

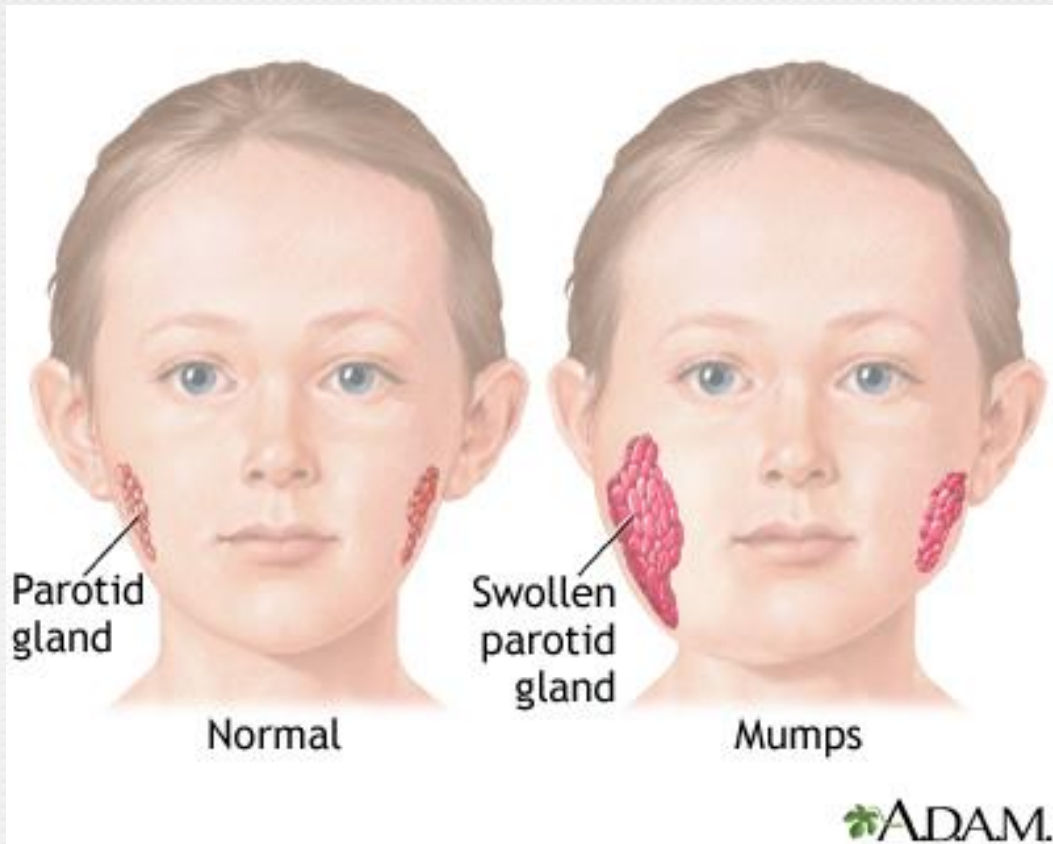
Epidemiology of Mumps

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Overview

- Mumps is a contagious **viral infection** caused by the **mumps virus**, a member of the **Paramyxoviridae family**, primarily affecting the salivary glands, remarkably the **parotid glands**, which often causes noticeable swelling. Although it is generally mild in children, it can lead to **serious complications in adults**.



Overview

- The term "mumps" originates from the British word "to mump," meaning **to grimace**, reflecting the appearance of patients with swollen cheeks.



Historical Overview

- **Early History:** Mumps has been recognized for centuries, with descriptions of the disease dating back to ancient **Greek and Roman** texts.
- In the **5th century BC**, **Hippocrates** documented a disease with swelling of the parotid glands.
- In **1934**, **Johnson and Goodpasture** identified the etiologic agent of mumps as **a virus**.

Epidemiology

- The epidemiology of mumps has undergone significant changes over the past several decades due to **vaccination** efforts, but it remains a public health concern in some regions.



