**African Centre for Project Management,**

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**Course: Post Graduate Diploma in Public Health**

***Course Unit: Module Three Assignment***

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1. ***Define a chronic disease with the help of two common examples. What are the characteristics of chronic diseases? How are they managed?***

U.S. National Center for Health Statistics defines a chronic disease as one that persists for a long time lasting about 3 months or more. Chronic diseases generally cannot be prevented by vaccines or cured by medication, nor do they just disappear. Health damaging behaviors, particularly tobacco use, lack of physical activity and poor eating habits are major contributors to the leading chronic diseases.

Chronic diseases tend to become more common with age and examples include [arthritis](https://www.medicinenet.com/arthritis/article.htm), cardiovascular disease such as heart attacks and [stroke](https://www.medicinenet.com/stroke_symptoms_and_treatment/article.htm), [cancer](https://www.medicinenet.com/cancer/article.htm) such as [breast](https://www.medicinenet.com/breast_anatomy/article.htm) and [colon cancer](https://www.medicinenet.com/colon_cancer/article.htm) and [diabetes](https://www.medicinenet.com/diabetes_mellitus/article.htm).

The two common examples of chronic diseases are Cardiovascular disease, Cancer and Diabetes. Cardiovascular disease (Heart disease) is the leading cause of death in the US with Cancer ranked second.

Cardiovascular disease includes conditions that affect the structures or function of the heart, such as Coronary artery disease (narrowing of the arteries), Heart attack, Abnormal heart rhythms, or arrhythmias, Heart failure, Heart valve disease, Congenital heart disease and Heart muscle disease (cardiomyopathy)

The symptoms vary depending on the specific type of disease, However, typical symptoms of an underlying cardiovascular issue include:

* Pains or pressure in the chest, which may indicate [angina](https://www.medicalnewstoday.com/articles/8886.php)
* Pain or discomfort in the arms, the left shoulder, elbows, jaw, or back
* Shortness of breath, also known as dyspnea
* Nausea and [fatigue](https://www.medicalnewstoday.com/articles/248002.php)
* Light-headed or faint
* Cold sweat

Cancer is a group of diseases that develop when cells in a part of the body begin to grow and multiply and spread out of control which when left unattended to will lead to death of the individual. Examples include breast cancer, colon cancer, brain cancer Skin cancer and Lung cancer. The following are signs relating to cancer though they are more dependent on the type of cancer

* A sore that does not heal
* Unusual bleeding or discharge
* Thickening or lump in the breast or elsewhere
* Indigestion or difficulty in swallowing
* Obvious change in a wart or mole
* Nagging cough or hoarseness

The general characteristics of chronic illnesses/diseases are;

* Complex causes which are uneasy to understand
* Many risk factors such as smoking, physical inactivity, poor nutritional habits etc.
* Long latency periods (time between onset of the illness and feeling its effects) that lasts several months or even years.
* A long illness that is usually more than three months and over extending to years
* Functional impairment or disability such as visual impairment caused by diabetes and or Hypertension and amputations of the limbs in the cases of diabetes.

Most chronic illnesses do not fix themselves and are generally not cured completely. Some can be immediately life-threatening, such as heart disease and stroke while others linger over time and need intensive management, such as diabetes and HIV/ AIDS. Other chronic illnesses persist throughout a person’s life, but are not always the cause of death, such as arthritis.

The general management of chronic diseases include;

* Physical activities such as exercising
* Eating a balanced diet (organic foods) rich in vegetables with low fat intake
* Stopping smoking of cigarette
* Worrying less and laughing more (Avoid stress)
* Stopping drinking of alcohol or only taking to a restricted low-level intake.
* Specific medication/ treatment of the individual chronic diseases such as diabetes.

1. ***(a) Discuss the various infectious agents***

An infectious agent is something that infiltrates another living thing and causes a disease. When an infectious agent enters a susceptible host like a human being, the human being is said to have been infected by the disease-causing agent which is also capable of crossing from this individual to infect another.

There are four main classes of infectious agents namely bacteria, viruses, fungi, and parasites (protozoa and warms) that infect any living thing.

**Bacteria**

Bacteria are single celled organisms without a nucleus. They may either be rod shaped, oval or spiral shaped. Examples include cocci, bacilli and spirochetes. They cause diseases such as respiratory diseases Pneumonia (*Streptococcus pneumoniae*), syphilis (*Treponema pallidum*) and wound infections (*Staphylococcus aureus*).

