

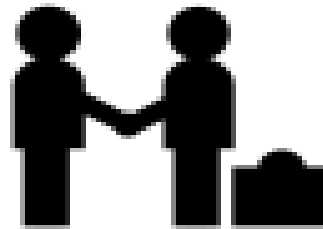


Epidemiology Droplet infection

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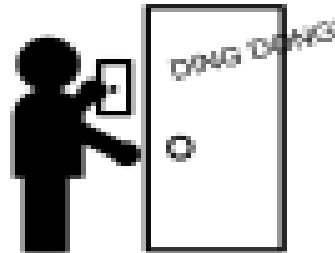
B. Human to Human Transmission

Direct Contact



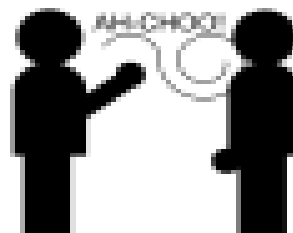
- Pathogen survives best inside the body
- Eg: HIV, Herpesviruses, Ebola

Indirect Contact



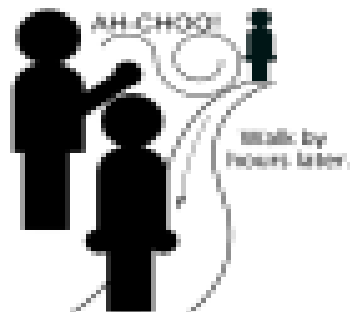
- Pathogen survives harsh environment
- Pick up pathogen from surface or air
- Eg Influenza, norovirus

Droplets



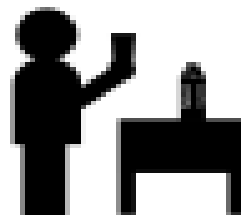
- Pathogens are in droplets, but do not survive long this way
- Eg: Ebola, *Bordetella pertussis*