Historical Trends and Incidence:

- Mumps was a common childhood illness before the introduction of the **Measles-Mumps-Rubella (MMR) vaccine** in the **1960s**. Vaccination led to a dramatic decline in cases globally.
- Despite high vaccine coverage, outbreaks are still reported in developed countries, particularly in settings like **universities, military camps, and other close-contact environments**, where immunity is low due to **incomplete vaccination**.

- **World Health Organization (WHO) Reports sporadic outbreaks**, especially in under-vaccinated communities.
- Global incidence estimates **vary** due to **inconsistent reporting**.

Mumps **was** a common infectious disease, prior to the widespread use of vaccines, with **annual incidence** ranging from **0.1% to 6%**.

Currently, the annual incidence of mumps in the absence of immunization is in the range of **100-1000 cases/100,000** population with **epidemic peak every 2-5 years**, depending on the region....

Prevalence:

- Highest in regions with limited vaccine access (e.g., some low- and middle-income countries).
- Persistent low-level endemic transmission in vaccinated populations due to waning immunity.

Epidemiology of Mumps in Iraq:

- In Iraq two significant mumps outbreaks occurred between **2004** and **2016**, with each outbreak recording over **10,000** cases.
- The **first** outbreak occurred in **2004**, during which Baghdad Governorate reported the highest number of cases among all governorates, totaling **3,768** cases.

- A larger outbreak spanned from **2015 to 2016**, with approximately **73,919** cases reported in 2016.
- By **2017**, the number of cases had decreased to **36,367**.

Agent and Virus Characteristics

- The mumps virus is a member of the *Rubulavirus* genus in the *Paramyxoviridae* family.
- It is an **enveloped, non-segmented RNA virus** with **two major surface glycoproteins:**
 - **hemagglutinin-neuraminidase** and **fusion protein**.
- The virus is **sensitive to heat** and **ultraviolet light** and has a **single known serotype**.
- **Humans** are the only natural hosts of the virus.

Host Factors

- In the pre-vaccine era, mumps primarily affected children aged **5–9** years.
- Since the introduction of the MMR vaccine, there has been **a shift in the age group affected**, with **adolescents** and **young adults** now more likely to contract the disease, especially **if their immunity has waned over time**.
- Natural infection typically confers **lifelong immunity**.

Pathogenesis

- After entry into the body, the virus first **replicates** in the **upper respiratory** or **gastrointestinal tract**, spreading to local lymphoid tissues and then to distant sites.
- The **parotid glands** are most commonly affected, but the virus can also target the **testis, pancreas, ovaries,** and **CNS**.
- **Viraemia** occurs **a few days** after the initial infection, and the **virus is excreted in urine** during the **infectious period**.

Reservoir of infection

- The reservoir of infection for mumps is **human.**

Incubation Period: Typically **16 to 18** days (range **12 to 25** days).

Mode of Transmission:

- Mumps is primarily **airborne transmission** spread through respiratory droplets, direct contact with the saliva of the infected person, and **fomites** (contaminated objects), which is **rare** but possible.
- Close contact settings, such as schools and crowded environments, facilitate its transmission.
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Period of communicability

- The period of communicability for mumps typically spans from **two days before the onset of symptoms** (especially parotitis or swelling of the salivary glands) **to about five days after symptoms appear.**
- **For public health purposes**, individuals with mumps are usually advised to **isolate for at least 5 days after parotitis onset to reduce transmission risk.**

Source Of Infection :

- Both **clinical** and **subclinical** cases.
- Subclinical cases which account for **30-40%** of all cases appear to be **responsible for maintaining the cycle of infection.**
- The virus can be isolated from the **saliva** or from swabs taken from the surface of **Stensen's duct.** Virus has also been found in the **blood, urine, human milk** and on occasion in the **CSF.**

Risk Factors for Infection:

