CONCEPT OF PREVENTION AND CONTROL

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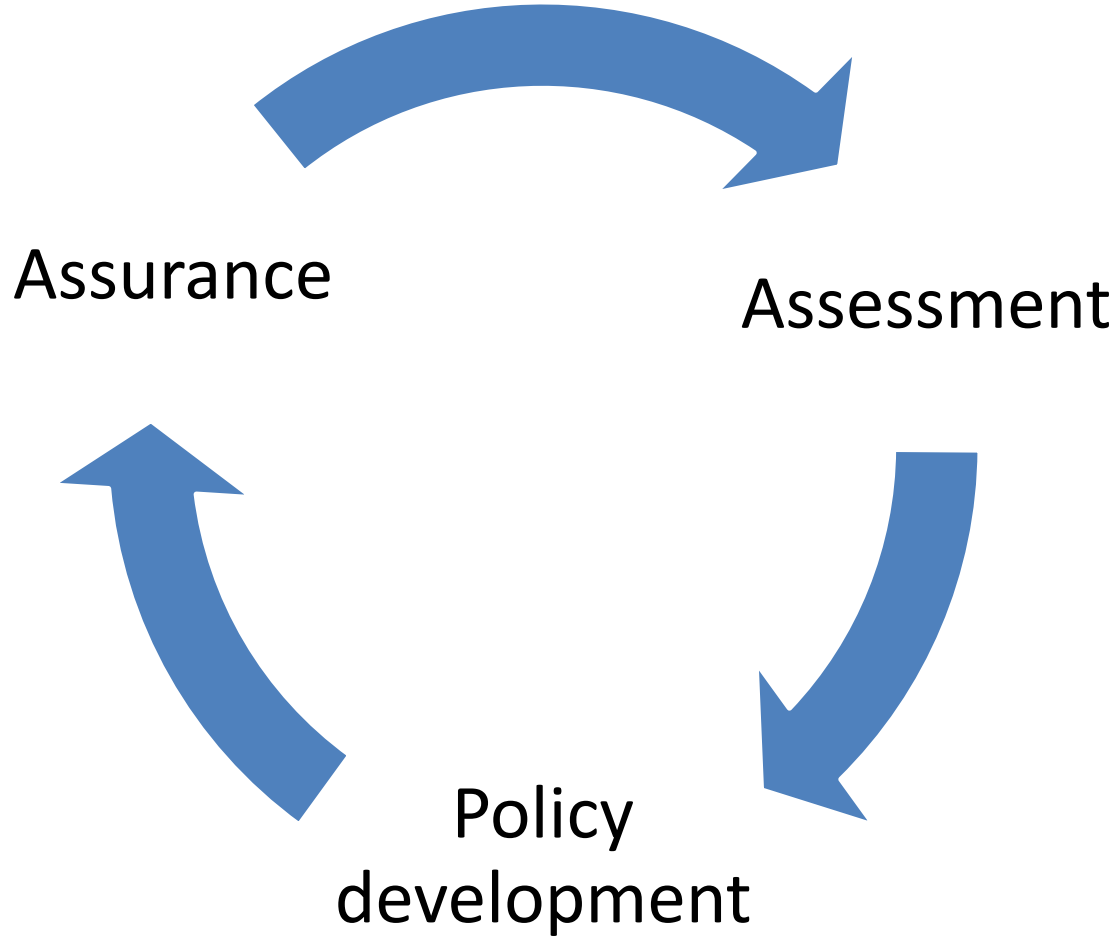
ONLINE PHARMA GURUKUL

CORE FUNCTIONS OF PUBLIC HEALTH

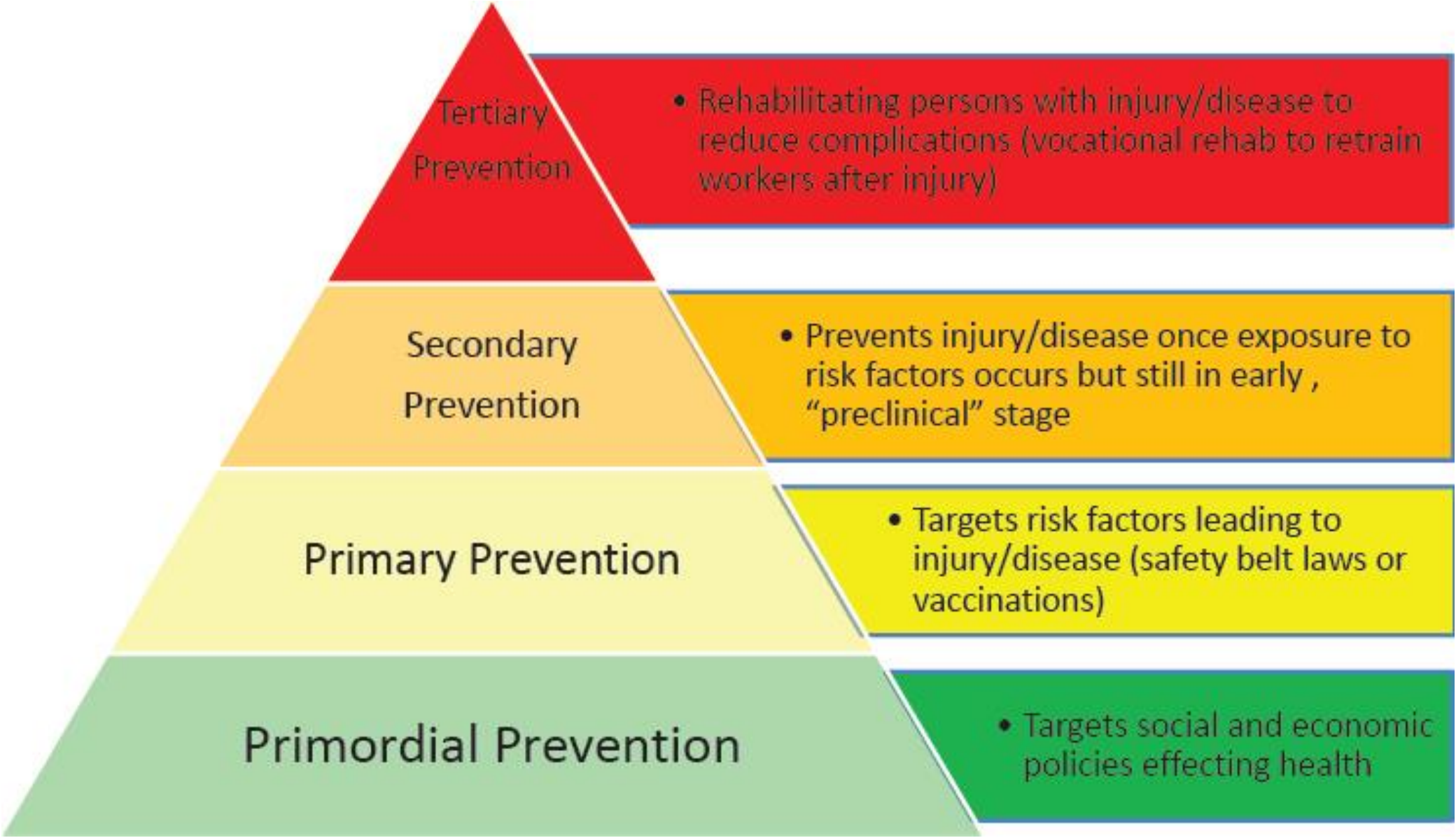


CONCEPT OF PREVENTION

“Prevention, in a narrow sense, means averting the development of a pathological state. In a broader sense, it includes all measures-definitive therapy among them-that limit the progression of disease at any stage of its course”.

