Module three questions

Name of student: Daniel Majur Majok

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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?**

A chronic disease is a human health condition or disease that is persistent or otherwise long-lasting in its effects or a disease that comes with time. The term chronic is often applied when the course of the disease lasts for more than three months. The examples of leading chronic diseases are:

1. arthritis and
2. Cardiovascular disease such as heart attacks and stroke, cancer such as breast and colon cancer, diabetes, and oral health problems.

Characteristics of chronic diseases are as follow but not limited to

- Complex causality, with multiple factors leading to their onset
- A long development period, for which there may be no symptoms
- A prolonged course of illness, perhaps leading to other health complications
- Associated functional impairment or disability

How are they managed?

Chronic Disease Management

Providing chronic disease care and support

Chronic Disease Management (CDM) is ongoing care and support to assist individuals impacted by a chronic health condition with the medical care, knowledge, skills and resources they need to better manage on a day to day basis. This may include:

- regular visits and support from your family physician, other primary care provider,
- Community-based programs or referrals to specialist programs and services.

So the importance of regular primary care (e.g. having a family physician) and that of primary health care provider is one of the good chronic disease management and other examples which includes care and support that is:

Proactive and Team-based.

Well integrated with primary care (e.g. your family physician) and the broader community are coordinated across providers and points of care easily accessible to the patient.

As such Primary Health Care is also another important approach which includes all of the basic services that are required to meet your everyday healthcare needs. This might be:

- a checkup with your family doctor, a visit to a physiotherapist, or a trip to the pharmacist or public health nurse.
- Interior Health is committed to improving the way primary health care is delivered to help you live a healthier life.
- Primary Health Care plays an important part of keeping you healthy! This approach is proactive using preventative measures, managing chronic disease, and encouraging self-care recommendations. Primary health care also services to decrease delay and increase access to the health care system, offering better health outcomes.

Each of our Primary Health Care centres, has an interdisciplinary health care team that provides a range of services in a single site. This coordinated approach to health care delivery ensures that clients receive the right care by the right provider, when and where they need it.

Divisions of Family Practice are community-based groups of family physicians working together with each other to achieve common health care goals. Through Collaborative Service Committee tables, Division representatives come together with Doctors of BC, Ministry of Health and Health Authority representatives to further collaborate and discuss ways of working more effectively together to improve the health of populations and services in their communities.

Divisions are incorporated as non-profit societies to give them the legal status necessary to sign contracts and/or hold funds to carry out the programs in their communities. They do not duplicate roles and responsibilities of a health authority.

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2. a. Discuss the various infectious agents

The major various infectious agents are epidemic diseases and are caused by bacteria, viruses, or parasites. The fact that each of these diseases is caused by a specific microbe which was established in the 1880s and 1890s, at a time of great scientific excitement, when almost every year marked a discovery of a new disease-causing bacterium. Robert Koch, a German physician, developed techniques to classify bacteria by their shape and their propensity to be stained by various dyes. Since billions of bacteria, most of them harmless to humans, inhabit the skin, throat, mouth, nose, large intestine, and vagina, it was necessary to develop a set of rules that could be used to prove that a specific organism caused a specific disease. These rules, called “Koch’s postulates,” are:

