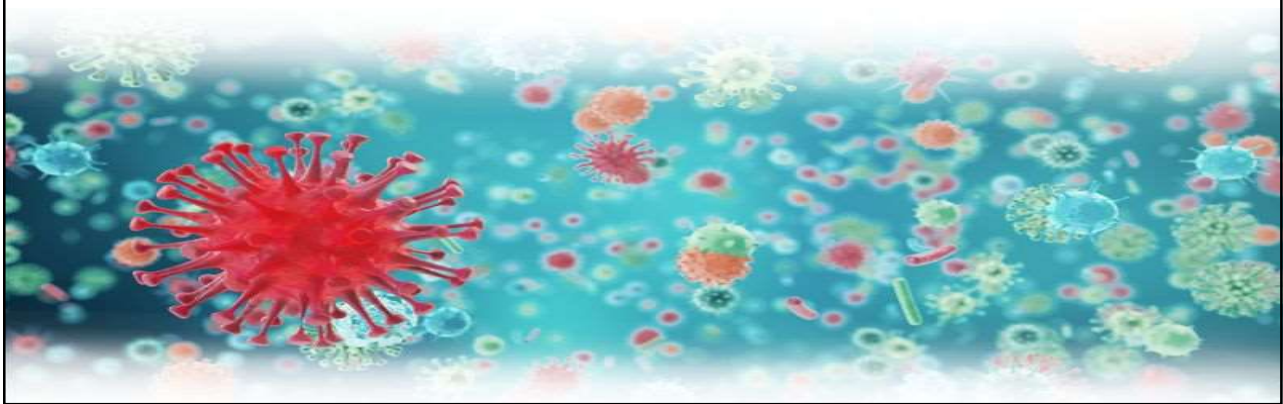


# Communicable Diseases

Dr. Latefa Dardas



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## Communicable Diseases

- Communicable diseases disproportionately impact resource-constrained communities and are linked to a complex range of overlapping determinants of health. These include availability of safe drinking water and basic sanitation, housing conditions, climate change risks, gender inequity, sociocultural factors, and poverty, among others.
- In addition to economic costs, communicable diseases impose intangible social costs on individuals, families, and communities. In sum, the burden of these diseases, with their health, economic, and social costs, prevents the full achievement of health and highlights the need to step up disease elimination efforts.

Communicable Diseases

Dr. Latefa Dardas

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## Communicable Diseases

- A communicable disease is any disease that passes between people or animals. Communicable diseases are also called “infectious” or “transmissible” diseases.
- Communicable are caused by microorganisms that can be spread, directly or indirectly, from one person to another. Some are transmitted through bites from insects while others are caused by ingesting contaminated food or water. There are many examples of communicable diseases, some of which require reporting to appropriate health departments or government agencies in the locality of the outbreak.
- Four main types of pathogens cause infection: Viruses, bacteria, fungi, and protists.
- Preventing and controlling the spread of disease is at the heart of much public health work. From influenza and Lyme disease to malaria and Ebola, outbreaks of infectious diseases can have an extraordinary impact on human health.

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## Communicable Diseases

### How do these communicable diseases spread?

- Physical contact with an infected person, such as through touch (staphylococcus), sexual intercourse (gonorrhea, HIV), fecal/oral transmission (hepatitis A), or droplets (influenza, TB)
- Contact with a contaminated surface or object (Norwalk virus), food (salmonella, E. coli), blood (HIV, hepatitis B), or water (cholera);
- Bites from insects or animals capable of transmitting the disease (mosquito: malaria and yellow fever; flea: plague); and
- Travel through the air, such as tuberculosis or measles.

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# Selected Infectious Diseases

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## Dengue Fever

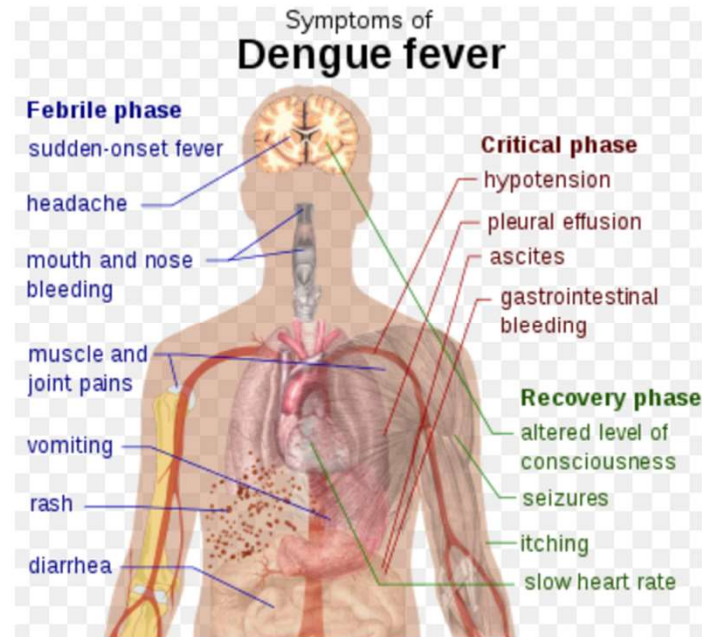
- Dengue is a mosquito-borne viral infection transmitted by *Aedes* mosquitoes. This mosquito also transmits chikungunya, yellow fever and Zika infection.
- The virus responsible for causing dengue, is called dengue virus (DENV). There are four DENV serotypes, meaning that it is possible to be infected four times.
- The infection causes flu-like illness, and occasionally develops into a potentially lethal complication called Dengue haemorrhagic fever (DHF) or severe dengue.
- The global incidence of dengue has grown dramatically in recent decades. About half of the world's population is now at risk.
- Dengue is found in tropical and sub-tropical climates worldwide, mostly in urban and semi-urban areas.
- The WHO classifies dengue into 2 major categories: dengue (with / without warning signs) and severe dengue.
- Severe dengue is a leading cause of serious illness and death among children in some Asian and Latin American countries.

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## Dengue Fever-Symptoms

- Dengue causes a wide spectrum of disease. This can range from subclinical disease (people may not know they are even infected) to severe flu-like symptoms in those infected.
- There is good evidence that sequential infection with the different serotypes of dengue virus increases the risk of more severe disease that can result in shock syndrome and death.
- Infected humans are the main carriers and multipliers of the virus. Dengue should be suspected when a high fever (40°C/104°F) is accompanied by 2 of the following symptoms: severe headache, pain behind the eyes, muscle and joint pains, nausea, vomiting, swollen glands or rash. Symptoms usually last for 2–7 days, after an incubation period of 4–10 days after the bite from an infected mosquito.
- Severe dengue is a potentially deadly complication due to plasma leaking, fluid accumulation, respiratory distress, severe bleeding, or organ impairment. Warning signs occur 3–7 days after the first symptoms in conjunction with a decrease in temperature (below 38°C/100°F) and include: severe abdominal pain, persistent vomiting, rapid breathing, bleeding gums, fatigue, restlessness and blood in vomit. The next 24–48 hours of the critical stage can be lethal; proper medical care is needed to avoid complications and risk of death.

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## Dengue Fever-Treatment

- There is no specific treatment for dengue/ severe dengue, but early detection and access to proper medical care lowers fatality rates below 1%.
- A dengue vaccine has been licensed by several National Regulatory Authorities for use in people 9-45 years of age living in endemic settings.
- Fever reducers and pain killers can be taken to control the symptoms of muscle aches and pains, and fever.
- The best options to treat these symptoms are acetaminophen or paracetamol.
- NSAIDs (non-steroidal anti-inflammatory drugs), such as ibuprofen and aspirin should be avoided. These anti-inflammatory drugs act by thinning the blood, and in a disease with risk of hemorrhage, blood thinners may exacerbate the prognosis.
- For severe dengue, medical care by physicians and nurses experienced with the effects and progression of the disease can save lives – decreasing mortality rates from more than 20% to less than 1%. Maintenance of the patient's body fluid volume is critical to severe dengue care. Patients with dengue should seek medical advice upon the appearance of warning signs.

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## Dengue Fever-Prevention Measures

- Prevention of mosquito breeding:
  - Preventing mosquitoes from accessing egg-laying habitats by environmental management and modification;
  - Disposing of solid waste properly and removing artificial man-made habitats that can hold water;
  - Covering, emptying and cleaning of domestic water storage containers on a weekly basis;
  - Applying appropriate insecticides to water storage outdoor containers;
- Personal protection from mosquito bites:
  - Using of personal household protection measures, such as window screens, repellents, insecticide treated materials, coils and vaporizers. These measures must be observed during the day both inside and outside of the home (e.g.: at work/school) because the primary mosquito vectors bites throughout the day;
  - Wearing clothing that minimises skin exposure to mosquitoes is advised;

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## Dengue Fever-Prevention Measures

- Community engagement:
  - Educating the community on the risks of mosquito-borne diseases;
  - Engaging with the community to improve participation and mobilization for sustained vector control;
- Reactive vector control:
  - Emergency vector control measures such as applying insecticides as space spraying during outbreaks may be used by health authorities;
- Active mosquito and virus surveillance:
  - Active monitoring and surveillance of vector abundance and species composition should be carried out to determine effectiveness of control interventions;
  - Prospectively monitor prevalence of virus in the mosquito population, with active screening of sentinel mosquito collections.

