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TOPIC: GLOBAL EPIDEMIC ALERT AND RESPONSE

INTRODUCTION

A **communicable disease** is one that spreads from human to human through contact, usually causing infection. These **infectious diseases** are caused by **microorganisms** such as viruses and bacteria. Microorganisms that cause disease are called **pathogens**. When an infectious disease spreads quickly through a population, infecting many people, this is known as an **epidemic**. When a disease spreads into many regions of the world and infects large numbers of people, it causes a **pandemic**. A pandemic is most likely to occur if the disease is new and if it spreads very easily among people.

It is vital that countries, international organizations and local officials are prepared in the event that an infectious disease begins to spread quickly. With action plans in place, health officials stand a much better chance of stopping an epidemic and preventing it from infecting more people.

While epidemics and pandemics are rare occurrences, they have very serious effects. Apart from making people sick and causing fatalities, they also disrupt economic activity such as travel and trade, which can put a serious strain on economic development.

The study of infectious diseases and epidemics is called **epidemiology**, and the scientists who conduct this research are called epidemiologists. Epidemiology is a part of a field known as **public health**, which is concerned with protecting the health of communities.

You can download a six-minute video on global epidemic alert and response on the World Health Organization website at www.who.int/csr.

BACKGROUND

Epidemics place a huge strain on health systems. In the event of an epidemic, health systems must devote huge amounts of resources to fighting it, including doctors' and nurses' time and effort, hospital beds, medicines and supplies. These scarce resources cannot then be used to fight other diseases. As a result, people with other diseases and conditions also suffer. When an

epidemic occurs in a country without a sound health system, it makes conditions even worse by using up the few available health resources.

Public health emergencies like epidemics also cause disruptions in trade and travel that can be very damaging to economies. Due to fear of a disease's spread, a country might try to restrict people's movement. Countries might refuse to admit people into their borders from regions where an epidemic is occurring. International shipments of products may also be halted. Provision of goods and services within a single country might even be slowed or stopped in the event of a serious epidemic threat.

In addition to the strain on national and international economic systems, epidemics are harmful to development because they take away money and resources from other public health and development projects. In addition, when people are sick they lose time from work. This lost income can hurt their families and make their living conditions worse, especially if they were poor to start. And in a very serious situation, people may be unable or unwilling to go out in public at all, for fear of contracting the disease.

Information about infectious disease epidemics changes very quickly and must be rapidly communicated to the appropriate authorities. Epidemic and Pandemic Alert and Response (EPR) is one of the World Health Organization's main focuses. The most important feature of an alert and response plan is to identify a potential epidemic early, before it becomes widespread or turns into a pandemic. Once officials confirm that the disease is a threat, information on how to treat and contain the disease must be transmitted rapidly to affected areas.

Epidemic-Prone Diseases

The issue of epidemic alert and response has been getting a lot of attention recently because of a new threat on the horizon – **H5N1 Avian Influenza**, also known as “bird flu.” H5N1 refers to the genetic makeup of the pathogen (in this case, a virus) that causes the disease. The pathogen is similar to the virus that causes other types of flu, but is far more deadly to humans. The virus is carried by birds, such as chickens and waterfowl. Humans have contracted the disease from birds, but to date, there have been no cases of human-to-human transmission.

H5N1 could be particularly dangerous because it is a relatively new strain, so humans have not had a chance to develop any kind of resistance, or **immunity**, to this form of the virus. In addition, this form of the flu virus causes very serious illness. A large proportion of the people who contract the disease die from it. Currently, the virus affects very few people. However, scientists fear that the disease will **mutate**, allowing it to spread from human to human. If this happens, the world may experience a very serious pandemic.¹

Avian influenza is not the first disease to threaten a pandemic. Influenza, cholera, plague, yellow fever, typhus and small pox are all examples of diseases that have caused epidemics and pandemics in the past, killing tens of thousands. But today, people can travel around the world farther and faster than ever before. They come into contact with many more people in many more locations, making the risk of a global pandemic even more serious.

More recently, in 2003, a highly contagious lung infection known as SARS (severe acute respiratory syndrome) threatened to become a serious pandemic. The disease is believed to have originated in Guangdong Province, China. It quickly spread within Asia, and to North America and Europe. By the end of the outbreak, 8,096 people had contracted the disease and 774 died.² Despite these tragic deaths, the outbreak could have been much more serious. Drawing on the Epidemic Alert and Response system, WHO acted quickly to identify the pathogen and stop the disease's spread.³

Although the virus cannot be spread through casual contact, the HIV/AIDS pandemic is considered one of the worst in history. Since its appearance in 1981, AIDS has claimed the lives of over 25 million people—and approximately 40 million people are currently living with HIV/AIDS.⁴ According to the UN, HIV/AIDS “threatens development, social cohesion, political stability, food security, and life expectancy and imposes a devastating economic burden that requires urgent action.”⁵

CRITICAL THINKING

China was severely criticized, and later apologized, for not reporting the SARS outbreak when it first began. What incentive might governments have to hide the fact that an infectious disease epidemic is occurring within their borders? What effect might hiding this evidence have on the infectious disease outbreak?