1) The organism must be present in every case of the disease;
2) The organism must be isolated and grown in the laboratory;
3) When injected with the laboratory-grown culture, susceptible test animals must develop the disease; and
4) The organism must be isolated from the newly infected animals and the process repeated. In rule number 2 Koch applied it in his proof that tubercle bacilli were the cause of tuberculosis, which was the leading cause of death in Europe at that time. Bacilli are bacteria that Infectious Agents Bacilli, Cocci, Spirochete. Appear rod-shaped when observed under the microscope. Koch identified another bacillus, Vibrio cholera, as the cause of cholera. Other disease-causing bacilli identified during that period were those that cause plague, typhoid, tetanus, diphtheria, and dysentery. Round-shaped bacteria, called cocci, include streptococci, which cause strep throat and scarlet fever; staphylococci, which cause wound infections; and pneumococcal, which cause pneumonia. Syphilis is caused by a corkscrew-shaped bacterium called a spirochete. All these bacteria were identified by the beginning of the 20th century. For some infectious diseases, however, no bacterial agent could be found. Smallpox, for example, was known to be transmitted from a sick person to a healthy one by something in the pus of the patient's lesions. Yet attempts to isolate a microorganism were unsuccessful. The agent that caused the disease could pass through the finest available filters and could not be observed in any existing microscope. Smallpox was recognized to be one of a number of diseases caused by such "filterable agents" or viruses. It was not until 1935, when the American scientist W. M. Stanley crystallized tobacco mosaic virus, that the nature of viruses was demonstrated. While bacteria are living, single-celled organisms that can grow and reproduce outside the body if given the appropriate nutrients, viruses are not complete cells. They are simply complexes of nucleic acid and protein that lack the machinery to reproduce themselves. Various kinds of viruses infect not only animal cells but also plant cells, as tobacco mosaic virus infects tobacco and even bacteria. They can survive extreme conditions such as treatment with alcohol and drying in a vacuum and become active again when they are injected into a living cell. They reproduce themselves by taking control of the cell's machinery, often killing the cell in the process. The human diseases caused by viruses include smallpox, yellow fever, polio, hepatitis, influenza, measles,

rabies, and AIDS, as well as the common cold. Human diseases can also be caused by protozoa, or single-celled animals that can live as parasites in the human body. Malaria, spread by mosquitoes; cryptosporidiosis, which caused the Milwaukee diarrhea epidemic described earlier in this text; and giardiasis, also known as “beaver fever” are examples of protozoan diseases. Other parasites, such as roundworms, tapeworms, hookworms, and pinworms, are the most common source of human infection in the world.

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

Public health measures to control the spread of disease are aimed at interrupting the chain of infection at whichever links are most vulnerable. At link 1, the pathogen could be killed, for example, by using an antibiotic to destroy the disease-causing bacteria when nurses or doctors give it out to the patient in the hospital. At link 2, one could eliminate a reservoir that harbors the pathogen. For example, controlling rat populations in cities by picking up garbage is a way of preventing the spread of plague to humans.

Adequate water and sewage treatment prevents the spread of water-borne diseases in the populated areas, and proper food-handling methods eliminate reservoirs of food borne pathogens. At link 3, transmission from one host to another could be prevented by quarantining infected individuals, for example, by warning people to boil their water if the water supply becomes contaminated especially water collected from the open source. Hand washing is an important way to prevent the spread of disease: it prevents restaurant workers from contaminating food, hospital workers from carrying pathogens from one patient to another, and allows all individuals to protect themselves against pathogens they may pick up from the environment and put in their mouth. The spread of sexually transmitted diseases can be prevented by use of a condom, a simple matter of blocking the movement of the pathogens to the uninfected person. At link 4, the resistance of hosts can be increased by immunization, which stimulates the body’s immune system to recognize the pathogen and to attack it during any future exposure. Vaccination not only keeps the individual from contracting a disease but also makes it harder for the pathogen to find susceptible hosts. In some cases, it may even be possible to completely eliminate a pathogen from the earth by eliminating the susceptibility of its potential hosts. This was accomplished in the case of smallpox, as discussed below. Other links are often included separately as part of the chain of infection when it is useful to consider them as sites for

public health intervention. For example, the port of entry into the host for a mosquito-borne disease would be the skin, a link that could be interrupted if the potential host wears long sleeves and gloves. Similarly, the place of exit is the route by which the pathogen leaves the host. Public health measures to control the spread of infectious disease include both routine prevention measures and emergency measures to control an outbreak once it has begun. Many of the measures referred to above especially those concerning links 2 and 3 come under the category of "environmental health." Immunization link 4 is a major weapon that has had great success against the dread diseases that created the epidemics of the past. However, vaccines do not exist for all diseases notably; a vaccine has not yet been developed against AIDS. Even when vaccines do exist, some diseases are too rare to justify the trouble and expense of vaccinating everyone. This is where surveillance is especially important.

