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WORLD HEALTH ORGANIZATION

GLOBAL ALERT AND RESPONSE FOR PANDEMICS AND EMERGING DISEASES

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Introduction

Threats to global public health present considerable political problems, disrupt economies, and can threaten the very stability of entire societies. For 30 years now, the international community has confronted the HIV/AIDS pandemic. Throughout 2009-2010, the World Health Organization (WHO), governments, public health agencies, and health providers sought to combat the rapidly spreading pandemic of H1N1, commonly known as the “swine flu.” New and emerging threats to global public health continue to present the World Health Organization (WHO), governments, public health agencies, hospitals, and local communities with formidable challenges as well as opportunities to enhance their capacities to effectively combat pandemic diseases.

The World Health Organization (WHO) defines a pandemic as “a worldwide epidemic of a disease. It does not necessarily mean mass fatalities. A pandemic refers to how far across the globe the disease has spread...”¹ Pandemics are then classified as to how widely they have spread and of course may reach varying levels of severity in different countries around the world. Countries with more developed and well-financed public health systems are generally more likely to respond quickly and effectively to emerging pandemics. Developing effective pandemic response mechanisms that are cost-effective and widely available will be a vital element of the work of the delegates to the World Health Organization (WHO). Four current pandemics will be examined in the course of this background guide: Tuberculosis (TB); HIV/AIDS; Malaria; and H1N1. Delegates to the World Health Organization (WHO) may wish to broaden the committee’s focus by discussing other contemporary pandemics as well.

Combating Tuberculosis and MDRTB

Tuberculosis is a highly infectious bacterial disease that has plagued humanity for at least 4,000 years and causes several million deaths annually. According to the World Health Organization (WHO), up to one-third of the world’s population is infected with tuberculosis

¹ Regional Office for Western Pacific – World Health Organization, “Pandemic H1N1 2009” 2009. Found at: http://www.wpro.who.int/health_topics/h1n1/info/info_pandemic.htm

(TB), and TB accounts for 2 million deaths annually worldwide, with 98% of those deaths occurring in the developing world. Tuberculosis (TB) is particularly pernicious in its devastating impact on economic and human development activities in the developing world. “In these regions, disease and death from TB occurs most often in the most economically active segment of the population; among the 1.5-2 million people dying annually from TB every year, 75 percent are between the ages of 15 and 54, with TB accounting for almost one-fifth of all deaths in this age group.”² Tuberculosis is also particularly devastating because of how easy it is to transmit; “it is estimated that each infectious patient infects 25-50 percent of his household contacts.”³ The high likelihood of transmitting the disease is compounded by the ever-present harbingers of poor health: poverty, malnutrition, overcrowding, lack of proper air circulation, and unsanitary living conditions.

Tuberculosis has been a leading cause of death worldwide for at least four millennia but multidrug-resistant tuberculosis (MDRTB) has only emerged as a serious threat to global health in the last 30 years. When patients begin but do not complete the appropriate course of drugs, they become highly susceptible to MDRTB, particularly because “MDRTB is a specific form of drug-resistant TB due to a bacillus resistant to at least isoniazid and rifampicin, the two most powerful anti-TB drugs.”⁴ As will become more apparent later, TB is found most frequently in poorer communities but its highly contagious nature makes it a profound danger to all. WHO asserts that, “given the increasing trend toward globalization, trans-national migration, and tourism, all countries are potential targets for outbreaks of MDRTB.”⁵

Currently, the countries in Eastern Europe and Central Asia are amongst the global hotspots for MDRTB and these countries “are putting EU[European Union] states at risk of a deadly outbreak.”⁶ Sub-Saharan African countries continue to constitute an area of grave concern for public health officials and Afghanistan is also a growing TB trouble spot. Multidrug-resistant tuberculosis (MDRTB) is especially insidious because of the increased difficulty in treating the infected as well as the resistance and resignation, respectively, of many politicians, pharmaceutical companies, and public health professionals to introducing second-line drugs and to higher mortality rates. Dr. Paul Farmer notes that “when patients have MDRTB, they require longer periods of treatment-about two years of a multidrug regimen. This compares with the six to nine months of treatment needed for disease caused by drug-susceptible strains. Several of the less powerful second-line drugs, which are required to treat MDRTB, are also more toxic, with

²Jim Yong Kim, Aaron Shakow, Arachu Castro, Chris Vanderwarker, and Paul Farmer, “Tuberculosis Control” from Smith, Richard, Robert Beaglehold, David Woodward, and Nick Drager, eds., *Global Public Goods for Health: Health Economic and Public Health Perspectives* Oxford University Press Oxford, United Kingdom 2003 p. 57.