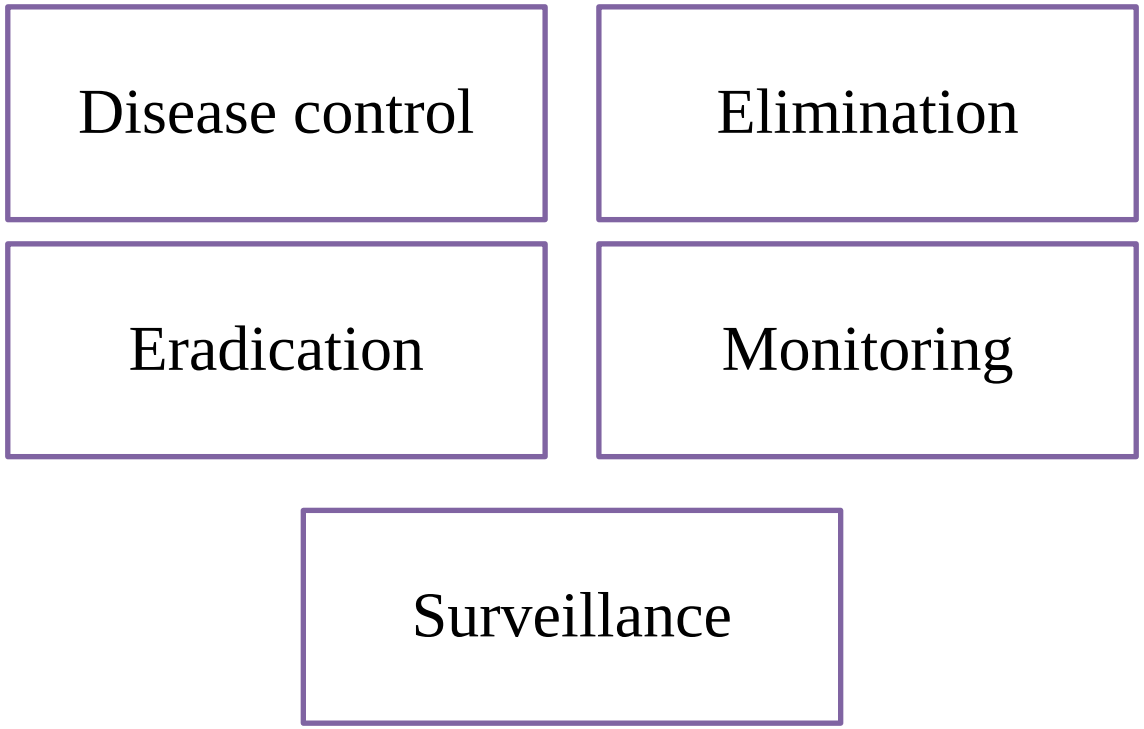
Levels of prevention

- Primordial prevention
- Primary prevention
- Secondary prevention
- Tertiary Prevention


Tertiary Prevention
• Rehabilitating persons with injury/disease to reduce complications (vocational rehab to retrain workers after injury)
Secondary Prevention
• Prevents injury/disease once exposure to risk factors occurs but still in early , "preclinical" stage
Primary Prevention
• Targets risk factors leading to injury/disease (safety belt laws or vaccinations)
Primordial Prevention
• Targets social and economic policies effecting health

CONCEPT OF CONTROL

Disease control means reducing the number of new infections, the number of people currently infected, and the number of people who become sick or die from a disease in local settings.



Disease Control	Elimination	Eradication	Monitoring	Surveillance
Describes (ongoing) operations aimed at reducing: - The incidence of disease - Duration of disease (risk of transmission) - Effects of infection (both physical and psychosocial) - Financial burden to the community - Mainly focused on primary and secondary prevention.	Reduction to zero of the infection of specified disease in defined geographical area	Termination of all transmission of infections by extermination of infectious agents	It is the performance and analysis of routine measurements aimed at detecting changes in the environment or health status of a population	It is a continuous process which involves three primary activities: - Collection of relevant data for a specified population, time period and/or geographic area - Meaningful analysis of data - Routine dissemination of data with accompanying interpretation.

General principles of prevention and control of diseases such as

- cholera,
- SARS,
- Ebola virus,
- influenza,
- acute respiratory infections,
- malaria,
- chicken guinea,
- dengue,
- lymphatic filariasis,
- pneumonia,
- diabetes mellitus,
- cancer,
- drug addiction-drug substance abuse

GENRAL PRINCIPLES OF PREVENTION AND CONTROL OF DISEASES

Cholera

Cholera is an acute, diarrheal illness caused by infection of the intestine with the toxigenic bacterium *Vibrio cholerae* serogroup O1 or O139.

- The cholera bacterium is usually found in water or in foods that have been contaminated by feces (poop) from a person infected with cholera bacteria. Cholera is most likely to occur and spread in places with inadequate water treatment, poor sanitation, and inadequate hygiene.
- Cholera infection is often mild or without symptoms, but can be severe. Approximately 1 in 10 people who get sick with cholera will develop severe symptoms such as watery diarrhea, vomiting, and leg cramps. In these people, rapid loss of body fluids leads to dehydration and shock. Without treatment, death can occur within hours.

Cholera (sign and symptoms)

- Diarrhea
- Nausea and vomiting
- Dehydration
- Irritability
- Fatigue
- sunken eyes
- a dry mouth
- extreme thirst
- dry and shriveled skin
- little or no urinating, low blood pressure, and an irregular heartbeat.
- Muscle cramps
- Shock

Basic Cholera Prevention Steps

Make sure to drink and use safe water to brush your teeth, wash and prepare food, and make ice

Wash your hands often with soap and safe water

Use latrines or bury your poop; do not poop in any body of water

Cook food well (especially seafood), keep it covered, and eat it hot. Peel fruits and vegetables

Clean up safely in the kitchen and in places where the family bathes and washes clothes

Infection Control for Cholera

Rehydration therapy for patients with cholera can include adequate volumes of a solution of oral rehydration salts, intravenous (IV) fluids when necessary, and electrolytes.

Antibiotic Treatment: Children <12 years old - Doxycycline 2–4 mg/kg by mouth (per os, p.o.) single dose and Children ≥12 years old and adults, including pregnant women - Doxycycline 300 mg p.o. single dose.

Vaccines: Vaxchora® (lyophilized CVD 103-HgR), Dukoral (manufactured by SBL Vaccines); ShanChol (manufactured by Shantha Biotec in India), and Euvichol-Plus/Euvichol (manufactured by Eubiologics).

Public health tool: Reinforcement of surveillance and laboratory diagnostic capacity and improving WASH conditions

SARS

- Severe acute respiratory syndrome (SARS), is a contagious and potentially fatal respiratory illness.
- SARS was first reported in Asia in February 2003. The illness spread to more than two dozen countries in North America, South America, Europe, and Asia before the SARS global outbreak of 2003 was contained.
- The most recent human cases of SARS-CoV infection were reported in China in April 2004 in an outbreak resulting from laboratory-acquired infections.
- The main way that SARS seems to spread is by close person-to-person contact. The virus that causes SARS is thought to be transmitted most readily by respiratory droplets (droplet spread) or when a person touches a surface or object contaminated with infectious droplets and then touches his or her mouth, nose, or eye(s).