Epidemiologic surveillance is the system by which public health practitioners watch for disease threats so that they may step in and break the chain of infection, halting the spread of disease. In the early history of public health, the solution was often quarantine isolation of the patient to prevent him or her from infecting others. Quarantine is still used occasionally, when the disease is serious and there is no effective vaccine. For example, a patient diagnosed with tuberculosis which is slow to respond to medication might be ordered to stay home for 2 to 4 weeks after treatment is started until the disease is no longer infectious. More often, the public health response when an outbreak is detected by surveillance is to locate people who have had contact with the infected individual and to immunize them or give them medical treatment, as appropriate. For tuberculosis, contact tracing is used in addition to quarantine: people who have been exposed to the patient are given prophylactic doses of antibiotics. Tuberculosis has presented new and more difficult problems to the public health system in recent years because of the development of drug resistant strains of the bacteria. Contact tracing is also routinely used for controlling sexually transmitted diseases, such as syphilis and gonorrhea. Syphilis, which tends to affect the poor, the homeless, drug users, and prostitutes, can be diagnosed by a blood test. Because it has few symptoms in the early stages, it may go untreated and is easily spread. The challenge for public health is to identify those with the disease through screening programs carried out, for example, in a city jail. Once a case is identified, public health workers try to discreetly alert those who have been exposed. The public health worker asks the person who has been diagnosed to identify sexual contacts; the worker then notifies the contacts that they have been

exposed without identifying the source of the exposure. Syphilis is readily cured by penicillin. If untreated, it may cause long-term damage to the heart and brain; congenital syphilis in infants born to infected mothers can be lethal. The classic public health measures of surveillance and quarantine were key components in combating severe acute respiratory syndrome (SARS), a highly infectious new disease that first broke out in southern China in November 2002. Because China did not at first report the disease, it was not recognized as a major threat until March 2003, when the World Health Organization (WHO) issued a global alert and a travel advisory. WHO had been alerted by Dr. Carlo Urbani, an infectious disease specialist working in Vietnam, who noticed that a patient who had recently arrived in Saigon from Hong Kong was suffering from an atypical form of pneumonia. Dr. Urbani himself soon contracted the disease and died. Epidemiologic detective work found that the patient in Saigon, as well as patients soon identified in Toronto and Singapore, had all stayed in the same hotel in Hong Kong where a traveler from southern China had spent one night before falling ill with the syndrome. More than a dozen guests at the hotel had been infected by that one traveler, and they carried the disease to several other countries.4 By July 5, 2003, when WHO declared that SARS had been contained, the disease had infected 8439 people in 30 countries and had killed 812 people. Although a virus was identified, lab tests could not diagnose the disease until weeks after a patient had developed symptoms. No drug has been found effective against the virus, and treatment requires intensive respiratory therapy during extended hospital stays. SARS was contained by old-fashioned measures: quickly isolating patients who were suspected to have the disease—because of fever, cough, and previous contact with a known SARS patient—and quarantining anyone who had come in contact with them. The epidemic had severe economic impact wherever it broke out, keeping business and vacation travelers from affected areas and even scaring away visitors from China towns in American cities. There was concern that the disease would be seasonal and would break out again in 2004, but this did not occur. A few small outbreaks in 2004 stemmed from inadequate safety measures in research laboratories, but alert health workers kept the disease from spreading. Since 2004 there have not been any known cases of SARS anywhere in the world. In conclusion Public health has had great success in controlling infectious diseases. Classic public health measures prevent transmission of disease-causing bacteria, viruses, and parasites by interrupting the chain of infection.