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## Cholera

- Cholera is an acute diarrhoeal infection that can kill within hours if left untreated. It is caused by ingestion of food or water contaminated with the bacterium *Vibrio cholerae*.
- Cholera remains a global threat to public health and an indicator of inequity and lack of social development. Researchers have estimated that every year, there are roughly 1.3 to 4.0 million cases, and 21 000 to 143 000 deaths worldwide due to cholera.
- Most of those infected will have no or mild symptoms, and can be successfully treated with oral rehydration solution.

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## Cholera-Symptoms

- Cholera is an extremely virulent disease that can cause severe acute watery diarrhoea. It takes between 12 hours and 5 days for a person to show symptoms after ingesting contaminated food or water.
- Most people infected with *V. cholerae* do not develop any symptoms, although the bacteria are present in their faeces for 1-10 days after infection and are shed back into the environment, potentially infecting other people.
- Among people who develop symptoms, the majority have mild or moderate symptoms, while a minority develop acute watery diarrhoea with severe dehydration. This can lead to death if left untreated.

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## Cholera-Symptoms

- The symptoms of cholera include diarrhoea, nausea and vomiting, and severe dehydration. Diarrhoea due to cholera often has a pale, milky appearance that resembles water in which rice has been rinsed, also known as rice-water stool.
- The signs and symptoms of cholera in children are similar to adults but they may also experience fever, extreme drowsiness, convulsions or even coma. Only about 1 in 10 infected people develop the typical signs and symptoms of cholera, usually within a few days of infection.

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## Cholera

- Cholera can be endemic or epidemic.
- A cholera-endemic area is an area where confirmed cholera cases were detected during 3 out of the last 5 years with evidence of local transmission (meaning the cases are not imported from elsewhere).
- A cholera outbreak/epidemic is defined by the occurrence of at least 1 confirmed case of cholera with evidence of local transmission in an area where there is not usually cholera.

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## Cholera

- Cholera transmission is closely linked to inadequate access to clean water and sanitation facilities. Typical at-risk areas include peri-urban slums, where basic infrastructure is not available, as well as camps for internally displaced persons or refugees, where minimum requirements of clean water and sanitation have not been met.
- The consequences of a humanitarian crisis – such as disruption of water and sanitation systems, or the displacement of populations to inadequate and overcrowded camps – can increase the risk of cholera transmission, should the bacteria be present or introduced. Uninfected dead bodies have never been reported as the source of epidemics.

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## Cholera: Prevention and Treatment

- A multifaceted approach is key to prevent and control cholera, and to reduce deaths. A combination of surveillance, water, sanitation and hygiene, social mobilisation, treatment, and oral cholera vaccines are used.
- Cholera is an easily treatable disease. The majority of people can be treated successfully through prompt administration of oral rehydration solution (ORS). The WHO/UNICEF ORS standard sachet is dissolved in 1 litre (L) of clean water. Adult patients may require up to 6 L of ORS to treat moderate dehydration on the first day.
- Severely dehydrated patients are at risk of shock and require the rapid administration of intravenous fluids. These patients are also given appropriate antibiotics to diminish the duration of diarrhoea, reduce the volume of rehydration fluids needed, and shorten the amount and duration of *V. cholerae* excretion in their stool.

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## Cholera: Prevention and Treatment

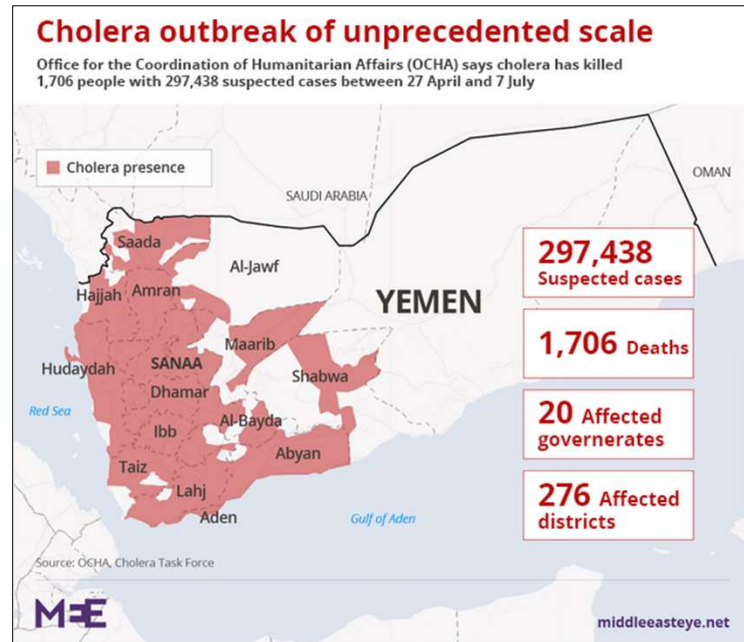
- Mass administration of antibiotics is not recommended, as it has no proven effect on the spread of cholera and contributes to increasing antimicrobial resistance.
- Rapid access to treatment is essential during a cholera outbreak. Oral rehydration should be available in communities, in addition to larger centres that can provide intravenous fluids and 24 hour care.
- Currently there are 3 WHO pre-qualified oral cholera vaccines: Dukoral®, Shanchol™, and Euvichol®. All 3 vaccines require 2 doses for full protection treatment, the case fatality rate should remain below 1%.

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## Amidst the devastation of war in Yemen...

Communicable Diseases

Dr. Latefa Dardas



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## The Story of Cholera: Summary

Communicable Diseases

Dr. Latefa Dardas

<https://www.youtube.com/watch?v=jG1VNSCsP5Q>

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## Malaria

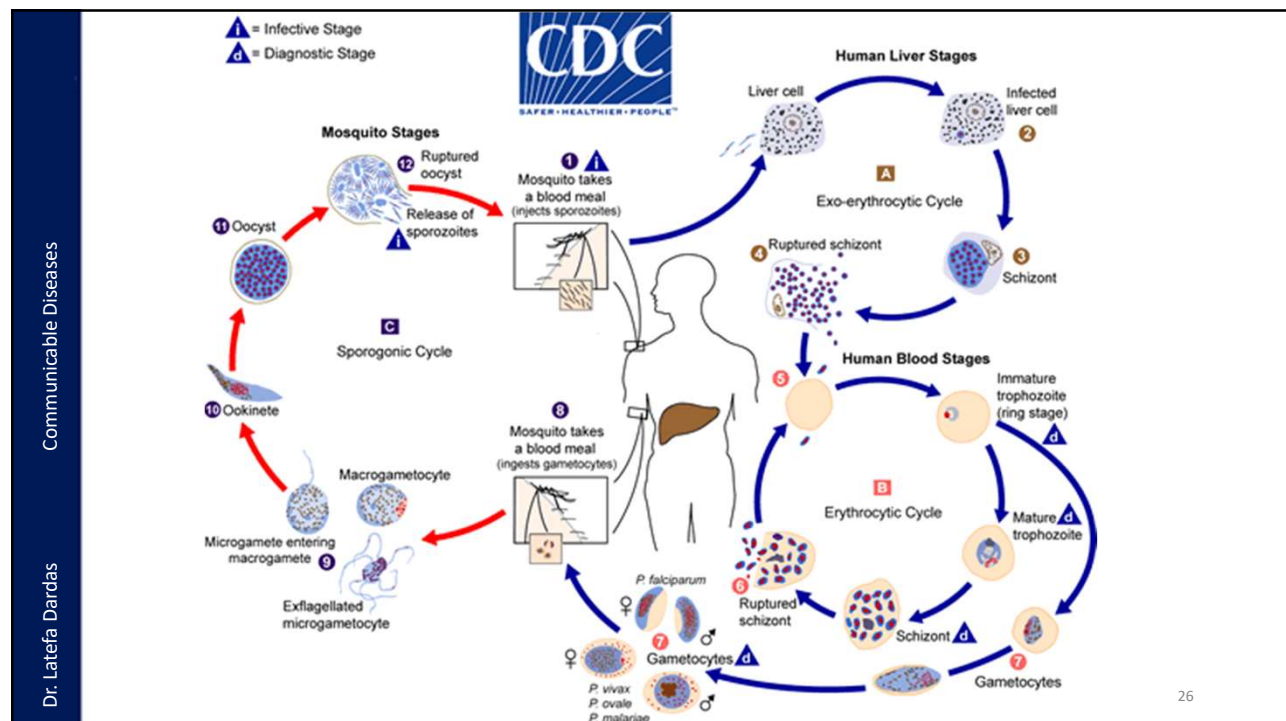
- Malaria is a life-threatening disease caused by parasites that are transmitted to people through the bites of infected female Anopheles mosquitoes. It is preventable and curable.
- There are more than 400 different species of Anopheles mosquito; around 30 are malaria vectors of major importance. All of the important vector species bite between dusk and dawn. The intensity of transmission depends on factors related to the parasite, the vector, the human host, and the environment.
- In 2016, nearly half of the world's population was at risk of malaria.
- In 2016, there were an estimated 216 million cases of malaria in 91 countries, an increase of 5 million cases over 2015.