³Kim, Shakow, Castro, Vanderwarker, and Farmer, p. 62.

⁴World Health Organization (WHO), “Drug- and multidrug-resistant tuberculosis (MDRTB) – Frequently asked questions” <http://www.who.int/tb/dotsplus/faq/en/>

⁵ WHO, “Drug- and multidrug-resistant (MDRTB) FAQ’s”.

⁶ *BBC News* “European Union „faces TB crisis“” October 10, 2006.

side effects such as nausea, abdominal pain, and even psychosis; as a result, it's harder to manage patients who are receiving them.”⁷ The treatment regimen also requires more prolonged exposure to chemotherapy and is still not widely available in many parts of the developing world. The costs of treating tuberculosis are significant, especially for developing countries. The British Broadcasting Corporation (BBC) reports that “treating patients with drug resistant TB is beyond the pocket of many developing countries. The cost of treatment can rise from \$2000 per patient with non-resistant TB to \$250,000 for multi-drug resistant TB.”⁸ And as the strains of drug-resistant tuberculosis mutate further, health professionals are now encountering tuberculosis patients who have TB that is resistant to almost all of the first and second-line drugs now available to treat the disease. Farmer also notes “the strikingly nonrandom occurrence of MDRTB” when pointing out that the overwhelming majority of cases have been “registered among the inner-city poor, with significant outbreaks confined to prisons, homeless shelters, and public hospitals.”⁹ These groups are also amongst the least likely to be able to resist the ravages of the disease, are more likely to be HIV+, and have the least access to high-quality affordable health care needed to combat MDRTB.

Getting from DOTS to DOTS+: WHO responds to changing conditions

Treating tuberculosis effectively requires concerted action at the local, national, and global levels. The World Health Organization (WHO) occupies a central position in the global pantheon of public health professionals and political decision makers. WHO's primary mechanism for combating the effects and spread of TB has long been its directly observed therapy, short-course program known as DOTS. DOTS was established in 1993 as WHO and the world community began to face the enormous toll that untreated TB can exact. DOTS relies upon health care workers and providers observing the prescribed short-course regimen of high protein diets and first-line drugs of isoniazid and rifampicin to treat and cure patients with TB. If DOTS is administered correctly and the treatment regimen lasts for a minimum of 6 months, non-drug-resistant TB patients have a very likelihood of being cured. Farmer and others conclude that “the DOTS approach is one of the most cost-effective interventions in all of global public health, but we now know that in many regions of the world it will not be enough to control the epidemic.”¹⁰ As the extent of the MDRTB crisis became more widely appreciated, WHO, in conjunction with national governments, NGO's, and related international organizations such as the International Union Against Tuberculosis and Lung Disease, began negotiating with pharmaceutical manufacturers to provide the more expensive second-line drugs at much lower prices and to expand the length of the treatment regimen for patients with MDRTB.

⁷ Paul Farmer, *Pathologies of Power: Health, Human Rights, and the New War on the Poor* University of California Press Berkeley, California 2005 p. 118.

⁸ *BBC News* “Tuberculosis” August 2, 2003. Found at: <http://www.bbc.co.uk>

⁹ Paul Farmer, *Infections and Inequalities: The Modern Plagues* University of California Press Berkeley, California 2001 p. 232.

¹⁰ Kim, Shakow, Castro, Vanderwarker, and Farmer, p. 67

The Global Fund and the Global Stop TB Plan

One key avenue for preventing the spread of TB and MDRTB and to also treat cases that are found is the Global Fund to Fight AIDS, Tuberculosis, and Malaria (GFATM). The Global Fund was established in 2002 as a result of recommendations made by WHO's Commission on Macroeconomics and Health (CMH) and is one of the cornerstone programs within the UN System to combat the spread of TB and MDRTB, along with the World Health Organization's directly observed therapy, short-course (DOTS) and the expanded DOTS-plus program introduced within the past few years. At the time, the Commission on Macroeconomics and Health (CMH) estimated that \$400 million would be needed annually for at least 10 years to combat TB and MDRTB effectively but lately the total amount needed has been raised to \$700 million annually. Private foundations such as the Bill and Melinda Gates Foundation have given gifts of hundreds of millions of dollars to the Global Fund as well as the Global Stop TB Plan over the past 6 years but it remains abundantly clear that the national governments of the world's wealthiest countries need to contribute significantly greater resources if TB and MDRTB are to be effectively resisted. As critical as support from Western governments is, corporate donors have been especially slow in contributing to the Global Fund to date. At the end of January 2006, only \$5 million out of a total of \$4.7 billion had been contributed by corporate donors but the launch of the "Product Red" campaign has significantly bolstered corporate contributions of the Global Fund; according to the latest figures from the Global Fund, Product Red contributions have totaled over \$183 million USD.¹¹ Western governments and decision makers can point to relatively low rates of TB and MDRTB in their own societies today but they must remain cognizant of the fact that TB and MDRTB are highly infectious airborne diseases that spread easily and that their own populations remain at risk because of the prevalence of TB and MDRTB in neighboring corners of the globe.

