AN INTRODUCTION TO GLOBAL HEALTH AND GLOBAL HEALTH ETHICS:
SEVEN TOPICS FOR STUDENTS

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# TABLE OF CONTENTS

LIST OF ABBREVIATIONS..........................................................................................iii

ABSTRACT..............................................................................................................vi

INTRODUCTION ......................................................................................................vii

TOPIC ONE: EBOLA 2014-15 - AN INTRODUCTION TO GLOBAL HEALTH AND
GLOBAL HEALTH ETHICS ..................................................................................1

TOPIC TWO: GLOBAL HEALTH: THE CURRENT STATE OF AFFAIRS ......................11

TOPIC THREE: A BRIEF HISTORY OF GLOBAL HEALTH .......................................22

TOPIC FOUR: HEALTH SYSTEMS AND TUBERCULOSIS ......................................36

TOPIC FIVE: HIV/AIDS AND RESEARCH IN DEVELOPING COUNTRIES ...............49

TOPIC SIX: GLOBAL SURGERY AND GLOBAL HEALTH METRICS .......................62

TOPIC SEVEN: MENTAL HEALTH AND THE CULTURAL CONTEXT OF GLOBAL
HEALTH ..................................................................................................................75

CONCLUSION .........................................................................................................86

REFERENCES .........................................................................................................87

CURRICULUM VITAE ...............................................................................................97
LIST OF ABBREVIATIONS

AAMC – Association of American Medical Colleges
AIDS – Acquired Immunodeficiency Syndrome
ART – Anti-Retroviral Therapy
AZT – Zidovudine
CDC – Centers for Disease Control
CIDI – Composite International Diagnostic Interview
DALY – Disability Adjusted Life Year
DOTS – Directly Observed Treatment, Short-course
DSM – Diagnostic and Statistical Manual of Mental Disorders
EVD – Ebola Virus Disease
FDA – Food and Drug Administration
GAVI – Global Alliance for Vaccines and Immunizations
GIEESC – Global Initiative for Emergency and Essential Surgical Care
HAART – Highly Active Anti-Retroviral Therapy
HALE – Healthy Life Expectancy
HICs – High-Income Countries
HIV – Human Immunodeficiency Virus
IDU – Intravenous Drug User
IGO - Inter-Governmental Organization
IMF – International Monetary Fund
IRB – Institutional Review Board
LICs – Low-Income Countries
LMICs – Low- and Middle-Income Countries
MDG – Millennium Development Goal
MDRTB – Multi-Drug Resistant Tuberculosis
MIT – Maternal-Infant Transmission
MSF – Medicins sans Frontieres (Doctors without Borders)
NCD – Non-Communicable Disease
NGO – Non-Governmental Organization
NIH – National Institutes of Health
NTP – National Tuberculosis Program
PAACS – Pan-African Academy of Christian Surgeons
PCP – Pneumocystis Pneumonia
PEPFAR – President’s Emergency Fund for AIDS Relief
PPP – Public-Private Partnership
PTSD – Post-Traumatic Stress Disorder
REB – Research Ethics Board
SAP – Structural Adjustment Program
TB – Tuberculosis
UK – United Kingdom
UN – United Nations
UNAIDS – Joint United Nations Program on HIV/AIDS
UNICEF – United Nations Children’s Fund
US – United States
WHO – World Health Organization
ABSTRACT

This is a practicum thesis to develop global health curriculum for students. The thesis includes seven articles that provide an introduction to global health and global health ethics. Topics for the articles were developed through research, discussions with current students and the author’s personal experiences in global health. The articles are: (1) Ebola 2014-15: An Introduction to Global Health and Global Health Ethics, (2) Global Health – The Current State of Affairs, (3) A Brief History of Global Health, (4) Health Systems and Treating Tuberculosis, (5) HIV/AIDS and Research in Developing Countries, (6) Global Surgery and Global Health Metrics, and (7) Mental Health and the Cultural Context of Global Health. Each article includes a specific topic in global health, a general concept in healthcare, and an issue in global health ethics, as well as questions for consideration. Articles are designed as a tool to help students become informed participants in global health.
INTRODUCTION

More and more, students in medical schools and universities are participating in global health. At the medical school level, the number of students in Canada and the US participating in global health experiences went from 11.5% in 2001 to 22.3% in 2004.\textsuperscript{1} A survey of American medical students in 2012, reported 30% had participated in global health experiences. Though similar studies have not been done at the university level, the number of volunteer programs through universities and other organizations suggest a significant portion of students are participating in global health experiences at the undergraduate level.\textsuperscript{2} Students seek out these experiences as a chance to travel, participate in healthcare and as a means to “do good”.\textsuperscript{3} Most global health experiences involve students from high-income countries traveling as part of a group to deliver healthcare or participate in research in communities in low- and middle-income countries.

Choosing to write about this topic was greatly influenced by my own experiences in global health. The summer after my first year of medical school, a fellow student and I traveled to Cuzco, Peru to work at a clinic. Prior to our trip we researched programs and settled on an organization directed at medical students wanting a clinic experience in a developing country. We applied for a grant through the school and by May 2011 we were off to spend six weeks living and working in Peru. Looking back I realize my expectations were mixed and, at the time, unexamined. I chose Peru because I wanted to improve my medical Spanish, I wanted to travel and I was interested in the Peruvian culture. I wasn’t sure what to expect and when we landed our initial organization turned out to be a clearing-house to connect US students with in-country programs. The clinic
to which we were assigned was government-run clinic for women and children, mostly serving the poor on the outskirts of the city.

My friend and I, along with four other first-year medical students were to arrive at the clinic Monday through Friday and choose the area where we wanted to work. Some of the students opted to spend most of their time in the labor and delivery wing, hoping to assist in births. Though I couldn’t say exactly why at the time, it bothered me that these students were choosing to attend births. Assisting deliveries was something medical students in the US wouldn’t see until their third year of school. I left Peru with a lot of valuable experience, improved medical Spanish, and feeling that I had been part of something that wasn’t quite right.

Though students are aiming to “do good” by participating in global health, many authors have written about the ethical concerns of untrained and inexperienced students participating in global health. One common concern raised by global health scholars is the lack of knowledge that students have for both the area they are visiting and the possible impact of their volunteer work. Much of the proposed curriculum for students has been focused specifically on the concerns of short-term medical volunteer trips. Recommended pre-trip preparation often entails learning about proper conduct in the clinical setting, learning about the specific culture and customs of the place the student will be visiting, as well as considerations about the outcomes of that volunteer trip.

Having researched and experienced the ethical questions that come to students participating in global health, I set out to develop curricula to aid students participating in global health. First, I turned to the undergraduate campus at Wake Forest University and asked students to meet with me to discuss their experiences in global health. I met with
eight students whose experience ranged from one week spring break trips to El Salvador to leading the student organization Global Brigades which organizes trips for students to developing countries. One student had spent two months in Peru observing and reporting on medical volunteer programs for a research project. Many of the students echoed concerns found in the literature on their lack of knowledge of the area, difficulties in communication and operating outside their scope of experience.

Taking what I had learned from the literature, my own experience and talking with students I developed a series of lectures designed to introduce students to ethical issues they might encounter while volunteering in global health. I paired each issue with a topic in global health to help inform and give examples. I then gave the lectures to students at Wake Forest University. I advertised each topic through student list-serves for pre-health, global health and on the University’s events website. Each lecture had a didactic portion followed by a discussion. While some of the students who attended the lecture had had global health experience, most did not, but were interested in learning more.

Over the autumn of 2014, I used the student’s feedback to refine and revise the topics I had chosen. What I found was that students often had a lack of knowledge about global health overall, including the history, structure and major events within the field. I realized that while pre-trip planning and the micro-ethics of volunteer trips are important for students involved in global health, it is also important for students to educate themselves about the bigger picture of global health. After completing the lecture series, I revisited each the topics and reworked them to reflect a broad view of global health and global health ethics.
The increasing number of students participating in global health represents a significant amount of money, travel and time spent. Some organizations depend on the donations and participation of students to carry out their work within global health. As such, within the crowded marketplace of funding in global health students represent a significant force. In order to choose or design their global health volunteer work wisely it is important for students to begin to understand the larger picture of global health.

Students’ experiences in short-term volunteer trips are microcosms within the larger field of global health. By entering into global health work, students are becoming part of a complex system of actors and forces that regulate the flow of billions of dollars and tackle a number of interrelated diseases and social conditions. The truth is global health is a complex and inherently ethical enterprise, involving nations and international organizations working to address issues such as global epidemics, health disparities between the rich and poor as well as climate change and global governance. By participating in volunteer work and donating money and time to organizations within global health, students represent an important vote in how global health is conducted.

The purpose of these articles is not to give a comprehensive account of global health and global health ethics, but rather as a tool to introduce students to some of the important events, concepts and ethical issues involved in global health. Each article is a combination of a specific topic in global health, a general concept in healthcare and a macro-ethical issue. The components are meant to complement each other and give students a basis for further consideration, with questions included at the end of each article. The articles can be used independently but are organized in suggested sequence.
for introduction of topics. My hope is that these articles will be used as a tool to help inform students about the complex field of global health.

TOPIC ONE: EBOLA 2014-15 - AN INTRODUCTION TO GLOBAL HEALTH AND GLOBAL HEALTH ETHICS
Learning Objectives:

1. Describe factors that contributed to the 2014-2015 Ebola Outbreak
2. Compare different definitions of Global Health
3. Consider ethical issues in Global Health response to the 2014-15 Ebola Outbreak

Ebola in West Africa: 2014-15

In December 2013, a small child in the town of Guéckédou, Guinea, contracted an illness that led to his death. The illness spread first to his family and then to the local community, bringing with it a high rate of mortality. The World Health Organization (WHO) and Doctors without Borders (MSF) dispatched teams to the area to help with treatment and containment. Health workers identified the epidemic as Ebola Virus Disease (EVD). Then in April of 2014, the epidemic that had been simmering in the border region of Guinea and Sierra Leone showed a sharp increase in the number of cases. By June the growth had become exponential and the virus had crossed into Liberia. By the end of the summer there were 3,052 confirmed or suspected cases and 1,546 deaths (51% mortality). The epidemic showed no signs of slowing down and new cases were reported in Nigeria as well. On August 8, 2014 the WHO declared the outbreak a Public Health Emergency of International Concern, a designation which required WHO member-nations to contribute to containment efforts. The efforts included travel restrictions, quarantines and deployment of international aid workers to the region. Though sporadic outbreaks of the Ebola virus had been reported in Africa since 1976, this pandemic was by far the worst.
The Virus

The Ebola virus is from a family of filoviruses and was first described in Zaire (now Democratic Republic of Congo) in 1976 when patients and workers at a hospital began to fall ill and die from a hemorrhagic fever. In this original outbreak a total of 318 cases were reported.