Epidemic Intelligence

As part of its global alert and response system, WHO gathers **epidemic intelligence**, which is information about suspected disease outbreaks. Often the word “intelligence” is used to mean secret information gathered by a country's government about a potential enemy. In this case, the enemy is an infectious disease, and public health officials must learn as much about it as possible to prevent it from becoming a full-scale epidemic.

Besides official reports from a country's health ministry, reports on disease outbreaks also come from WHO country offices, laboratories, academic institutions and nongovernmental organizations (NGOs). But often informal sources yield even more information. WHO explains, “With the advent of modern communications technologies, many initial outbreak reports now originate in the electronic media and electronic (online) discussion groups.” More than 60 percent of epidemic intelligence comes from these informal, unofficial reports, which must then be verified by WHO officials.⁶

The first step in stopping a potential epidemic is to recognize the spread of an infectious disease. For some highly infectious diseases, the existence of a single case is significant. For other diseases that are more common, health experts look for a pattern that shows that the disease is spreading to large numbers of people in a population—a sign that an epidemic may be starting.

Event Verification

The next step after the gathering of epidemic intelligence is event verification. In this case, an “event” might be a single reported case of a rare disease, or the spread of an epidemic-prone

disease from one location to another. Officials must confirm the event actually took place and determine whether the outbreak is a cause for international concern. If they ignore a case of unknown illness or a disease, a deadly epidemic might result. But if they overreact, they risk wasting important resources and disrupting travel and trade, which would also be damaging.

There are six criteria that WHO uses to determine whether a reported disease outbreak is truly a cause for international concern.⁷ If any of these conditions are present, WHO will make a decision to get involved so that the outbreak does not turn into a more serious problem. A disease is treated as a serious threat if:

1. it is a previously unknown disease;
2. it has the potential to spread beyond national borders;
3. if it is causing an unusually high illness or death rate;
4. if it might potentially interfere with international travel or trade;
5. if the country where the disease outbreak is taking place does not have the capacity to contain the outbreak on its own; or
6. if there is suspicion that the disease was released on purpose, or released accidentally from a lab.

Information Management

If news of an infectious disease event is confirmed and officials believe it is a threat, the next step is to get this information to the health professionals who need it, so that they can take appropriate action. First, the event goes onto a list called the WHO Outbreak Verification List (OVL) which provides public health professionals with real-time alerts and information on possible and confirmed disease outbreaks.

WHO also maintains a news service called Disease Outbreak News, which provides information to the public about diseases of international importance. The Disease Outbreak News is available online on the WHO website at www.who.int/csr/don/en. In addition, WHO publishes the *Weekly Epidemiological Record*, which provides information on the disease outbreaks to public health specialists.⁸

The goal of information management efforts is to make sure that infectious disease outbreaks get the attention that they deserve. At the same time, WHO must make sure that the threat is well-understood so that no inappropriate or excessive actions are taken.

Preparedness for Deliberate Epidemics

Although it is extremely rare, the international community must also be prepared for the possibility of a **deliberate** epidemic—one that is started on purpose as an act of war or terrorism. It is possible that a deliberate epidemic would be difficult to detect, or perhaps be mistaken for a natural phenomenon. But it is vital that authorities recognize a deliberate outbreak as soon as possible. Once the disease spreads into the population, containing the outbreak is much more difficult.

A deliberate epidemic may also be more challenging because it will require that health agencies work collaboratively with partners that may be unfamiliar to them, such as law enforcement and military. Even though several international laws ban the use of **biological weapons** under all circumstances, the international health community must be prepared for the possibility of a biological attack.

Not only could such an attack cause illness and death, but it would also tax health systems and could be economically damaging to countries all over the world. WHO explains, even in the case of a relatively small-scale attack, “widespread panic and fear would be certain; the public health system would be overwhelmed and economic impact would be considerable.”⁹

CRITICAL THINKING

Why might use of a biological weapon be a particularly devastating act of terrorism, whether or not it were to cause large-scale casualties? Think about what acts of terrorism might be intended to accomplish, as well as the longer term effects of such an attack.

INTERNATIONAL ACTION

The World Health Organization (WHO)

The World Health Organization has a Global Alert and Response Team in place that includes WHO officials from national, regional and international WHO offices. Each weekday morning, the team meets to review information on infectious disease outbreaks and to decide what actions, if any, should be taken. WHO has identified six key areas where it focuses its alert and response efforts¹⁰:

1. Helping member states improve their preparedness by developing laboratories and early warning systems;
2. Supporting national and international training programs;
3. Help member states to prepare for and respond to seasonal Influenza;
4. Standardize the procedures used in outbreaks of particular epidemic-prone diseases;
5. Strengthen biosafety and biosecurity; and
6. Continue to develop and maintain a global system for outbreak response that includes international and regional offices.