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# Malaria

- 90% of the cases in 2016 were in the WHO African Region, followed by the WHO South-East Asia Region (7%) and the WHO Eastern Mediterranean Region (2%).
- Nigeria accounted for the highest proportion of cases globally (27%), followed by the Democratic Republic of the Congo (10%), India (6%) and Mozambique (4%).
- Malaria control in the WHO African Region has recorded progress, with a 42% reduction in case incidence and a 66% decline in the mortality rate between 2000 and 2016.
- Total funding for malaria control and elimination reached an estimated US\$ 2.7 billion in 2016.

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## Malaria-Symptoms

- Malaria is an acute febrile illness. In a non-immune individual, symptoms usually appear 10–15 days after the infective mosquito bite. The first symptoms – fever, headache, and chills– may be mild and difficult to recognize as malaria. If not treated within 24 hours, *P. falciparum* malaria can progress to severe illness, often leading to death.
- Children with severe malaria frequently develop one or more of the following symptoms: severe anaemia, respiratory distress in relation to metabolic acidosis, or cerebral malaria. In adults, multi-organ involvement is also frequent. In malaria endemic areas, people may develop partial immunity, allowing asymptomatic infections to occur.

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## Malaria-Treatment

- Early diagnosis and treatment of malaria reduces disease and prevents deaths. It also contributes to reducing malaria transmission. The best available treatment, particularly for *P. falciparum* malaria, is artemisinin-based combination therapy (ACT).
- WHO recommends that all cases of suspected malaria be confirmed using parasite-based diagnostic testing (either microscopy or rapid diagnostic test) before administering treatment.
- Treatment, solely on the basis of symptoms should only be considered when a parasitological diagnosis is not possible.
- Resistance to antimalarial medicines is a recurring problem. WHO recommends the routine monitoring of antimalarial drug resistance.

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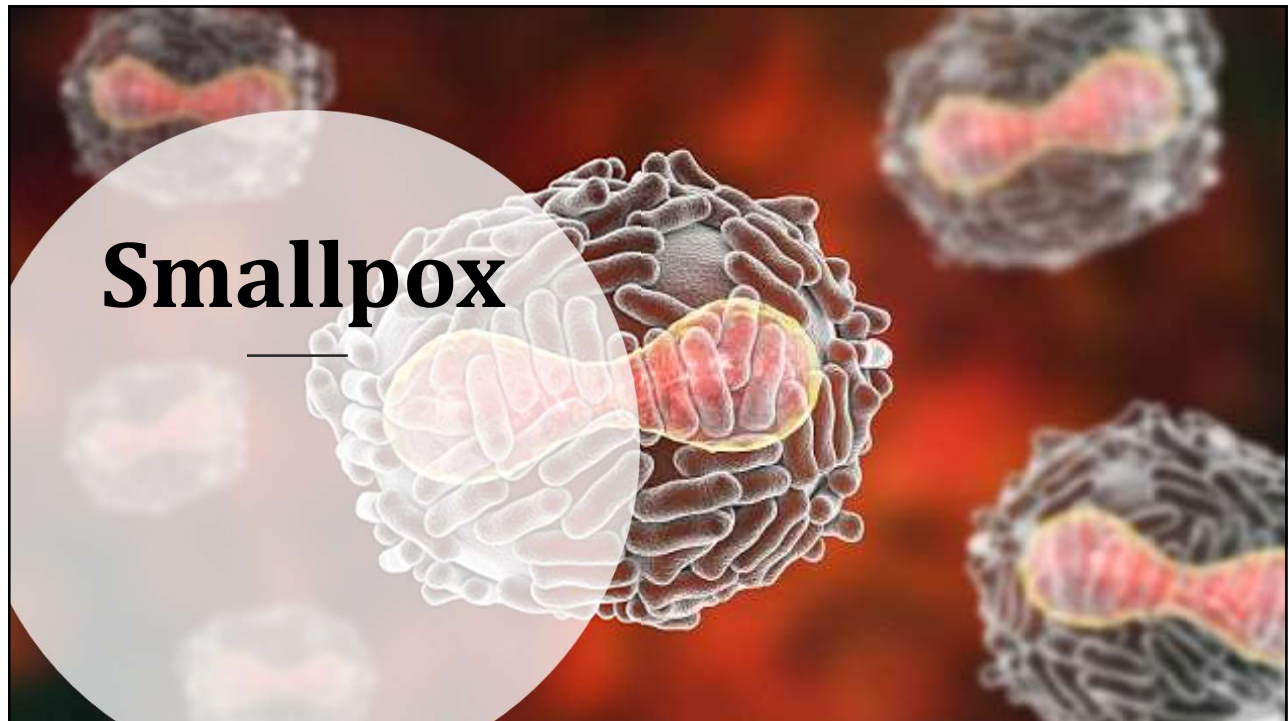


## How Mosquitoes Use Six Needles to Suck Your Blood

<https://www.youtube.com/watch?v=rD8SmacBUcU>

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29



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## Smallpox

- Smallpox has existed for at least 3,000 years and was one of the world's most feared diseases until it was eradicated by a collaborative global vaccination programme led by the World Health Organization. The last known natural case was in Somalia in 1977. Since then, the only known cases were caused by a laboratory accident in 1978 in Birmingham, England, which killed one person and caused a limited outbreak. Smallpox was officially declared eradicated in 1979.
- Smallpox is a contagious disease and kills as many as 30% of those infected. The virus which causes smallpox is transmitted from person to person by infected aerosols and air droplets spread through face-to-face contact with an infected person after fever has begun. The disease can also be transmitted via contaminated clothes and bedding.

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## Smallpox

- Smallpox no longer occurs naturally since it was totally eradicated by a lengthy and painstaking process, which identified all cases and their contacts and ensured that they were all vaccinated.
- Then why is smallpox being talked about now? Some governments believe there is a risk that the virus which causes smallpox exists in places other than these laboratories and could be deliberately released to cause harm.

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## Smallpox and Chickenpox

- Chickenpox is the most important disease likely to be confused with smallpox. It is caused by a different virus.
- In smallpox, fever is present for 2 to 4 days before the rash begins, while with chickenpox, fever and rash develop at the same time.
- All the pocks of the smallpox rash are in the same stage of development on any given part of the body and develop slowly. In chickenpox, the rash develops more rapidly, and vesicles, pustules, and scabs may be seen at the same time.

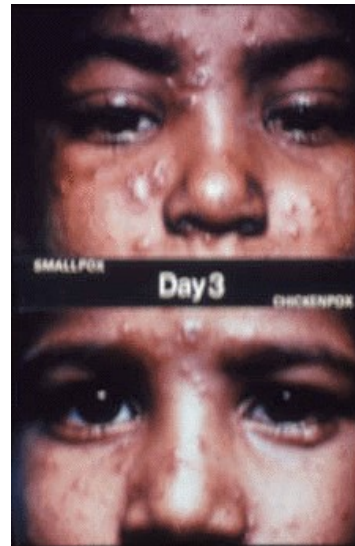
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- During the first day or two of rash it may be impossible, from the rash alone, to differentiate smallpox from chickenpox.



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- On day 3, the rash associated with each of the diseases continues to look very similar.



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- By day 5, however, it is perfectly clear that the patients have different diseases. The patient with chickenpox shows several different stages of rash. There are papules, vesicles and pustules present. However, all of the smallpox lesions are at the same stage of development. Most of the chickenpox lesions are small, between 1 and 5 mm, while the smallpox lesions are uniformly larger, between 5 and 10 mm. The smallpox pustules are firm and deeply embedded in the skin while the lesions of chickenpox are much more superficial.



