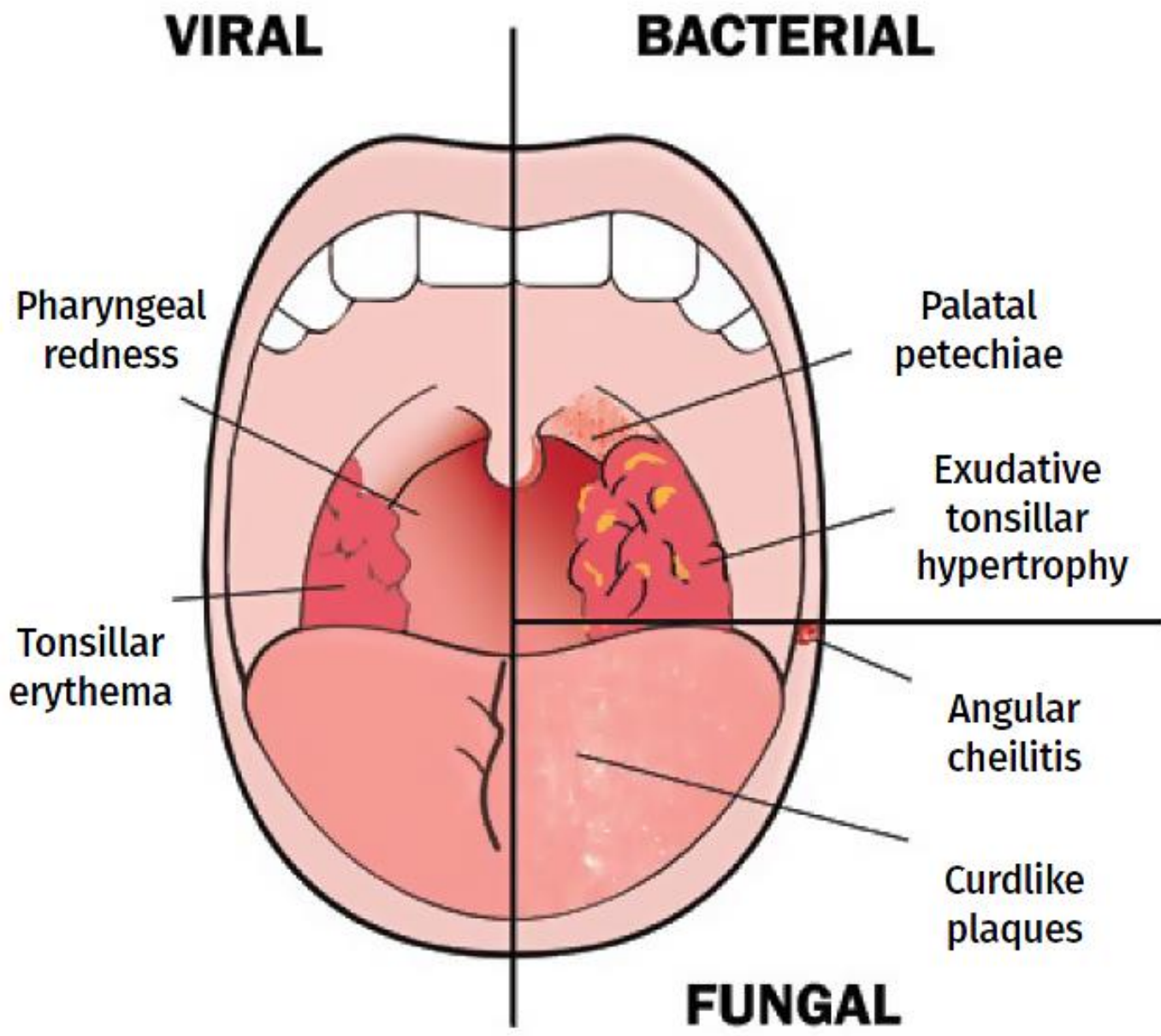


Viral Etiology of Pharyngitis

- Rhinovirus
- Adenovirus
- Coxsackievirus
- Coronavirus
- Respiratory syncytial virus
 - Parainfluenza
- Epstein-Barr virus
- Orthomyxoviridae