Recent Outbreaks, including XDRTB

As tuberculosis continues to mutate and evolve, the medical community must seek to keep pace with new developments. In early 2006, WHO and the US Centers for Disease Control (CDC) named the most frightening TB mutation thus far: extensively drug-resistant tuberculosis (XDRTB). This new strain, XDRTB, is not only resistant to the two primary front-line drugs, isoniazid and rifampicin, it is also resistant to at least three to six of the eight second-line drugs. On October 9 and 10, 2006, the WHO Global Task Force on XDRTB met in Geneva, Switzerland to develop guidelines for countries facing outbreaks of XDRTB. Combating XDRTB will require countries to provide greater access to second-line TB drugs as well as to increase the prescription of anti-retroviral medication to HIV+ patients, many of whom are very likely to contract either MDRTB or XDRTB. XDRTB is still considered relatively rare but WHO estimates, based upon TB population samples, that up to 20% of all MDRTB patients can develop XDRTB, although WHO cautions that the overall percentage is likely to be lower than 20% of MDRTB cases developing into XDRTB; in 2008, the percentage of all TB cases that

¹¹ The Global Fund, "Pledges and Contributions" 2012. Found at: <http://www.theglobalfund.org/en/about/donors/>

were diagnosed as XDRTB was estimated at approximately 7%.¹² In September 2006, the government of South Africa issued an urgent appeal to WHO for immediate assistance in confronting an outbreak of XDRTB in that country. With the dangerously high incidence of HIV/AIDS in Africa, especially southern Africa, combating MDRTB and XDRTB must be considered an urgent public health priority throughout the region.

The Scourge of HIV/AIDS: A Global Health Epidemic

It is truly impossible to know just how many people worldwide are infected with HIV/AIDS because many people never get tested and may die before ever knowing that they were infected. Even with acknowledging that fact, though, it is abundantly clear that HIV/AIDS is a global epidemic with some 40 million people already known to be infected and with approximately 3 million new cases reported each year and at least 2 million people dying from HIV/AIDS-related causes each year. HIV/AIDS also overwhelmingly affects the 15-54 age group which constitutes the vast majority of the parents and workers worldwide; the approximately 12 million AIDS orphans worldwide are the children of so many of these parents.

According to the World Health Organization (WHO), an estimated 390,000 children were infected with HIV in 2010, representing a 30% decrease from the high point of 560,000 in 2003, with the vast majority of those cases occurring because of mother-to-child-transmission (MTCT).¹³ An additional tragedy from this global HIV/AIDS epidemic is the fact that approximately one third of all children born to mothers infected with HIV/AIDS will be HIV+, and the overwhelming majority of these HIV+ babies and infants will die within the first few years of life. The positive news is that there are ways to dramatically reduce the infection rate for all people as well as to reduce the transmission from mother to child.

The countries that are most effectively combating the HIV/AIDS problem have done so by combining emphases on abstaining from sexual activity outside marriage, the use of contraception, and programs aimed at educating men, women, and children about the transmission of HIV/AIDS and how to prevent that transmission. Countries like Thailand and Uganda have been widely credited for implementing two of the most effective strategies to combat HIV/AIDS in the developing world and their strategies have included greater access to contraception as well as expanded access to antiretroviral drugs (ARVs) that are essential to slowing the rate at which HIV destroys a person's immune system and ultimately turns into AIDS. Governments must also seek to reduce the infrastructure and poverty that ultimately condemn far too many women to lives scarred and destroyed by HIV/AIDS. Dr. Paul Farmer, the Harvard-trained physician who directs the international NGO Partners in Health, argues that "women are at risk [for HIV/AIDS] because poverty is the primary and determining condition of

¹² *BBC News*, "Aggressive TB treatment „success“" August 24, 2008.