Airborne



- Pathogens aerosolized and stay infective
- Eg: Influenza, Tuberculosis

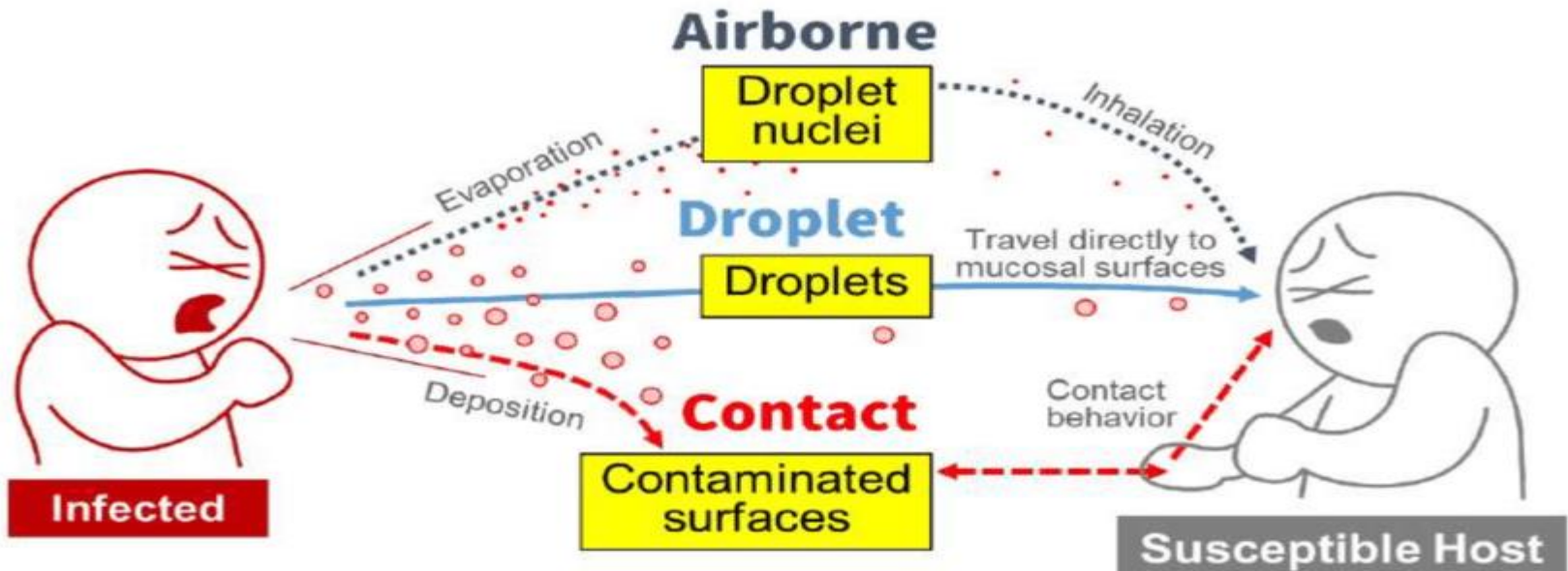
Fecal - Oral



- Through contaminated water or food
- Eg: Cholera, Norovirus, Shigella

Respiratory Infection:

- ***Direct droplet infection:***
 - both reservoir of infection and the new host are found together within the same place. The host gets infected through direct inhalation of droplet spray of the reservoir.
 - Kissing is a potential method of direct infection.



Predisposing factors

- Crowding, especially in confined places as classrooms of schools, and dormitories of camps.
- Association with the reservoir for long time.
- Ill ventilation of the place.



Indirect droplet infection

- Reservoirs and hosts do not come together.
- Infection is transmitted by
 - Air born
 - Articles and fomites
 - Milk

Airborne infection

- **Droplet nuclei** are the minute residues of fine droplets after evaporation of water. They remain suspended in air for hours, and may be carried by air current for nearby places.
- **Dust:** big droplets and respiratory discharges may fall on the floor or any surface, and get dried. Included organisms may rise again in air with dust, when disturbed by wind, and when sweeping, shaking or beating floors, furniture, bedding, carpets, and contaminated surfaces.

Articles and fomites

- contaminated with respiratory discharges: may transmit infection when used in common with the others, especially when freshly soiled.



Milk

- though milk is food, yet it may be contaminated with two respiratory organisms, that may cause respiratory infection through invasion of upper respiratory mucosa, not ingestion.
 - Haemolytic streptococci that cause pharyngitis (or scarlet fever).
 - Diphtheria bacilli, causing diphtheria.

Portal of Entry:

- organisms of droplet infection invade the respiratory tract of host at any point, from the nasal mucosa down to the alveoli.
- Invasion is followed by, according to nature of organism:
 - Local involvement of respiratory tract,
 - Systemic manifestations.

Diseases of Respiratory Infection

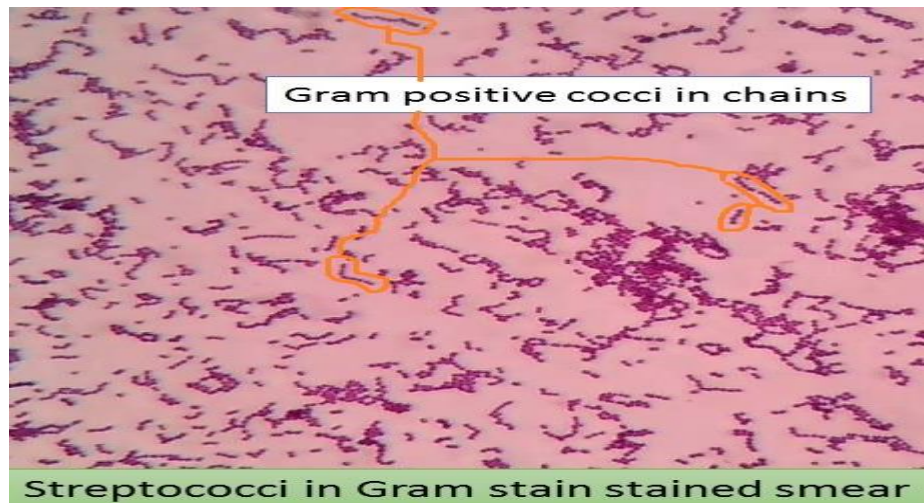
- ***Human Reservoir:*** streptococcal pharyngitis, influenza, common cold, pertussis, measles, mumps, rubella, varicella, poliomyelitis, diphtheria, meningococcal meningitis, lower respiratory infections (pulmonary tuberculosis, bronchitis, pneumonia, bronchopneu-monia, and other lung infections), variola.