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

There has been great excitement about the potential uses of genetics and genomics in preventing and treating disease. However, the discoveries have opened a Pandora's Box of ethical, legal, social, and scientific questions. There are lessons to be learned from the mistakes made in early attempts to screen for sickle cell disease, a disorder of hemoglobin, the oxygen-carrying protein in the blood. In this disease, painful crises of impaired blood circulation occur in individuals who have inherited two copies of the recessive gene, which was identified in the 1970s. However, well-meaning attempts to initiate screening programs for sickle-cell disease caused widespread confusion and ill feeling among African and Americans, the group at highest risk for carrying the sickle cell gene tests. However the meaning of the tests was not understood, and many people who were healthy carriers of one gene were discriminated against in school and in employment and were denied health insurance. Many African Americans became suspicious that the intent of the program was genocidal. So due to that problem Considerable time, effort, and money were required to overcome the early mistakes. Now, most states include sickle-cell disease in their newborn screening programs are ongoing. While there is no cure for sickle-cell disease, infant and childhood mortality is reduced by prophylactic treatment with penicillin, which prevents infections associated with the crises. And difficult questions always arise when a serious disorder is diagnosed in a fetus or the genetic potential for such a problem is recognized in the parents. Aborting a fetus with a genetic or teratogenic abnormality is often the only alternative to the birth of a child with a handicap. Many people are uncomfortable with, if not morally opposed to, abortion. However, attitudes vary with the severity of the abnormality: Most people would support the parents' decision to abort a fetus with anencephaly, the absence of a brain, a condition that is rapidly and inevitably lethal. The acceptability of a Down syndrome child varies significantly among prospective parents; some couples choose abortion, while others are happy to have the child. Matters become even more complicated when the genes being identified are those that are known to cause diseases of later life. One of the cruelest of these is Huntington's disease, a single-gene defect in which symptoms first appear between the ages of 30 and 50. During the next 10 to 20 years, the disease progresses toward death, with symptoms that include extreme involuntary movements, intellectual deterioration, and psychiatric disturbances will be eradicated. Because Huntington's disease is inherited in an autosomal dominant fashion, each child of an affected individual has a 50

percent chance of developing the disease. Although a test is now available that allows individuals to learn whether they carry the gene and are thus destined to develop the symptoms, many people who are at risk have decided they would prefer not to know. The psychological impact of such knowledge can be devastating, and the potential for being denied insurance or employment is significant. On the other hand, individuals with a family history of Huntington's disease may wish to know whether they carry the gene before deciding or to be get from their children. so There is a fine line between the worthy goal of preventing disease and disability and the use of genetic screening and abortion to select desirable traits and eliminate undesirable ones from the gene pool. The former is part of the mission of public health, but the latter comes dangerously close to the kind of eugenics practiced by Nazi Germany. The Human Genome Project set aside 3 percent to 5 percent of its funding to study the many social, ethical, and legal dilemmas that result from better understanding of human heredity. Since genetic screening first became possible in the 1960s, various groups have proposed guidelines for how screening should be done and who should be screened. Most of the principles are consistent with the recommendations proposed by an Institute of Medicine committee, which include the following:

• Newborn screening should be done only when there is a clear indication of benefit to the newborn, when a system is in place to confirm the diagnosis, and when treatment and follow-up are available for affected infants.

• Carrier identification programs should be voluntary and confidential, and they should include counseling about all choices available to the identified carriers.

• Prenatal diagnosis should include education and counseling before and after the test, informing the parents about risks and benefits of the testing procedure and the alternatives available to them.

• All tests should be of high quality, because life and death decisions are based on the results. New tests should be evaluated by the FDA, and there should be more government oversight of laboratory proficiency.

• There should be more education for the general public about genetics. With the increasing availability of genetic tests; there is great concern about how the information will be used. The knowledge can help individuals and their doctors make informed decisions about their lifestyle and medical care. However, there has been great concern about harmful consequences, for example if insurance companies use the information to deny coverage or prospective employers deny employment to individuals who may be more vulnerable in the work environment or who may potentially be more expensive to insure. According to some