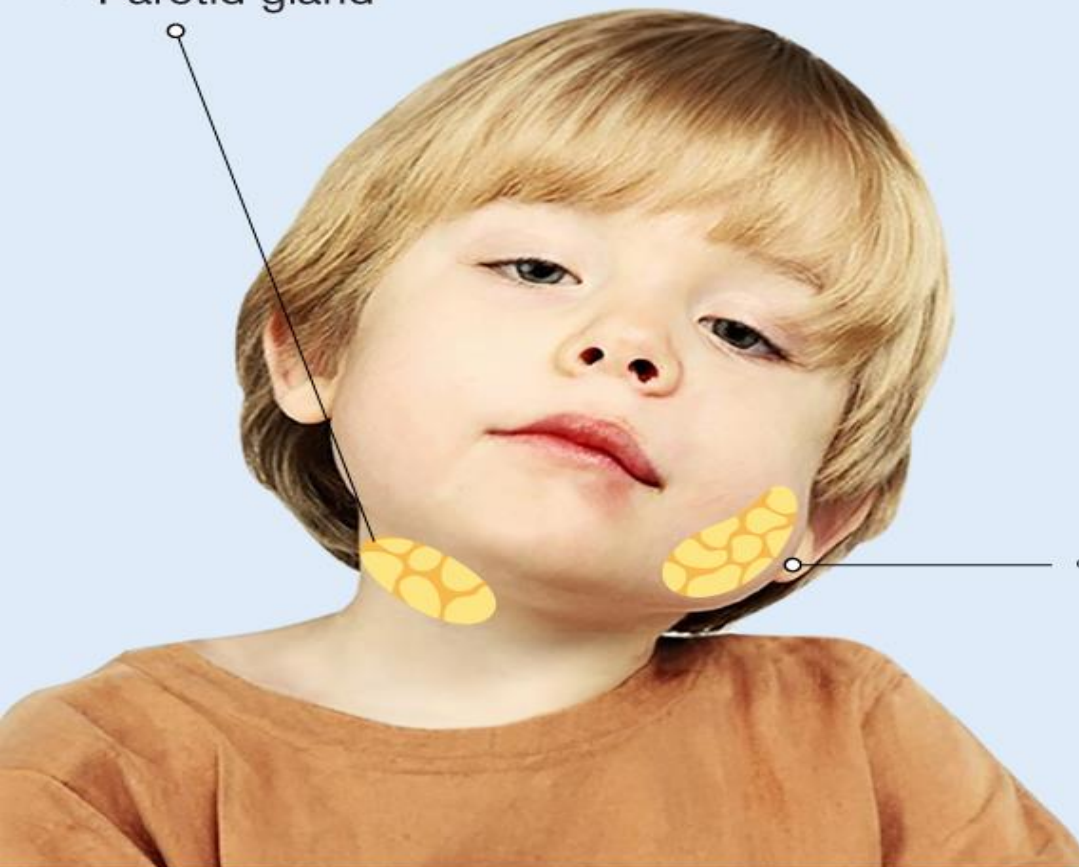
- **Vaccination Status:** Unvaccinated individuals, or those with incomplete vaccination, are at higher risk for contracting mumps.
- **Crowded Settings:** Mumps outbreaks are common in schools, universities, and military settings due to close proximity and shared living spaces.
- **Waning Immunity:** Vaccinated individuals who have not received booster doses, or whose immunity has decreased over time, are also at risk.

Clinical Features :

Initial Symptoms :

- The disease often begins with mild **prodromal symptoms** such as fever, malaise, headache, muscle aches, and loss of appetite.
- **The hallmark feature is painful swelling of the parotid glands, which occurs in 60-70% of cases. Parotitis can be unilateral or bilateral,**
- **Recovery:** Parotid swelling subsides in **4 to 7** days, with full recovery typically in about **10** days.

◦ Parotid gland



SYMPTOMS

- Pain or discomfort when chewing or swallowing.
- Fever
- Headache.
- Muscle aches and fatigue.
- Loss of appetite.
- Sore throat.
- Earache.