¹³ World Health Organization (WHO), http://www.who.int/hiv/pub/progress_report2011/global_facts/en/index.html

their lives.”¹⁴ By improving the lives and quality of life for hundreds of billions of women around the world, governments and interested civil society partners will be able to dramatically reduce the transmission of HIV to fetuses and babies.

Malaria

Malaria is a potentially fatal disease that is spread by mosquitoes. Once malaria enters the human blood stream, it infects the liver and red blood cells throughout the body. Once symptoms appear, malaria must be treated quickly or it may threaten vital organs and ultimately cause death. According to WHO, there were 247 million reported cases of malaria in 2006 with nearly 1 million deaths worldwide, with the majority of those deaths being African children.¹⁵ WHO also administers the Global Malaria Programme (GMP) and strives to provide technical assistance to countries that are seeking to scale up their malaria response mechanisms and systems.¹⁶

Vector Control

A key method of preventing malaria infection is „vector control“. Vectors, in this case, are the mosquitoes, the vehicles of malaria infection. If infected mosquitoes can be prevented from coming in contact with humans, then the instance of malaria can be greatly reduced, or even eliminated. The prevailing methods recommended by various international agencies, including the World Health Organization(WHO), UNICEF, Roll Back Malaria (RBM) and The Global Fund, are insecticide treated nets (ITNs) and indoor residual spraying (IRS).

Insecticide treated nets (ITNs) are chemically treated bed nets which are highly effective when widely distributed. When used by many people in a community, even those without ITNs are far less likely to contract malaria. The use and distribution of ITNs, however, is varies widely between regions and countries. Within the African WHO region (the region with the largest high-risk population), the use of ITNs varies from nearly 0 percent in Gabon to approximately 100 percent in Sierra Leone and several other countries; in contrast to the situation a few years ago where no country had met the World Health Assembly’s 2005 goal of 80 percent distribution and use for ITNs, it is clear that significant progress is being made in many parts of Africa and that this progress must be sustained. It is a general consensus that young children and pregnant women comprise the immediate priorities for protection; in 2006, however, National Malaria

¹⁴Paul Farmer, *Pathologies of Power: Health, Human Rights, and the New War on the Poor* University of California Press Los Angeles 2005 p. 44.

¹⁵WHO, “Malaria” Fact Sheet No. 94 January 2009.

Found at: <http://www.who.int/mediacentre/factsheets/fs094/en/index.html>

¹⁶ WHO, “About WHO Global Malaria Programme (GMP)”

Found at: http://www.who.int/malaria/about_us/en/index.html

Control Programs (NCMPs) reported that, on average, only 23 percent of children under the age of 5 slept under ITNs and 27% of pregnant women.

Another form of vector control is indoor residual spraying (IRS). After feeding, mosquitoes prefer to rest in dark cool places, usually indoors. There is a wide variety of IRS formulas which makes it highly adaptable to different countries which exhibit strains of malaria that are resistant to some insecticides. DDT is the most effective, lasting as long as 6 months and playing an important role in managing and avoiding vector resistance. There are guidelines and recommendations on the use of DDT by WHO and the Stockholm Convention, but generally DDT can be used for as long as necessary. However, due to its high cost, IRS is usually used in targeted areas where there is high risk, due to larger gatherings of populations, or epidemics. Other vector control methods include dumping standing water (mosquito breeding habitat) and filling in marsh lands near high population areas. The World Health Organization, the UN Environment Programme (UNEP), and many national environmental regulatory agencies have warned about the need to prevent DDT from leaking into agricultural sectors and into groundwater tables.

Both ITNs and IRS are used in a wide range of areas, from low to high transmission. A problem exists with the costs of these measures and the distribution to those in need. ITNs are bulky and thus special attention needs to be paid to procurement, storage and transport. Mosquitoes breed and the highest rates of infection are during the rainy seasons, therefore ITNs need to be transported and repositioned in areas which are hard to access during that season. WHO recommends a ratio of one ITN per two people at risk, but the current ratios are far lower. In addition, timing for IRS is important as several years of spraying is needed to be effective. IRS should not be implemented if a continuous supply cannot be maintained, there is not a monitoring system to confirm the effectiveness of the formula being used or spraying campaigns cannot be completed before the onset of the rainy season. Because it is so costly, it is usually not feasible to continuously spray for long periods of time and is more effective in areas of high transmission for purposes of immediate reduction of infection. They are also highly effective as a first line of defense against epidemics and in areas where transportation of ITNs is not feasible such as emergency situations like refugee camps and displaced populations.