Infectious Mononucleosis



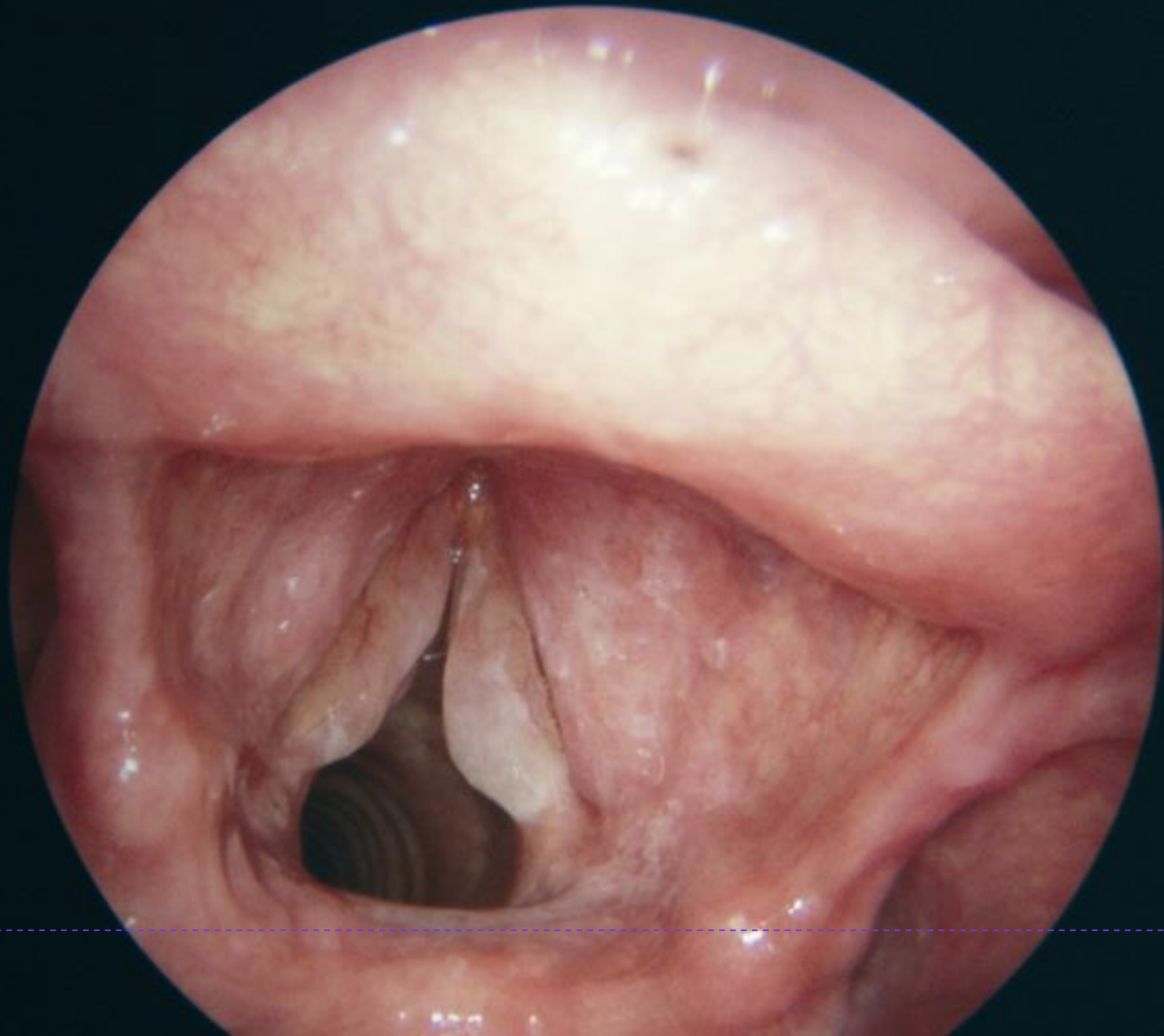


Diseases	VCA IgM	VCA IgG	VCA IgA	EA (D) IgG	EA (R) IgG	EA IgA	EBNA1 IgG
Chronic active infection	+/-	++	+/-	+	++	-	+/-
Burkitt's lymphoma	-	++	-	+/-	++	-	+
Nasopharyngeal carcinoma	-	++	+	++	+/-	+	+
Hodgkin's lymphoma	-	++	-	+	-	-	+
Reactivation	+/-	++	+/-	+	+/-	+/-	+/-