Where does it come from? The virus exists in an animal reservoir and will occasional mutate and gain the ability to infect humans and other primates. Bats are suspected to be the primary reservoir and humans likely come in contact with the virus by ingestion or through animal bites.

How does it make us ill? Ebola virus is able to affect a variety of tissues in the human body, including the immune system, liver and blood vessels. At first the body reacts with a viral prodrome of fever, malaise, muscle aches, and fatigue. As the disease progresses the virus affects blood vessels, leading to shock and clotting dysfunction. In some cases this results in the “hemorrhagic” symptoms of blood oozing from gums and any puncture sites, symptoms that are not present in all cases. Other systems are often affected leading to liver failure and kidney failure. The virus’ ability to affect several types of tissues in the body leads to an overall dysfunction that can be fatal.

How is it transmitted? The Ebola virus is transmitted when infected fluids come in contact with mucosal surfaces (nose, mouth, genitalia) or breaks in the skin, meaning that ingestion, accidental cuts or sexual contact are all methods of transmission. Once someone has been exposed there is an incubation period (time between infection and development of symptoms) of 6-21 days. People can only transmit the virus once they are symptomatic (fever, vomiting, etc.).
How can we treat it? The current treatment for patients with Ebola virus is supportive care; giving them fluids, keeping their fever down, maintaining nutrition, etc. In places where treatment is available mortality rates of the virus are significantly reduced; making the toll of the virus significantly higher in resource-poor settings. There are some experimental treatments but none that have been widely tested and proven to be effective.\(^5\)

How do you fight an outbreak? Infectious disease control is based on identifying cases of illness, limiting exposure to the source and limiting transmission. Since the exact source of the Ebola virus is unknown and transmission is person-to-person, quarantine and isolation are the main methods of disease control. Health workers first must identify a) people exposed to the virus and b) people who have contracted the virus. For the first group, contact tracing is used to identify people who may have been exposed and then implementing quarantine. In the second group, screening tests and laboratory tests are used to identify cases of Ebola virus. Those with signs and symptoms of disease are isolated and tested for the virus. Those with known virus are treated and kept isolated until they are no longer infectious. Proper disposal of the deceased is also very important to prevent further transmission.\(^6\)

What Happened Next

Despite the massive effort to combat the virus, the pandemic was still spreading in the autumn of 2014. By the end of July the first case of Ebola in the US had been reported leading to increased attention to the crisis by the international community.\(^7\) The WHO worked to raise US$174 million in funds to supply workers on the ground with mobile hospital units, diagnostic equipment, adequate personal protective equipment as well as
food. The money came from donors such as the African Development Bank Group, the World Bank and countries like the US.\textsuperscript{8} In September 2014, President Obama sent 3,000 US troops along with material assistance such as portable hospitals, home health kits and logistical equipment.\textsuperscript{9} By this point the Ebola crisis was one of the deadliest and widespread on record, and many factors contributed to its virulence:

- **Environment:** Most previous outbreaks of Ebola had taken place in Central Africa. The communities of Guinea, Liberia and Sierra Leone had limited previous experience with the illness. Furthermore, there was a high degree of population mobility along the border of these three countries, where the Ebola outbreak began. People often travel far to find work and food making the transmission chains widespread.\textsuperscript{10}

- **Lack of local resources** – The countries most affected had recently gone through civil unrest and had limited healthcare infrastructure. Leading into the crisis Liberia had 1 doctor for every 100,000 citizens.\textsuperscript{11} Tracing the disease and treating individuals was difficult in the face of severe workforce shortages. Furthermore, the impoverished countries often lacked the means to support citizens needing to be under quarantine, with food and water, making it hard to enforce good disease control practices.

- **Cultural Differences** – Local practices such as returning to die in one’s hometown and the ritual of washing the dead before burial are thought to have contributed to the spread of the Ebola virus.\textsuperscript{12} There was also evidence in many areas that local communities had a mistrust of hospitals and avoided bringing the sick to be
treated; it is estimated only 18% of Ebola patients had received care in hospitals during the first months of the outbreak.\(^\text{13}\)

- **Vaccines and Treatments** – Though vaccines and treatments for Ebola are being researched there is nothing ready for wide-scale implementation. Treatment relies on daily nursing care and supportive measures such as intravenous fluids and nutrition.\(^\text{14}\) As a result, treatment for Ebola often puts healthcare workers at risk and fatalities are high among the physicians and nurses working in the epidemic.\(^\text{15}\)

*Beginning of the End or End of the Beginning?*

By the start of 2015 numbers of new cases began to decrease and several countries, such as Nigeria, had stopped the spread of the virus all together. However since January 2014 new cases of Ebola virus have continued to be reported in Liberia and Sierra Leone. New case appeared scattered across the country and many suspected that cases continued to go un-reported leaving the potential for future spread as people were unwittingly exposed.\(^\text{16}\) Nigeria, unlike Sierra Leone and Liberia, had the personnel and healthcare infrastructure to implement successful public health measures to contain the virus.

By February 2015 fundraising for the Ebola crisis had slowed and the WHO faced a $200 million deficit in their budget for the first six months of 2015.\(^\text{17}\) Aside from the money contributed to the WHO fund, the US congress passed a bill for US$6 billion to fight Ebola, of which about $2.5 billion will go towards oversea efforts and $3 billion will go towards the US ability to confront future outbreaks of Ebola, although only 10 cases of Ebola were reported in the US during the crisis.\(^\text{18}\) International organizations and wealthy nations stepped in to increase funding and support when the Ebola crisis was
reaching a peak. Now that cases have decreased international efforts have continued thought funding and deployment of aid workers has decreased. Though the crisis may have reached its peak in 2014, the lasting impact of the Ebola virus in West-Central Africa remains to be seen.

**Global Health and Global Health Ethics**

When the WHO declared the Ebola outbreak a Public Health Emergency of International Concern, it was a formal recognition that the infection happening in West-Central Africa was a global health issue. Why was this outbreak a global health concern? To begin to answer that question, we must consider the different definitions of global health.

**International Health:** One way to define global health is that “global” refers to the scope of the problem. This would define global health issues as those that cross international borders and affect more than one nation. Another consideration would be that global health issues are those that require international efforts to address.\(^{19}\) This emphasizes the interactions between nations in health concerns as the foundation of global health.

**Supranational Health:** This definition considers health issues to be “global” in the sense that they are universal concerns. Health is something that is important for each individual regardless of where they are born and so global health issues include anything that threatens human health, including issues such as poverty, discrimination and access to healthcare.\(^{20}\)

In response to the WHO’s declaration of the Ebola outbreak as a Public Health Emergency of International Concern, nations such as the US responded with funding and material assistance to help fight the disease. Before that, international organizations like
the WHO and Doctors without Borders had sent international aid workers to assist national efforts in Liberia, Guinea and Sierra Leone. Every day, nations, organizations and individuals are participating in the work of global health. It is important to take a step back and wonder why.

**Global Health Ethics**: a discipline that considers why individuals and nations should care about the fate and existence of individuals and nations in other parts of the world.\(^{21}\) It is a discipline that encompasses ethics in clinical medicine, public health, research, sociology, religion, law and many other areas of study. It examines questions such as social justice, human rights and health inequalities throughout the world.\(^{22}\)

Examining questions of global health ethics is vital to understand the work of global health. Billions of dollars in international aid and thousands of international health organizations are all focused on improving global health. However, many have very different understandings of what that means. Studying the moral basis of global health sheds light on the complex networks and interventions of global health.

**Questions to Consider:**

Why do you think the US Government sent aid and troops to the countries of West-Central Africa during the Ebola outbreak? To prevent spread of infection to the US? Out of charity? Out of a duty to help other nations? Classify these reasons within the two definitions of global health offered above.

The individuals that provided care for Ebola patients put themselves at significant risk of being infected. Do you think that healthcare providers in the affected countries were required to help patients? What about healthcare providers from other nations? Do they have different duties toward Ebola patients? If so, why?
The supranational definition of global health considers the social factors of disease such as poverty and infrastructure as health issues. In what ways did these factors affect the outbreak of Ebola? Should these factors be addressed as part of international aid, for example spending money on building new medical schools in affected countries to try and address the workforce shortage?

**Glossary**

**Epidemic** – a sudden increase in the frequency of infection in a population or region

**Pandemic** – An epidemic that affects populations in large regions

**Reservoir - Zoonosis** – transmission of infection from one species to another

**Incubation period** – time between infection and the development of symptoms

**Quarantine** – restriction of healthy persons on the basis of exposure to infection to prevent transmission

**Isolation** – restriction of persons with known or suspected infection to prevent transmission

**Viral prodrome** – a combination of symptoms shared by a variety of viral illnesses

**Shock** – the body’s inability to maintain blood pressure adequate to supply oxygen and nutrients to vital organs

**Additional Resources:**

- The World Health Organization’s Website for updated information on Ebola in West-Central Africa and elsewhere
  - [http://apps.who.int/ebola/](http://apps.who.int/ebola/)
  - Includes interactive maps to illustrate spread of disease

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The World Health Organization, Factors that Contributed to the Undetected Spread of the Ebola Virus and Impeded Rapid Containment.


TOPIC TWO: GLOBAL HEALTH: THE CURRENT STATE OF AFFAIRS
**Learning Objectives:**

1. Consider different features of global health and how they relate to international aid
2. Explain the role of Governmental, Inter-Governmental and Non-Governmental Agents in Global Health
3. Compare different concepts of Global Health

**Global Health Survey**

The following questions were developed by Hans Rosling and the team from GapMinder.com to test people’s general knowledge of Global Health. These questions were part of a survey given to adults in the United States in 2013. Take a moment to mark your response. Answers to the questions will be included in the section “Products of a New Global Health”.

What do you think is the life expectancy in the world as a whole in 2012?

A. 50 years  
B. 60 years  
C. 70 years

What percentage of the world’s one-year old children is vaccinated against measles?

A. 20%  
B. 50%  
C. 80%
In the last 20 years the proportion of the world living in extreme poverty has…¹

A. Almost doubled
B. Remained more or less the same
C. Almost halved

Global Health

The start of the 21st century has marked a new period in global health. The past few decades have seen global health aid go from US$ 2.5 billion in 1990 to US$ 14 billion in 2005,² to almost US$30 billion by 2013.³ This growth is accompanied by a growing diversity in the participants of global health and a broad range of health concerns being addressed. The bottom line is that Global Health is complex. With so many different participants, the definition of Global Health can change depending on your perspective. The following are three different perspectives on the definition of Global Health.