**Viruses**

Viruses are more tiny organisms than bacteria. A virus is a tiny dormant organism made up of a nucleic acid enveloped in a protein envelope called a capsid that only multiplies in a host cell. It contains either DNA or RNA but not both. It isn't technically alive because it cannot function or multiply unless in a host cell. If they get inside a host, they will get into action and multiply by hijacking the host cell's machinery and replicate themselves using the already available or made amino acids of the host cell. This can occur right away, or they might lay dormant for a bit before they replicate. After new viruses have been made, they go out into the world and the cycle starts over. Examples of viruses include the HIV virus, Ebola Virus, Polio virus, Hepatitis virus etc.

**Fungi**

Fungi are [eukaryotic](https://www.yourdictionary.com/eukaryotic) organism typically having [chitin](https://www.yourdictionary.com/chitin) cell walls but no [chlorophyll](https://www.yourdictionary.com/chlorophyll) or [plastids](https://www.yourdictionary.com/plastids). Fungi may be unicellular or multicellular organisms that reproduce by spores, examples including the mushrooms, molds, yeasts, and mildews.

There are five phyla of fungi: Chytridiomycota, Zygomycota, Glomeromycota, Ascomycota, and Basidiomycota.

Ascomycetes are often pathogens of plants and animals, including humans, in which they are responsible for infections like athlete’s [foot](https://biologydictionary.net/foot/), ringworm, and ergotism, which causes vomiting, convulsions, hallucinations, and sometimes even death. However, some ascomycetes normally are found inside humans, such as Candida albicans, a yeast which lives in the respiratory, gastrointestinal, and female reproductive tracts. They cause a disease in people with compromised immunity.

**Parasites**

A parasite is a plant or an animal organism that lives in or on another and takes its nourishment from that other organism. Parasitic diseases include infections that are due to protozoa, helminths, or arthropods. For example, [malaria](https://www.medicinenet.com/malaria_facts/article.htm) is caused by Plasmodium, a parasitic protozoon. Protozoa and warms such as hook warms are usually grouped as parasites. They depend on their host for nourishment and cause a disease to the host.

Generally, infectious agents are organisms or particles that causes a disease to a healthy organism after entry into or onto the hosts body from another organism or surface. These infectious agents are transmitted from one person to another either through contact with an infected person or a media either another organism or through droplets in the air. Infectious agents are diverse and causes different diseases to their hosts (humans/Animals) and they present differently depending on the type of infectious agent. However, they all affects the performance of the infected individual who in turn becomes a source of infection to other individuals.

***(b) Public health has had great success in controlling infectious diseases. Discuss the validity of this statement.***

According to WHO, Dowdle (1998) proposed a definition of control as a reduction in the incidence, prevalence, morbidity or mortality of an infectious disease to a locally acceptable level; elimination as reduction to zero of the incidences of disease or infection in a defined geographical area; and eradication as permanent reduction to zero of the worldwide incidences of infection.

Interruption of transmission has often been predicted as the goal, and standard public health concepts of disease control.

Public health indeed has done some tremendous job in disease control and even eradication.

**Successes**

**Vaccination**

Taking for example the smallpox a disease caused by a virus and spreads more easily was a major killer in the past, however, smallpox which was and remains to date eradicated through vaccination with only the last case seen in 1977 is a success achieved by Public health. Immunization against smallpox pioneered by Edward Jenner defined vaccine preventable diseases and marked the dawn of numerous universal childhood vaccination programs. Smallpox eradication was one of the early targets WHO had set after its formation in 1948. The disease was rampant in the 1950 affecting about 50 million people annually and falling to about 10-15 million cases in 1967 with the vaccination made universal and in same year an intensified plan to eradicate smallpox was adopted. Gradually the disease was isolated to the horn of Africa with the last case identified in Somalia in 1977 and global eradication was accepted by WHO in 1980. This is a great achievement by Public Health.

Other diseases also targeted by WHO for eradication included Poliomyelitis, neonatal tetanus and measles as well as the tropical diseases such as Leprosy, trachoma, Chagas’ disease, dracunculiasis, onchocerciasis and enteric warms. The development of vaccines and antibiotics brought optimism to public health leading to believe that infectious diseases could be conquered.