estimates, every individual carries at least 5 to 10 genes that could make him or her sick under the wrong circumstances or could adversely affect his/her children. All people have an interest in ensuring that any knowledge about their genetic makeup will be used to do them good and not harm. In 2008, Congress passed and President Bush signed the Genetic Information Non discrimination Act, which prohibits discrimination by health insurers or employers on the basis of DNA. Part of the justification for the law was that some people might otherwise avoid getting genetic tests that could benefit their health. Another benefit is that the law would encourage people to be more willing to participate in research studies without fear that their genetic information might be used against them. From a public health perspective; there is danger that the enthusiasm for genomics may deflect attention and resources from the important mission of preventing disease in the population. Although individuals differ in their genetic susceptibility to the most common diseases, these diseases are associated with well-known environmental and behavioral risks that are traditional targets of public health intervention. Smoking, for example, increases risk for heart disease, several kinds of cancer, and a number of other diseases. To reduce smoking in the whole population is a far more efficient and effective approach to improving the population's health than attempts to identify risk genes in individual smokers. There is a place for genomics in understanding the biological basis of diseases that cannot be prevented with existing knowledge, such as breast cancer, type 1 diabetes, and Alzheimer's disease. However, many public health advocates believe that resources would be better spent on research and interventions aimed at modifying health-related behaviors, including smoking, diet and physical activity patterns, and sexual behavior. According to one skeptical epidemiologist, the benefits of genomics are likely to be greatest for treatment rather than prevention, and "our resources allocated to treatment already massively outweigh those spent for disease prevention.

Conclusion People's health is determined significantly by their genes, and sometimes by prenatal exposure to infectious agents and toxic substances. Public health measures can sometimes prevent unfortunate health outcomes caused by genes or by exposures before birth.

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

HIV is a retrovirus, a virus that uses RNA as its genetic material instead of the more usual DNA. Retroviruses have long been known to cause cancer in animals, and they were

extensively studied for clues to the causes of human cancer, research that proved helpful for understanding the immunodeficiency virus when it was identified. Two human retroviruses causing two types of leukemia were known before HIV was discovered. Retroviruses infect cells by copying their RNA into the DNA of the cell, penetrating the genetic material like a "mole" in a spy agency. This DNA may sit silently in the cell, being copied normally along with the cell's genetic material for an indefinite number of generations. Or it may take over control of the cell's machinery, causing the uncontrolled reproduction typical of cancer. The target of HIV is a specific type of white blood cell called the CD4-T lymphocyte, or T4 cell. T4 cells are just one of many components of the complicated immune machinery that is activated when the body recognizes a foreign invader such as a bacterium or a virus. The T4 cell's role is to divide and reproduce itself in response to such an invasion and to attack the invader. In a T4 cell that is infected with HIV, activation of the cell activates the virus also, which then produces thousands of copies of itself in a process that kills the T4 cell. The T4 cells are a key component of the immune system because, in addition to attacking foreign microbes, they also regulate other components of the immune system, which including the cells that produce antibodies, the proteins in the blood that recognize foreign substances. Thus destruction of the T4 cells disrupts the entire immune system.

How HIVS course or infected people

The course of infection with HIV takes place over a number of years. After being exposed to HIV, a person may or may not notice mild, flu-like symptoms for a few weeks, during which time the virus is present in the blood and body fluids and may be easily transmitted to others by sex or other risky behaviors and sharp instrument or objects. The body's immune system responds as it would to any viral infection, producing specific antibodies that eliminate most of the circulating viruses. The infection then enters a latent period, with the viruses mostly hidden in the DNA of the T4 cells, although a constant battle is taking place between the virus and the immune system. Billions of viruses are made, and millions of T4 cells are destroyed daily. During this time, the person is quite healthy and is less likely to transmit the virus than during the early stage of infection (although transmission is still possible). Eventually however, after several years, the immune system begins to lose the struggle, and so many of the T4 cells begin to die that they cannot be replaced rapidly enough. When the number of T4 cells drops below 200 per cubic millimeter of blood, about 20 percent of the normal level, symptoms are likely to begin appearing, and the person is vulnerable to opportunistic infections and certain tumors. At the same time, the number of circulating

viruses increases, and the person again becomes more capable of transmitting the infection to others. At this stage, the person meets the criteria for AIDS, which is defined by the T4 cell count and/or the presence of opportunistic infections. The development and licensing of a screening test in 1985 was a major step forward in the fight against HIV. The test measures antibodies to the virus, which begin to appear 3 to 6 weeks after the original infection. This test is relatively fast and inexpensive; it is a sensitive screening test, giving the first indication that the individual may be HIV positive. The test is used for three purposes: diagnosing individuals at risk to determine whether they are infected so that they may be appropriately counseled and, if necessary, treated; monitoring the spread of HIV in various populations via epidemiologic studies; and screening donated blood or organs to ensure that they do not transmit HIV to a recipient of a transfusion or transplant. A major drawback of the antibody screening test is the absence of antibodies in the blood during the initial 3- to 6-week period after infection. This "window" of non detect ability may give newly infected people a false sense of security. More accurate tests that look for the virus itself in the blood are now available. These tests are used to confirm infection in people who have tested positive in the screening test. They are also done on all donated blood to ensure that no virus infected blood is used for transfusions. Tests that directly measure a virus in the blood have contributed a great deal to understanding the biomedical basis of HIV infection. Measurement of "viral load" the concentration of viruses in the blood is a valuable tool for evaluating the effectiveness of therapeutic drugs.