SARS (sign and symptoms)

SARS usually begins with flu-like signs and symptoms

- Fever
- Chills
- muscle aches
- headache and occasionally diarrhea.

After about a week, signs and symptoms include:

- Fever of 100.5 F (38 C) or higher
- Dry cough
- Shortness of breath

Basic SARS Prevention Steps

Respiratory hygiene/cough etiquette in healthcare settings, personal protective equipment (PPE)

Hand hygiene in health care settings

Staying at least 3 feet away from other people

Avoiding sharing food, drinks, and utensils

Regularly cleaning surfaces with disinfectant

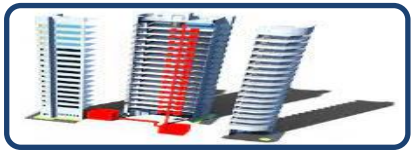
Infection Control for SARS

Assessment of the residence

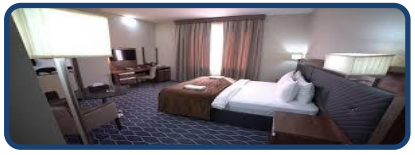
Ensure that the residence has the features necessary for provision of appropriate care and infection control precautions

There should be a bathroom in the home for use by the patient and household members only. If there are multiple bathrooms, one should be designated solely for the patient's use, especially if the patient has diarrhea.

The patient should have a bed and preferably a private room for sleeping



If the home is a multiple family dwelling (e.g., apartment building), the area in which the patient will be housed should have a separate air-handling system (if one is present).



Basic amenities, such as heat, electricity, potable and hot water, sewer, and telephone access, should be available

There should be a primary caregiver to assist the patient with basic needs in the home and social service support for obtaining groceries, prescriptions, and other personal needs.

Infection Control for SARS

Infection Control for Prehospital Emergency Medical Services (EMS)

Safely transport patients with the fewest EMS personnel required to minimize possible exposures.

Personal Protective Equipment: Disposable isolation gown, pair of disposable patient examination gloves, eye protection (i.e., goggles or face shield). Respiratory protection (i.e., N-95 or higher-level respirator)

Ensure safe work practices among EMS personnel to prevent transmission

Safely collect clinical specimens from SARS patients during transport.

Post-Transport Management of the Contaminated Vehicle

Ensure appropriate follow-up and care of EMS personnel who transport SARS patients.

Infection Control for SARS

Infection Control Precautions for SARS Patients Isolated at Home

Continue the infection control precautions outlined below until 10 days until the health department has determined that home isolation precautions can be safely discontinued

Patients should not leave the home for the duration of the isolation period

Limit the number of persons in the household to those who are essential for patient support.

Unexposed persons who do not have an essential need to be in the home should not visit.

Infection control measures in the home like Hand hygiene, Source control, Gloves and other protective attire, Laundry, Dishes and other eating utensils, Household waste, Cleaning and disinfection of environmental surfaces

Ensure appropriate follow-up and care of exposed close contacts of SARS patients in home isolation.

Infection Control for SARS

Infection Control for Care of SARS Patients in Community Isolation Facilities

Community isolation facilities should have rooms with private bathrooms.

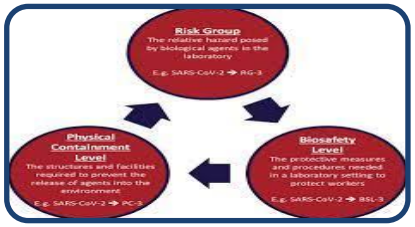
Personnel who enter the room should wear an N-95 respirator. If there will be direct contact with the patient or the patient's environment, a disposable isolation gown and gloves should be worn.

Receptacles for soiled linen/laundry and contaminated waste should be placed in designated locations. Follow home care guidelines above for handling these materials.

Infection Control for SARS

Infection Control for Laboratory and Pathology Procedures

Safely collect and handle specimens from SARS patients to prevent transmission of SARS



Biosafety levels 2 and 3, according to specimen type, are recommended for processing SARS specimens.

Safely handle human remains during autopsy procedures to prevent transmission of SARS

Follow standard safety procedures for preventing percutaneous injuries during autopsy.

Ebola Virus Disease

- Ebola Virus Disease (EVD) is a rare and deadly zoonotic disease most commonly affecting people and nonhuman primates.
- The viruses that cause EVD are located mainly in sub-Saharan Africa.
- It is caused by an infection with a group of viruses within the genus *Ebolavirus*:

  Ebola virus (species *Zaire ebolavirus*) (infects human)

  Sudan virus (species *Sudan ebolavirus*) (infects human)

  Taï Forest virus (species *Taï Forest ebolavirus*) (infects human)

  Bundibugyo virus (species *Bundibugyo ebolavirus*) (infects human)

  Reston virus (species *Reston ebolavirus*) (infects nonhuman primates and pigs)

  Bombali virus (species *Bombali ebolavirus)* (infects bats)

Ebola Virus Disease (sign and symptoms)

Early signs and symptoms include:

- Fever
- Severe headache
- Joint and muscle aches
- Chills
- Weakness

Over time, symptoms become increasingly severe and may include:

- Nausea and vomiting
- Diarrhea (may be bloody)
- Red eyes
- Raised rash
- Chest pain and cough
- Sore throat
- Stomach pain
- Severe weight loss
- Bleeding, usually from the eyes, and when close to death, possible bleeding from the ears, nose and rectum
- Internal bleeding