The WHO also maintains a Strategic Health Operations Center (SHOC) that helps to facilitate the sharing of information, collaboration and problem solving during health crises. SHOC’s first test in 2003 was the SARS epidemic, which was dealt with quickly and efficiently. Still, the WHO believes that there is room for improvement, especially because epidemics even more challenging than SARS are likely to come along in the future. In 2004, SHOC served as a communications hub during the tsunami disaster in South East Asia, because the spread of disease is a serious post-disaster threat. It helped to coordinate and streamline the efforts of WHO, other UN agencies, member states and NGOs.

For gathering epidemic intelligence, the WHO has a Global Public Health Intelligence Network (GPHIN), which is a secure Internet-based search tool that continually looks for news of

potential epidemics on websites and newswires. GPHIN has been a very important early-warning tool for preventing epidemics.¹¹

In 2002, the World Health Assembly passed a resolution to help address the threat associated with natural, accidental and deliberate epidemics. It is called the *Global Public Health Response to Natural Occurrence, Accidental Release or Deliberate Use of Biological and Chemical Agents or Radionuclear Materials that Affect Health*. WHO developed four of its main epidemic-related focuses in response to this resolution: international preparedness, global alert and response, national preparedness, and preparedness for particular diseases.¹²

International Health Regulations (IHR)

WHO has been responsible for the implementation of the International Health Regulations (IHR) since 1948. WHO member states ratified this legal code through the World Health Assembly. IHR focuses on three epidemic-prone diseases: cholera, plague and yellow fever.

According to WHO, the International Health Regulations (IHR) are designed to “ensure maximum security against the international spread of diseases with a minimum interference with world traffic.”¹³ Currently the IHR are being revised. WHO is hoping to introduce some improvements to the regulations to make them more effective. For instance, countries will be required to verify an outbreak at WHO’s request, and must notify WHO about health emergencies of international concern.

Global Outbreak Alert and Response Network (GOARN)

The Global Outbreak Alert and Response Network (GOARN) is a collaboration between 110 different organizations, including labs, research institutions and NGOs, which pool their resources to improve global alert and response. GOARN investigative teams can be on the scene of an infectious disease event in under 24 hours. They help to confirm the diagnosis, handle dangerous pathogens, treat affected patients and contain the outbreak.

RECOMMENDATIONS FOR FORMULATING A RESOLUTION

Delegates may consider the following when drafting resolutions:

1. Defining the responsibility of member states in reporting, verifying and handling an epidemic or pandemic threat;
2. Forming strategies for dealing with the threat of Avian Influenza;
3. Identifying other potential threats to international public health;
4. Finding ways to encourage member states to contribute the needed resources to strengthen public health systems;
5. Encouraging collaboration and cooperation among countries in handling epidemic and pandemic threats; and
6. Raising awareness about measures that would improve public health systems, such as increasing the number of available health personnel, making drugs and treatment available, and providing medical technology.

TERMS AND CONCEPTS

Communicable disease: a disease that can be transmitted from one person to another.

Infectious disease: A disease caused by a microorganism such as a bacterium, fungus, or virus.

Microorganisms: an organism too small to be seen without a microscope.

Pathogens: a substance or organism that causes disease

Epidemic: an outbreak of a contagious disease that spreads widely and quickly

Pandemic: an epidemic that affects multiple countries or regions

Epidemiology: the scientific study of epidemics and epidemic-prone diseases.

Public Health: a field of study that deals with improving and protecting the health of communities

H5N1 Avian Influenza: an influenza virus found in birds that has the potential to cause a deadly pandemic if it starts to spread among humans.

Immunity: resistance to or protection from a disease.

Mutate: to change genetically

Epidemic intelligence: information gathered about potential epidemics and epidemic-prone diseases

Deliberate: intentional; on purpose

Biological weapon: a pathogen or biological toxin used deliberately to sicken a population as a criminal or terrorist act

QUESTIONS TO CONSIDER

1. Which infectious diseases are most prevalent in your country?
2. Is an infectious disease epidemic a major concern for your country?
3. Has your country ever experienced an epidemic? If so, what effect did it have?
4. Is there a strong health system in your country?
5. What measures has your country's government taken to address the threat of avian influenza and other potential epidemics?

SOURCES FOR RESEARCH

World Health Organization, Epidemic and Pandemic Alert and Response, www.who.int/csr

Centers for Disease Control and Prevention, www.cdc.gov

REFERENCES

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² Fact check

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