How HIVS is transmitted

Viral load has also been found to influence the individual's chances of transmitting the virus by sexual and other means. Thus a therapy that is effective in reducing viral load can help to control the spread of HIV.

- The major pathways of HIV transmission vary in different populations. Homosexual relations between men are still the leading route of exposure for men in the United States. Injection drug use accounts for 10 percent of new HIV infections in Americans. Transmission by heterosexual relations, especially male to female, is becoming increasingly common in Africa; it is the leading route of infection for females. In the developing countries of Asia and Africa, where HIV infection is spreading rapidly, heterosexual relations are the most common means of transmission. Several studies have found that circumcision protects men against contracting HIV from infected women; circumcision does not appear to protect

women against contracting HIV from infected men. Studies of the effect of circumcision on male-to-male transmission have yielded mixed results.

- The sharing of needles is a common route of transmission in developing countries because of insufficient supplies of sterile equipment for medical use. In poor countries, including Russia and some nations in Eastern Europe and Africa, medical personnel often use one syringe repeatedly for giving immunizations or injections of therapeutic drugs. If one of the patients is HIV positive, this practice may transmit the infection to everyone who later receives an injection with the same needle. According to the World Health Organization (WHO), 40 percent of injections worldwide are given with unsterile needles.
- Transfusion with HIV-contaminated blood is no longer a significant source of HIV infection but it still occurs in countries too poor to screen donated blood. A special case of HIV transmission occurs from mother to infant, in utter or during delivery, in 25 to 33 percent of births unless antiretroviral drugs are given. The virus can also be transmitted to breast-fed babies in their mother's milk. All infants of HIV-positive women will test positive during the first few months after birth. This is because fetuses in the womb receive a selection of their mothers' antibodies, providing natural protection against disease (though not HIV) during their first months of life. Testing a baby's blood for HIV antibodies provides evidence of the mother's HIV status. Many states in the Africa routinely perform HIV screening tests on newborns' blood as part of their newborn screening programs. The special issues raised by maternal fetal transmission of the virus have been the subject of ethical, legal, and political controversy at the national and state levels. Drug therapies are now capable of preventing transmission of the virus from mother to infant in 99 percent of cases.

How HIVS/AIDS is treated

Similar drug treatment of mothers and/or infants can prevent transmission in breast milk. HIV/AIDS has become a disease of minorities. Although African and Americans make up only about 12 percent of the U.S. population, almost half of new cases being diagnosed in recent years are among blacks. According to the Centers for Disease Control and Prevention (CDC), in 2013, the rate of infection was almost seven times higher in black men than in white men and 15 times higher in black women than white women. Hispanics are diagnosed at three times the rate of whites. Among the factors that contribute to the higher rates among minorities are the fact

that people tend to have sex with partners of the same race and ethnicity; minorities tend to experience higher rates of other sexually transmitted diseases, which increase the risk of transmission of HIV; socioeconomic issues associated with poverty; lack of awareness of HIV status; and negative perceptions about HIV testing. Progress in treating HIV/AIDS over the past two decades has been dramatic. Early therapy focused on treating opportunistic infections, which were often the immediate cause of death in AIDS patients.