Security Perspective: This is a limited view of global health and refers to containment of health threats that cross international borders, such as infectious disease and bio-weapons. The work of global health in this sense is the effort to identify, track and respond to international health threats.

Development Perspective: This view of global health is recognition of the disparities that exist in the distribution of death and disease. Global health aims to raise standards of living by addressing issues such as poverty, access to water, food security and access to healthcare. This component generally refers to the transfer of resources and aid from wealthy nations to poorer nations.⁴
Globalized Health Perspective: This is a view of health issues that transcend national borders. An example would be outcomes due to tobacco use. Lung cancer and chronic respiratory diseases are health issues that affect people all over the world as a result of tobacco. Addressing these health problems involves individuals, communities, governments and multinational corporations; a reflection of the current trend of globalization.

Inequalities vs. Inequities

Health Inequalities – “the uneven distribution of health in or between populations.” This can include differences like older adults tend to require more medications than younger adults, or the health needs of women are different than men, due to pregnancy.

Health Inequities – “the presence of systematic disparities in health between more and less advantaged social groups.” For example, populations in poor countries tend to have higher rates of childhood mortality than populations in wealthy countries.

The important distinction between inequalities and inequities is that inequity reflects an unfair distribution. While health inequalities may be due to biological and unavoidable differences, health inequities are a result of environmental and social conditions which can be altered.

Participants in Global Health

The field of global health contains a number of different participants that add to the complexity. Some raise funds, others manage and deliver health care while others are the recipients of aid, and many times groups are doing more than one of those things. In an effort to organize these many groups they are split into governmental actors, and non-governmental actors.
**Governmental Actors**

**Nation-States:** Health systems are organized at the national level, with health ministries or departments supplying health services to citizens. Nations also participate in global health through membership in international organizations like the World Health Organization (WHO) and the United Nations (UN), which work to set international standards.

**Providers:** In addition, many high-income countries (HIC), such as the United States, provide a significant portion of international aid funding. In addition, national agencies, such as the President’s Emergency Plan for AIDS Relief (PEPFAR) and the Global Health Initiative, act to manage and distribute global health aid.

**Recipients:** Many low- and middle-income countries (LMICs) receive direct international aid through grants and support for their health sectors.

**Inter-Governmental Organizations (IGOs):** These organizations are made up of member states which provide funding and influence policymaking. The World Health Organization (WHO), founded in 1948, has long been the major IGO in global health. However, in the past several decades, organizations like the World Bank and the United Nations have formed branches devoted to global health (e.g. UNICEF, UNAIDS).

**Non-Governmental Actors**

In addition, there are many organizations that make significant contributions to global health outside of the nation-state structure.

**Non-Governmental Organizations (NGOs):** This is an enormously diverse category of actors in global health. It can range from organizations that operate in countries all over
the world, such as Doctors without Borders (MSF), to small organizations that operate in a single community. NGOs gain funds from individuals, foundations as well as grants from wealthy nations and IGOs. They address a broad range of health issues through a wide variety of mechanisms.

**Private Foundations/Philanthropies:** The Bill and Melinda Gates Foundation is an example of a private trust which operates in global health. Through contributions to other organizations and their own operations these trusts also address a wide variety of health issues.

**Multi-National Corporations:** Companies, such as pharmaceutical companies, play an important role in global health. In addition to donating products to other organizations they can also run their own programs in developing nations.

**Individuals:** People participate in global health both as contributors and recipients. Individuals can contribute through monetary donations, their taxes, and their time. In addition in democratic societies, individuals participate in political activities that influence policymaking decisions. The populations that receive aid and healthcare as a result of global health funding are the ultimate recipients of the system.

In addition to these many actors, there is also a rising trend of **Public-Private Partnerships** (PPPs), where NGOs, corporations and private foundations are partnering with IGOs, and national governments to coordinated efforts in addressing a health issue. Organizations such as, the Global Fund to Fight AIDS, Tuberculosis and Malaria, and the Global Alliance for Vaccines and Immunizations (GAVI) are led by representatives from the private and public sectors.
Products of the New Global Health

What is certain is that amidst the increasing funds for global health and the growing numbers of participants, health needs are being addressed. Global health indicators show that life expectancy from birth has increased from 64 years in 1990 to 70 years in 2012. In addition, mortality in children under 5 years has undergone an accelerated decline from 90 deaths per 1,000 in 1990 to 48 per 1,000 in 2012. Contributing to these improvements are measures like childhood vaccinations which are increasing in coverage. In 2012, 84% of the world’s children (12-23mos) received measles vaccinations; a health measure that has contributed to the 78% drop in total measles deaths between 2000 and 2012. In addition, the number of new cases per year of both tuberculosis and HIV has been falling since 2001. Though these are just some of the improvements made in global health in the past few decades, they reveal significant advancements.

However, that is not to say that significant health disparities have gone away. Though the number of people living in extreme poverty (living on <US$ 1 per day) has gone from 47% in 1990 to 22% in 2010, the economic gap between the world’s richest and poorest people has been widening. In 2015, the richest 1% controlled 83% of resources, while the poorest 50% controlled 2% of resources. While overall gains have been made, there is still inequitable distribution of health burdens. Life expectancy from birth has a gap of 18.9 years between high-income counties (82.0 years) and low-income countries (63.1 years). Furthermore, mortality in children under 5 years in thirteen times higher in low-income countries (82 deaths per 1,000), than in high-income countries. Much of the difference has to do with the social determinants of disease, such as poverty,
malnutrition and lack of access to health care which can increase the burden of disease and worsen outcomes.

**Conceptions of Health**

Amidst all the effort and funding going towards global health, it is good to take a step back and examine what it is all for. What is the ultimate end for individuals and nations that participate in the field of global health? In order to start answering that question, we need to consider what “health” means to different groups. The following are three different conceptions of health.

**Health as Security:** As was discussed above, one reason for global health might be for nations to protect their citizens from the threat of epidemics or bio-weapons. In this view, governments owe citizens protection from health threats, and their obligations at the international level do not go beyond the mechanisms to identify, track and respond to health threats.  

**Health as a Public Good:** This view borrows from the moral theory of utilitarianism, or the principle of “the greatest good for the greatest number.” In this case, health or well-being is the good that should be maximized. Often in global health, policymakers will talk about the “cost-effectiveness” of a health intervention. Cost-effectiveness is seen as a virtue in global health because it maximizes the amount of health or lives saved or healthcare distributed per dollars spent.

**Health as a Human Right:** Historically, philosophers introduced rights as freedoms which the state could not violate, such as free speech, privacy and property. Overtime, others argued that rights were due to individuals, not by virtue of citizenship, but by virtue of being human. In addition to the traditional civil rights, some have added social
and economic rights, among which is the right to healthcare. For each right there is a corresponding duty. In the case of free speech or privacy, others have a duty not to interfere with an individual’s right, a negative duty. For other rights there may be a corresponding positive duty, such as the right to education, others must help provide resources for the individual. This view, in essence, is because we are human we have a right to be cared for when we are in ill-health, and because of this right, others have a duty to provide healthcare.16

Question to Consider:

Revisit the Quiz at the beginning of the article: What knowledge did you use to choose your answers? How did you do on the global health survey? Were you surprised by the answers given in “Products of the New Global Health”? Those questions were from an “Ignorance Survey” conducted by Has Rosling, creator of GapMinder.org. A series of questions were given to people in the US to test their knowledge of global health. If you did poorly, don’t feel bad most people did.17

Consider the different accounts of health given at the end of the article and what each definition might require.

Health as security: In this view countries can and must act to protect the health of their citizens. However, public health measures such as travel restrictions and quarantines can infringe on individual rights. Take for example the military quarantines in Liberia and Sierra Leone during the 2014-15 Ebola Crisis in West Africa. Troops stationed on the perimeter of towns prevented people from leaving, not just those who were infected with Ebola but the entire town. Is it right for governments to effectively imprison people in order to prevent the spread of disease? What about those in the village, who were not
infected with the virus, shouldn’t they be able to leave in order to protect themselves from exposure?

*Health as a public good*: Let us compare health to another public good, such as clean water. Supplying water takes machinery and pipes and sanitation facilities, all of which cost money. Should people have to pay for water? Should the government provide it for free? Who should own the water facilities? Who owns the actual water?

*Health as a human right*: As discussed above, each right comes with a corresponding duty. The right to life means that others are required not to kill you. The right of free speech means that others must not prevent you from expression.

If health is a human right, what then is the corresponding duty? Is it just that others don’t cause you illness (they can’t poison you or break your legs) or is it that they must actively support your health? (Bring you to the emergency room when you’re poisoned or have a broken leg)

**Additional Information:**

The website [www.GapMinder.org](http://www.GapMinder.org) contains interactive maps, the results of the ignorance survey and up-to-date statistics on the state of Global Health.


This article discusses controversies surrounding enforced quarantines. It gives a good example of how security concerns in health can be at odds with individual rights.


This article gives an account of the global concerns in the provision of clean water. Much of the discussion about water as a public good has a lot of relevance for considering health as a public good.

4 Ibid.
5 Khaliq and Smego Jr, “Global Health: Past, Present, and Future.”
8 Ibid.
11 United Nations, “End Poverty: Millennium Development Goals and Beyond” (UN Department of Public Information, 2015).
15 Suri et al., “Values and Global Health”; Ng and Ruger, “Global Health Governance at a Crossroads.”
16 Suri et al., “Values and Global Health.”; Ng and Ruger, “Global Health Governance at a Crossroads.”
TOPIC THREE: A BRIEF HISTORY OF GLOBAL HEALTH
Learning Objectives:

1. Identify population-level and individual-level health measures across the history of global health
2. Consider competing theories of justice in global health
3. Evaluate the arguments for and against wealthy nations to provide international aid

A Brief History of Global Health

In order to understand a broad concept, like global health, it is important to consider where it comes from. The history of global health will be told here in broad strokes and will follow two major trends that shaped global health organizations: population health through the control of infectious diseases and individual health through the delivery of healthcare. Each of the stages discussed here, tropical medicine, international health, the age of development and the rise of the NGO, overlap and converge. Overall, as the world became increasingly interconnected global health moved from the imperial concerns of “tropical medicine” to include more nations and other international organizations in the formations of international health policy. However, though the concept of global health changed greatly since its beginning, infection control and delivery of healthcare remained important core features of global health.