Access to Medicines

The second phase of eliminating malaria is the treatment of infected persons and the prevention of infection through artemisinin-based combination therapy (ACT) and intermittent preventive treatment during pregnancy (IPT). The 2008 Millennium Development Goals Report states that “There has been less progress in treating malaria than preventing it.” No malaria endemic country has adequate access to malaria treatments; many do not have the capabilities to accurately diagnose malaria cases, especially in rural or isolated areas. Though National Malaria Control Programs (NCMPs) underestimate distribution numbers, due to missing data and non-uniform recording systems, they reported large increases of anti-malaria drugs in the period between 2001 and 2006. Of the 49 million doses procured in 2006, however, 45 million were for

African countries; the remainder was primarily reserved for other regions, especially the Eastern Mediterranean and Western Pacific regions. Delegates to the World Health Organization may wish to examine specific trends of ACT and IPT between 2007-2011 to determine the current effectiveness of these measures.

The Global Fund

The Global Fund to Fight AIDS, Tuberculosis and Malaria is an increasingly critical source of financial support for pandemic control. Irwin Arieff states that “the fund has become the main source of financing for international efforts to combat the three diseases, providing a quarter of all international financing for AIDS programs, two-thirds for tuberculosis and three-quarters for malaria. For AIDS alone, the fund funneled \$15 billion into hundreds of programs in 140 programs by the end of 2008.”¹⁷ At the conclusion of a recent round of funding in November 2009, the international Board of the Global Fund approved a total of 90 disease funding proposals affecting 69 countries and totaling slightly over \$2.3 billion USD.¹⁸ The Global Fund receives its funding through several different mechanisms, including direct contributions from 50 governments as well as from philanthropic foundations; in 2008, the Global Fund hosted its second Replenishment conference in Berlin Germany and the mid-term review of this Replenishment was held in Cáceres, Spain in the spring of 2009.¹⁹ The Global Fund also receives ad hoc donations from governments that wish to assist in the critical work that is being done. As the Global Fund’s work is cited as being absolutely critical to saving, and improving the quality of, millions of lives, it is essential that governments, philanthropic organizations, and maybe even pharmaceutical manufacturers consider increasing their voluntary contributions to the Global Fund.

H1N1

The rapid spread of the H1N1, or “swine flu”, pandemic throughout 2009 overwhelmed policy-makers and public health systems in many countries, if only temporarily. By the end of 2009, WHO stated that over 200 countries and overseas territories had reported outbreaks of H1N1 with over 12,000 deaths worldwide.²⁰ Over half of all of the reported deaths occurred in the Americas with Europe reporting the second highest number of fatalities and Africa actually reporting the fewest deaths from H1N1 in 2009. While WHO urged aggressive and rapid

¹⁷ Irwin Arieff, “HIV/AIDS, Tuberculosis and Malaria” *A Global Agenda: Issues Before the United Nations 2009-2010* United Nations Association (UNA-USA) New York 2009 p. 77.

¹⁸ The Global Fund to Fight AIDS, Tuberculosis and Malaria, “Funding Decisions” 2009. Found at: <http://www.theglobalfund.org/en/fundingdecisions/?lang=en>

¹⁹The Global Fund to Fight AIDS, Tuberculosis and Malaria, “Our Resources” 2009. Found at: <http://www.theglobalfund.org/en/resources/?lang=en>

²⁰World Health Organization (WHO), “Pandemic (H1N1) 2009 - update 81” December 30, 2009. Found at: http://www.who.int/csr/don/2009_12_30/en/index.html

treatment of H1N1 throughout 2009, some critics are questioning the role of pharmaceutical manufacturers in pushing for such an aggressive and rapid treatment regimen; WHO conducted a review of its own response to H1N1 to determine if the response was both adequate and appropriate.²¹

As the hysteria over the H1N1 pandemic diminished, WHO, national governments, and health providers must cooperate to resolve several outstanding issues. At the beginning of the H1N1 pandemic, very little vaccine was available; today, there are hundreds of millions of unused doses of vaccines that are rapidly accumulating in countries such as the United States²² and the UK, while conversely, there may still not be enough vaccine for countries such as Mexico.²³ Countries that produce the vaccines themselves are far more likely to be able to respond quickly to pandemic outbreaks; of course, these countries are typically wealthier countries with far greater productive capacities and resources available to respond to pandemics than poor and developing countries.