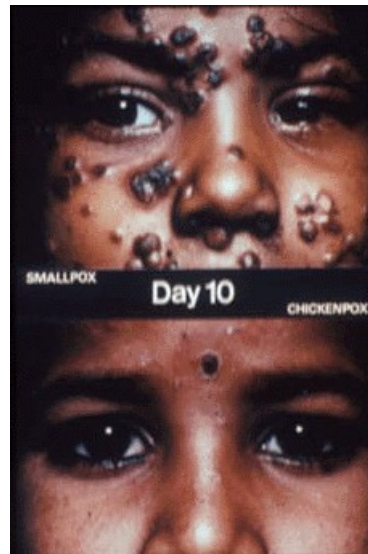
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- By day 7, most of the chickenpox lesions have already formed scabs and some scabs, in fact, have already separated. Scabs over the smallpox lesions have not yet formed.



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- On day 10 of the rash, most of the chickenpox scabs have fallen off, while the smallpox scabs are just beginning to form.
- In chickenpox, the scabs may form as early as day 3 or 4 of rash and normally fall off by day 14.

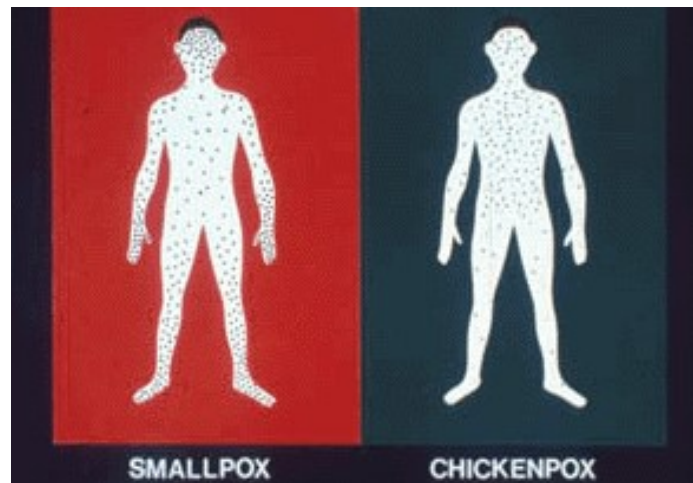


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## Smallpox and Chickenpox

- The distribution of rash is also important in diagnosis.
- In smallpox, more pocks usually occur on the arms and legs than on the body. In chickenpox, more pocks occur on the body. In smallpox, lesions are commonly found on the palms and soles. In chickenpox, however, there are very few or no lesions on the palms and soles.
- The relative density of rash on different parts of the body should be carefully observed.

## Smallpox and Chickenpox

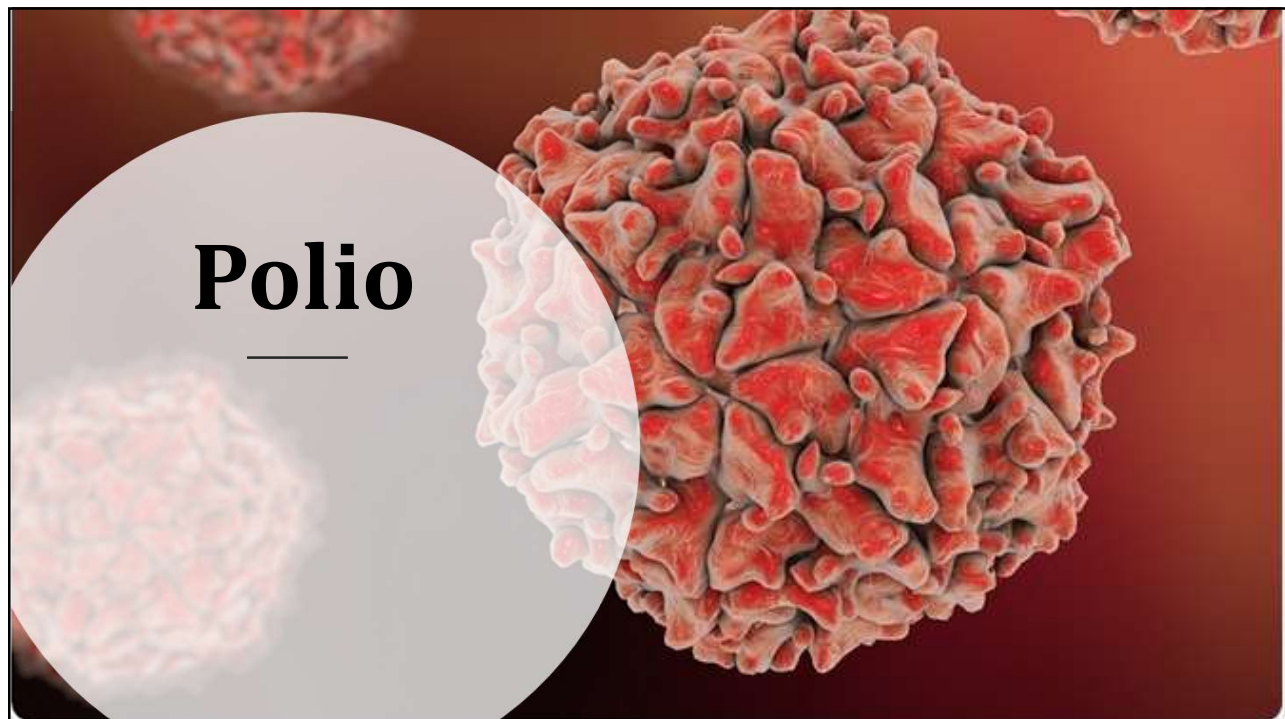




## Smallpox and Chickenpox

- Summary of the particular points that help to differentiate smallpox from chickenpox:
  - in smallpox, the fever precedes the rash by 2 to 4 days,
  - the pocks on any part of the body are at the same stage of development, and they develop slowly,
  - the pocks are more numerous on the arms and legs than on the body,
  - the pocks are usually present on the palms and soles,
  - death following smallpox is not uncommon, while in chickenpox death is very rare.
- \*\* When death occurs in a patient in whom chickenpox has been diagnosed, smallpox should always be suspected.

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## Polio

- Polio, or poliomyelitis, is a crippling and potentially deadly infectious disease. It is caused by the poliovirus. The virus spreads from person to person and can invade an infected person's brain and spinal cord, causing paralysis.
- Poliovirus only infects humans. It is very contagious and spreads through person-to-person contact. The virus lives in an infected person's throat and intestines. It enters the body through the mouth and spreads through contact with the feces of an infected person and, though less common, through droplets from a sneeze or cough. You can get infected with poliovirus if you have feces on your hands and you touch your mouth. Also, you can get infected if you put in your mouth objects like toys that are contaminated with feces.

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## Polio

- An infected person may spread the virus to others immediately before and about 1 to 2 weeks after symptoms appear. The virus can live in an infected person's feces for many weeks. It can contaminate food and water in unsanitary conditions.
- People who don't have symptoms can still pass the virus to others and make them sick.
- Polio vaccine protects children by preparing their bodies to fight the polio virus. Almost all children (99 children out of 100) who get all the recommended doses of vaccine will be protected from polio.
- There are two types of vaccine that can prevent polio: inactivated poliovirus vaccine (IPV) and oral poliovirus vaccine (OPV). Only IPV has been used in the United States since 2000; OPV is still used throughout much of the world.

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## Polio- Symptoms

- Most people who get infected with poliovirus (about 72 out of 100) will not have any visible symptoms.
- About 1 out of 4 people with poliovirus infection will have flu-like symptoms that may include:
  - Sore throat
  - Fever
  - Tiredness
  - Nausea
  - Headache
  - Stomach pain
- These symptoms usually last 2 to 5 days then go away on their own.

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## Polio- Symptoms

- A smaller proportion of people with poliovirus infection will develop other more serious symptoms that affect the brain and spinal cord:
  - Paresthesia (feeling of pins and needles in the legs)
  - Meningitis (infection of the covering of the spinal cord and/or brain) occurs in about 1 out of 25 people with poliovirus infection
  - Paralysis (can't move parts of the body) or weakness in the arms, legs, or both, occurs in about 1 out of 200 people with poliovirus infection

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## Polio- Symptoms

- Paralysis is the most severe symptom associated with polio because it can lead to permanent disability and death. Between 2 and 10 out of 100 people who have paralysis from poliovirus infection die because the virus affects the muscles that help them breathe.
- Even children who seem to fully recover can develop new muscle pain, weakness, or paralysis as adults, 15 to 40 years later. This is called post-polio syndrome.

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## Polio- Treatment

- There is no cure for polio; it can only be prevented by immunization. The polio vaccine, given multiple times, can protect a child for life. More than 18 million people are able to walk today who would otherwise have been paralysed, since 1988, when the Global Polio Eradication Initiative was launched. An estimated 1.5 million childhood deaths have been prevented through the systematic administration of vitamin A during polio immunization activities.
- Treatments for polio focus on limiting and alleviating symptoms. Heat and physical therapy can be used to stimulate the muscles and antispasmodic drugs are used to relax the effected muscles. This can improve mobility but does not reverse permanent polio paralysis.