Ebola Virus Ecology and Transmission

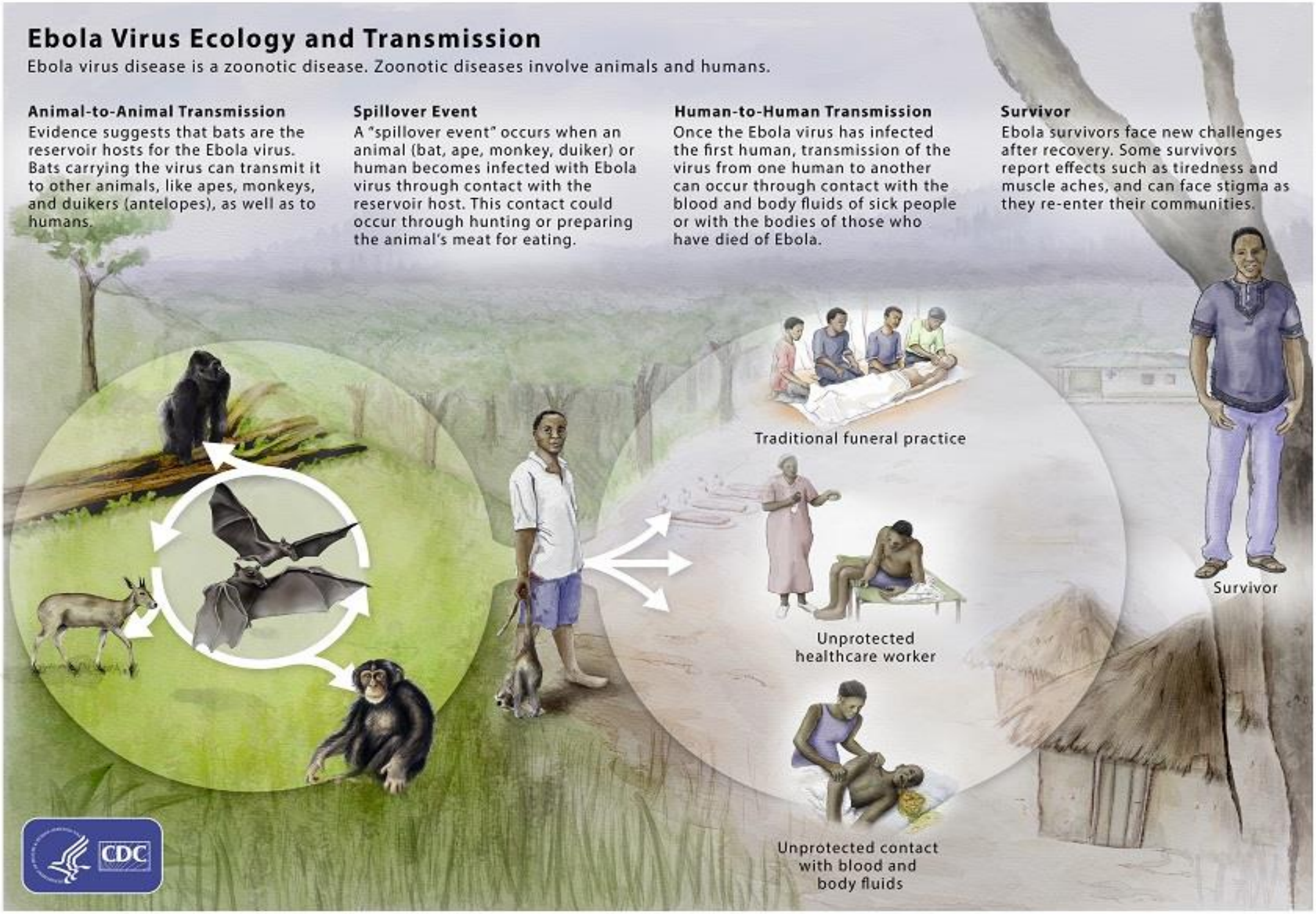
Ebola virus disease is a zoonotic disease. Zoonotic diseases involve animals and humans.

Animal-to-Animal Transmission
Evidence suggests that bats are the reservoir hosts for the Ebola virus. Bats carrying the virus can transmit it to other animals, like apes, monkeys, and duikers (antelopes), as well as to humans.

Spillover Event
A "spillover event" occurs when an animal (bat, ape, monkey, duiker) or human becomes infected with Ebola virus through contact with the reservoir host. This contact could occur through hunting or preparing the animal's meat for eating.

Human-to-Human Transmission
Once the Ebola virus has infected the first human, transmission of the virus from one human to another can occur through contact with the blood and body fluids of sick people or with the bodies of those who have died of Ebola.

Survivor
Ebola survivors face new challenges after recovery. Some survivors report effects such as tiredness and muscle aches, and can face stigma as they re-enter their communities.



Basic Ebola Prevention Steps

Avoid contact with blood and body fluids (such as urine, feces, saliva, sweat, vomit, breast milk, amniotic fluid, semen, and vaginal fluids) of people who are sick.

Avoid contact with semen from a man who has recovered from EVD

Avoid contact with items that may have come in contact with an infected person’s blood or body fluids (such as clothes, bedding, needles, and medical equipment).

Avoid funeral or burial practices that involve touching the body of someone who died from EVD or suspect EVD.

Avoid contact with bats, forest antelopes, and nonhuman primates (such as monkeys and chimpanzees) blood, fluids, or raw meat prepared from these or unknown animals (bushmeat).

Infection Control for Ebola

Prevention: There are a number of ways to protect yourself and prevent the spread of EVD. After returning from an area experiencing an Ebola outbreak, people should monitor their health for 21 days and seek medical care immediately if they develop symptoms of EVD.

Vaccine: The U.S. FDA approved the Ebola vaccine rVSV-ZEBOV (called Ervebo®) on December 19, 2019.

Therapeutics: The first drug approved in October 2020, Inmazeb™, is a combination of three monoclonal antibodies. The second drug, Ebanga™, is a single monoclonal antibody and was approved in December 2020.

Supportive Care: Providing fluids and electrolytes orally or through IV, Using medication to support blood pressure, reduce vomiting and diarrhea, and to manage fever and pain. Treating other infections, if they occur.

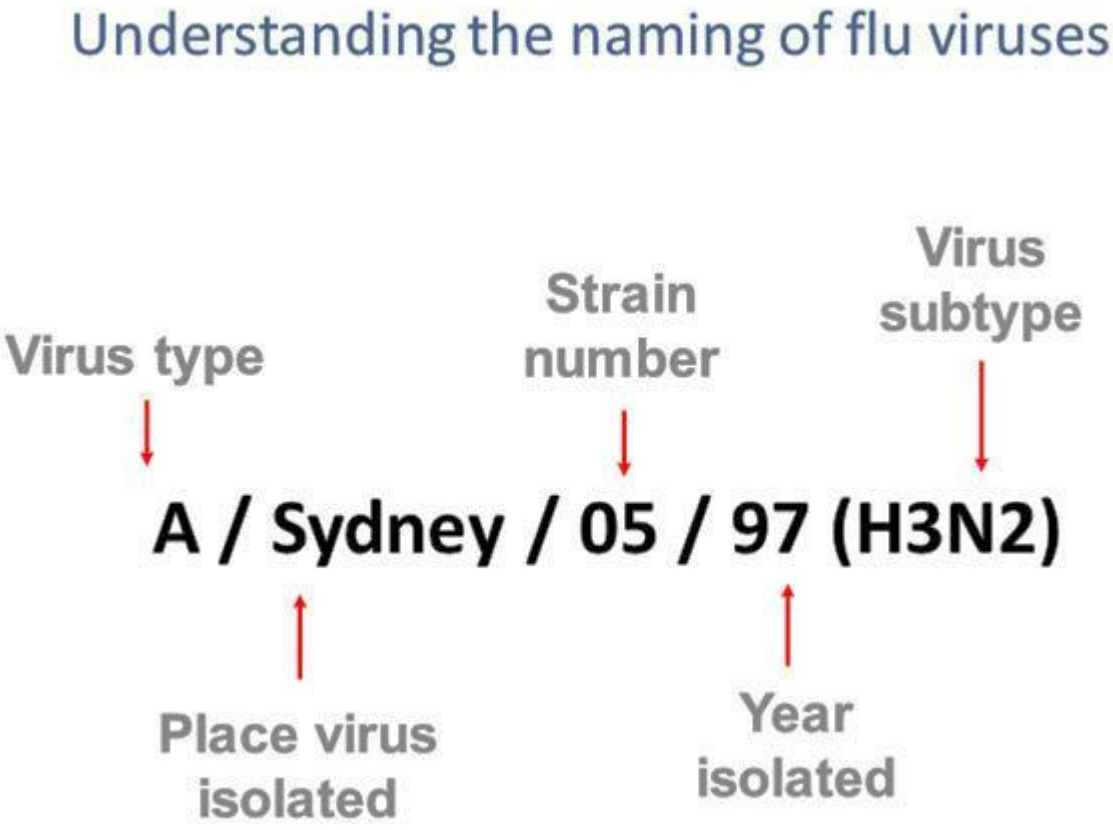
Influenza

- Influenza (flu) is a contagious respiratory illness caused by influenza viruses that infect the nose, throat, and lungs.
- For most people, the flu resolves on its own. But sometimes, influenza and its complications can be deadly.
- There are four types of influenza viruses: A, B, C and D.
- Human influenza A and B viruses cause seasonal epidemics of disease (known as flu season) almost every winter.
- Influenza C virus infections generally cause mild illness and are not thought to cause human epidemics.
- Influenza D viruses primarily affect cattle and are not known to infect or cause illness in people.