Diseases of Respiratory Infection

- ***Animal Reservoir:*** pulmonary tuberculosis by bovine bacillus, and influenza.

Streptococcosis

- Streptococci form part of the normal flora of man and animal however there are many species that are pathogenic to man.
- They are gram +ve cocci arranged in chains of variable length



Classification

- Beta hemolytic strept.
- Alpha hemolytic strept → Veridans strept
- Non hemolytic strept → strept fecalis



Diseases caused by group A Beta hemolytic streptococci

- Sore throat, tonsillitis, pharyngitis
- Scarlet fever
- Skin infections: Impetigo, cellulites, ersipelas, wound infection & puerperal sepsis
- Auto immune diseases: Rheumatic fever, acute glomerulonephritis

Streptococcal sore throat

(Strept. Tonsillitis or pharyngitis)

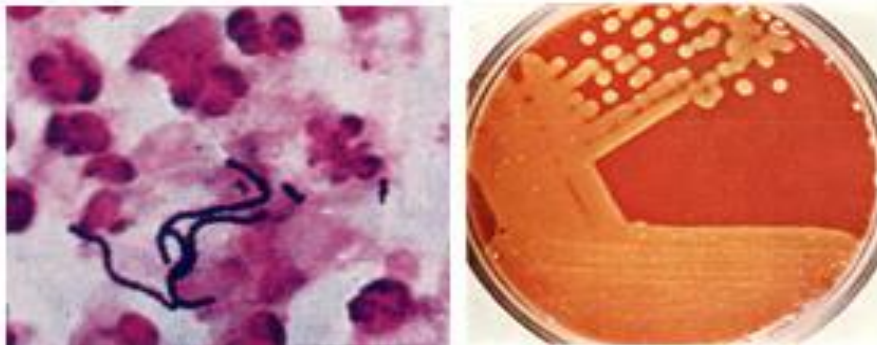


Streptococcal sore throat

- **An acute communicable disease of worldwide distribution.**
- **It occurs in endemic and sporadic form especially in developing countries.**
- **Many sociodemographic factors predispose to its occurrence and endemicity.**
- **Some cases may develop dangerous systemic autoimmune complications.**

Causative agent:

- **Streptococcal pyogen, including over 130 distinct serotypes.**
- **The organisms are moderately resistant outside the body.**
- **However, they are readily destroyed by heat, disinfectants, oxidizing agents, and boiling of milk.**



Reservoir:

- Humans (cases, carries)
 - **Cases** may be typical, atypical, mild, moderate, severe-etc.
 - **Carries** are usually temporary but sometimes chronic, they are either nasal or throat carriers.

- **Exit:**
 - Throat and nasal discharges of cases and carriers.
- **Period of communicability:**
 - Late incubation period, all over the course of the disease and to a variable period in convalescence.
 - However, proper management of cases shorten to a great extent the period of infectivity.
- **Incubation period: 1-3 days.**

Modes of transmission:

- **Direct droplet infection** due to intimate contact with case or carrier . It is the most important mode of transmission.
- **Airborne infection** through **droplet nuclei** and **dust**.
- **Indirect infection** from soiled articles and fomites.
- **Milk** which may be contaminated from droplets of foodhandlers or infected udder of the animal. During milk ingestion, the organisms pierce the mucous membrane of the upper respiratory passages.