Tropical Medicine

This stage of global health is defined by the imperial system of colonization. In the 16th and 17th centuries European countries began to travel to new lands setting up the settlements that would eventually become the colonies of the 18th and 19th centuries.
Countries such as Great Britain, France and Portugal founded colonies in places such as India, China and Africa, where settlers encountered new diseases and harsh climates.\(^1\) Infectious diseases were devastating to both the native populations and to the European colonists. For example, epidemic diseases completely decimated the Taino tribe of Hispaniola (now Haiti and the Dominican Republic), encountered by Columbus in 1492. By the end of the 17\(^{th}\) century not a single member of the Taino tribe remained.

Mortality rates for the European settlers were also high. For British colonists on Africa’s Gold Coast (now Ghana) mortality rates were as high as 300-700 per 1,000 during the first year of the colony. The new diseases and harsh conditions of these colonies gave birth to the field of Tropical Medicine.\(^2\)

Tropical medicine developed as part of a larger blossoming of medical study and knowledge in the 19\(^{th}\) century. The medical field had begun to advance and apply new ideas, like germ theory, to the fight against diseases. In 1854, John Snow famously met with the Board of Governors and Directors of the Poor to report his findings on a cholera epidemic in one of London’s poorest districts. He had connected the outbreak to the Broad Street water pump and proposed removing the handle as a means of quelling the outbreak.\(^3\) The story of the Broad street pump represented a larger movement within medical science to view disease and treatment at the level of populations through epidemiology and public health.\(^4\) These new ideas also made their way into the colonies, where innovations in healthcare were being applied at the population level and at the individual level:

**Military Medicine:** Within many colonies, the military was responsible for setting up healthcare facilities for soldiers and later the civilians who settled in the urban centers.
The Colonial Medical Service of Great Britain, for example founded clinics in British colonies that concentrated on limiting the toll of epidemic diseases. These organizations were able to conduct some of the earliest epidemiologic studies as they followed illness and causes of death in the British Military as it expanded colonial borders. This was a time of great violence towards native populations and colonial medical officials implemented sometimes draconian public health measures, such as forced quarantines, as a means to “civilize” native populations. Population health for colonies was to contrast the health of European settlers to the tropical diseases of native populations.

**Medical Missions:** At the same time that colonial medicine was expanding at the population level, many religious organizations were also sending missionaries to colonies, which began to provide individualized medical services. Religious missions had been a part of colonization since the beginning, and in the 19th century the protestant missions that proliferated in areas like Africa began to incorporate medical care into their services. In this context, health care was means of introducing Western culture and displacing traditional healers. The focus for missions was improving the living conditions of native populations through conversion to Christianity and adoption of Western civilization. This conception was about using healthcare to save individual souls and so focused more on the delivery of services rather than the containment of disease.

Tropical medicine encompasses the international health measures between imperial nations and their far flung colonies. The scientific advancements coming from universities of Western countries were used largely as tools to protect colonists from tropical diseases and to control and “civilize” native populations. At the same time,
countries began to see the need for cooperation between nations for effective health policies.

**International Health**

In addition to medicine, the 19th century saw great economic and technological expansion. Trade routes crisscrossed the globe with goods, people and diseases crossing borders. Between 1816 and 1899 six global cholera pandemics killed thousands as the disease spread across trade routes from Asia and the Middle East to Eastern and then Western Europe. In response, physicians and diplomats from 12 European governments, including Austria, France, Great Britain, Portugal, Russia, Spain, Turkey and five states of what would become Italy, met in Paris for the first time in 1851. The International Sanitary Convention would continue to meet, and acquire new members up until the First World War. Its purpose was to create an international code for containing epidemics, using the new methods of public health, so that nation’s trade and citizens could be protected.

**Cholera:**

A disease caused by the bacterium *Vibrio cholerae* and spread through ingestion of water contaminated by feces. The bacteria cause acute diarrheal disease which can lead to dehydration and death. Treatment is largely supportive, through oral or intravenous hydration, though antibiotics can shorten the course of the disease in the most severe cases.

A much feared disease in the 19th century, cholera continues to affect populations especially in times of conflict or disaster. In 2010, cholera appeared in Haiti following the earthquake after being absent from Haiti for a century.
Though no policy was ever agreed upon, the International Sanitary Conventions were the first time nations came together to create an international health policy.\textsuperscript{89}

Subsequent approaches to international cooperation were more successful. For example, in 1902 the Pan-American Sanitary Bureau formed in cooperation between the US and their trade partners in Central and South America. The 1924 Pan-American Sanitary Code addressed health issues concerning immigration and recurrent yellow fever outbreaks.\textsuperscript{10} In 1907, the Office International d’Hygiene Publique formed in Paris and began to collect epidemiologic information throughout the world, harnessing technologies such as the telegraph to track epidemics as they happened.\textsuperscript{11} The measures of these international bureaucracies were focused on the protection of trade and the control of infectious diseases through cooperation between nations.

In addition, an important international health organization at this time was the Rockefeller Foundation International Board of Health, founded in 1913. The Rockefeller Foundation was the single largest funder of global health in the first half of the 20\textsuperscript{th} century.\textsuperscript{12} It operated both within the United States and in countries throughout the world to expand healthcare capabilities. One of its major efforts was the construction of public health schools in North America and Europe to train personnel to send to Latin America and the Caribbean to treat “tropical diseases”.\textsuperscript{13} While the international conventions struggled to develop codes for the control of infectious disease, private organizations worked to expand the healthcare capabilities within countries.

\textit{Age of Development}

Following the First World War, the League of Nations formed a Health Committee that aimed to work with international organizations such as the Pan-American
Sanitary Bureau, the Red Cross and the Rockefeller Foundation to coordinate international health work and expand beyond infectious diseases. However, all international health efforts were disrupted during the Second World War, and what emerged after the horrors of the Holocaust and atrocities committed during combat was a reimaging of international health work.  

In 1946, the recently formed United Nations (UN) met and approved a Constitution for what would become the World Health Organization (WHO). Initially signed by 61 countries, the WHO took over the function of the international health bureaucracies of the early 20th century and became the central force in global health. The WHO Constitution redefined health as, “a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity”; A definition that recognized social factors of health, such as income, nutrition, and access to healthcare as important components of international efforts in health.

Politically, the WHO was operating in the midst of the Cold War. Development of poor nations was part of the agenda for both the US and the USSR in decades following WWII, and both countries contributed to the efforts of the WHO as well as supplying direct aid to poor nations. The collapse of the colonial system following World War II had left many newly formed nations impoverished and with inadequate healthcare infrastructures. The World Health Organization had a broad mandate which included setting international health standards, data collection, epidemiologic surveillance, research, training and emergency relief. More countries joined and membership swelled to over 190 countries. The WHO began its work and had some major successes in expanding the availability of vaccinations, reducing the rates of
childhood mortality and eradicating small pox by 1980.¹⁹ This was a period of global health marked by centralization within the WHO and the practice of direct aid from wealthy nations to poor nations. While the WHO sought to expand their world to include a broader conception of health, including healthcare delivery, many of their interventions remained focused on the control of infectious diseases.

*Rise of the NGO*

The end of the Cold War marked a change within international aid and global health. In the 1980s, international economic organizations, such as the World Bank and the International Monetary Fund (IMF) created new policies to try and address the struggling economies of the world’s poorest nation. Leading nations such as the US and the United Kingdom (UK) were concerned that the direct aid given to developing countries was contributing to corrupt governments and preventing economic development. The World Bank and IMF created structural adjustment programs (SAPs) that were designed to incentivize debt repayment. As a result, many developing nations reorganized their administrations to focus on economic concerns, often to the detriment of health services.²⁰ This was a period of economic expansion throughout the world and a growing interdependence between countries.

In the realm of global health many felt that despite the successes of the 1970s and 1980s the WHO focused too much on the control of infectious diseases and not enough on the delivery of healthcare. While some disease-focused programs were a success, many, such as those for malaria, had failed.²¹ In the 1970s, non-governmental organizations (NGOs) such as Doctors without Borders (1971) began to form to address the lack of healthcare delivery and infrastructure contributing to the burden of disease in
poor nations.\textsuperscript{22} The World Health Assembly, in 1978 at Alma-Ata, Kazakhstan, marked a turning point in the strategy of the WHO. The Declaration of Alma-Ata stated the goal was “health for all” and determined that primary healthcare was the way to get there.\textsuperscript{23} During the 1970s and 1980s many more NGOs formed to address specific regions, specific diseases or other determinants of health such as clean water or food scarcity. At the same time, the WHO turned their attention to expanding primary care services in addition to their traditional responsibilities the surveillance and prevention of infectious diseases.

\textit{Turn of the New Century}

In the 1990s a new epidemic arose that would change global health once more. HIV/AIDS became a force that galvanized international cooperation between government and non-government organizations. Wealthy nations formed new agencies, such as the President’s Emergency Fund for AIDS Relief (PEPFAR, 2002) to address research and treatment of HIV/AIDS in developing nations and expanded their funding in global health.\textsuperscript{24} In 2000, the countries of the G8 (Canada, France, Germany, Italy, Japan, Russia, UK, US and European Union) included HIV/AIDS as a national security issue; recognizing the importance of health issues within international relations.\textsuperscript{25} Infectious disease had once again brought nations together to tackle international health. Private philanthropies, such as the Bill and Melinda Gates Foundation, as well as a burgeoning number of NGOs all contributed to the expanding field of global health. Funding for global health went from US$ 2.5 billion in 1990 to US$14 billion in 2005.\textsuperscript{26} However, many saw this as a way to use infectious disease to expand healthcare infrastructure. For
example, organizations, such as Partners in Health, leveraged issues of expanding access
to anti-retroviral drugs to include other essential medicines, such as antibiotics.\textsuperscript{27}

In 2000, the World Health Organization released eight Millennium Development
Goals to set the agenda for global health in the 21\textsuperscript{st} century. The goals were:

1. Eradicate extreme poverty and hunger
2. Provide universal primary education
3. Improve gender equity and empowerment of women
4. Reduce childhood mortality
5. Improve maternal health
6. Combat HIV/AIDS, malaria and other disease
7. Promote environmental sustainability
8. Develop Global partnerships for development\textsuperscript{28}

While, infectious diseases are certainly a part of numbers 4 and 6, the agenda for global
health reflects a commitment to improving healthcare throughout the world. Throughout
the history of global health tensions existed between providing health at the population
level and at the individual level. These two concerns continue to be part of the global
health strategy.
Global Health and Theories of Distributive Justice

The relationship between current inequities in global health and the history of international health policy brings up questions about what wealthy nations must do to rectify the inequitable distribution of disease throughout the world.