Laryngitis and Croup

Laryngitis and Croup



Sounds of Croup (Laryngotracheitis) - Lung Sounds –
MEDZCOOL

<https://www.youtube.com/watch?v=C1q6ATkMtm0>

Box 2: Differential diagnosis of stridor³

Common

- Croup

Less common

- Bacterial tracheitis
- Epiglottitis

Rare

- Upper-airway abscess
 - Peritonsillar
 - Retropharyngeal
- Foreign-body aspiration or ingestion
 - Tracheal
 - Esophageal
- Allergic reaction causing upper-airway edema
- Angioedema
- Laryngeal diphtheria

Box 3: Level of severity of croup and clinical features¹⁷

Mild

- Barky cough: occasional
- Stridor: none to limited at rest
- Indrawing (suprasternal and/or intercostal): none to mild

Moderate

- Barky cough: frequent
- Stridor: easily audible at rest
- Indrawing (suprasternal and/or intercostal): visible at rest
- Distress or agitation: none to limited

Severe

- Barky cough: frequent
- Stridor: prominent inspiratory and occasionally expiratory
- Indrawing (suprasternal and/or intercostal): marked or severe
- Distress or agitation: substantial
- Lethargy may be present

Impending respiratory failure

- Barky cough: often not prominent because of fatigue
- Stridor: audible at rest, but may be quiet or hard to hear
- Indrawing: may not be marked
- Lethargy or decreased level of consciousness
- Dusky or cyanotic without supplemental oxygen



Bronchiolitis



Viral Pneumonia

Viral Pneumonia

Table 1 Medications used in the treatment for viral pneumonia

Medication	Uses		Special consideration
Oseltamivir	Influenza pneumonia and uncomplicated influenza infection	Oral 75 mg twice daily for 5 days *Consider longer duration for critically ill patients	Needs dose adjustment for renal impairment, CrCl<50
Peramivir	Uncomplicated influenza infection	Intravenous 600 mg single dose *Consider repeated daily dosage up to 5 days for complicated influenza infection	Efficacy not established for serious influenza infection and influenza B Needs dose adjustment for renal impairment (CrCl)<50
Zanamivir	Uncomplicated influenza infection	*Intravenous zanamivir investigational drug, available for clinical use for oseltamivir-resistant influenza strains	Inhaled form is not recommended for influenza pneumonia
Ribavirin	*Mostly used for RSV infection in immunocompromised, used anecdotally for severe PIV and HMPV infection	*Aerosolized 2 g over 2 hours every 8 hours±intravenous immunoglobulin *Systemic oral or intravenous (dosage variable)±intravenous immunoglobulin	Logistically difficult to administer In mechanically ventilated patients, can deposit in the ventilator delivery system leading to malfunction Hemolytic anemia Teratogenic, requires special drug handling for HCW
Cidofovir	*Severe adenovirus infection in immunocompromised and immunocompetent patients	*Intravenous 5 mg/kg/dose weekly, duration of therapy variable, usually until symptoms resolve	Nephrotoxicity is a major toxicity, given concomitantly with intravenous hydration and oral probenecid 2 g 3 hours prior to infusion then 1 g at 2 hours and 8 hours after completion of the infusion Contraindicated with pre-existing renal disease CrCl<55
Acyclovir	Varicella pneumonitis	Intravenous 10 mg/kg/dose every 8 hours for at least 7 days	Neurotoxicity and nephrotoxicity Needs dose adjustment for CrCl<50 Neurotoxicity may be more common in patients with renal impairment
Ganciclovir	*CMV pneumonitis	Intravenous 5 mg/kg/dose every 12 hours for at least 2 weeks	Hematological toxicity (anemia, thrombocytopenia, leucopenia), nephrotoxicity and gastrointestinal symptom Needs dose adjustment for CrCl<70

*Off-label use.

CMV, cytomegalovirus; CrCl, creatinine clearance; HCW, healthcare workers; HMPV, human metapneumovirus; PIV, parainfluenza viruses; RSV, respiratory syncytial virus.



CORONAVIRUS

COVID-19

WUHAN

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Good Luck