- Influenza A viruses are divided into subtypes based on two proteins on the surface of the virus: hemagglutinin (H) and neuraminidase (N).
- There are 18 different hemagglutinin subtypes and 11 different neuraminidase subtypes (H1 through H18 and N1 through N11, respectively).
- While more than 130 influenza A subtype combinations have been identified in nature, primarily from wild birds, there are potentially many more influenza A subtype combinations given the propensity for virus “reassortment.”
- Reassortment is a process by which influenza viruses swap gene segments. Reassortment can occur when two influenza viruses infect a host at the same time and swap genetic information.
- Current subtypes of influenza A viruses that routinely circulate in people include: A(H1N1) and A(H3N2). Influenza A subtypes can be further broken down into different genetic “clades” and “sub-clades.” See the “Influenza Viruses” graphic below for a visual depiction of these classifications.

Naming Influenza Viruses

- CDC follows an internationally accepted naming convention for influenza viruses. This convention was accepted by WHO in 1979 and published in February 1980 in the Bulletin of the World Health Organization, 58(4):585-591 (1980)



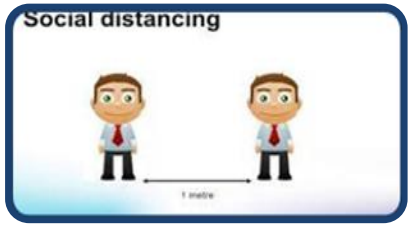
Influenza (sign and symptoms)

Common signs and symptoms of the flu include:

- Fever
- Aching muscles
- Chills and sweats
- Headache
- Dry, persistent cough
- Shortness of breath
- Tiredness and weakness
- Runny or stuffy nose
- Sore throat
- Eye pain
- Vomiting and diarrhea, but this is more common in children than adults

Basic Influenza Prevention Steps

CDC recommends a yearly **flu vaccine** as the first and most important step in protecting against flu viruses. Quadrivalent inactivated influenza vaccine [IIV4], recombinant influenza vaccine [RIV4], or live attenuated influenza vaccine (LAIV4).



Avoid close contact with people who are sick. If you are sick, limit contact with others as much as possible to keep from infecting them.

Cover your nose and mouth with a tissue when you cough or sneeze. Throw the tissue in the trash after you use it.

There are four FDA-approved **antiviral drugs** recommended by CDC to treat flu this season. oseltamivir phosphate (available as a generic version or under the trade name Tamiflu®), zanamivir (trade name Relenza®), peramivir (trade name Rapivab®), and baloxavir marboxil (trade name Xofluza®).

Basic Influenza Prevention Steps

Drink plenty of liquids. Choose water, juice and warm soups to prevent dehydration.

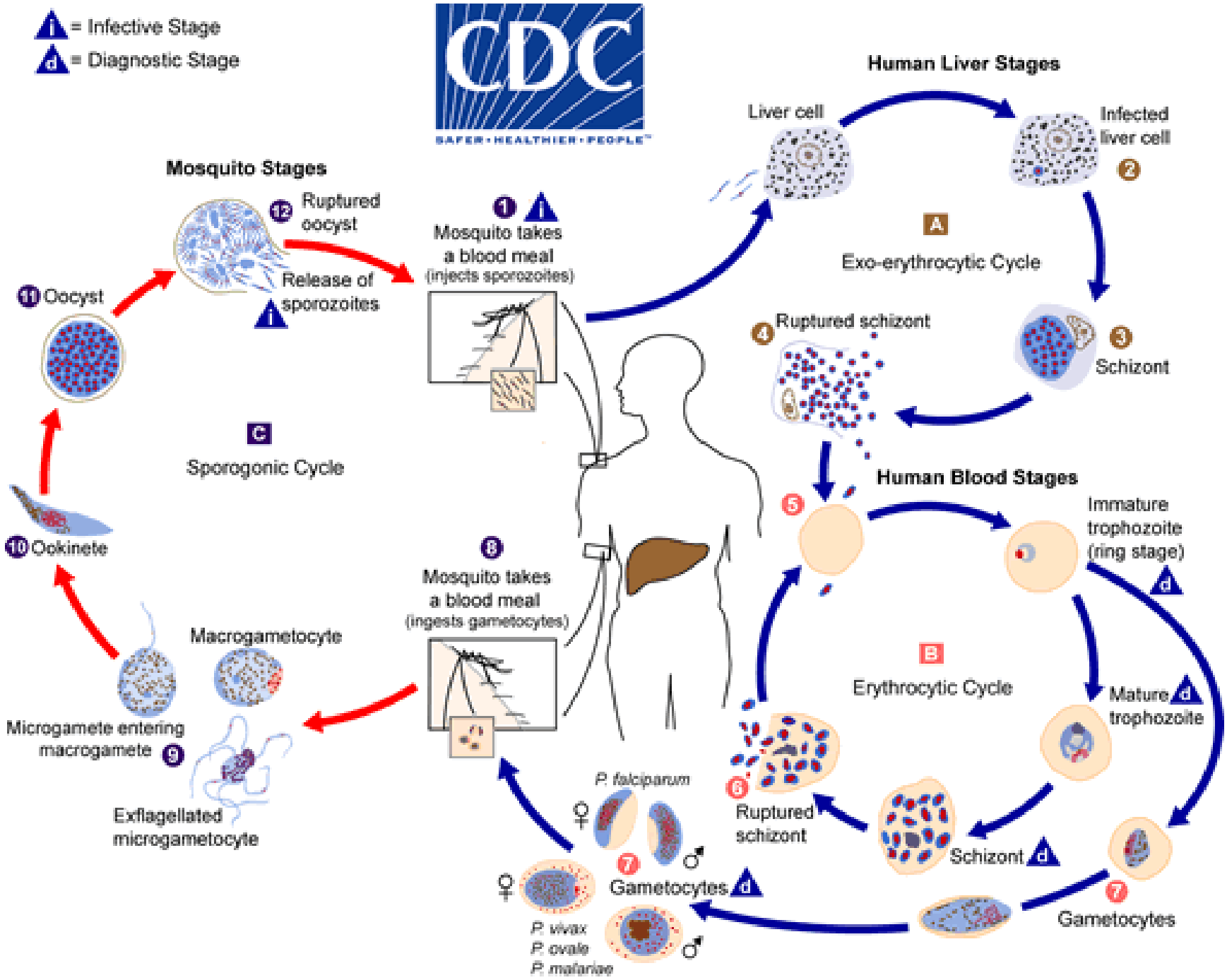
Rest. Get more sleep to help your immune system fight infection. You may need to change your activity level, depending on your symptoms.

Wash your hands often with soap and water. If soap and water are not available, use an alcohol-based hand rub.

Avoid touching your eyes, nose, and mouth. Germs spread this way. **Clean and disinfect surfaces** and objects that may be contaminated with viruses that cause flu.