Vaccination campaign against polio has be targeted to its elimination, however, despite its success in polio control, it has remained endemic in countries such as Nigeria, India, Pakistan and Afghanistan. Reasons for the failure in these countries is due to;

* + Civil war
  + Poor infrastructure of primary health care
  + Failure to adopt the policy options to special conditions (lack of political will).
  + Believe on the effect of the vaccine as seen in the case of polio vaccine in Nigeria where it was believed that the vaccine causes AIDS.
  + Population mobility

Polio virus like smallpox had the potential for eradication, but due to the mentioned reasons above it failed to meet the target of eradication though it was eliminated in in some countries such as in Europe, Asia and the western pacific where the incidences were reduced by 99 percent worldwide by the year 1999. This shows a great well-done job by public health though vaccination as a preventive measure in reducing morbidity and mortality world over.

In 2001, an estimated global total of over 23 million disability-Adjusted life years was lost due to measles. The inexpensive highly effective vaccine intervention however made a tremendous achievement with improved immunization coverages. In Eastern Mediterranean region, the number of deaths due to measles fell by 93 percent between 2000 and 2008 attaining the United Nations’ goal of reducing measles deaths by 90 percent by 2010 which was achieved before the year. This is a great achievement by the public health.

Other diseases such as hepatitis B and A and human papilloma virus (approved in 2006) are other diseases whose infection cycles have been interrupted through vaccination reducing the cases from the previous highs to lower ones saving millions of lives in the world.

**Disease control and prevention**

Public health has also achieved success in the control of Ebola hemorrhagic disease. Since the first incidence of the first epidemic in 1976, there were 23 known Ebola outbreaks in equatorial Africa (WHO 2016) plus the current one in DRC making it 24. Between December 2013 and April 2016, the largest epidemic of Ebola virus disease generated a total of 28,616 cases and 11,310 deaths though the true toll was certainly greater (WHO 2016). This epidemic took 10 months to reach peak incidence, but cases were reported for an additional 18 months. Through the public health interventions, the epidemic was declared over after about 42 days equivalent to two incubation periods of the virus. This therefore marks a success to public health in bringing the epidemic to an end.

According to the Guardian (15/May/2019), more than 1,600 people have been infected with the Ebola virus in the North Kivu region of DRC and more than 1,000 have died by that time with the great majority women and children. At least 10 months since the outbreak began, the numbers are rising steadily, and the fatality rate is higher than in previous outbreaks, at about 67%.

New cases over the past month have increased at the fastest rate since the outbreak began last year, as aid agencies struggle to enact a public health response in areas that have suffered decades of neglect and conflict, with incredibly fragile health systems and regular outbreaks of deadly violence involving armed groups.

However, despite this outbreak of Ebola in DRC, efforts have also been made to contain it within DRC preventing the spread to other neighboring countries like what happened in the west African outbreak. Till now there have not been reported cases in the neighboring countries. This success is all attributed to the public health interventions in the control of Ebola such as personal hygiene, quarantine of cases, contact tracing and the likes.

**Hygiene and sanitation**

According to the CDC (1999), in the 19th century shift in population from villages to cities due to industrialization and immigration led to overcrowding in poor housings served by inadequate or nonexistent public water and waste disposal systems. This led to increased repeated outbreaks of infectious diseases such as Cholera, Dysentery, TB, Typhoid fever, Yellow fever, Influenza and Malaria. However, by 1900, the incidences of many of these diseases began to decline due to public improvements in sanitation and hygiene a collective public health action implemented by the governments at all levels and the partners through provision of safe drinking water and safe waste disposal which kept on up to the 21st century.

This also explains the occurrences of outbreaks of some infectious diseases such as cholera where for the past years has had several outbreaks in South Sudan except this year that there has not been any reported case of and outbreak.

**Antibiotic and anti-parasitic drugs**

The development of antibiotic for medical use in the 1940s marked a remarkable success in the treatment of bacterial illnesses which used to be dangerous killing millions yearly. The development of these antibiotics such as penicillin and the others saved several millions of lives.

However, to date, there is also a challenge of drug resistant strains of bacteria such as the MDR TB. They have also become a challenge despite the success achieved by drug development.

This challenge how ever is being tackled by a combined medications to treat the MDR TB.

**Technological advances in Disease detection**

Improvement in communication gadgets such as the computerized and electronic forms of communication has been of importance in disease control attributed to public health success. The development of computers with ability to gather, analyze and disseminate disease surveillance data has helped greatly the population in the fight against diseases. This provides the statics representing the burden of diseases and mortality being the foundations of epidemiology and public health.

Development of serological testing methodology such as the one for the detection of infectious diseases such as syphilis and Typhoid fever have helped a lot in the detection of diseases hence, leading to saving of millions of lives. Previously where there were no techniques to detect a specified disease left the population to suffer the burden of diseases without treatment. Where a disease can be identified means proper treatment and thus better healthy populations. Treatment of an identified disease means reducing the chances of cross infection of the other population.