Susceptibility and Resistance

- **Age**: All ages are susceptible especially school children from 5-15 years.
- **Sex**: No sex difference.
- **Immunity**: Immunity is type specific, however repeated attacks may occur due to many types of streptococcal pyogen. Antibiotherapy may interfere with type specific immunity.
- **Sociodemographic and environmental factors**: it include poverty, malnutrition, poor housing conditions; ill ventilation and crowiness.
 - Bad health habits and low health consciousness favour spread of infection especially among confined groups in schools, camps, prisons, parks and mental hospitals.

- Clinical picture
- Complications:
- Local: Suppurative extension of infection causing
 - Peritonsillar abscess.
 - Otitis media .
 - Laryngitis.
 - Bronchitis.
- Systemic:
 - 2 remote autoimmune sequelae might occur after 2-3 weeks, namely acute rheumatic fever and acute glomerulonephritis.
 - Secondary gastrointestinal infection of infants and children.
 - Wound infection in the form of puerperal sepsis

Diagnosis: depends on.

- Clinical picture.
- Throat swabbing and isolation of the organisms.
- Rising of antistreptolysin O titre which denotes recent streptococcal infection.

Differential diagnosis:

- Other types of sore throat (e.g viral).
- Diphtheria (low grade fever, bad general condition, toxic facies and adherent membrane which is usually unilateral).

Prevention:

General measures

- Sanitary housing conditions, good ventilation, avoidance of over crowding and dust control.
- Milk sanitation.
- Health education of the public as regards .
 - Source, mode of transmission and complications.
 - Importance of milk sanitation.
 - Value of proper and adequate management namely completion of the full course of antibiotherapy.

Specific measures:

Chemoprophylaxis:

- Penicillin is the drug of choice.
- Given in the form of long acting 1.200,000 I.U, I.M injection for adults and 600,000 I.U. for children every 2-4 weeks, oral penicillin may be given.
- Erythromycin is given to hyper-sensitive cases to penicillin.
- Chemoprophylactic agent should be given for at least 5 years .
- Chemoprophylaxis is given to guard against repeated attacks or infection and rheumatic activity among rheumatic fever or RHD cases.

Specific measures: *(Cont.)*

- **M antigen vaccine is under trial, challenges include many serological types and potential risk of developing autoimmune complications.**

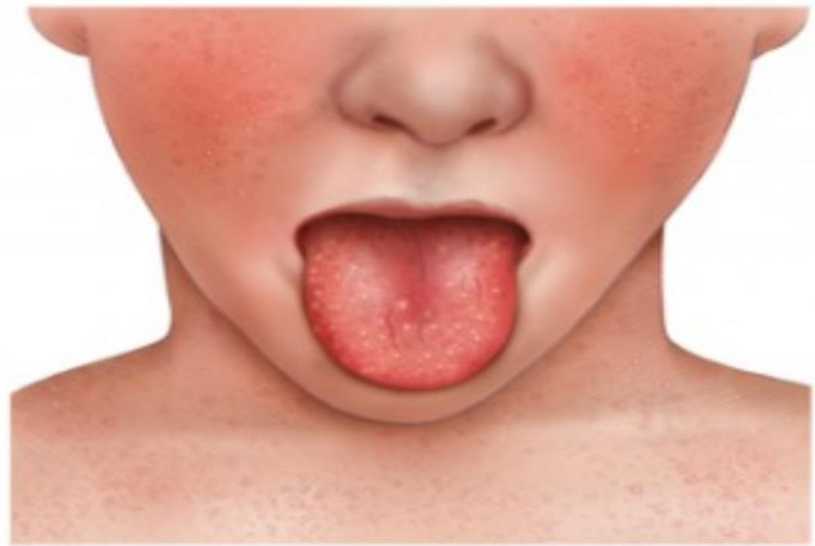
Control: (Cases)

- **Early case findings.**
- **Notification to LHA.**
- **Isolation usually at home for 24 hours after starting proper antibiotics providing good general condition.**
- **Concurrent disinfection for nasopharyngeal discharges and contaminated articles and fomites and terminal cleaning .**
- **Treatment**

