

Blood borne infections

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Blood-borne disease
can be spread through
contamination by blood
and other body fluids.

- Blood can contain pathogens of various types, chief among which are microorganisms, like bacteria and parasites, and viruses.
- Three bloodborne pathogens in particular, all viruses, are cited as of primary concern to health workers: [HIV](#), [hepatitis B](#) and [hepatitis C](#).
- Diseases that are not usually transmitted directly by blood contact, but rather by insect or other vector, are more usefully classified as vector-borne disease, even though the causative agent can be found in blood. Vector-borne diseases include [West Nile virus](#), [zika fever](#) and [malaria](#).
- Many blood-borne diseases can also be contracted by other means, including high-risk sexual behavior or intravenous drug use.
- Since it is difficult to determine what pathogens any given sample of blood contains, and some blood-borne diseases are lethal, standard medical practice regards all blood (and any body fluid) as potentially infectious. Blood and Body Fluid precautions are a type of infection control practice that seeks to minimize this sort of disease transmission.

Different types of blood infections

- Bacteria blood infection: septicemia
- Viral blood infection: viremia
- Fungal blood infection: fungemia
- Parasitic blood infection

Bacterial Blood Infection: Septicemia

- A wide range of bacteria can enter bloodstream.
- And though bacteria may infect through a wound or burn, septicemia often results from another infection such as a urinary tract infection or pneumonia.
- Once it gets in the blood, bacteria can travel to other organs and tissues and damage them. Septicemia is more likely to develop in young children or older people as their immune systems may not be strong enough to resist the bacteria.
- A compromised immune system or recent surgery can also up risk.

Bacterial Blood Infection: Septicemia

Some signs of a bacterial infection in the blood include high temperature, chills and violent shivering, fatigue, clammy pale skin, and shallow rapid breathing.

On skin may also developed pinprick bruises or large purplish splotches.

In severe cases, chemicals and proteins released by body in the blood to fight the infection can damage blood vessels and affect blood flow. This can result in low blood pressure and eventually damage critical organs like your kidneys or your brain.

Viral Blood Infection: Viremia

- Viremia is a medical term for viruses present in the bloodstream. A virus is a tiny, microscopic organism made of genetic material inside a protein coating. Viruses depend on a living host, like a human or animal, for survival. A virus attaches to one of cells, releases its DNA or RNA, takes control of the cell, and forces it to replicate the virus.
- You could also swallow them by having contaminated food or water or be infected through insect bites or through sexual contact. Examples of viruses that enter the bloodstream include:
 - HIV
 - Hepatitis B virus
 - Hepatitis C virus
 - Dengue virus
 - West Nile virus
 - Rubella
 - Measles
 - Cytomegalovirus
 - Epstein-Barr virus
 - Yellow fever virus
 - Varicella-zoster virus (VZV)

Fungal Blood Infection: Fungemia

- Fungi are all around us. Their microscopic spores can be found on the ground and in the air. Most of these fungi are harmless, however certain types can cause serious fungal infections in some people.
- Many fungi like *Aspergillus* and *Saccharomyces cerevisiae* can cause fungemia.
- But the most common fungus that can infect blood is *Candida*. This microorganism usually lives on skin or gastrointestinal tract without causing any issues. Even when it does affect health, it usually means minor infections like thrush and vaginal yeast infection.
- But in some people, fungi can enter the bloodstream and cause a potentially life-threatening infection. A bloodstream infection by candida – candidemia – is more likely in people who are using a central venous catheter, have a compromised immune system, take broad-spectrum antibiotics, have kidney failure or diabetes, or are in the ICU or have had surgery.

Fungal Blood Infection: Fungemia

- *Histoplasma*, which causes histoplasmosis when the spores enter the lungs. The majority of people who inhale the spores will not become ill, but it can cause serious illness, especially among people with a weakened immune system.
- *Pneumocystis jirovecii*, which causes pneumocystis pneumonia (PCP). This fungus generally causes serious illness in people who have impaired immune systems, particularly immune system impairment caused by HIV/AIDS or corticosteroid use.

Parasitic Blood Infection

Some parasites can be bloodborne. This means:

- the parasite can be found in the bloodstream of infected people; and
- the parasite might be spread to other people through exposure to an infected person's blood (for example, by blood transfusion or by sharing needles or syringes contaminated with blood).
- These parasites don't just enter blood but can affect other organs as well. For instance, the malaria parasite first infects liver cells and then red blood cells while trypanosomes first infect blood, subcutaneous tissues, and lymph and then get across the blood-brain barrier to reach the central nervous system.

Examples of parasitic diseases that can be bloodborne:

- African trypanosomiasis (*Trypanosoma brucei*: Causes African trypanosomiasis or “sleeping sickness,” spread by the tsetse fly.; *Trypanosoma cruzi*: Causes American trypanosomiasis or Chagas disease, transmitted by certain insects,
- Babesiosis *Babesia*: Causes babesiosis, spread by ticks,
- Chagas disease,
- leishmaniasis,
- Malaria: Plasmodium: Causes malaria, spread by mosquitoes., and
- toxoplasmosis. *Toxoplasma gondii* is not transmitted by an insect (vector).

In nature, many bloodborne parasites are spread by insects (vectors), so they are also referred to as vector-borne diseases.

Occupational exposure

- There are 26 different viruses that have been shown to present in healthcare workers as a result of occupational exposure.
- The most common blood-borne diseases are:
 - hepatitis B (HBV),
 - hepatitis C (HCV), and
 - human immunodeficiency virus (HIV).
- Exposure is possible through blood of an infected patient splashing onto mucous membranes; however, the greatest exposure risk was shown to occur during percutaneous injections performed for vascular access. These include blood draws, as well as catheter placement, as both typically use hollow bore needles.
- Preventive measures for occupational exposure include standard precautions (hand washing, sharp disposal containers), as well as additional education.

Needle exchange programs

- Needle exchange programs (NEPs) are an attempt to reduce the spread of blood-borne diseases between intravenous drug users.
- They often also provide addiction counseling services, infectious disease testing, and in some cases mental health care and other case management. NEPs acquired their name as they were initially places where intravenous (IV) illicit substance users were provided with clean, unused needles in exchange for their used needles. This allows for proper disposal of the needles. Empirical studies confirm the benefits of NEPs. NEPs can affect behaviors that result in the transmission of HIV. These behaviors include decreased sharing of used syringes, which reduces contaminated syringes from circulation and replaces them with sterile ones, among other risk reductions.