Also added to the shelves of technology in relation to diseases identification, treatment and prevention was the development of viral isolation and culture. Long before the invention of the technique to isolate viruses and do tissue culture, so many viral diseases went unidentified killing the populations without any intervention such as treatment leaving it to linger in the community and the world infecting one person and the other. But with the isolation of the viruses, public health has a reason to celebrate its success in identification of the viruses causing diseases that were previously not known. This helped a lot in the prevention and control of viral outbreaks such as HIV and the Ebola disease.

Molecular techniques such as the gene detection and characterization of pathogens is a success in charactering the nucleic acid sequence to detect disease causing agents that were previously un known such as hepatitis C. it helps in tracking infections and ways on how to prevent and treat them.

Therefore, generally public health have achieved a lot ranging from the development of vaccines against infectious diseases, development of antibiotics for treatment of infectious diseases, provision of safe drinking water and proper waste disposal, development of improved communication tools as well as development of diagnostic techniques to identify disease causing agent and behavior change have helped a lot to save the world, however, Public Health remains with challenges that need to be tackled as below;

**Challenges**

**Emerging and reemerging infections**

Currently there have been new emerging diseases such as HIV has become a challenge. To date it has not been able to cure HIV. This is a challenge that public health needs to work towards achieving the cure of HIV/AIDS.

Ebola disease was first identified when there was an outbreak in 1976 with its worst outbreak in western Africa in 2014 and its latest being the outbreak in DRC which has killed more than 1,600 to date. This is an emerging disease that needs urgent public health attention to prevent another outbreak. According to WHO (May 2019), As of 28 May 2019, a total of 1945 EVD cases, including 1851 confirmed and 94 probable cases, were reported. A total of 1302 deaths were reported (overall case fatality ratio 67%), including 1208 deaths among confirmed cases.

Also, another example of emerging diseases is the H1N1 which broke out and took the world by storm in May 2009.

Other diseases such as polio and measles are another challenge to public health. These diseases that are preventable through vaccination are reemerging in parts of the world such as the persistence of measles in Europe and the failure to eliminate polio as illustrated by new cases in Tadzhikistan CDC (2009).

**Drug resistance**

The emergency of drug resistant diseases is also another challenge such as the MDR TB that need the public health to handle. This has led to more deaths from TB.

**Co infections**

With the existence of HIV/AIDS, the body’s immunity is weakened, this leads to the coinfections with other opportunistic diseases which otherwise could not cause disease in a normal human being. Examples include diseases such as influenza, Dengue, West Nile viruses which are of relatively benign character in majority of cases can be severe in immunocompromised people and people with chronic diseases.

**Disasters**

Natural and man-made disasters such as floods and civil wars lead to destruction of the environments. This leads to changes in temperatures which result to migration of disease vectors to higher altitudes. This brings the pathogens in to more proximity with humans. Diseases such as Malaria, Dengue Fever, Cholera and food-born infections such as Typhoid Fever are also sensitive to climate change causing concerns to public health.

Disasters lead to abandonment of homes and people seek shelter in other places as they escape the disaster, this leads to overcrowding in poorly constructed houses with poor sanitation and waste disposal bringing in challenges of disease out breaks such as cholera and dysentery.

**Hard to eliminate**

Diseases such as Malaria and the other tropical diseases including Dracunculiases which were target for elimination have given public health challenge and will continue to pose more challenge.

Inconclusion therefore, the mortality due to infectious diseases has dropped dramatically in the developed world where as the developing world still face the double burden of both infectious and chronic diseases due to sanitary and food safety development, vaccine, antibiotic developments, improved Nutrition and other advances in technology and social and economic developments. However, the challenges of population growth, urbanization, deforestation, pollution, global climate change and movement of populations has led to augmented diffusion of old and new pathogens resulting in an increased number of outbreaks. Public health therefore has a lot to do to avert these challenges for a better future health for all.

1. ***Discuss the ethical, legal, social, and scientific implications of using genetics and genomics in preventing and treating diseases***

**Genetics** refers to the study of genes and their role in inheritance, it relates to the way certain traits or character are passed down from one generation to another. while **Genomics** is the study of all of a person’s genetic material, the interactions with one another and interactions of the genetic material with the environment bringing about mutation, and the subsequent phenotypic changes.

**Genetics** uses information from one or two genes to explain a disease or condition, whereas **genomics** examines all the genetic information to determine biological markers that are predisposing an individual to disease.