Control: (Contacts)

- **Enlistment by age, sex, occupation etc.**
- **Health education.**
- **Protection by chemoprophylaxis in high risk close contacts.**

Scarlet Fever

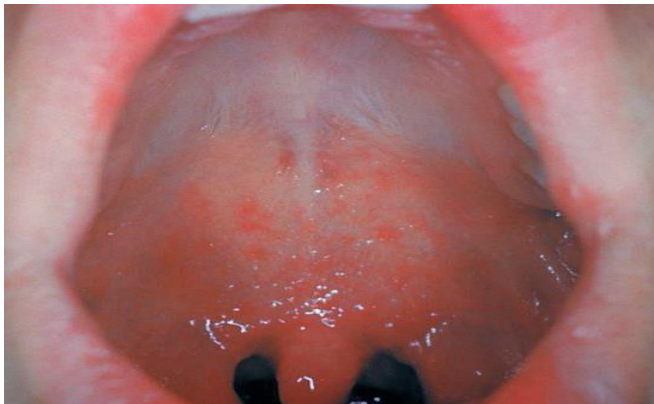


Scarlet fever

- It is a form of streptococcal diseases characterized by skin rash and fever.
- The rash is caused by erythrogenic exotoxin secreted by streptococcal pyogen.
- The disease is common in temperate zones and well recognized in semitropical areas but less frequently recognized in tropical climates.
- It occurs in sporadic, endemic and epidemic forms.
- It is mainly a disease of childhood.
- It occurs all the year round but it is more common in late winter and springs in developing countries.

The clinical features include:

- Fever.
- Focus of streptococcal infection usually the throat, less commonly wound (**surgical scarlet**) or female genital tract (**puerperal scarlet**).
- Rash, internal (**enanthem**) and external (**exanthem**).
- The rash is usually **punctate erythema blanching on pressure**.
- **Strawberry tongue** and **circumoral pallor**.



Scarlet fever is of low prevalence in Egypt due to

- Under reporting of cases.
- Missing or undiagnosis of cases.
- Acquired immunity due to repeated subclinical infection to erythrogenic strain.

Deck test: is a skin test where diluted toxins are injected intradermally however, negative test indicates immunity while positive reaction signifies susceptibility.

Scarlet Fever



Rheumatic Fever and Rheumatic Heart Diseases (RHD)



Rheumatic fever

- **It is a non-suppurative systemic complication following infection with streptococcal pyogen.**
- **It is a major public health problem, particularly in developing countries including Egypt.**
- **It has been estimated that 10-15 million new cases develop each year all over the world.**
- **In Egypt, the prevalence of rheumatic heart diseases reaches 3.4/1000 among school children.**

Rheumatic fever

- Is a systemic disease involving
 - the joints (poly-arthritis),
 - the heart (pan-carditis) and less frequently
 - the central nervous system (chorea),
 - skin (erythema marginatum) and subcutaneous tissue (subcutaneous nodules).
- It has a marked tendency to recur.
- Beside the previous major criteria, **minor** criteria includes **fever, arthralgia, positive antistreptolysin O titre and presence of C-reactive protein.**

Susceptibility

- **Age:** Childhood and adolescents 5-15 years are mostly affected. However, rheumatic activity may occur at any age.
- **Sex:** Both sexes are affected while females are more affected by rheumatic chorea and mitral stenosis.
- **Genetics:** The disease runs in families.
- **Environmental and social factors:**
 - rheumatic activity increases in cold months.
 - The disease is associated with poor housing conditions; ill ventilation and overcrowding and low percapita income, malnutrition and lack of health services.

Prevention:

- Prevention of streptococcal sore throat .
- Proper management and care of cases of streptococcal sore throat.
- Control (secondary prevention) of cases of rheumatic fever and rheumatic heart diseases by **chemoprophylaxis** to prevent rheumatic activity.
- Rehabilitation (social, psychological and vocational) of the disabled cases (tertiary prevention).

Formative exam

Good Luck