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## Polio- Treatment

- Vaccination is crucial in the fight against polio. Failure to implement strategic approaches leads to ongoing transmission of the virus. Endemic transmission of wild poliovirus is continuing to cause cases in border areas of Afghanistan and Pakistan. Failure to stop polio in these last remaining areas could result in as many as 200 000 new cases every year within 10 years, all over the world. That is why it is critical to ensure polio is eradicated completely, once and for all.



## Hepatitis

- Hepatitis is an inflammation of the liver that is caused by a variety of infectious viruses and noninfectious agents leading to a range of health problems, some of which can be fatal. There are five main strains of the hepatitis virus, referred to as types A, B, C, D and E. While they all cause liver disease, they differ in important ways including modes of transmission, severity of the illness, geographical distribution and prevention methods. In particular, types B and C lead to chronic disease in hundreds of millions of people and together are the most common cause of liver cirrhosis, liver cancer and viral hepatitis-related deaths. An estimated 354 million people worldwide live with hepatitis B or C, and for most, testing and treatment remain beyond reach.

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## Hepatitis

- Some types of hepatitis are preventable through vaccination. A WHO study found that an estimated 4.5 million premature deaths could be prevented in low- and middle-income countries by 2030 through vaccination, diagnostic tests, medicines and education campaigns. WHO's global hepatitis strategy, endorsed by all WHO Member States, aims to reduce new hepatitis infections by 90% and deaths by 65% between 2016 and 2030.

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## Hepatitis Symptoms

- Many people with hepatitis A, B, C, D or E exhibit only mild symptoms or no symptoms at all. Each form of the virus, however, can cause more severe symptoms. Symptoms of hepatitis A, B and C may include fever, malaise, loss of appetite, diarrhoea, nausea, abdominal discomfort, dark-coloured urine and jaundice (a yellowing of the skin and whites of the eyes). In some cases, the virus can also cause a chronic liver infection that can later develop into cirrhosis (a scarring of the liver) or liver cancer. These patients are at risk of death.

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## Hepatitis Symptoms

- Hepatitis D (HDV) is only found in people already infected with hepatitis B (HBV); however, the dual infection of HBV and HDV can cause a more serious infection and poorer health outcomes, including accelerated progression to cirrhosis. Development of chronic hepatitis D is rare.
- Hepatitis E (HEV) begins with mild fever, reduced appetite, nausea and vomiting lasting for a few days. Some persons may also have abdominal pain, itching (without skin lesions), skin rash or joint pain. They may also exhibit jaundice, with dark urine and pale stools, and a slightly enlarged, tender liver (hepatomegaly), or occasionally acute liver failure.

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## Hepatitis Transmission

- The hepatitis A virus is transmitted primarily by the faecal-oral route; that is when an uninfected person ingests food or water that has been contaminated with the faeces of an infected person. In families, this may happen though dirty hands when an infected person prepares food for family members.

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## Hepatitis Transmission

- In highly endemic areas, hepatitis B is most commonly spread from mother to child at birth (perinatal transmission) or through horizontal transmission (exposure to infected blood), especially from an infected child to an uninfected child during the first 5 years of life. The development of chronic infection is common in infants infected from their mothers or before the age of 5 years.
- Hepatitis B is also spread by needlestick injury, tattooing, piercing and exposure to infected blood and body fluids, such as saliva and menstrual, vaginal and seminal fluids. Transmission of the virus may also occur through the reuse of contaminated needles and syringes or sharp objects either in health care settings, in the community or among persons who inject drugs. Sexual transmission is more prevalent in unvaccinated persons with multiple sexual partners.

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## Hepatitis Transmission

- The hepatitis C virus is a bloodborne virus. It is most commonly transmitted through:
  - the reuse or inadequate sterilization of medical equipment, especially syringes and needles in healthcare settings;
  - the transfusion of unscreened blood and blood products; and
  - injecting drug use through the sharing of injection equipment.
- HCV can be passed from an infected mother to her baby and via sexual practices that lead to exposure to blood (for example, people with multiple sexual partners and among men who have sex with men); however, these modes of transmission are less common.
- Hepatitis C is not spread through breast milk, food, water or casual contact such as hugging, kissing and sharing food or drinks with an infected person.

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## Hepatitis Transmission

- The routes of hepatitis D virus (HDV) transmission, like HBV, occur through broken skin (via injection, tattooing etc.) or through contact with infected blood or blood products. Transmission from mother to child is possible but rare. Vaccination against HBV prevents HDV coinfection and hence expansion of childhood HBV immunization programmes has resulted in a decline in hepatitis D incidence worldwide.
- Chronic HBV carriers are at risk of infection with HDV. People who are not immune to HBV (either by natural disease or immunization with the hepatitis B vaccine) are at risk of infection with HBV, which puts them at risk of HDV infection.
- Those who are more likely to have HBV and HDV co-infection include indigenous people, people who inject drugs and people with hepatitis C virus or HIV infection. The risk of co-infection also appears to be potentially higher in recipients of haemodialysis, men who have sex with men and commercial sex workers.

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## Hepatitis Transmission

- Hepatitis E infection is found worldwide and is common in low- and middle-income countries with limited access to essential water, sanitation, hygiene and health services. In these areas, the disease occurs both as outbreaks and as sporadic cases. The outbreaks usually follow periods of faecal contamination of drinking water supplies and may affect several hundred to several thousand persons. Some of these outbreaks have occurred in areas of conflict and humanitarian emergencies such as war zones and camps for refugees or internally displaced populations, where sanitation and safe water supply pose special challenges.
- Sporadic cases are also believed to be related to contamination of water, albeit at a smaller scale. The cases in these areas are caused mostly by infection with genotype 1 virus, and much less frequently by genotype 2 virus.

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## Hepatitis Treatment

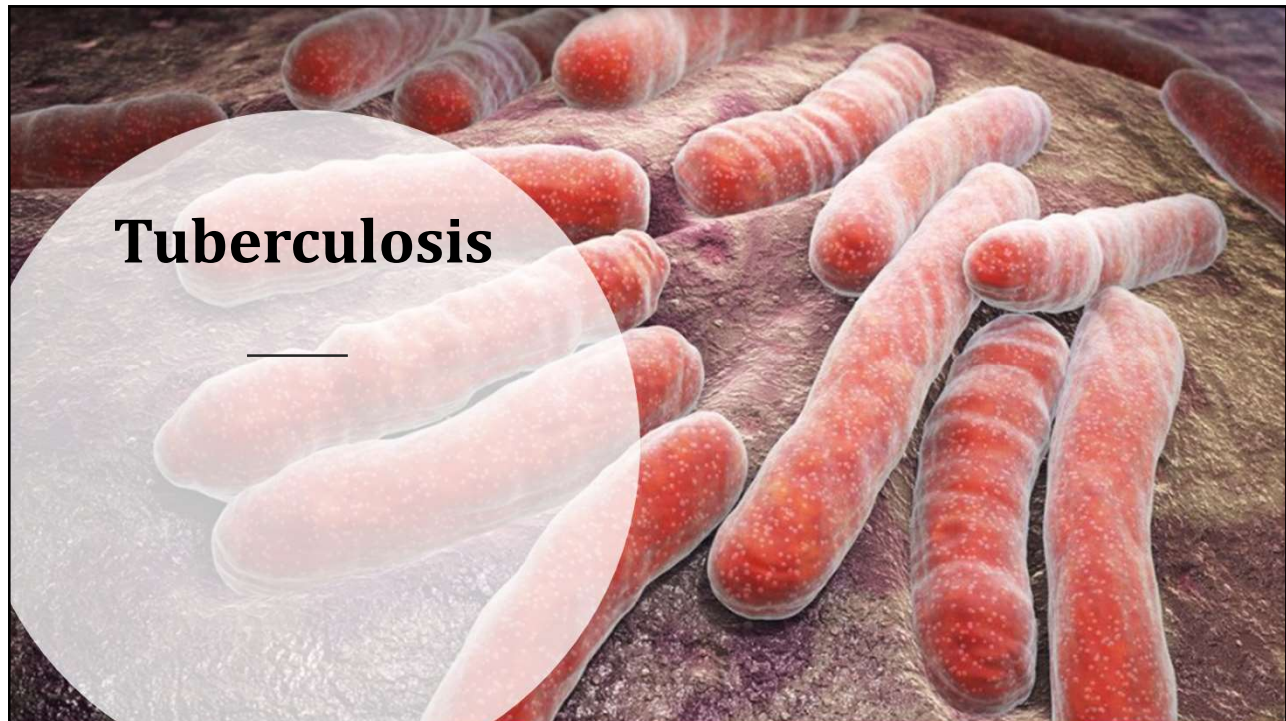
- Safe and effective vaccines are available to prevent hepatitis B virus (HBV). This vaccine also prevents the development of hepatitis D virus (HDV) and given at birth strongly reduces transmission risk from mother to child. Chronic hepatitis B infection can be treated with antiviral agents. Treatment can slow the progression of cirrhosis, reduce incidence of liver cancer and improve long term survival. Only a proportion of people with chronic hepatitis B infection will require treatment. A vaccine also exists to prevent infections of hepatitis E (HEV), although it is not currently widely available. There are no specific treatments for HBV and HEV and hospitalization is not usually required. It is advised to avoid unnecessary medications due to the negative effect on liver function caused by these infections.