There are many benefits of genetics and genomic medicine in disease diagnosis, prognosis and prevention such as;

Predictive and disease susceptibility testing in which genetic information is used to predict the susceptibility of an individual to a specific disease that are inherited such as type one diabetes. This is an achievement by genetics and genomics. It allows then the person found to be susceptible to take some lifestyle changes to prevent the onset of the disease.

Bioengineering of bacteria to produce the human insulin which has achieved a lot in treatment of diabetes is a result of genomics. This pioneered in 1978 by the company Genentech Inc. has helped save so many lives and reduced on life loss.

Disease diagnosis, prognosis and monitoring is also an achievement of the genetic medicine where a disease such as cancer is diagnosed, prognosed and monitored using the genetic material and preventive measures can be taken to prevent the disease at earliest stages.

Much as genetics and genomics is important and has contributed a lot in disease diagnosis, prognosis, monitoring, Treatment and prevention, it poses a lot of ethical, social and legal issues/challenges that need a lot to be done which include;

**Pharmaceutical, Biotechnology and Insurance companies**

Biomarkers are used by drug manufacturing companies to aid research during the development of drugs to determine the person’s likelihood to respond to a drug which can be risk. Such drugs are usually used on patients without their consent. This is a great unethical and illegal process.

Insurance companies have also not been able to accept reimbursement of personalized medicines tests.

**Incentives**

Manufacturing and researching agents have been paying incentives to physicians in order to use their product on market so they can research on the product. This is unethical and tantamount to bribes. Bribes make the physicians not to work independently and at the same time putting the life of his clients in danger.

**Discrimination and stigma**

Genetics and genomics achieved in the detection and diagnosis of genetically inherited diseases such as Sickle cell anaemia which is a disease caused by the inheritance of two recessive genes from both parents. This brought in the issue of premarital screening to detect carriers are are healthy individual. This brought the issue of discrimination and stigma against the carriers whom some of them remained unmarried and were not allowed to mix freely with the other people in public places such as schools.

**Abortion after Prenatal screening**

Some other diseases also inherited such as Huntington and Tay-Sachs have been subjected to prenatal screening of the fetus who is innocent. Much as this is valued as preventing the occurrence of disease it is illegal and unethical to terminate life. It is not the fetus that chose to be that but has been from the parents why should the innocent child be aborted? This is denying one the right to life.

**Denying health insurance coverage for carriers**

With the screening results of these diseases, insurance companies tend to deny the individuals the health coverage. This is denial of access to health which is a fundamental human right.

It is therefore the need to look afresh the screenings performed for such diseases at a greater angle putting in mind the unethical and illegal implication of the results and information got from these screening. Though genetics and genomics has done some great job such as disease diagnosis and prevention, it is recommended that;

* There is need to educate the population on genetics and what it can do and how other diseases are transferred from one generation to another. This will help the population to understand the subject matter very well and make informed decisions. Generally, there should be a better literacy level of the community to be able to educate the population about genetics and genomics.
* Newborn screening should only be done when there is an indication of the benefit to the new born.
* It should also be done only if it can be confirmed by another test that the diagnosis is truly the one
* If there is treatment and follow-up for the affected infants that will benefit the infant.
* Carrier screening should be voluntary and confidential with pre and post counselling services offered to the clients and should provide alternative choices for the identified carrier client.
* Counselling and information sharing for prenatal diagnosis should be done indicating the risk and benefits of the test as well as the available alternatives. No prenatal screening should be done without the consent of the two parents who should be informed about the outcome of the results.
* Basing on the results decisions are made, therefore quality and accurate results are encouraging in order to avoid taking innocent lives mistakenly.

1. ***Identify two infectious diseases and the possible treatment of each***

Infectious diseases are disorders caused by organisms such as bacteria, viruses, fungi or parasites. There are organisms that live in and on our bodies, which are normally harmless or even helpful, but under certain conditions, some organisms may cause disease.

Some infectious diseases can be passed from person to person either transmitted by bites from insects or animals or are acquired by ingesting contaminated food or water or being exposed to organisms in the environment.

The signs and symptoms of infectious diseases vary depending on the organism causing the infection, but often include fever and fatigue. Mild infections may respond to rest and home remedies, while some life-threatening infections may require hospitalization.

Many infectious diseases can be prevented by vaccination such as measles, Polio and chickenpox etc. while personal hygiene such as frequent and thorough hand-washing with soap/ash and clean water also helps protect one from most infectious diseases including Cholera and Typhoid fever.