Distributive Justice: This is a moral theory that gives direction on how to distribute benefits, risks and costs within a population. Aristotle, an ancient Greek philosopher, posited that justice was to treat equals, equally and to treat unequals, unequally. When it comes to healthcare, the fact that some disease and suffering is a result of systematic disparities means that there is an inequitable, or unjust, distribution of disease burden; the poor and otherwise disadvantaged individuals carry a disproportionately high burden. Furthermore, healthcare to relieve the burden of disease is not available to all, due social and environmental factors such as poverty, contributing to the health inequities.

Theories of distributive justice within global health attempt to provide a method for (a) determining what is unjust in the distribution of health and healthcare and (b) determining who has the duty to address such injustices. Below are some examples of

### Inequalities vs. Inequities

**Health Inequalities** – “the uneven distribution of health in or between populations.” This can include differences like older adults tend to require more medications than younger adults, or the health needs of women are different than men, due to pregnancy.

**Health Inequities** – “the presence of systematic disparities in health between more and less advantaged social groups.” For example, populations in poor countries tend to have higher rates of childhood mortality than populations in wealthy countries.
the different theories of distributive justice that show a wide range in the scope of responsibility. In each example, we consider what the theory would mean for the obligation of wealthy nations to give international aid to poor nations:

**Nationalism** – (a) The just distribution of health and healthcare is a matter for nations and not a global concern. Standards for justice are set by each nation. (b) Each nation has a duty to ensure fair distribution of health and healthcare for their resources. Nations are obligated to ensure fair distribution of health and healthcare for their own citizens, such as national health programs or care for the poor, such as Medicaid. However those obligations do not extend to non-citizens and so there is no obligation for international aid.

**Social Contract** – (a) Nations determine global standards of justice by consensus through international treaties or declarations. (b) Nations have the duty only to uphold the obligations they agreed to by international contracts. Nations only have an obligation to provide international aid if they enter into a contract with other nations that stipulates the giving of international aid.

**Cosmopolitanism** – (a) Standards of justice are universal and apply across national boundaries to all persons. (b) All nations and even individuals within nations have the duty to ensure just distribution of health and healthcare throughout the world. International aid is obligatory in the sense that it aims to correct the unjust distribution of health and healthcare.

**Moral Response of Nations**

Having heard a brief history of global health you may notice that it is characterized by interactions between nations, both rich and poor. In recent history,
much of the work of global health has been funded by wealthy nations such as the US, in order to alleviate the burden of disease in poor nations. Let us consider some moral arguments about the relationships between wealthy and poor nations:


This article introduces moral arguments for and against the moral obligation for wealthy nations to give international aid. As you read:

Consider the arguments for and against a moral obligation for foreign aid. Which arguments do you find most persuasive or unpersuasive? Why?

Justice is one of the arguments for international aid in the article. In this account wealthy nations act in a way that produces poverty which causes the disparities in health. Do you think nations should be held responsible for correcting economic imbalance, (e.g. by giving aid to poor nations)? Or should each nation try to act in their best interest?

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3 Ibid.
5 Greene et al., “Colonial Medicine and Its Legacies.”
6 Ibid.


Greene et al., “Colonial Medicine and Its Legacies.”


Markel, “Worldly Approaches to Global Health: 1851 to the Present.”


Birn, “The Stages of International (global) Health: Histories of Success or Successes of History?”

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McCoy, Chand, and Sridhar, “Global Health Funding: How Much, Where It Comes from and Where It Goes.”


Reidpath and Allotey, “Measuring Global Health Inequity.”

Velji and Bryant, “Global Health Ethics.”

Reidpath and Allotey, “Measuring Global Health Inequity.”

TOPIC FOUR: HEALTH SYSTEMS AND TUBERCULOSIS
Learning Objectives:

1. Describe the main components of health systems
2. Identify risk factors for developing drug resistance
3. Evaluate designs of health systems in the setting of poverty

Introduction

Tuberculosis is a disease that has affected humans since prehistoric times. Evidence of tuberculosis infections have been found in the remains of humans who lived 6,000 years ago. Cases have been described by physicians such as Hippocrates in Ancient Greece and Galen of the Roman Empire.\(^1\) However, during the nineteenth century new developments increased both the incidence of tuberculosis and our understanding of it.

The organism, *mycobacterium tuberculosis*, causes the infection and spreads through the air via droplets. As industrialization spread throughout Europe and the United States people began to move to city centers, living close together and in poor conditions, the ideal environment for the bacteria to spread. At the same time, scientific advancement led to the identification of the causative bacteria by physician Robert Koch, and the means to contain it through the new field of public health.\(^2\) Then, in the 1950s, two new antibiotics, Streptomycin and Rifampin, came into use as a means of curing tuberculosis infections, and many thought that it was only a matter of time before the disease could be eradicated.\(^3\) Unfortunately, that was not the case and tuberculosis continues to affect millions of people throughout the world.
The illness caused by the tuberculosis bacterium can be complicated and highly variable. At every stage tuberculosis is reacting to conditions inside the body and the larger environment.

**Etiology:** *Mycobacterium tuberculosis* come from the family of mycobacteria, rod shape organisms which grow in oxygen rich environments and cause a number of diseases in humans, including tuberculosis and leprosy.

**Transmission:** The bacteria spread when a person with active pulmonary tuberculosis expels small amounts of the bacteria into the air while coughing, talking, sneezing or singing. Due to the exceptionally small size of the bacteria (0.4x3 micrometers) it can remain in the air for minutes to hours. An individual is exposed by inhaling the droplets into their lungs. It is important to note that not all persons exposed to the bacteria will go on to develop an infection.

**Infection** (Latent tuberculosis): Infection occurs when the bacteria invade the lung tissue. The bacteria replicate and form a *granuloma*, walling itself off from the host’s immune system. At this point, the infected person is without symptoms and cannot spread the bacteria. The individual’s immune system keeps the bacteria segregated, in its latent form.

**Disease:** Should the host’s immune system falter, the bacteria that have been living inside the granulomas can begin to spread and cause symptoms. Transition to active disease is influence by a number of factors, including: age (children under 5 years old and elderly adults), immune suppression (due to HIV, cancer, chemotherapy, etc.), and malnutrition. However, the transition to active disease only happens in a fraction of
patients. A young person with a new infection has only a 10% lifetime risk of developing active disease.

Tuberculosis can have many different manifestations:

- **Pulmonary**: This is the most common form of tuberculosis and accounts for 80% of cases in HIV-negative patients. Possible symptoms include: persistent coughing (>2 weeks), cough productive of phlegm and/or blood, shortness of breath, chest pain, fevers, night sweats and weight loss.

- **Lymphatic**: The traditional term for this type of tuberculosis is “scrofula”. The bacteria invade and spread through the individual’s lymph nodes causing them to enlarge. The enlarged lymph nodes appear as rubber, painless masses below the skin. It is a form more common in women and children.

- **Extra-pulmonary**: Tuberculosis can affect any organ system in the body including the brain, bones and kidneys.

**Diagnosis**: Due to the wide variety of presentations in tuberculosis, diagnosis of infection and disease can be complicated.

- **Clinical**: Healthcare providers identify individuals with symptoms (persistent cough, fevers, night sweats, weight loss) and/or radiographic signs (typical findings on chest x-ray); this combined with response to treatment constitutes a clinical diagnosis.

- **TB Skin Test**: this test identifies individuals who have been exposed and developed an immune response to tuberculosis. A small amount of tuberculin protein is injected into the skin and in 48-72 hours a raised bump will identify those with an immune response.
- This test does not differentiate between those who have infection, disease or previously treated tuberculosis

- **Sputum Sample**: this is the current standard for identifying tuberculosis disease. The *sputum* coughed up by a symptomatic individual is stained and examined under a microscope for evidence of mycobacterium tuberculosis

- Can only be utilized in individuals with productive cough

- High level of false negatives – individuals with active TB that have negative sputum samples (diagnosed by symptoms, x-rays and response to treatment)

- **Nucleic Acid Amplification**: a newer technology that also uses sputum samples to look for tuberculosis by identifying components of the bacteria

- Technology is more expensive than sputum samples but can detect lower levels of bacteria in a given sample

**Treatment**: The current standard of treatment was developed by the Centers for Disease Control and adopted for general use by the WHO in the 1990s and is termed Directly Observed Treatment, Short-course (DOTS). It involves a system within a country to identify symptomatic patients and confirm diagnosis through sputum samples and/or clinical diagnosis. The patients are enrolled in a program to supply 6 months of daily treatment with 2-3 drugs (primarily the antibiotics Isoniazid and Rifampin). Healthcare workers observe patients taking their medications each day and monitor symptoms and side-effects.

**Resistance**: One feature of tuberculosis that makes it difficult to treat is the bacteria’s ability to develop resistance to antibiotics. As the individual is treated with antibiotics,
the bacteria continue to replicate, and some strains may adapt mechanisms to counteract the antibiotics. Risk factors for developing resistance include the use of a single drug, inadequate length of therapy and interrupted therapy. Strains resistant to the standard therapy (isoniazid and rifampin) are termed Multi-Drug Resistant Tuberculosis (MDRTB) and stains resistant to standard and second line therapy are termed Extremely Drug Resistant Tuberculosis (XDRTB).

**Tuberculosis Today**

As effective treatments for tuberculosis came about, rates of infection and disease fell drastically over the 20th century, but the hoped for eradication of the disease did not materialize. In 2013, the WHO estimated that 11 million people were living with tuberculosis in the world and 1.1 million had died from tuberculosis. Though the mortality rate has decreased 45% from 1990 to 2013, tuberculosis continues to be the second leading infectious disease cause of death and disability, preceded only by HIV.5

Of the estimated 9 million new cases of tuberculosis diagnosed in 2013, 25% were in the WHO’s African Region and 56% in the South East Asia and Western Pacific Regions.6 The distribution of tuberculosis and mortality from tuberculosis is closely related to poverty with 95% of tuberculosis disease and 98% of deaths from tuberculosis occurring in developing countries.7 The conditions of poverty (overcrowding, malnutrition and limited access to healthcare) make it much more likely for both the transmission of tuberculosis and the development of active disease. Though tuberculosis rate are higher in low-income countries (LICs), high-income countries (HICs) continue to have outbreaks of tuberculosis in areas of poverty. Furthermore, the surveillance and
treatment of tuberculosis requires dedicated healthcare workers, laboratory facilities and consistent supply of drugs that can be difficult to maintain in a resource poor setting.