Malaria

- **Malaria** is a mosquito-borne disease caused by a parasite.
- The natural history of malaria involves cyclical infection of humans and female *Anopheles* mosquitoes. In humans, the parasites grow and multiply first in the liver cells and then in the red cells of the blood. In the blood, successive broods of parasites grow inside the red cells and destroy them, releasing daughter parasites ("merozoites") that continue the cycle by invading other red cells.
- Following the infective bite by the *Anopheles* mosquito, a period of time (the "incubation period") goes by before the first symptoms appear. The incubation period in most cases varies from 7 to 30 days. The shorter periods are observed most frequently with *P. falciparum* and the longer ones with *P. malariae*.


= Infective Stage
= Diagnostic Stage
CDC
SAFER • HEALTHIER • PEOPLE™
Human Liver Stages
Liver cell
Infected liver cell
2
A
Exo-erythrocytic Cycle
3
Schizont
4
Ruptured schizont
Human Blood Stages
5
Immature trophozoite (ring stage)
d
Mature trophozoite
d
B
Erythrocytic Cycle
6
Ruptured schizont
Schizont
d
7
Gametocytes
Gametocytes
d
P. falciparum
P. vivax
P. ovale
P. malariae
8
Mosquito takes a blood meal (ingests gametocytes)
Macrogametocyte
Microgamete entering macrogamete
9
Exflagellated microgametocyte
10
Ookinete
11
Oocyst
12
Ruptured oocyst
Release of sporozoites
Mosquito Stages
1
Mosquito takes a blood meal (injects sporozoites)
C
Sporogonic Cycle

- The malaria parasite life cycle involves two hosts. During a blood meal, a malaria-infected female *Anopheles* mosquito inoculates sporozoites into the human host.
- Sporozoites infect liver cells and mature into schizonts, which rupture and release merozoites. (In *P. vivax* and *P. ovale* a dormant stage [hypnozoites] can persist in the liver (if untreated) and cause relapses by invading the bloodstream weeks, or even years later). After this initial replication in the liver (exo-erythrocytic schizogony), the parasites undergo asexual multiplication in the erythrocytes (erythrocytic schizogony).
- Merozoites infect red blood cells.
- The ring stage trophozoites mature into schizonts, which rupture releasing merozoites .
- Some parasites differentiate into sexual erythrocytic stages (gametocytes).
- Blood stage parasites are responsible for the clinical manifestations of the disease. The gametocytes, male (microgametocytes) and female (macrogametocytes), are ingested by an *Anopheles* mosquito during a blood meal.
- The parasites' multiplication in the mosquito is known as the sporogonic cycle. While in the mosquito's stomach, the microgametes penetrate the macrogametes generating zygotes.
- The zygotes in turn become motile and elongated (ookinetes) which invade the midgut wall of the mosquito where they develop into oocysts.
- The oocysts grow, rupture, and release sporozoites, which make their way to the mosquito's salivary glands. Inoculation of the sporozoites into a new human host perpetuates the malaria life cycle.

Malaria (sign and symptoms)

Infection with malaria parasites may result in a wide variety of symptoms, ranging from absent or very mild symptoms to severe disease and even death. Malaria disease can be categorized as uncomplicated or severe (complicated).

Signs and symptoms of malaria may include:

- Fever
- Chills
- General feeling of discomfort, Fatigue
- Headache
- Nausea and vomiting
- Diarrhea
- Abdominal pain, Muscle or joint pain
- Rapid breathing and heart rate
- Cough

Basic Malaria Prevention Steps

Apply mosquito repellent with DEET (diethyltoluamide) to exposed skin.

Drape mosquito netting over beds.

Put screens on windows and doors.

Treat clothing, mosquito nets, tents, sleeping bags and other fabrics with an insect repellent called permethrin.

Wear long pants and long sleeves to cover your skin.

Infection Control for Malaria

Prevention: There are a number of ways to protect yourself and prevent the spread of Malaria.

Vaccine: The only approved vaccine, as of 2021, is a recombinant protein-based malaria vaccine RTS,S developed by PATH Malaria Vaccine Initiative (MVI) and GlaxoSmithKline (GSK) with support from the Bill and Melinda Gates Foundation known by the brand name Mosquirix. It requires four injections.

Antimalarial drugs: Artemisinin drugs (artemether and artesunate), Atovaquone (Mepron®), Chloroquine, Doxycycline (Doxy-100®, Monodox®, Oracea®), Mefloquine, Quinine.

Immunity

Dengue

- Dengue virus is spread to people by the bite of an infected mosquito *Aedes aegypti* and *Aedes albopictus*.
- The virus responsible for causing dengue, is called dengue virus (DENV). Dengue is caused by one of any of four DENV serotypes: DENV-1, DENV-2, DENV-3 and DENV-4.
- Dengue is found in tropical and sub-tropical climates worldwide, mostly in urban and semi-urban areas.
- The number of dengue cases reported to WHO increased over 8 fold over the last two decades, from 505,430 cases in 2000, to over 2.4 million in 2010, and 5.2 million in 2019. Reported deaths between the year 2000 and 2015 increased from 960 to 4032, affecting mostly younger age group.

Dengue (sign and symptoms)

- Dengue should be suspected when a high fever (40°C/104°F) is accompanied by 2 of the following symptoms during the febrile phase (2-7 days). Symptoms include severe headache, pain behind the eyes, muscle and joint pains, nausea, vomiting, swollen glands and rash.

- A patient enters what is called the critical phase normally about 3-7 days after illness onset. During the 24-48 hours of critical phase, a small portion of patients may manifest sudden deterioration of symptoms. It is at this time, when the fever is dropping (below 38°C/100°F) in the patient, that warning signs associated with severe dengue can manifest. Warning signs that doctors should look for include: severe abdominal pain, persistent vomiting, rapid breathing, bleeding gums or nose, fatigue, restlessness, liver enlargement, blood in vomit or stool.

Basic Dengue Prevention Steps

Apply mosquito repellent like DEET, IR3535 or icaridin to exposed skin.

Drape mosquito netting over beds.

Put screens on windows and doors.

Treat clothing, mosquito nets, tents, sleeping bags and other fabrics with an insect repellent called permethrin.

Wear long pants and long sleeves to cover your skin.

Infection Control for Dengue

Prevention: There are a number of ways to protect yourself and prevent the spread of Malaria.

Vaccine: Dengvaxia developed by Sanofi Pasteur is the only dengue vaccine approved by the U.S. Food and Drug Administration and recommended for routine use by the Advisory Committee on Immunization Practices (Dengvaxia will be available starting in 2022 for use in children and adolescents 9–16 years old). The vaccine prevents dengue caused by all four dengue virus serotypes.

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.

Immunity

Chikungunya

- Chikungunya is a viral disease transmitted to humans by infected mosquitoes. It is caused by the chikungunya virus (CHIKV).
- It is an RNA virus that belongs to the *alphavirus* genus of the family *Togaviridae*. The name “chikungunya” derives from a word in the Kimakonde language, meaning “to become contorted”, and describes the stooped appearance of sufferers with joint pain (arthralgia).
- The virus is spread to people by the bite of an infected mosquito *Aedes aegypti* and *Aedes albopictus*. The *Ae. aegypti* is confined within the tropics and sub-tropics, *Ae. albopictus* also occurs in temperate and even cold temperate regions.