**Malaria**

Malaria is a parasitic life-threatening mosquito-borne blood disease caused by the parasite Plasmodium. It is transmitted to humans through the bite of an infected female anopheles mosquito when it sucks blood.

There are 5 parasite species that cause malaria in humans, P. falciparum, *P. Malariae*, *P. Ovale*, *P. knowlesi* and P. vivax . Two of these species – P. falciparum and P. vivax – pose the greatest threat.

**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 failure is also frequent. In malaria endemic areas, people may develop partial immunity, allowing asymptomatic infections to occur.

Some population groups are at considerably higher risk of contracting malaria, and developing severe disease, than others. These include infants, children under 5 years of age, pregnant women and patients with HIV/AIDS, as well as non-immune migrants, mobile populations and travelers

**Disease Burden**

In 2017, there were an estimated 219 million cases of malaria in 87 countries with the estimated number of malaria deaths which stood at 435 000 in 2017. Of the 219 million cases, five countries accounted for nearly half of all malaria cases worldwide: Nigeria (25%), the Democratic Republic of the Congo (11%), Mozambique (5%), India (4%) and Uganda (4%) making Africa region to carry the highest share of the global burden with 92 percent of the malaria cases and 93 percent of deaths.

Children under 5 years of age were the most vulnerable group affected by malaria accounting for 61% (266 000) of all malaria deaths worldwide.

**Prevention**

Vector control is the main way to prevent and reduce malaria transmission.

The two forms of vector control include insecticide-treated mosquito nets and indoor residual spraying which are effective in destroying the vector the female anopheles mosquito.

Other methods of prevention include draining stagnant waters, covering stagnant water surfaces with oil, putting on long sleeve and trousers in the evening hours while sitting out, use of window screens with mosquito wire nets to prevent entry, clearing of bushes around home states and use of air conditioners in areas with warm temperatures.

Proper and timely diagnosis and treatment with antimalarial medicines can also be used to prevent malaria. This helps in clearing the parasites in the blood system of the infected person such that there is not parasite for the mosquito to pick during a blood meal when it bites the person.

For pregnant women living in moderate-to-high transmission areas, WHO recommends intermittent preventive treatment with sulfadoxine-pyrimethamine, at each scheduled antenatal visit after the first trimester.

**Treatment**

Malaria is a preventable and treatable disease. The primary objective of treatment is to ensure complete cure, that is the rapid and full elimination of the Plasmodium parasite from the patient’s blood, to prevent progression of uncomplicated malaria to severe disease or death, and to chronic infection that leads to malaria-related anemia.

Meanwhile from a public health perspective, treatment is meant to reduce transmission of the infection to others, by reducing the infectious reservoir and by preventing the emergence and spread of resistance to antimalarial medicines.

Falciparum malariahas become resistant to conventional treatment, such as chloroquine, sulfadoxine-pyrimethamine, and other antimalarial medicines used on their own.

A combination of drugs that includes a compound derived from artemisinin a substance extracted from the plant Artemisia annuaalong with another antimalarial drug is the best choice for malaria treatment.

This combination of artemisinin derivatives with another effective antimalarial medicine is called artemisinin-based combination therapy (ACT) and is currently the most effective medicine available to treat malaria. An example includes the commonly known Coartem contains a combination of artemether and lumefantrine. Artemether and lumefantrine are anti-malaria medicines that interfere with the growth of parasites in the red blood cells of the human body.

**Cholera**

Cholera is an infectious disease caused by a water-borne bacterium the *vibrio cholerae*, transmitted through contaminated food or water, or through contact with fecal matter or vomit from infected people.

**Disease burden**

The number of cholera cases reported to WHO has continued to be high over the last few years. During 2017,1,227,391 cases were notified from 34 countries, including 5,654 deaths.

According to MSF (2019), although easy to prevent and treat, cholera affects up to 4 million people worldwide per year, resulting in up to 140,000 deaths. The discrepancy between the figures and the estimated burden of the cholera disease is because many cases are not recorded due to limitations in surveillance systems and fear of economic and social impact that can affect trade and tourism of those individual countries.

Between 1 January and 26 March 2019, MSF has admitted 7,938 suspected cholera cases to its health facilities in Amran, Hajjah, Ibb and Taiz governorates of Yemen, 50% of them coming from Ibb governorate, in the country’s southwest. Over this period, the number of cholera patients treated by MSF increased from 140 to 2,000 per week.