Despite these barriers, great strides have been made to address tuberculosis in the developing world. National Tuberculosis Programs (NTPs) are found in most countries, which allows for surveillance of latent tuberculosis and treatment with DOTS. As a result the overall incidence of tuberculosis fell by an average of 1.5% per year between 2000 and 2013, reflecting a decrease in transmission. The overall prevalence of TB fell 41% between 1990 and 2013, marking a significant improvement in treatment. Much of the improvements are due to expanded health services that utilize community health workers, nurses and doctors to provide the daily care needed for tuberculosis treatment.

Healthcare Systems

Health care systems are the method by which healthcare is financed, organized and delivered to a population. Across the world there are many variations of health systems as each is particular to the culture and history of the population they serve. However, there are some common features to health systems and many of the variations can be attributed to a ratio of public to private control in the areas of finance, organization and delivery.

Organization: Health systems can be divided into three broad categories of care. Variation between systems is due to varying amounts of facilities, funding and geographic placement of each category of care.

Public Health: This includes the healthcare provided by the government or government agencies to address population health. Public health includes infection disease control, water safety, and reporting of births, deaths, injuries,
and accidents. In some countries a robust public health can include departments for food and drug safety, workplace safety, vaccination programs and other measures to ensure population health.¹

Primary Care: Primary care refers to the routine care of an individual including vaccinations for children, care before and during childbirth and care for chronic illnesses. Delivery tends to be within communities by anyone from physicians to nurses to lay-persons with training in healthcare. In the developing world tradition healers can be an important part of primary care.

Secondary/Tertiary Care: Care that is beyond the purview of primary care falls into this category, including surgery and other services that require hospitalization. Delivery tends to be by physicians and other medical personnel with specialized training. Care tends to take place in a more formal setting of clinics and/or hospitals.

While public health facilities are owned and operated by governments, primary and secondary care facilities can be either privately or publicly owned. The matter of ownership is important because it can factor into the location of primary and secondary care centers. For example, a public hospital may be built to serve the health needs of a specific community, while privately owned hospitals are located based on demand for services.

Delivery: A primary goal of healthcare systems is to deliver care to individuals, often in a combination of materials, personnel and facilities.

Materials: Medicines, machines, protective equipment and other medical resources make up the materials needed to deliver care.
**Personnel:** This includes lay-persons trained as community health workers, physicians, nurses, physical therapists, all the way up to public health and government administrators. In general, the term “personnel” includes those with special training necessary to delivery healthcare.

**Facilities:** Healthcare facilities include structures such as offices, clinics, nursing homes and hospitals where people receive care. In addition, places such as diagnostic laboratories, blood banks and schools for health professionals are also important components to healthcare delivery in many countries.

**Financing:** How healthcare services are paid for is an important part of every health system. Methods of payment can affect both the organization of the system and how individuals access care. Most health care systems incorporate a number of different methods of financing in order to pay for health services.

*Taxation/Revenue:* This is the method of collecting payment for components of the health system that is under public control.

*External Resources:* A method of financing in low-income countries, this refers to external aid for the provision of health services.

*Health Insurance:* This is a method for pooling health risks by paying into an organization that then reimburses providers and facilities for health services.

  **Social Insurance** – in this model the market for insurance is regulated by the government which requires all (or most) to purchase insurance and also uses public funds to subsidize the poor.

  **Private Insurance** – in this model, insurance is offered in the marketplace and generally purchased by individuals or employers on behalf of their
workers. There is not requirement for individuals to purchase in this model.

Direct Payment: This refers to payment from individuals directly to providers and facilities for health services, also known as “out-of-pocket” payments

Cost-effectiveness and the Controversy of MDRTB

One of the new challenges in the fight to control tuberculosis is the development of Multi-Drug Resistant Tuberculosis (MDRTB). Resistant strains can develop within previously treated individuals or be spread as new cases of tuberculosis. The number of cases of MDRTB has tripled between 2009 and 2013 and in 2013; an estimated 3.5% of new cases and 20.5% of previously treated cases were MDRTB strains. Ultimately drug resistance can happen spontaneously, but is much more likely to develop if an individual has incomplete or inadequate initial therapy. There are many factors which can contribute to the development of MDRTB, including:

- **Barriers in Therapy:** A complete treatment for a new case of tuberculosis takes 6 months of taking antibiotics every day. Patients as part of observed therapy may be required to travel to a clinic daily or have a worker come to their house. The drugs can cause unpleasant side effects, such as nausea. Furthermore, there can be a social stigma to living with tuberculosis that can prevent people from completing treatment.

- **Drug Supply:** For many patients in developing countries, therapy comes as part of a National Tuberculosis Program (NTP) which provides drugs at low or no cost. However, as a result of depending on government budgets and/or international aid,
disruptions such as civil conflict or decreased funds can limit the purchase of appropriate drugs.

- **Drug Quality:** Even if drug supply is secure, antibiotics may be of low quality. This is especially a concern in countries such as India where much of the treatment of tuberculosis happens in the private sector with patients purchasing drugs directly from pharmacies.\(^\text{13}\)

In order to diagnose MDRTB, symptomatic individuals who have failed treatment or new cases must have their sputum samples cultured and tested against the available antibiotics to confirm resistance and reveal possible drug choices. Once an individual contracts or develops MDRTB, they can no longer be cured by the standard treatment. Instead they must be treated with second-line antibiotics, which usually have more side effects, for a longer period of time (18-24 months).\(^\text{14}\) In addition, the cost of treating one person with MDRTB is currently US$ 4,000,\(^\text{15}\) ten times the cost of treating drug-sensitive tuberculosis.\(^\text{16}\) Due to the difficulties in diagnosing and treating MDRTB, it is estimated that less than 20% of cases receive the appropriate treatment.\(^\text{17}\)

In response to MDRTB, many countries are adopting additional programs to address the identification and treatment of these cases. Furthermore, the WHO and other international aid organizations are trying to lower the cost of treatment for MDRTB through the lowering of existing drug prices, the development of new second line drugs and trials of shorter courses of treatment for MDRTB.\(^\text{18}\) However, many countries still face difficult decisions in how to allocate resources for tuberculosis treatment.
Questions to Consider:

The delivery of tuberculosis treatment requires taking daily medications observed by a health worker each day. This demonstrates how vital adequate health systems are in providing effective health care. However, the structure of health systems varies widely between countries with some systems being under the control of the government, while others allow for mostly private healthcare.

Recently, the WHO has focused on a new issue, providing universal healthcare in all countries. Part of this work is determining the basic level of healthcare for individuals, without undue financial hardship. Consider the structure of health systems outlined above:

What should be the levels of care included in basic healthcare? Public health? Plus primary care? Plus secondary/tertiary care? What would be some services not included? Consider health care for an impoverished individual that is unable to pay? What type of healthcare should they receive? Who should pay for it?

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2 Ibid.
5 Global Tuberculosis Report 2014
6 Global Tuberculosis Report 2014
7 Gandy and Zumla, “The Resurgence of Disease: Social and Historical Perspectives on the ‘New’ Tuberculosis.”
8 Global TB Report 2014

11 Global TB Report 2014; TB factsheet


14 Shin et al., “Community-Based Treatment of Multidrug-Resistant Tuberculosis in Lima, Peru: 7 Years of Experience.”


16 Global TB 2010


18 WHO Factsheet

TOPIC FIVE: HIV/AIDS AND RESEARCH IN DEVELOPING COUNTRIES
Learning Objectives:

1. Describe the components of a clinical research trial
2. Evaluate the special considerations for research in a developing country
3. Analyze the extra responsibilities research may or may not have when conducting trials in a resource-poor setting

HIV/AIDS: Origins and History

Human Immunodeficiency Virus (HIV) is a retrovirus, meaning once it enters the body the virus attacks infection fighting cells of the immune system and incorporates itself, allowing it to exist and replicate silently for years before causing symptoms. The history of the HIV tells a similar story. Scientists trace the first HIV strains back to the beginning of the 20th century in West-Central Africa. It is thought that the Simian Immunodeficiency Virus (SIV), a virus that affected non-human primates, mutated and crossed species through a process called zoonosis. HIV is thought to have existed in humans since the early 20th century and was contained for decades within small, high-risk groups in West-Central Africa until the 1960s when increased international travel brought HIV to countries around the world.

It was not until the 1980s, that the symptoms of HIV came to international attention. In the body, HIV continues to replicate and slowly depletes the supply of helper T-cells, a type of immune cell that works to coordinate the body’s defense against bacteria, fungus and other viruses. In 1981, physicians noted a rare form of pneumonia, formerly found in only in immunosuppressed cancer patients, among a group of young, gay men in Los Angeles. The first case described in Africa, in 1982, was of a patient...
with what was known as “slim disease.”² By 1983, scientists had determined HIV to be
the causative agent of Acquired Immunodeficiency Syndrome (AIDS), the collection of
opportunistic infections and syndromes that result from the virus’s destruction of helper
T-cells.³ By the early 1990s, HIV had spread causing epidemics in countries throughout
the world. Mortality rates were rising, and initially, there were no proven treatments for
the disease.

**HIV/AIDS⁴**

**Etiology:** There are two strains of the virus - HIV-1, found throughout the world, and
HIV-2, found mainly in West Africa. HIV is a retrovirus which infects helper T-cells
(CD4 cells). T-cells are part of the body’s immune system whose main job is to regulate
and signal other immune cells to respond to infections such as bacteria, viruses, parasites
and funguses.

**Natural History:** HIV has three phases. If untreated, individuals usual progress to severe
disease and death in 10-15 years.

*Acute Phase:* Usually begins 2-4 weeks after infection. Individuals will
experience fever, sore throat and mono-like symptoms that will resolve in 1-2
weeks. Antibodies to the virus begin to appear during this time.

*Latent Phase:* Virus continues to replicate and spread among CD4 cells causing a
slow decline. Individuals are asymptomatic during this time.

*Acquired Immunodeficiency Syndrome (AIDS):* This is the final stage of the virus
as CD4 cells fall below 200 cells/mm³ (normal >500cells/mm³). The individual is
susceptible to opportunistic infections such as pneumocystis pneumonia (PCP).
disseminated fungal infections and Kaposi’s sarcoma which cause disability and eventual death.

**Transmission:** In most cases, HIV has a low rate of transmission; rates vary from 0.5 to 67 per 10,000 exposures depending on the route. HIV is infectious at all stages and risk of transmission increases with higher levels of the virus in the system.

*Sex:* HIV is transmitted when virus-containing fluid (semen, vaginal secretions, anal secretions, saliva) comes in contact with the mucosal surface of the vagina, penis, anus or throat. Vaginal intercourse is the source of 70% of HIV infections worldwide.