Global Alert and Response System

The Global Alert and Response (GAR) system that WHO established within the past few years is designed to “support national and international training programmes for epidemic preparedness and response; coordinate and support Member States for pandemic and seasonal influenza preparedness and response; and develop standardized approaches for readiness and response to major epidemic-prone diseases.”²⁴ The GAR’s effectiveness may well be determined by how effectively countries integrate the information and communications technologies (ICT) that are being designed for public health management.²⁵ Furthermore, as WHO expands the scope of the Global Alert and Response (GAR) system to provide an integrated and coordinated schema of pandemic response mechanisms, its work must be mirrored by governmental cooperation and reliable information-sharing regarding the extent of pandemics and emerging diseases.

Patients’ Rights?

Governments, public health officials, health providers, and ordinary citizens may rationally be concerned, even alarmed, by the outbreak of a new pandemic but that does not mean that anyone diagnosed with, or sometimes even just suspected of having, a pandemic

²¹ Imogen Foulkes, “World Health Organization to review swine flu response” *BBC News* January 12, 2010.

²² Lauren Neergaard, “Too much flu vaccine? Shot push this week to tell” *Washington Post* January 12, 2010.

²³ Catherine E. Shoichet, “Mexico still waiting for most swine flu vaccines” *Washington Post* January 13, 2010.

²⁴ WHO, “Global Alert and Response (GAR)” 2012. Found at: <http://www.who.int/csr/en/>

²⁵ Delegates are encouraged to visit the following site: <http://www.who.int/csr/ict4phem/en/index.html>

disease automatically forfeits his/her rights. Many countries quarantine people who have confirmed cases of pandemics, even when quarantining the patients may not address the health issues being experienced by the patients of the wider community.²⁶ Even in those cases where quarantining patients may be effective in terms of combating further pandemic outbreaks, patients must be treated with dignity and must be informed of their treatment options as well as the best available information regarding their likely prognosis for successful treatment.

Conclusion

Pandemics can overwhelm not only public health systems but public confidence in governments, international organizations such as the World Health Organization (WHO), and health care providers. At the height of the 2009 H1N1 pandemic fears, governments enacted travel restrictions and closed down schools and businesses suffered considerable declines as potential customers avoided public spaces.²⁷ While predictions for 2012 regarding H1N1 indicate an emerging consensus that H1N1 will likely not present overwhelming problems this year, the international community must take to heart the lessons learned in combating various pandemics, including H1N1, and H5N1, avian influenza²⁸, and devote considerable resources to preventing future pandemics and mitigating the effects of those pandemics if they do break out. WHO continues to develop the Global Alert and Response(GAR) to “maintain and further develop a global operational platform to support outbreak response and support regional offices in implementation at regional level” as well as improve the capacities of states of issue immediate alerts and initiate prompt responses to the emergence of new pandemic threats.²⁹

Wealthy countries must not succumb to the false hopes that they can just inoculate their own peoples and that any danger from these pandemics will then disappear. Influenza strains and other diseases can mutate or develop resistance to the drugs used to treat them; furthermore, one infected person who enters these countries bearing a new version of the pandemic may potentially infect large numbers of people in the new host country, sometimes without ever setting foot in that country. A plague on one house may indeed become a plague on all of our houses.

Guiding Questions:

What pandemic diseases are most prevalent in your country? How have your government, public health officials, and health care providers responded to these pandemics?

²⁶Celia W. Dugger, “TB Patients Chafe Under Lockdown in South Africa” *New York Times* March 25, 2008.

²⁷Veronica Smirk, “Swine flu infects Argentine economy” *BBC News* July 10, 2009.

²⁸ *BBC News*, “China bird flu victim dies in Shenzhen city” December 31, 2011.

²⁹WHO, “Global Alert and Response (GAR)” 2010. Found at: <http://www.who.int/csr/en/>

How effectively has the World Health Organization (WHO) responded to pandemic outbreaks around the world? What steps can the WHO take to improve its effectiveness at preventing and combating pandemics?

How can governments, public health agencies, regional offices of WHO, and health providers work together more effectively to prevent and combat pandemics that spread when people travel between countries? How might governments, philanthropic organizations, and corporations increase their contributions to voluntary funds, including the Global Fund to Combat HIV/AIDS, Tuberculosis and Malaria, especially in light of contemporary global economic and financial problems?

How does your government strive to balance public health concerns with the rights of patients? Has your government modified these policies in recent years? If so, in what ways and what have been the results?