- The first antiretroviral therapy, zidovudine (AZT), was approved by the Food and Drug Administration (FDA) in 1987. The drug interfered with the replication of HIV by inhibiting the enzyme that copies the viral RNA into the cell's DNA. However, the virus's tendency to mutate rapidly leads to the development of resistance to the drug, meaning that its effectiveness can wear off. As scientists gained a better understanding of the virus, they developed drugs that target different stages of viral replication. Protease inhibitors, which interfere with the ability of newly formed viruses to mature and become infectious, were introduced in 1995.
- At the same time, scientists recognized that treating patients with a combination of drugs that attack the virus in different ways reduces the opportunity for HIV to mutate and develop resistance. The introduction of these drug combinations, called highly active antiretroviral therapy (HAART), led to dramatic improvements in the survival of HIV-infected patients. As a result, the number of AIDS deaths fell by more than half between 1996 and 1998 and has continued to decline since then.
- The development of effective treatments for HIV/AIDS has many beneficial consequences. HAART can reduce viral load to undetectable levels in the blood and body fluids of many patients, which greatly reduces the likelihood that the virus will be transmitted to others through sexual contact and other means. The availability of effective therapy also encourages at-risk people to be tested and counseled on ways to protect themselves and to prevent transmission of the virus to others. Scientists hoped that HAART would be able to completely eradicate HIV from the body, but this hope has not been realized. The virus manages to survive in protected reservoirs of the body, rebounding into active replication when the drugs are withdrawn. For some

patients, side effects of the drugs can be severe and even fatal; about 40 percent of patients treated with protease inhibitors develop lip dystrophy, characterized by abnormal distributions of fat in the body, sometimes accompanied by other metabolic abnormalities.

- Moreover, the virus can develop resistance to these drugs if used improperly. A survey of blood samples taken between 1999 and 2003 found that 15 percent were resistant to at least one drug.14 New drugs continue to be developed, including a class called "fusion inhibitors," introduced in 2003, which interfere with HIV's ability to enter a host cell, and a class called integrates inhibitors, introduced in 2002, which prevents the virus from integrating into the genetic material of human cells.
- A totally new approach, published in 2014 but not ready for clinical application, uses genetic engineering to knock out a receptor on the membrane of T cells, making them resistant to HIV. Thus for many patients, HIV infection has become a chronic disease, necessitating life-long therapy but enabling them to live a relatively normal life. The drugs are expensive however, costing an average of $23,000 per year per patient, and many insurance plans cover only a limited portion of the cost. The apparent worldwide explosion of AIDS then occurred because of changing patterns of sexual behavior and the use of addictive drugs in developed and developing countries, together with the ease of international air travel.

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2. Ebola

In 1976, before the AIDS epidemic was recognized but while, as scientists now believe, the virus was spreading silently into African cities, another viral illness broke out with much more dramatic effect in Zaire and Sudan. Symptoms caused by the previously unidentified Ebola virus include fever, vomiting and diarrhea, and severe bleeding from various bodily orifices. Several hundred people became ill from the disease, and up to 90 percent of its victims died. The disease spread rapidly from person to person, affecting especially family members and hospital workers who had cared for patients. Investigators from the CDC and WHO identified the virus and helped devise measures, including quarantine, to limit the spread of the disease, which eventually disappeared. The Ebola virus broke out again in Zaire in the summer of 1995, killing 244 people before it again seemed to vanish. Since then, there have been repeated outbreaks in West and Central Africa. According to CDC data, more than

800 Africans died of Ebola between 1996 and early 2013. The Ebola virus infects monkeys and apes as well as humans, and on a number of occasions infected monkeys have been imported into the United States and some part of africa. In 1989, a large number of monkeys imported from the Philippines died of the viral infection at a primate quarantine facility in Reston, Virginia. In that episode, which served as the basis for Richard Preston's book, The Hot Zone, several laboratory workers were exposed to the virus, which fortunately turned out to be a strain that did not cause illness in humans. Fruit bats, common in African jungles, are thought to serve as the reservoir for the virus between outbreaks in the human population.

The Ebola virus is rare and often deadly to those who contract it. It can affect humans and primates such as monkeys and chimpanzees. There are five species of the Ebola virus, which people can contract by coming in contact with the bodily fluids of a person who has the virus or a person who has passed away from it.