Chikungunya (sign and symptoms)

- After the bite of an infected mosquito, onset of illness usually occurs 4-8 days later (but can range from 2-12 days). Chikungunya is characterized by an abrupt onset of fever, frequently accompanied by joint pain. The joint pain is often very debilitating; it usually lasts for a few days, but may be prolonged for weeks, months or even years. Hence, the virus can cause acute, subacute or chronic disease. Other common signs and symptoms include muscle pain, joint swelling, headache, nausea, fatigue and rash.
- Occasional cases of ophthalmological, neurological and heart complications have been reported with chikungunya virus infections, as well as gastrointestinal complaints.

Basic Chikungunya Prevention Steps

Apply mosquito repellent like DEET, IR3535 or icaridin to exposed skin.

Drape mosquito netting over beds.

Put screens on windows and doors.

Treat clothing, mosquito nets, tents, sleeping bags and other fabrics with an insect repellent called permethrin.

Wear long pants and long sleeves to cover your skin.

Infection Control for Chikungunya

Prevention: There are a number of ways to protect yourself and prevent the spread of Malaria.

Vaccine: As of 2021, no approved vaccines are available. A phase-II vaccine trial used a live, attenuated virus, to develop viral resistance in 98% of those tested after 28 days and 85% still showed resistance after one year. In August 2014 researchers at the National Institute of Allergy and Infectious Diseases in the USA were testing an experimental vaccine which uses virus-like particles (VLPs) instead of attenuated virus.

The clinical management targets primarily to relieving the symptoms, including the joint pain using anti-pyretics, optimal analgesics, drinking plenty of fluids and general rest. Medicines such as paracetamol or acetaminophen are recommended to pain relief and reducing fever.

Immunity

Pneumonia

- Pneumonia is an infection of the lungs that can cause mild to severe illness in people of all ages.
- Pneumonia is an infection that inflames the air sacs in one or both lungs. The air sacs may fill with fluid or pus (purulent material), causing cough with phlegm or pus, fever, chills, and difficulty breathing.
- A variety of organisms, including bacteria, viruses and fungi, can cause pneumonia. A common cause of typical bacterial pneumonia is *Streptococcus pneumoniae*.
- Some pneumonias had different characteristics compared to “typical” pneumonias, they called these “atypical”.

Common Types of Pneumonia Caused by Atypical Bacteria

- ***Chlamydia pneumoniae* Infection**

  This illness, caused by *Chlamydia pneumoniae*, is most common in school-aged children and usually develops into mild pneumonia or bronchitis.

- **Psittacosis**

  People get this sometimes serious illness, caused by *Chlamydia psittaci*, from infected pet birds (parrots, parakeets) and poultry (turkeys, ducks).

- **Legionnaires' Disease**

  Legionnaires' disease is a severe type of pneumonia that is caused by a type of bacteria called *Legionella*.

- ***Mycoplasma pneumoniae* Infection**

  This generally mild illness is a common cause of "walking pneumonia" by *Mycoplasma pneumoniae*.

Pneumonia (sign and symptoms)

Signs and symptoms of pneumonia may include:

- Chest pain when you breathe or cough
- Confusion or changes in mental awareness (in adults age 65 and older)
- Cough, which may produce phlegm
- Fatigue
- Fever, sweating and shaking chills
- Lower than normal body temperature (in adults older than age 65 and people with weak immune systems)
- Nausea, vomiting or diarrhea
- Shortness of breath

Basic Pneumonia Prevention Steps

Vaccine: Pneumococcal conjugate vaccines (PCV13, PCV15, and PCV20) and Pneumococcal polysaccharide vaccine (PPSV23). If PCV15 is used, this should be followed by a dose of PPSV23.

Practice good hygiene. To protect yourself against respiratory infections that sometimes lead to pneumonia, wash your hands regularly or use an alcohol-based hand sanitizer.

Don't smoke. Smoking damages your lungs' natural defenses against respiratory infections.

Keep your immune system strong. Get enough sleep, exercise regularly and eat a healthy diet.

Hypertension

- Hypertension - or elevated blood pressure - is a serious medical condition that significantly increases the risks of heart, brain, kidney and other diseases.
- Blood pressure is determined both by the amount of blood your heart pumps and the amount of resistance to blood flow in your arteries. The more blood your heart pumps and the narrower your arteries, the higher your blood pressure.
- A blood pressure reading is given in millimeters of mercury (mm Hg). It has two numbers. Top number (systolic pressure). The first, or upper, number measures the pressure in your arteries when your heart beats. Bottom number (diastolic pressure). The second, or lower, number measures the pressure in your arteries between beats.

- **Pulmonary hypertension** happens when the pressure in the blood vessels leading from the heart to the lungs is too high.
- With pulmonary hypertension, the blood vessels to the lungs develop an increased amount of muscle in the wall of the blood vessels. The heart pumps blood from the right ventricle to the lungs to get oxygen. Because the blood does not have to travel very far, the pressure in this side of the heart and in the artery taking blood from the right ventricle to the lungs is normally low-usually much lower than systolic or diastolic blood pressure.
- When the pressure in this artery gets too high, the arteries in the lungs can narrow and then the blood does not flow as well as it should, resulting in less oxygen in the blood.

Basic Hypertension Prevention Steps

Reducing salt intake (to less than 5g daily).

Eating more fruit and vegetables.

Limiting the intake of foods high in saturated fats.

Eliminating/reducing trans fats in diet.

Being physically active on a regular basis.

Avoiding use of tobacco.

Reducing alcohol consumption.

Hypertension Control

Reducing and managing stress.

Regularly checking blood pressure.

There is no cure for pulmonary hypertension. However, there are many different types of treatments, including Inhaled medicine, Medicine given through the veins under the skin, Medicine to reduce swelling in the feet (diuretics) and Oxygen therapy

Medicines: ACE Inhibitors, Beta-Blockers, Calcium Channel Blockers, Peripherally Acting Alpha-Adrenergic Blockers, Vasodilators, Centrally-Acting Alpha Adrenergics, Angiotension II Receptor Blockers, Renin Inhibitors, Combination Medicines and Diuretics (sometimes called "water pills")

Angiotension-Converting Enzyme (ACE) Inhibitors	Captopril, enalpril, ramipril etc.
Beta Blockers	Atenolol, carvedilol, propranolol etc.
Calcium Channel Blockers	Amlodipine benzoate, diltiazem, nifedipine etc.
Peripherally Acting Alpha-Adrenergic Blockers	Prazosin, terazosin, phenyloxybenzamine etc.
Vasodilators	Hydralazine, minoxidil etc.
Angiotension II Antagonists	Losartan, telmisartan, valsartan etc.
Centrally-Acting Alpha Adrenergics	Clonidine, guanfacine etc.
Renin Inhibitors	Aliskiren
Diuretics	Chlorothiazide, furosemide, spironolactone etc.
Combination Medicines	Amlodipine besylate and olmesartan, atenolol and chlorthalidone, amlodipine besylate and atorvastatin etc

Diabetes mellitus

- Diabetes mellitus refers to a group of diseases that affect how your body uses blood sugar (glucose).
- Chronic diabetes conditions include type 1 diabetes and type 2 diabetes.
- Type 1 diabetes is also called insulin-dependent diabetes. This is an autoimmune condition. It happens when your body attacks your pancreas with antibodies. The organ is damaged and doesn't make insulin.
- Type 2 diabetes used to be called non-insulin-dependent or adult-onset diabetes. When you have type 2 diabetes, your pancreas usually creates some insulin. But either it’s not enough or your body doesn’t use it like it should.
- Potentially reversible diabetes conditions include prediabetes and gestational diabetes.
- Prediabetes occurs when your blood sugar levels are higher than normal, but not high enough to be classified as diabetes. And prediabetes is often the precursor of diabetes unless appropriate measures are taken to prevent progression.
- Gestational diabetes occurs during pregnancy but may resolve after the baby is delivered.