◦ Swollen parotid gland

Complications:

- Although mumps is generally **mild**, it can lead to serious complications, **especially in adults**:
- **Aseptic Meningitis**: Occurs in about **10%** of patients, with **50%** showing abnormalities in cerebrospinal fluid (CSF).
- **Encephalitis**: **Rare** but can cause significant morbidity.
- **Deafness**: Estimated incidence of hearing loss is about **1 per 15,000 cases**.



- **Orchitis:** Testicular inflammation affects about **25%** of postpubertal men with mumps and can lead to **testicular atrophy** in one-third of cases. However, **sterility is rare**.
- **Pancreatitis:** Affects a small proportion of cases, and mumps virus may trigger **T1DM** insulin-dependent diabetes in some individuals.
- **Oophoritis:** **Rare** in women, but can occur in postpubertal women.
- **Spontaneous Abortion:** Mumps during early pregnancy increases the risk of abortion.

Diagnosis:

- Mumps is commonly diagnosed based on **clinical presentation**, though laboratory tests may be used for confirmation:
 - **Virus Isolation:** Can be obtained from throat swabs, saliva, urine, or CSF.
 - **Serological Testing:** Detection of **mumps-specific IgM antibodies** or **a rise in IgG titers** between acute and convalescent phases.
 - **Virus Culture:** The virus can be identified by the Haemadsorption Inhibition (HAI) test.

Diagnosis:

Laboratory definitive evidence for a confirmed case requires at least one of the following:

- **Detection of mumps virus nucleic acid (PCR)**
- **Isolation of mumps virus by culture.**

Management:

- Mumps is usually self-limiting, requiring only supportive care:
 - . **Pain Relief:** Analgesics for headache or discomfort caused by parotitis and orchitis.
 - . **Rest:** Recommended to help recovery.
 - . **No Specific Antiviral Treatment:** There is no specific antiviral therapy for mumps.

Prevention:

- **Vaccination:**

- The MMR vaccine is the **cornerstone of mumps prevention**, with **two doses recommended to ensure optimal protection**.
- The live attenuated vaccine , **Jeryl-Lynn strain** of the mumps vaccine is used in the United States.





Vaccination Recommendations:

- **Children:** First dose at 12-15 months, second dose at 4-6 years.
- **Adults:** For those at high risk (e.g., healthcare workers, college students), **2 doses** of MMR are recommended, at least **28** days apart.



Vaccination Recommendations:

Post-Exposure Vaccination:

- Mumps vaccine is **not effective in preventing infection after exposure.**
- However, non-immune individuals should be vaccinated to prevent future outbreaks.

- **Effectiveness:** The vaccine significantly reduces the incidence of mumps, **although outbreaks** can still occur in **unvaccinated** populations.
- **One dose** of the MMR vaccine is about **78%** effective, while **two doses** provide around **88%** **protection** against mumps.
- In **outbreak** settings, **booster doses** are sometimes recommended.

- **Vaccine Safety:** The vaccine is generally safe, with side effects such as mild parotitis or low-grade fever being rare and transient.
- **Contraindications:** Vaccination should not be given to **immunocompromised** individuals, **pregnant** women, or those with **severe HIV infections**.

Outbreak Control:

- During outbreaks, **rapid vaccination campaigns** and **isolation of infected individuals** for at least **5** days are essential.
- Public health measures should also focus on **improving vaccine access and addressing vaccine hesitancy**.

Challenges and Global Strategies:

Vaccine Hesitancy and Under-Vaccination:

- Despite the availability of effective vaccines, mumps outbreaks continue to occur, primarily due to vaccine hesitancy (refers to delay in acceptance or refusal of vaccines despite availability of vaccination services)

Challenges and Global Strategies:

- **Incomplete vaccination schedules, and decreased immunity over time. These factors are particularly evident in certain regions or among specific age groups, such as young adults.**

Global Strategies:

- **The WHO emphasizes:**
 1. **The importance of integrating the MMR vaccine into national immunization programs,**
 2. **Improving access to vaccines in low-resource settings.**
 3. **Combating vaccine misinformation to increase coverage.**

**THANK
YOU
VACCINES**