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## Hepatitis Treatment

- Hepatitis C (HCV) can cause both acute and chronic infection. Some people recover on their own, while others develop a life-threatening infection or further complications, including cirrhosis or cancer. There is no vaccine for hepatitis C. Antiviral medicines can cure more than 95% of persons with hepatitis C infection, thereby reducing the risk of death from cirrhosis and liver cancer, but access to diagnosis and treatment remains low.
- Hepatitis A virus (HAV) is most common in low- and middle-income countries due to reduced access to clean and reliable water sources and the increased risk of contaminated food. A safe and effective vaccine is available to prevent hepatitis A. Most HAV infections are mild, with the majority of people recovering fully and developing immunity to further infection. However, these infections can also rarely be severe and life threatening due to the risk of liver failure.

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## Tuberculosis

- Tuberculosis (TB) is caused by bacteria (*Mycobacterium tuberculosis*) that most often affect the lungs, but can attack any part of the body such as the kidney, spine, and brain.
- TB is the ninth leading cause of death worldwide and the leading cause from a single infectious agent, ranking above HIV/AIDS.
- Seven countries account for 64% of the new TB cases in 2016, with India leading the count, followed by Indonesia, China, Philippines, Pakistan, Nigeria, and South Africa.
- TB is a leading killer of HIV-positive people: in 2016, 40% of HIV deaths were due to TB.
- Not everyone infected with TB bacteria becomes sick. As a result, two TB-related conditions exist: latent TB infection (LTBI) and TB disease. If not treated properly, TB disease can be fatal.

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## Tuberculosis: Transmission

- TB bacteria are spread through the air from one person to another. The TB bacteria are put into the air when a person with TB disease of the lungs or throat coughs, speaks, or sings. People nearby may breathe in these bacteria and become infected. People with TB disease are most likely to spread it to people they spend time with every day. This includes family members, friends, and coworkers or schoolmates. A person needs to inhale only a few of these germs to become infected.
- TB is NOT spread by shaking someone's hand; sharing food or drink; touching bed linens or toilet seats; sharing toothbrushes; kissing.
- According to WHO (2016), about one-third of the world's population has latent TB, which means people have been infected by TB bacteria but are not (yet) ill with the disease and cannot transmit the disease.

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## Tuberculosis: Transmission

### Required Video:

<https://www.youtube.com/watch?v=UKV8Zn7x0wM>

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## Tuberculosis: Signs & Symptoms

- Symptoms of TB disease depend on where in the body the TB bacteria are growing. TB bacteria usually grow in the lungs (pulmonary TB). TB disease in the lungs may cause symptoms such as:
  - a bad cough that lasts 3 weeks or longer
  - pain in the chest
  - coughing up blood or sputum (phlegm from deep inside the lungs)
  - weakness or fatigue
  - weight loss, lack of appetite
  - Chills, fever, night sweats
- Symptoms of TB disease in other parts of the body depend on the area affected.
- People who have latent TB infection do not feel sick, do not have any symptoms, and cannot spread TB to others.

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## Tuberculosis: Risk Factors

- Many people who have latent TB infection never develop TB disease. But some people who have latent TB infection are more likely to develop TB disease than others. Those at high risk for developing TB disease include:
  - People with HIV infection
  - People who became infected with TB bacteria in the last 2 years
  - Babies and young children
  - People who inject illegal drugs
  - People who are sick with other diseases that weaken the immune system
  - Elderly people
  - People who were not treated correctly for TB in the past

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## Tuberculosis: Treatment

- TB is a treatable and curable disease. Active, drug-susceptible TB disease is treated with a standard 6 month course of 4 antimicrobial drugs that are provided with information, supervision and support to the patient by a health worker or trained volunteer. Without such support, treatment adherence can be difficult and the disease can spread. The vast majority of TB cases can be cured when medicines are provided and taken properly.

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## Multidrug-Resistant Tuberculosis (MDR-TB)

- MDR-TB is a form of TB caused by bacteria that do not respond to isoniazid and rifampicin, the 2 most powerful, first-line anti-TB drugs. MDR-TB is treatable and curable by using second-line drugs. However, second-line treatment options are limited and require extensive chemotherapy (up to 2 years of treatment) with medicines that are expensive and toxic.
- Drug resistance emerges when anti-TB medicines are used inappropriately, through incorrect prescription by health care providers, poor quality drugs, and patients stopping treatment prematurely.

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## Tuberculosis and HIV

- HIV and TB form a lethal combination, each speeding the other's progress.
- 34% of people living with HIV in the African Region in 2016 were infected with TB bacteria.
- People living with HIV are 20 to 30 times more likely to develop active TB disease than people without HIV.
- WHO recommends a 12-component approach of collaborative TB-HIV activities, including actions for prevention and treatment of infection and disease, to reduce deaths.

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## Ebola

- Ebola virus disease (EVD), formerly known as Ebola haemorrhagic fever, is a severe, often fatal illness in humans.
- The virus is transmitted to people from wild animals and spreads in the human population through human-to-human transmission.
- The average EVD case fatality rate is around 50%. Case fatality rates have varied from 25% to 90% in past outbreaks.
- The first EVD outbreaks occurred in remote villages in Central Africa, near tropical rainforests. The 2014–2016 outbreak in West Africa involved major urban areas as well as rural ones.

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## Ebola: Transmission

- Ebola spreads via direct contact (through broken skin or mucous membranes) with the blood, secretions, organs or other bodily fluids of infected people, and with surfaces and materials (e.g. bedding, clothing) contaminated with these fluids.
- Health-care workers have frequently been infected while treating patients with suspected or confirmed EVD. This has occurred through close contact with patients when infection control precautions are not strictly practiced.
- Burial ceremonies that involve direct contact with the body of the deceased can also contribute in the transmission of Ebola.
- People remain infectious as long as their blood contains the virus.

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## Ebola: Transmission

- Ebola virus is known to persist in immune-privileged sites in some people who have recovered from Ebola virus disease. These sites include the testicles, the inside of the eye, and the central nervous system. In women who have been infected while pregnant, the virus persists in the placenta, amniotic fluid and fetus. In women who have been infected *while* breastfeeding, the virus may persist in breast milk.
- Studies of viral persistence indicate that in a small percentage of survivors, some body fluids may test positive on reverse transcriptase polymerase chain reaction (RT-PCR) for Ebola virus for longer than 9 months.

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## Ebola: Symptoms

- The incubation period, that is, the time interval from infection with the virus to onset of symptoms is 2 to 21 days. Humans are not infectious until they develop symptoms. First symptoms are the sudden onset of fever fatigue, muscle pain, headache and sore throat. This is followed by vomiting, diarrhoea, rash, symptoms of impaired kidney and liver function, and in some cases, both internal and external bleeding (e.g. oozing from the gums, blood in the stools). Laboratory findings include low white blood cell and platelet counts and elevated liver enzymes.

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## Ebola: Diagnosis

- It can be difficult to clinically distinguish EVD from other infectious diseases such as malaria, typhoid fever and meningitis. Confirmation that symptoms are caused by Ebola virus infection are made using the following diagnostic methods:
  - antibody-capture enzyme-linked immunosorbent assay (ELISA)
  - antigen-capture detection tests
  - serum neutralization test
  - reverse transcriptase polymerase chain reaction (RT-PCR) assay
  - electron microscopy
  - virus isolation by cell culture.

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## Ebola: Treatment

- There is as yet no proven treatment available for EVD. However, a range of supportive care-rehydration with oral or intravenous fluids- and treatment of specific symptoms, improves survival. These include:
  - Providing fluids and electrolytes (body salts) through infusion into the vein (intravenously).
  - Offering oxygen therapy to maintain oxygen status.
  - Using medication to support blood pressure, reduce vomiting and diarrhea and to manage fever and pain.
  - Treating other infections, if they occur.
- Recovery from EVD depends on good supportive care and the patient's immune response. Those who do recover develop antibodies that can last 10 years, possibly longer. It is not known if people who recover are immune for life or if they can later become infected with a different species of Ebola virus.