Diabetes mellitus (sign and symptoms)

Some of the signs and symptoms of type 1 diabetes and type 2 diabetes are:

- Increased thirst
- Frequent urination
- Extreme hunger
- Unexplained weight loss
- Presence of ketones in the urine
- Fatigue
- Irritability
- Blurred vision
- Slow-healing sores
- Frequent infections

Prevention of Diabetes mellitus

Center your diet on more fruits, vegetables, lean proteins and whole grains - foods that are high in nutrition and fiber and low in fat and calories - and cut down on saturated fats, refined carbohydrates and sweets.

Exercise lowers your blood sugar level by moving sugar into your cells, where it's used for energy. Exercise also increases your sensitivity to insulin, which means your body needs less insulin to transport sugar to your cells.

Quit tobacco, smoking and alcohol

Losing weight - if you are overweight. Work with your healthcare team to develop a weight-loss plan.

Control of Diabetes mellitus

Insulin: People with type 1 diabetes need insulin therapy to survive. Many people with type 2 diabetes or gestational diabetes also need insulin therapy.

Oral or other medications: Metformin (Glumetza, Fortamet, others) is generally the first medication prescribed for type 2 diabetes. Another class of medication called SGLT2 inhibitors may be used. They work by preventing the kidneys from reabsorbing sugar into the blood. Instead, the sugar is excreted in the urine.

Transplantation: In some people who have type 1 diabetes, a pancreas transplant may be an option.

Bariatric surgery

Cancer

- Cancer is a disease in which some of the body's cells grow uncontrollably and spread to other parts of the body.
- Normally, human cells grow and multiply (through a process called cell division) to form new cells as the body needs them. When cells grow old or become damaged, they die, and new cells take their place. Sometimes this orderly process breaks down, and abnormal or damaged cells grow and multiply when they shouldn't. These cells may form tumors, which are lumps of tissue. Tumors can be cancerous (malignant) or not cancerous (benign).
- Malignant tumors spread into, or invade, nearby tissues and can travel to distant places in the body to form new tumors (a process called metastasis). Benign tumors do not spread into, or invade, nearby tissues.

Cancer: Drivers

- Cancer is a genetic disease - that is, it is caused by changes to genes that control the way our cells function, especially how they grow and divide. The genetic changes that contribute to cancer tend to affect three main types of genes - proto-oncogenes, tumor suppressor genes, and DNA repair genes. These changes are sometimes called “drivers” of cancer.
- Proto-oncogenes are involved in normal cell growth and division. However, when these genes are altered in certain ways or are more active than normal, they may become cancer-causing genes (or oncogenes), allowing cells to grow and survive when they should not.
- Tumor suppressor genes are also involved in controlling cell growth and division. Cells with certain alterations in tumor suppressor genes may divide in an uncontrolled manner.
- DNA repair genes are involved in fixing damaged DNA. Cells with mutations in these genes tend to develop additional mutations in other genes and changes in their chromosomes, such as duplications and deletions of chromosome parts. Together, these mutations may cause the cells to become cancerous.

Cancer : Types

- There are more than 100 types of cancer. Types of cancer are usually named for the organs or tissues where the cancers form.
- Here are some categories of cancers that begin in specific types of cells:

Category of cancers	Type of cell
Carcinoma	formed by epithelial cells
Sarcoma	form in bone and soft tissues, including muscle, fat, blood vessels, lymph vessels, and fibrous tissue (such as tendons and ligaments).
Leukemia	begin in the blood-forming tissue of the bone marrow
Lymphoma	begins in lymphocytes (T cells or B cells).
Multiple Myeloma	begins in plasma cells, another type of immune cell.
Melanoma	begins in cells that become melanocytes, which are specialized cells that make melanin
Brain and Spinal Cord Tumors	star-shaped brain cells called astrocytes
Germ Cell Tumors	begins in the pluripotent cells that give rise to sperm or eggs.
Neuroendocrine Tumors	form from cells that release hormones into the blood in response to a signal from the nervous system

Cancer: Prevention

Cancer risk can be reduced by:

- not using tobacco
- maintaining a healthy body weight
- eating a healthy diet, including fruit and vegetables;
- doing physical activity on a regular basis
- avoiding or reducing consumption of alcohol
- avoiding ultraviolet radiation exposure and/or ensuring safe and appropriate use of radiation in health care
- minimizing occupational exposure to ionizing radiation; and reducing exposure to outdoor air pollution and indoor air pollution, including radon (a radioactive gas produced from the natural decay of uranium, which can accumulate in buildings - homes, schools and workplaces).

Cancer: Treatment

- A correct cancer diagnosis is essential for appropriate and effective treatment because every cancer type requires a specific treatment regimen.
- Treatment usually includes surgery, radiotherapy, and/or systemic therapy (chemotherapy, hormonal treatments, targeted biological therapies). Proper selection of a treatment regimen takes into consideration both the cancer and the individual being treated. Completion of the treatment protocol in a defined period of time is important to achieve the predicted therapeutic result.
- Palliative care is treatment to relieve, rather than cure, symptoms and suffering caused by cancer and to improve the quality of life of patients and their families. Palliative care can help people live more comfortably. It is particularly needed in places with a high proportion of patients in advanced stages of cancer where there is little chance of cure. Relief from physical, psychosocial, and spiritual problems through palliative care is possible for more than 90% of patients with advanced stages of cancer.

Cancer: Treatment

- **Biomarker Testing for Cancer Treatment:** Biomarker testing is a way to look for genes, proteins, and other substances (called biomarkers or tumor markers) that can provide information about cancer.
- **Chemotherapy:** Chemotherapy is a type of cancer treatment that uses drugs to kill cancer cells.
- **Hormone Therapy:** Hormone therapy is a treatment that slows or stops the growth of breast and prostate cancers that use hormones to grow.
- **Hyperthermia:** Hyperthermia is a type of treatment in which body tissue is heated to as high as 113 °F to help damage and kill cancer cells with little or no harm to normal tissue.

Cancer: Treatment

- **Immunotherapy:** Immunotherapy is a type of cancer treatment that helps your immune system fight cancer.
- **Photodynamic Therapy:** Photodynamic therapy uses a drug activated by light to kill cancer and other abnormal cells.
- **Radiation Therapy:** Radiation therapy is a type of cancer treatment that uses high doses of radiation to kill cancer cells and shrink tumors.
- **Stem Cell Transplant:** Stem cell transplants are procedures that restore stem cells that grow into blood cells in people who have had theirs destroyed by high doses of chemotherapy or radiation therapy.
- **Surgery:** When used to treat cancer, surgery is a procedure in which a surgeon removes cancer from your body.

Cancer: Treatment

- **Targeted Therapy:** Targeted therapy is a type of cancer treatment that targets the changes in cancer cells that help them grow, divide, and spread.

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