Cumulatively, as of 11 June 2017, about 6,870 cholera cases including 174 deaths (case fatality rate 2.6 per cent) have been reported in South Sudan since the beginning of 2017. The current outbreak has lasted for one year, compared to four months for the 2015 outbreak and seven months for the 2014 outbreak (UNICEF 26 June 2017) with case fatality rate for 2017 higher than those of the previous three years and with at least 69 per cent of deaths occurring at the community level.

Factors contributing to the high number of community deaths include poor treatment seeking behavior, including the use of traditional medicine before seeking healthcare; low awareness about cholera; geographical inaccessibility of affected areas, where communities are also dispersed; poor communication in affected areas; and limited humanitarian partner presence.

**Symptoms**

Approximately one in ten (5-10%) of infected persons will have severe cholera which in the early stages includes:

* profuse watery diarrhea, sometimes described as “rice-water stools,” loosing up to 25 litres of fluid per day
* vomiting
* rapid heart rate
* loss of skin elasticity
* dry mucous membranes
* low blood pressure
* thirst
* muscle cramps
* restlessness or irritability

While Persons with severe cholera can develop acute renal failure, severe electrolyte imbalances and coma. If untreated, severe dehydration can rapidly lead to shock and death in just hours.

**Treatment**

Cholera is relatively simple to treat in most cases, with people with mild to moderate forms usually able to recover through treatment with fluids and oral rehydration salts, which are easy to administer.

WHO (2019) estimates that Up to 80% of cases can be successfully treated with oral rehydration solution (ORS) while Severe cases will need rapid treatment with intravenous fluids and antibiotics.

In these cases, they should be admitted to a Cholera Treatment Centre (CTC). Without treatment, the mortality rate can reach 50 per cent; with adequate care, it's less than 2 per cent.

**Prevention**

Persons caring for cholera patients can avoid acquiring illness by [washing their hands](https://www.cdc.gov/healthywater/hygiene/hand/handwashing.html) after touching anything that might be contaminated and properly disposing of contaminated items and human waste.

While oral vaccines have proven effective in preventing cholera during outbreaks, current two-dose strategies are logistically challenging to implement during emergencies. But with know previous experience and scientific evidence, a one-dose oral cholera vaccine strategy is not only safe and easy to implement but can also prevent or reduce the transmission of the disease during an outbreak.

A rapid response is vital to containing the spread of a cholera outbreak such as quickly putting in place health promotion activities educating people on how to help to limit the spread

* Water and sanitation activities
* Establishing treatment centers and
* Vaccinating in an emergency response can help limit how far an epidemic spread hence, reducing the number of people who fall sick or die.

Cholera occurs in areas with poor access to sanitation and unsafe drinking water, hence, providing people with clean and safe drinking water and proper sanitation facilities is vital to preventing and curbing any outbreaks. Informing people about behavior change and good hygiene practices such as washing hands, using clean toilets, and using only clean water to drink and wash food, can also curb outbreaks of the disease.

1. ***What are some public health responses to emerging infections in your country***

An emerging infectious disease is one that is either newly recognized in a population or involves a recognized pathogen affecting new or larger populations or geographic areas. Disease emergence is influenced by ecologic and environmental changes (e.g., agriculture, deforestation, droughts, floods), human demographics and behavior (e.g., population migration, urbanization, international trade and travel), technology and industry, microbial adaptation, and breakdown in public health measures.

South Sudan has been devastated by decades of war in terms of loss of human life, massive displacement, destruction of both physical and social infrastructure, and loss of human resource development opportunities, including the loss of experienced health professionals. This, combined with a lack of awareness, has seriously limited both access to and use of quality health care services including family planning resulting in the country having some of the highest maternal and child mortality rates in Sub-Saharan Africa (MOH, 2013).

Detection and control of many emerging and reemerging infectious diseases primarily require a functional healthcare system involving investment in primary healthcare infrastructure, human resources, training, and provision of essential drugs, supplies, vaccines, and equipment. NGOs, United Nations agencies, and international organizations are providing crucial humanitarian assistance to many conflict-affected populations including in South Sudan in coordination with relevant authorities.

In South Sudan, the emerging infectious diseases include Cholera, Tuberculosis, HIV/AIDS, the Ebola outbreak in the neighboring DRC and Uganda, reemerging Drug resistant Tuberculosis, reemerging Guinea warm as is the case seen in Yambio (Eye Radio 12 June 2019), Malaria, Rift valley Fever (2007, 2010), and Hepatitis B.