1. **Causes of Ebola**

Scientists believe Ebola was first present in animals and transmitted to humans. It is a virus in the ebolavirus and Filoviridae family, and the way in which it transmits from animals to humans is unknown. In certain parts of the world, people have contracted Ebola from handling animals that are ill or deceased. In people, the virus becomes contagious as soon as symptoms present.

2. **Transmission of Ebola**

Contact with bodily fluids such as blood, mucus, saliva, urine, and feces are responsible for the transmission of Ebola. For instance, a person with a cut on their arm who touches the bodily fluids of an infected individual will contract the virus. The bodily fluids of animals such as fruit bats, monkeys, or chimpanzees can also carry the virus. People with the virus but no symptoms are not contagious.

3. Symptoms of Ebola

People who encounter the Ebola virus will begin to experience symptoms anywhere between two and 21 days later. Symptoms include fever, severe headache, muscle pain, weakness, fatigue, diarrhea, vomiting, stomach pain, and unexplained bleeding or bruising. Those who experience multiple symptoms of this kind should seek medical attention. The Ebola virus may be rare, but it is dangerous to those who become infected. Blood tests may reveal low white blood cell counts indicating viral or bacterial infection.

4.Diagnose of Ebola

The Ebola virus is difficult to diagnose because many of the symptoms can be attributed to other illnesses. To be diagnosed with Ebola, you must be experiencing multiple symptoms and have had contact with a person who may have it within twenty-one days of the arrival of symptoms. Blood tests can show Ebola, but not until symptoms have been present for at least three days. If a doctor suspects you have Ebola, you will be isolated away from the public to prevent an outbreak. Outbreaks can occur quickly, as people are in contact with others daily.

5. **Treatment for the Ebola Virus**

If you contract the Ebola virus, your medical provider will treat your symptoms as they appear. For example, if you are vomiting or have diarrhea, your doctor will give you medications and electrolytes to prevent dehydration. Treating the symptoms as they arise can greatly increase the chance of survival, which depends on the health of the infected individual's immune system. There are antiviral medications for other viruses, but the Ebola virus currently has no vaccines available. Scientists are working to find an antiviral vaccine that will work for the Ebola virus and help prevent outbreaks.

Therefore Most of the workers were willing to endure a milder form of quarantine at home, being monitored by public health workers, taking their temperature twice a day, and keeping a distance of three feet from others when in public.

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5. What are some public health responses to emerging infections in your country?

The republic of South Sudan on public health system, criticized in 2008 for being in disarray, has taken many steps toward responding to the emerging threats of infectious diseases. While still underfunded and challenged from all sides, South Sudan public health agencies have devoted significant resources to developing plans and priorities for confronting the threats. The Institute of Medicine has undertaken several studies Juba teaching hospital to address the environmental, demographic, social, and other factors leading to the emergence or reemergence of infectious diseases. One of its conclusions is that most of the emerging infectious disease events have been caused by zoonotic disease pathogens—those infectious agents that are transmitted from animals to humans. Factors that contribute to the risk of this animal to human transmission include human population growth, changing patterns of human– animal contact, increased demand for animal protein, increased wealth and mobility, environmental changes, and human encroachment on farmland and previously undisturbed wildlife habitat. Clearly, these diseases are an international problem, and dealing with them requires an international response. Global surveillance for infectious diseases is critically important for identifying potential epidemics early enough to bring them under control. Diseases that went unnoticed in animals but have spread to humans include HIVS and AIDS, hepatitis A and B, influenza, and SARS. Effective control of emerging infectious diseases requires worldwide disease surveillance focusing not only on human populations, but also on domestic animals and wildlife. Thus, the CDC is collaborating with, in addition to the World Health Organization, the World Organization for Animal Health, and the Food and Agricultural Organization of the United Nations. In addition, the CDC has established the International Emerging Infections Program, which has laboratories in neighboring countries Egypt, Kenya, and republic of Congo. Other priorities that the Institute of Medicine has identified for controlling emerging infections include reducing inappropriate use of antibiotics by banning their use for growth promotion in animals and by developing improved diagnostic tests for infectious diseases so that antibiotics are not used for viral diseases. The Institute of Medicine also recommends developing new vaccines, new anti microbial drugs, and measures aimed at vector-borne diseases.

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