*Blood:* Injection of HIV containing blood is another route of transmission. Before reliable testing, blood transfusions caused many cases of HIV. Today, needle sharing among intravenous drug users (IDU) is a significant cause of new infections and accounted for 80% of HIV infections in Eastern Europe and Central Asia (UNAIDS 2006). Accidental needle-sticks have low rates of transmission (32 per 10,000 exposures).

*Birth:* Babies born to untreated HIV-infected mothers have a 1 in 3 chance of infection. Transmission can occur during pregnancy, during labor and delivery and through breastfeeding. Perinatal transmission accounts for 5-10% of HIV infections worldwide.

**Diagnosis:** Initial diagnosis can be done through testing for HIV antibodies or clinically, based on the presence of disease-defining opportunistic infections. In high-income countries (HIC) individuals are monitored with blood tests for CD4 counts and viral load (number of copies of HIV). In developing countries progression is followed through
WHO Stages based on symptoms, functional status and presence of opportunistic infections.

Prevention and Treatment: Individuals are treated with antiretroviral therapy (ART), a combination of 3 or more drugs which that suppresses the virus and prevents loss of CD4 cells. Counseling and education about protected sex as well as needle-sharing are examples of some public health measures to prevent spread of HIV.

**HAART and the Developing World**

By the end of 1998, 33.4 million people were infected with HIV. Although HIV/AIDS affected people all over the world, the pandemic in Sub-Saharan Africa had reached plague proportions. Of the 5.8 million new cases of HIV in 1998, 4 million were in the 34 countries of Sub-Saharan Africa, a region that accounted for 91% of AIDS deaths in the late 1990s. Countries like Zimbabwe saw their national life expectancy go from 61 years in 1993 to 49 years by 2000.\(^5\) Initially, public health workers focused on counseling, prevention and treatment of opportunistic diseases, as there were no treatments available to address the virus.

Researchers were working furiously to find treatments for HIV and in 1987 the US Food and Drug Administration (FDA) approved zidovudine (AZT) as the first drug approved from the treatment of HIV. In 1995, Saquinavir and then nevirapine (1996) were approved and became part of Highly Active Antiretroviral Therapy (HAART), a treatment that could suppress HIV and reduce mortality from AIDS.\(^6\) Other research trials looked at methods of preventing maternal-infant transmission (MIT), and in 1994 the AIDS Clinical Trial Group study 076 found a regimen for pregnant women that reduced MIT from 25% to 8%. The research trial included oral AZT during the 2nd and
3rd trimesters to prevent in utero transmission, IV AZT during labor and had infants bottle-fed and given oral AZT drops for the first 6 weeks of life. The dramatic decrease in MIT, led developed countries to adopt the 076 protocol almost immediately as the new standard of care.\(^7\)

However, the cost of these new treatments for HIV made it difficult for low- and middle-income countries (LMICs) to adopt treatment in the same way countries like the US had. Initial pricing of HAART drugs meant cost per person, per year was between US$10,000 and $15,000. The 076 protocol cost between $800 and $1000 per birth.\(^8\)

These amounts were many times more than the total amount most developing countries had for total health expenditures per person.

So, in 1994 the World Health Organization (WHO) convened over 50 experts to consider the implications of the 076 Protocol for the developing world. The consensus was that shorter, simpler and less costly regimens were needed to reduce mother-infant transmission of HIV in limited resource settings. The WHO organized 16 clinical trials in 11 developing countries of Africa and Southeast Asia to look for alternative methods to reduce MIT. Half of the trials looked into shorter courses of AZT while others examined the use of Vitamin A or cleansers during delivery as alternative methods to reduce MIT. Nine of the 16 trials were sponsored by the National Institutes of Health (NIH) and Centers for Disease Control (CDC).\(^9\) Placebos were used in all of the trials except one, in Thailand, that used a 076-type regimen in the control group.\(^10\)

In 1997, an article was published in the New England Journal of Medicine arguing that the placebo-controlled trials were unethical. Critics argued that women in the placebo groups should be receiving the standard treatment to prevent MIT that was
developed in the 076 trials, as they would have if the research trials had taken place in the US. The debate that resulted covered many of the issues of conducting research among poor populations in resource-limited settings.

**Components of a Clinical Trial**

**Research Question:** Clinical trials are designed to address a specific question or hypothesis. Clinical trials can address questions in medicine, surgery, public health, psychology and other fields within healthcare.

**Researchers:** These are the people that develop, organize and implement a research project. The principal investigator in clinical trials is usually a PhD or medical doctor. Assistants may be medical professionals (physicians, nurses), technicians or lay-person volunteers.

**Subjects/Participants:** These are the people who participate in research by being part of either the control group(s) or intervention arm(s). Subjects are chosen based on criteria that can include, age, gender, socioeconomic status and medical conditions along with various other factors researchers might include in their study design. Subjects are then assigned to one of the groups included in the study.

**Intervention Group(s):** Subjects receive the intervention(s) being studied in the research question. There can be more than one type of intervention per study and can include new medicines, new regimens of existing medicines, different surgical techniques, behavior changes, etc.

**Control Group(s):** Subjects receive a therapy comparable to the intervention being studied.
**Placebo-control**: Placebos are physiologically inactive versions of interventions. For example, testing a new migraine medication, subjects in the control group will receive an identical “sugar-pill” instead of the medication. Placebos allow researchers to compare the physiological effect of an intervention by keeping other aspects equal.

**Active-control**: In active control trials, subjects receive an active therapy comparable to the intervention to treat the medical condition under investigation.

**Historical-control**: Some studies include only intervention arms and use data collected from prior research or existing medical records in order to compare outcomes.

**Global Health Research**

**90/10 Gap**

This phrase, “the 90/10 gap”, is commonly referred to when discussing research in global health. It refers to a major disparity in health research, that 90% of research dollars are spent on 10% of diseases, or put another way, developing countries account for approximately 90% of the global burden of disease, but only 10% clinical trials study disease in developing countries. One reason for this discrepancy is that most low- and middle-income countries (LMICs) do not have the resources to fund research. As a result, almost all of the funding for global health research comes from national agencies of high-income countries (50%), pharmaceutical companies (42%) and private trusts or other philanthropic agencies (8%). Though progress is being made to increase funding to global health research through partnerships between public and private organizations, the gap persists.
Social Value of Research

Another consideration for global health research is the type of research question being investigated in the clinical trials that do take place in developing countries. As part of an overall trend, research trials tend to focus on new technologies and biomedical advancement, where new patents or expanded use of medicines can return profits to the companies undertaking the research. However, this focus can spill over into trials in developing countries where technologies and medicines are tested that may be impracticable in the resource poor setting. An example would be to test a new formulation of a medicine in a low-income country, even though the drug won’t become available to the population it was tested on. Concerns about exploitation in research have led many to argue that research in developing nations should be limited to questions that concern the population participating in the study.

Research on the Ground

Finally, research taking place in developing nations be very different from clinical trials taking place in developed nations. Researchers face the question of how to adapt research methods to a different environment. There are several considerations that make conducting clinical trials in developing nations:

Study Design: The lack of medical care in developing countries can change the design of a clinical trial. Research in LMICs may be designed not to improve upon existing best effective treatment, but rather attempting to come up with a treatment that is better than what is available. As a result deciding whether to use a placebo control or deciding what should be the active control has a lot to do with what type of medical care the research population has access to. However, it is important to recognize that while this
type of research may find better treatments, it is not designed to address the underlying inequities that prevent the best effective treatments from being available.

**Ethical Review:** In many countries, researchers using human subjects must submit their research for review to organizations such as Institutional Review Board (IRB) in the US, or Research Ethics Boards (REBs) in other countries. This is a step which allows outside parties to evaluate the study for scientific and ethical concerns. However, many times developing countries lack similar structures to review studies to be conducted in their communities. The review could be a place where local communities and governments can set standards for research, examine the research questions and evaluate study design.

**Communication:** Obtaining the informed consent of subjects before they participate in research is a mainstay of clinical trials. Persons must be able to understand the research question, design and possible risks and benefits of being in either the intervention or control groups before they can freely consent to participate. Differences in language and culture as well as illiteracy can prevent good communication between researchers and participants. Good communication with research populations and obtaining proper consent is crucial to maintaining trust between researchers and the communities the work in.

**HIV/AIDS Today**

The HIV/AIDS pandemic was a force that galvanized efforts within global health. In response to the suffering of people in developing nations, countries like the US expanded their international aid to levels never before seen. International partnerships like the Global Fund to Fight AIDS, Tuberculosis and Malaria (2002) and UNAIDS, raised billions of dollars for the prevention, treatment and research of HIV/AIDS.
Public-private partnerships were successful in lowering the price of ART, from US$1,200 to US$100 per person per year.\textsuperscript{24} As a result, more and more people gained access to treatment and mortality rates declined.

As of 2013, 35 million people were living with HIV/AIDS,\textsuperscript{25} with sub-Saharan Africa accounting for 68\% of HIV infections.\textsuperscript{26} However, expansions in treatment and prevention have transformed HIV for many, from a death sentence to a chronic illness. The availability of antiretroviral therapy greatly increased and an estimated 8 million people received access to ART in 2011, a 20 fold increase since 2003.\textsuperscript{27} As a result the number of people living with HIV has increased, while mortality rates have decreased.\textsuperscript{28}

In addition, with expanded access to ART, the WHO 2010 recommendations include oral AZT for pregnant women from 14 weeks gestation through the end of breastfeeding along with oral nevirapine for breastfeeding infants.\textsuperscript{29} Though many women and their babies are not able to access these therapies, their inclusion in the WHO recommendations reflects a changing view of what is possible for HIV-infected people in developing nations.

\textit{After Research Ends}

Below is a link to the TED talk of Boghuma Kabisen Titanji, a clinical researcher for HIV/AIDS. She discusses the ethical considerations of doing clinical research in resource-poor settings.

\url{Boghuma Kabisen Titanji: Ethical riddles in HIV research}\textsuperscript{30}

In the video, Ms. Taitanji, tells the story of Celine, woman with HIV living in the West-Central African country of Cameroon. Celine was diagnosed with HIV 6 years ago and at that time participated in a research trial where she received antiretroviral therapy as
well as bus fare to travel to the research clinic. But, like all research trials, it came to an end. When Ms. Taitanji met Celine she had been without ART for 18 months because once the study ended she had no money for bus fare to the clinic and was too ill to walk the 35km.

In her talk, Ms. Taitanji covers many of the considerations of doing research in developing countries and also talks about what should happen when research trials end. Researchers must have plans to ensure any treatments found to be beneficial during the trial are made available to participants once the trial is over and to maintain effective treatments in the wider community.

Post-trial benefits: Why is it the responsibility of researchers to provide ongoing treatment to participants? What is it about the setting of research that confers this responsibility?