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## The Story of Ebola: Summary

<https://www.youtube.com/watch?v=XCrOde-JYs0&t=1s>

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## Sexually Transmitted Infections (STIs)



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- More than 1 million sexually transmitted infections (STIs) are acquired every day worldwide, the majority of which are asymptomatic.
- Each year there are an estimated 374 million new infections with 1 of 4 STIs: chlamydia, gonorrhoea, syphilis and trichomoniasis.
- More than 500 million people aged 15 to 49 years are estimated to have a genital infection with herpes simplex virus (HSV) (1).
- HPV infection is associated with 570 000 cases of cervical cancer in 2018, and over 311 000 cervical cancer deaths each year (2).
- Almost 1 million pregnant women were estimated to be infected with syphilis in 2016, resulting in over 350 000 adverse birth outcomes including 200 000 stillbirths and newborn deaths (3).
- STIs have direct impact on sexual and reproductive health through stigmatization, infertility, cancers and pregnancy complications and can increase the risk of HIV.
- Drug resistance, especially for gonorrhoea, is a major threat to reducing the burden of STIs worldwide.

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- More than 30 different bacteria, viruses and parasites are known to be transmitted through sexual contact. Eight of these pathogens are linked to the greatest incidence of sexually transmitted disease. Of these, 4 are currently curable: syphilis, gonorrhoea, chlamydia and trichomoniasis. The other 4 are viral infections which are incurable: hepatitis B, herpes simplex virus (HSV or herpes), HIV and human papillomavirus (HPV).
- STIs are spread predominantly by sexual contact, including vaginal, anal and oral sex. Some STIs can also be transmitted from mother-to-child during pregnancy, childbirth and breastfeeding.
- A person can have an STI without showing symptoms of disease. Common symptoms of STIs include vaginal discharge, urethral discharge or burning in men, genital ulcers and abdominal pain.

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## Diagnosis of STIs

- Accurate diagnostic tests for STIs are widely used in high-income countries. These are especially useful for the diagnosis of asymptomatic infections. However, diagnostic tests are largely unavailable in low- and middle-income countries. Where testing is available, it is often expensive and geographically inaccessible, and patients often need to wait a long time (or need to return) to receive results. As a result, follow-up can be impeded and care or treatment can be incomplete.

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## Diagnosis of STIs

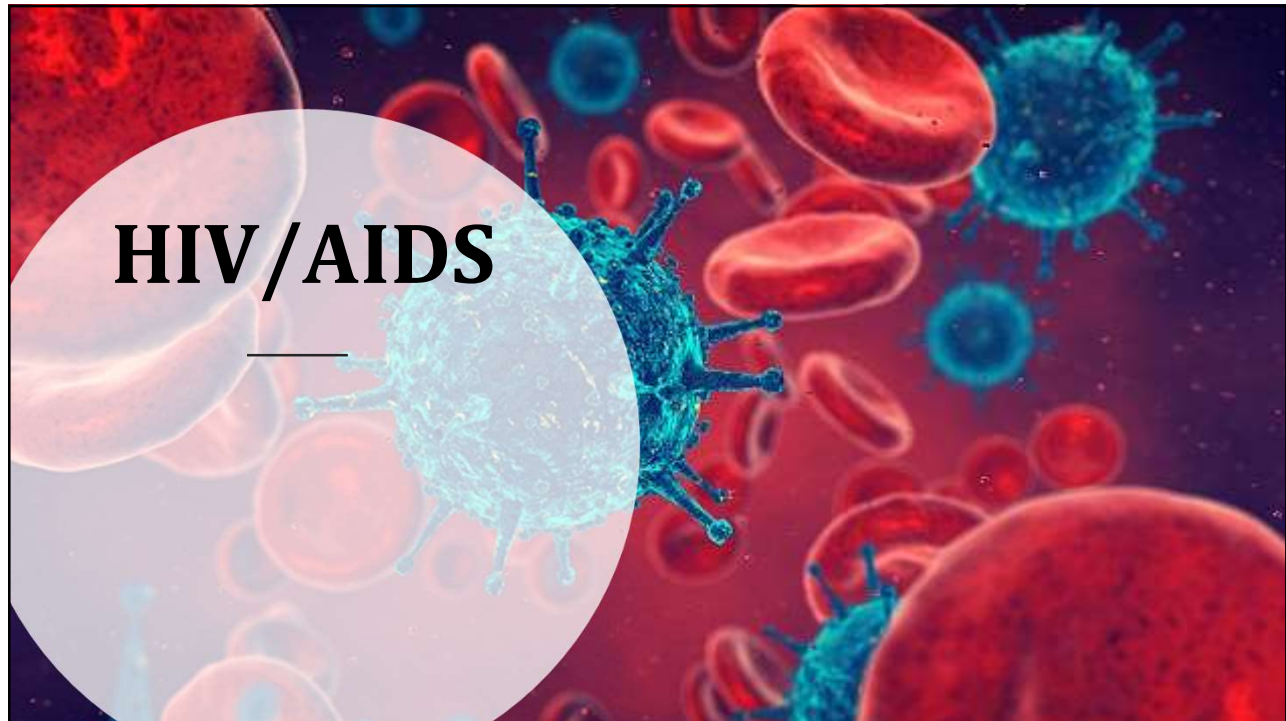
- The only inexpensive, rapid tests currently available for STIs are for syphilis, hepatitis B and HIV. The rapid syphilis test is already in use in some resource-limited settings. A rapid dual HIV/syphilis test is now available whereby a person can be tested for HIV and syphilis from a single finger-stick and using a single testing cartridge. These tests are accurate, can provide results in 15 to 20 minutes, and are easy to use with minimal training. Rapid syphilis tests have been shown to increase the number of pregnant women tested for syphilis. However, increased efforts are still needed in most low- and middle-income countries to ensure that all pregnant women receive a syphilis test at the first antenatal care visit.
- Several rapid tests for other STIs are under development and have the potential to improve STI diagnosis and treatment, especially in resource-limited settings.

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## Treatment of STIs

- Effective treatment is currently available for several STIs.
- Three bacterial STIs (chlamydia, gonorrhoea and syphilis) and one parasitic STI (trichomoniasis) are generally curable with existing single-dose regimens of antibiotics.
- For herpes and HIV, the most effective medications available are antivirals that can modulate the course of the disease, though they cannot cure the disease.
- For hepatitis B, antiviral medications can help to fight the virus and slow damage to the liver.
- Antimicrobial resistance (AMR) of STIs – in particular gonorrhoea – to antibiotics has increased rapidly in recent years and has reduced treatment options. The Gonococcal AMR Surveillance Programme (GASP) has shown high rates of resistance to many antibiotics including quinolone resistance, increasing azithromycin resistance and emerging resistance of extended-spectrum cephalosporins, a last-line treatment, increasing the risk that gonorrhoea will be untreatable. AMR for other STIs, though less common, also exists, making prevention and prompt treatment critical.

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## HIV/AIDS

- HIV stands for Human Immunodeficiency Virus. It is the virus that can lead to Acquired Immuno-Deficiency Syndrome or AIDS if not treated.
- Unlike some other viruses, the human body can't get rid of HIV completely, even with treatment. So once a person get HIV, s/he has it for life.
- HIV attacks the body's immune system, specifically the CD4 cells (T cells), which help the immune system fight off infections. Untreated, HIV reduces the number of CD4 cells in the body, making the person more likely to get other infections or infection-related cancers. These opportunistic infections or cancers take advantage of a very weak immune system and signal that the person has AIDS, the last stage of HIV infection.

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## HIV Origin

- Scientists identified a type of chimpanzee in Central Africa as the source of HIV infection in humans. They believe that the chimpanzee version of the immunodeficiency virus (called simian immunodeficiency virus, or SIV) most likely was transmitted to humans and mutated into HIV when humans hunted these chimpanzees for meat and came into contact with their infected blood. Studies show that HIV may have jumped from apes to humans as far back as the late 1800s. Over decades, the virus slowly spread across Africa and later into other parts of the world.



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## Stages of HIV

### Stage 1: Acute HIV infection

- Within *2 to 4 weeks* after infection with HIV, people may experience a flu-like illness, which may last for a few weeks. This is the body's natural response to infection. When people have acute HIV infection, they have a large amount of virus in their blood and are very contagious. But people with acute infection are often unaware that they're infected because they may not feel sick right away or at all. To know whether someone has acute infection, either a fourth-generation antibody/antigen test or a nucleic acid (NAT) test is necessary.

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## Stages of HIV

### Stage 2: Clinical latency (HIV inactivity or dormancy)

- This period is sometimes called *asymptomatic HIV infection* or *chronic HIV infection*. During this phase, HIV is still active but reproduces at very low levels. People may not have any symptoms or get sick during this time. For people who aren't taking medicine to treat HIV, this period can last a decade or longer, but some may progress through this phase faster. People who are taking medicine to treat HIV (ART) the right way, every day may be in this stage for several decades. It's important to remember that people can still transmit HIV to others during this phase, although people who are on ART and stay virally suppressed (having a very low level of virus in their blood) are much less likely to transmit HIV than those who are not virally suppressed.