The Public health responses towards the emerging infectious diseases are specific to target diseases and infections that can be summarized as follows;

**Immunization**

South Sudan has been hit by immunolabel diseases such as cholera and meningococcal meningitis. Immunization is a successful cost-effective public health strategy that saves millions of lives from these infectious diseases. With the effect of the cholera outbreaks that happened in Juba during the past years, South Sudan ministry of health and some humanitarian partners such as MSF rolled out vaccination against cholera as an intervention to prevent the killer disease from causing a lot of deaths to the people of South Sudan.

Also, with the outbreak of the Ebola in the neighboring DRC and now in Uganda, the ministry of health together with WHO rolled out the first ever vaccination against Ebola in South Sudan for the health front liners who are deployed in different boarder posts of the country and those within juba that are attached to the Ebola response team.

**Screening individuals**

Screening individuals to determine if they have been infected or exposed is also a core public health strategy in fighting infectious diseases from spreading. As mentioned above about the Ebola, the government together with partner organizations have deployed task forces at boarder entry points and Airports to screen travelers for any sign of Ebola such as high fever/ Temperatures. All travelers arriving in to South Sudan will be screened to see their body temperatures.

Another intervention is the screening of both married/ cohabiting partners for HIV and STDs such as Syphilis. Pregnant mothers and their partners are screened for these infectious diseases to see if one of them is infected or not. This will help in preventing transmission from one partner to the other. It also helps in preventing the unborn child from getting the infection like in the case of PMTCT.

**Limiting contact with infectious persons**

The government together with other health partners also limited contact with infectious persons through quarantine and opening of specialized clinics such as the Cholera treatment centers. This is aimed to prevent other healthy people from getting into contact with the infected individuals. Travelers getting into South Sudan who have been screened to have high temperatures were quarantined to prevent them from getting into contact with the entire population.

Distribution of condoms by partners and the ministry of health is also one method of preventing contact. Free condoms are issued to prevent the spread of sexually transmitted diseases such as HIV, Syphilis and Hepatitis.

Contact tracing and quarantine of suspected infectious diseases such as Ebola and other diseases has also been a better strategy in limiting contact with infectious individuals.

The provision of PPEs for the case of the Ebola response and hand gloves in health centers and Cholera treatment centers as well as disinfection liquids have been a vital strategy in the fight against emerging infectious diseases. This protects the health workers and other from getting into contact with the infection.

Provision of clean and safe drinking water by the government and the implementing partners in their WASH programs including safe waste disposal is also another public health intervention towards emerging infectious diseases such as Typhoid fever, Cholera, Guinea Warm infections, Shigellosis and other water born diseases such as Amoebiasis.

**Early Detection and treatment**

Through well-equipped surveillance systems and Laboratory and adequate supply of medications and supplies early detection and treatment od infectious diseases such as Malaria, Cholera and the likes can be a better way of curbing the spread of these diseases. This is because when the patient with the disease like malaria is treated, the parasites in the blood system will all get done leaving no more parasite to be picked by the mosquito to infect another person.

Outbreaks such as measles and Meningitis when detected earl and early treatment is initiated and vaccination done to the mass, the outbreak can be contained with just limited effect.

The implementation of directly observed therapy for Tuberculosis treatment has been an intervention in curbing the development of drug resistant Tuberculosis where health workers are deployed to directly observe the patient while taking the medication. Community health workers are trained to trace patients and they dispense the drugs to the known patients as they watch them take the medicine. This is intended to prevent the development of drug resistance due to the patients skipping taking the medication.

Specific frameworks for preparedness and response for diseases such as Cholera and Ebola have been developed to guide the specific preparedness and response plans.

**Communication and information**

Taking the case of the cholera outbreak in South Sudan in 2017, community deaths accounting for about 69 percent of the total deaths which was higher than the other two outbreaks in the previous years due to factors including;

* Poor treatment seeking behavior, including the use of traditional medicine before seeking healthcare;
* Low awareness about cholera;
* Geographical inaccessibility of affected areas, where communities are also dispersed;
* Poor communication in affected areas; and limited humanitarian partner presence.

These factors can be curbed through community education and awareness by providing the community information on how the disease is transmitted, prevented, treated and where the treatment can be sought. Information in disease prevention is a vital as food to the body and must be shared among the population in order to intervene correctly. This therefore was one of the interventions used by the health partners and the Government to bring the outbreak down making it the last outbreak to date.

**Coordination**

Interagency coordination in a key in the fight of infectious diseases. Outbreaks require a lot of resources that if not involving the pooling of resources from several agencies will never be successful.

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