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## Stages of HIV

### Stage 3: Acquired Immunodeficiency Syndrome (AIDS)

- AIDS is the most severe phase of HIV infection. People with AIDS have such badly damaged immune systems that they get an increasing number of severe illnesses, called opportunistic illnesses.
- Without treatment, people with AIDS typically survive about 3 years. Common symptoms of AIDS include chills, fever, sweats, swollen lymph glands, weakness, and weight loss. People are diagnosed with AIDS when their CD4 cell count drops below 200 cells/mm or if they develop certain opportunistic illnesses. People with AIDS can have a high viral load and be very infectious.

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## HIV: Signs and Symptoms

- The symptoms of HIV vary depending on the stage of infection. Though people living with HIV tend to be most infectious in the first few months, many are unaware of their status until later stages. The first few weeks after initial infection, individuals may experience no symptoms or an influenza-like illness including fever, headache, rash or sore throat.
- As the infection progressively weakens the immune system, an individual can develop other signs and symptoms, such as swollen lymph nodes, weight loss, fever, diarrhoea and cough. Without treatment, they could also develop severe illnesses such as tuberculosis, cryptococcal meningitis, and cancers such as lymphomas and Kaposi's sarcoma, among others.

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## HIV: Diagnosis

- Serological tests, such as RDTs or enzyme immunoassays (EIAs), detect the presence or absence of antibodies to HIV-1/2 and/or HIV p24 antigen. When such tests are used within a testing strategy according to a validated testing algorithm, HIV infection can be detected with great accuracy. It is important to note that serological tests detect antibodies produced by an individual as part of their immune system to fight off foreign pathogens, rather than direct detection of HIV itself.
- Most individuals develop antibodies to HIV-1/2 within 28 days and therefore antibodies may not be detectable early after infection, the so-called window period. This early period of infection represents the time of greatest infectivity; however HIV transmission can occur during all stages of the infection.
- It is best practice to also retest all people initially diagnosed as HIV-positive before they enroll in care and/or treatment to rule out any potential testing or reporting error.

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## HIV: Transmission

- HIV can be transmitted via the exchange of a variety of body fluids from infected individuals, such as blood, breast milk, semen and vaginal secretions. Individuals cannot become infected through ordinary day-to-day contact such as hugging, shaking hands, or sharing personal objects, food or water.
- Behaviours and conditions that put individuals at greater risk of contracting HIV include:
  - having anal or vaginal sex;
  - having another sexually transmitted infection such as syphilis, herpes, chlamydia, gonorrhoea, and bacterial vaginosis;
  - sharing contaminated needles, syringes and other injecting equipment and drug solutions when injecting drugs;
  - receiving unsafe injections, blood transfusions, tissue transplantation, medical procedures that involve unsterile cutting or piercing; and
  - experiencing accidental needle stick injuries, including among health workers.

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## HIV: Treatment

- No effective cure currently exists, but with proper medical care, HIV can be controlled. The medicine used to treat HIV is called antiretroviral therapy or ART. If taken the right way, every day, this medicine can dramatically prolong the lives of many people infected with HIV and greatly lower their chance of infecting others.

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## HIV: Key Facts

- Africa is the most affected region by HIV/AIDS in the world, particularly among young women. In 2015:
  - Close to 26 million people were living with HIV, of whom 2.3 million were children under the age of 15 years.
  - 90% of the children in the world living with HIV were in sub-Saharan Africa.
  - 70% of AIDS-related deaths in the world occurred in the African Region.
  - Of the 2.1 million new HIV infections, worldwide in 2015, 1.37 million (65%) occurred in sub-Saharan Africa.
  - The overall estimate of HIV/AIDS prevalence in the Region was 4.8%.

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## List of Communicable Diseases

- |                  |                         |                                     |                                   |
|------------------|-------------------------|-------------------------------------|-----------------------------------|
| • Cholera        | • Syphilis              | • Plague                            | • Creutzfeldt–Jakob disease       |
| • Leprosy        | • Rubella               | • Typhoid fever                     | • Scabies                         |
| • Tuberculosis   | • Hepatitis C           | • Shigellosis                       | • Chancroid                       |
| • Influenza      | • Lyme disease          | • Poliomyelitis                     | • Dengue                          |
| • HIV/AIDS       | • Cryptosporidiosis     | • Viral hemorrhagic fever           | • Trichinosis                     |
| • Measles        | • Brucellosis           | • Yellow fever                      | • Group A streptococcal infection |
| • Whooping cough | • Meningitis            | • Listeriosis                       | • Amoebiasis                      |
| • Hepatitis A    | • Tetanus               | • Hepatitis B                       | • Yersiniosis                     |
| • Mumps          | • Giardiasis            | • Ebola virus disease               | • Rocky Mountain spotted fever    |
| • Rabies         | • Smallpox              | • Severe acute respiratory syndrome |                                   |
| • Chickenpox     | • Diphtheria            | • Q fever                           |                                   |
| • Gonorrhoea     | • Meningococcal disease | • Psittacosis                       |                                   |
| • Salmonellosis  | • Chlamydia infection   | • Campylobacteriosis                |                                   |
| • Malaria        |                         | • Tularemia                         |                                   |
|                  |                         | • Leptospirosis                     |                                   |

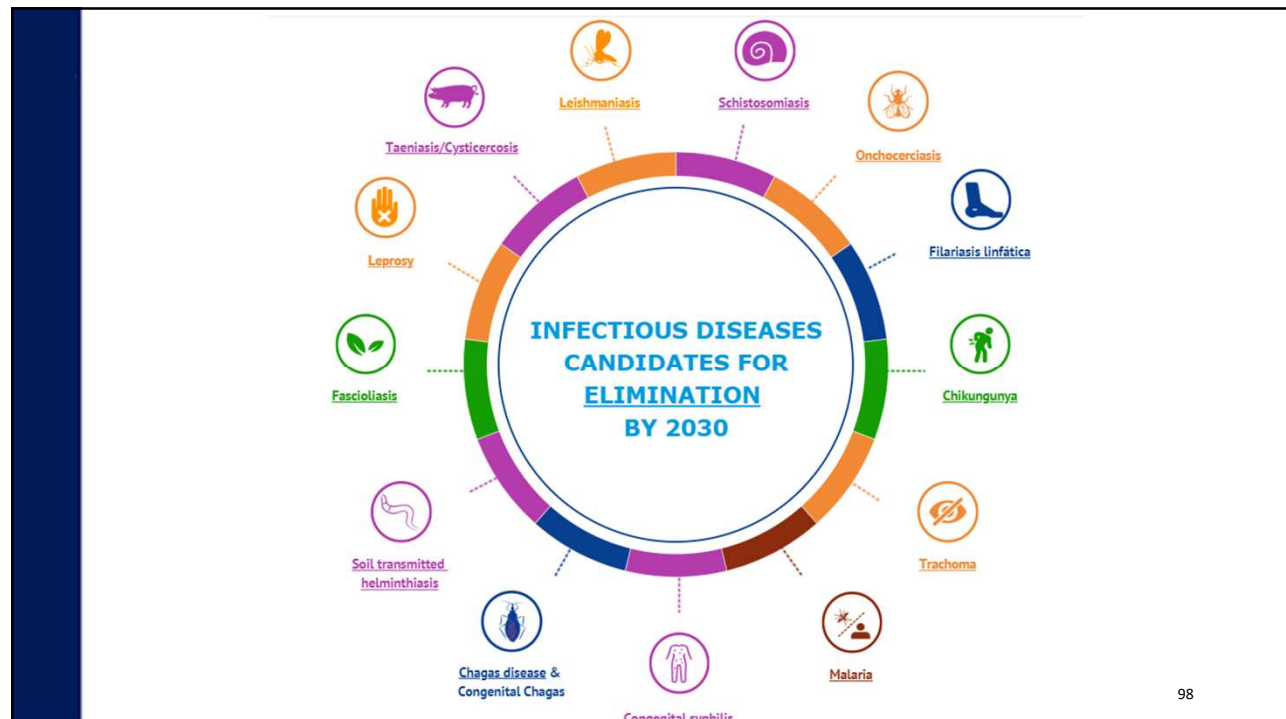
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## Diseases for which Vaccines are Used

- Anthrax
- Chicken pox
- Cholera
- Diphtheria
- German measles (rubella)
- Hepatitis A & B
- Influenza
- Malaria (in process)
- Measles
- Meningitis
- Mumps
- Plague
- Pneumonia
- Polio
- Rabies
- Small pox
- Spotted fever
- Tetanus
- Tuberculosis
- Typhoid Fever
- Typhus
- Whooping Cough
- Yellow Fever

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