What other benefits should researchers consider for post-trial benefits? Ongoing free medications? Continued assistance for Celine to get to the clinic?

Scott, “The Debate Over AZT Clinical Trials.”
9 Emanuel, “Global Justice and the ‘Standard of Care’ Debate.”
10 Scott, “The Debate Over AZT Clinical Trials.”
17 Wertheimer, “The Obligations of Researchers Amidst Injustice or Deprivation.”
20 Hussein and Upshur, “Ethical Challenges in Global Health Research.”
21 Ibid.
24 Adams and Woelk, “Tuberculosis and HIV/AIDS.”
27 Adams and Woelk, “Tuberculosis and HIV/AIDS.”
28 Doyal, Living with HIV and Dying with AIDS: Diversity in the Global Pandemic.
29 Adams and Woelk, “Tuberculosis and HIV/AIDS.”
TOPIC SIX: GLOBAL SURGERY AND GLOBAL HEALTH METRICS
**Learning Objectives:**

1. Describe the components needed for surgical procedures
2. Assess the different methods of measuring disease burden
3. Evaluate the ethical implications of global health measures

**Principles of Surgery**

Humans have been effecting treatment and cure of disease by incision and manipulation of tissues since ancient times. Egyptian hieroglyphics recorded healers performing caesarean sections, craniotomies and laparotomies by using wine and cannabis as anesthetics.¹ For centuries, surgical procedures to close wounds and set broken bones were a part of the skills of traditional healers and physicians. Then, the 19th century ushered in several important medical advancements which allowed surgery to expand. Such discoveries as inhaled anesthetics, sterilization and antisepsis as well as antibiotics improved the outcomes of existing operations and allowed surgeons to work on new areas of the body, such as the abdomen and brain.² Surgical conditions are those for which surgery is the best option for treatment, cure or palliation. There are so many types of procedures that the field has becomes specialized with surgeons being trained in trauma, obstetrics/gynecology, pediatrics, oncology and orthopedics, just to name a few. The special components for procedures set surgery apart from other medical interventions.

**Components of Surgery**

**Operating Room:** Operating rooms have special needs including a reliable and powered light source, operating tables and the special instruments used during procedures.
**Anesthesia:** Very few operations can occur without the participation of anesthesia professionals. Their equipment includes anesthetic gas machines, ventilators, and a variety of drugs to both put people “asleep”, under anesthesia, and to “wake them up” again. Just undergoing anesthesia is a risk and in developing nations the rate of mortality can be as high as 1 in 150 from anesthetics.³

**Anti-sepsis:** Another important factor in surgical procedures is preserving sterile conditions. This requires the use of an autoclave (a machine that heat sterilizes instruments and linens). Furthermore, the patient, the medical staff and the room have to be cleaned before each procedure. Included in this consideration is the use of antibiotics, both before procedures and afterwards to fight infection.

**Post-operative Care:** In many cases, as patients recover from surgery and anesthesia they require an intensive level of care: including monitoring of their heart and lungs, wound care, pain management, supportive measures such as IV fluids and antibiotics.

**Blood banking:** With many types of surgery there is a risk of bleeding. In order to support patients through difficult procedures, blood and blood products are necessary. Blood banking needs laboratory facilities to test and process donated blood as well as storage facilities.

**Operating Abroad**

In 2008, the WHO estimated that between 187.2 and 281.2 million major surgical procedures were performed worldwide, a volume that significantly exceeded the number of child births in the same year.⁴ However, 73.6% of these procedures occurred in high-income countries (HIC), while only 3.5% of surgical procedures were performed in low-income countries (LIC).⁵ The low rates of surgery in developing nations do not
necessarily reflect lower rates of surgical conditions, but rather a significant unmet need. People living in developing nations face a number of barriers in accessing surgical care.

**Geography:** Often, in developing countries, surgical services are only available in urban centers. Due to long distances and poor travel conditions many people with surgical conditions are not seen.⁶

**Limited Personnel:** Furthermore, there is a shortage of surgical personnel in low- and middle-income countries (LMICs). In Sub-Saharan Africa there is 1 trained surgeon for every 2.5 million people, and the numbers for physician-anesthesiologists are even lower.⁷

**Poor Infrastructure:** Operating rooms and peri-operative wards depend on specialized machinery to care of patients, perform surgery and sterilize equipment. As a result, hospitals require reliable sources of electricity, water and oxygen, among other things. A study done by the WHO in 132 facilities in eight developing nations showed that facilities had, on average, 50% availability of clean water, 36% for electricity and 21% available supply of oxygen.⁸

**Limited Resources:** Surgery depends on medications and antibiotics for patient safety as well as sterile drapes, gloves and personal protective equipment for infection control. The same study revealed that while some hospitals had consistent supply of items like eye protection and sterile gloves, others had less than 5% availability.⁹

**Financial Concerns:** In many developing countries surgery is on a fee-for-service basis. Only patients who can afford to pay for drugs, supplies, and tests, as well as the surgeon’s time, can access service. On the other hand, charitable donations to cover resources and personnel can help but often come inconsistently as donors make single instead of ongoing contributions.¹⁰
Patient Barriers: Finally, cultural and educational barriers may exist in supplying surgical services. Many times patients rely on traditional healers to treat surgical conditions or do not seek care due to fear and misunderstanding of surgery.\textsuperscript{11}

**Surgery in Global Health**

Perhaps the most important impediment to improving global surgery is the lack of attention at the international level. During the second half of the 20\textsuperscript{th} century the policymakers in the field of global health focused mainly on the prevention and treatment of communicable diseases. In 1993 the World Bank commissioned the *World Development Report - Investment in Health* that would influence global health policies and funding for the next decade. The report emphasized the importance of cost-effective measures to improve health and labeled surgery as high cost and low effect. The following decade brought huge resources towards combating communicable disease such as, the Global Fund to Fight AIDS, Tuberculosis and Malaria (2001) and the President’s Emergency Plan for AIDS (PEPFAR, 2003).\textsuperscript{12} While non-governmental organizations (NGOs), such as Operation Smile and Doctors without Borders (MSF), continued their work in global surgery, the field was not included in the global health agenda.

That is until 2006, when for the first time the World Bank report setting priorities for aid to developing countries included evidence that surgical care could be as cost-effective as other interventions, like vaccinations and anti-retroviral therapy. The World Health Organization (WHO) followed with their *World Health Report* in 2008 including surgery as a part of primary care.\textsuperscript{13} This gradual inclusion of surgery into the global health agenda was part of a greater trend within global health.
**Epidemiologic Shift**

During the 21st century, global health began to respond to the shifting demographics of the world. Life expectancy in women increased from 48 years (1950-55) to 70 years (2005-2010) and 45 years to 65 years in men, mostly due to rapid increases within developing countries. The changes were, in part, due to decreased rates of infant and childhood mortality, better access to clean water and sanitation and better control of communicable diseases, such as HIV/AIDS, tuberculosis and malaria. As a result, more people are living longer and the burden of disease is changing. Now, as the population ages non-communicable disease (NCDs), such as heart disease and cancer and other conditions treated, in part, with surgery have become leading causes of death. This epidemiologic shift is reflected not only in existing statistics but also in the types of measurements policy-makers are using to set global health priorities.

Classic epidemiology came along with other population sciences in the late 18th and early 19th century. Disciplines such as epidemiology, sociology and public health studied humans in terms of populations, instead of individuals, for the first time. Demographic indicators such as birthrate, mortality, fertility and life-expectancy were used to compare countries during industrial and economic development. Measurements such as incidence, prevalence and case-fatalities allowed public health officials to track epidemics and endemic diseases. When global health was dominated by concerns about communicable diseases, these indicators were sufficient to measure areas of need and the improvements made by interventions such as antibiotics and vaccinations.

**Classic Epidemiologic Metrics**

**Life Expectancy:** Average length of life (in years) in a given population.
Birthrate – Number of children born in a given population; usually expressed as X per 1,000 people.

Mortality (Death Rate): Number of deaths in a given population; expressed as X per 1,000 people.

Incidence: Number of new disease cases over a given time period; expressed as rate (cases/time).

Prevalence: Total number of cases in a period of time; expressed in person-years

\[
\text{Prevalence} = \text{Incidence} \times \text{Duration}
\]

Now, as chronic conditions have become a larger part of the global burden of disease, policymakers have begun to use composite measures to improve our understanding of the state of global health. The classic epidemiologic metrics measured health indirectly by describing the ultimate outcomes (lower mortality, higher life-expectancy), but were unable to capture the disability caused by disease. Metrics such as disability adjusted life years (DALYs) and healthy life expectancy (HALE) recognize that living a life with a chronic condition, such as cancer, is not the same as being completely healthy.\(^{19}\) The shift towards calculating the burden of disease and not just the outcomes has helped to re-prioritize the policies within global health.

**Composite Health Indicators:**\(^{20}\)

Disability Adjusted Life Year (DALY): \(\text{DALY} = \text{YLL} + \text{YLD}\)

1 DALY = 1 year of life lost to disability or death

Years of Life Lost (YLL) – premature death from disease; age of death subtracted from standard life expectancy
Years of Life Lost to Disability (YLD) – calculated based on incidence of a disease, disability weight and average length of time lived with disease (either until cure or death)

Disability weight – determined by in-country surveys and expert opinion on disability caused by disease, 1.0=no disability and 0.0=disability akin to death

Age Weighted – the DALY includes a weight for age with the beginning and end of life having less value that young adulthood

Healthy Life Expectancy (HALE)

Life expectancy minus years lived with disability

Uses surveys to account for prevalence of disability at each age; not disease specific

Global Burden of Surgical Disease

The Disease Control Priorities in Developing Countries Report (2006) estimated that surgical disease accounted for 11% of the total DALYs in 2004, which was more than the DALYs for HIV/AIDS, tuberculosis and malaria combined. Contributing to that number were surgical needs for trauma, tumors, congenital abnormalities, pregnancy complications and cataracts. As such, surgery is an integral part of reducing childhood mortality and improving maternal health.

Take for instance the burden caused by trauma, which accounts for 38% of the total surgical burden of disease. Injuries, including road traffic accidents, kill more than 5 million people each year and cause millions more to become disabled. Of those killed, approximately one third are between the ages of 15 and 44. In addition, 5% of
mortality in children under 5 years old (approx. 345,000 children in 2011) is attributed to injuries. Overall, road traffic accidents and injuries are among the top 20 leading causes of DALYs each year. What is perhaps more disturbing is the more than 90% of deaths from injuries occur in developing countries, often from a lack of access to care, including treatment for broken bones, abdominal injuries and burns – all provided by surgeons. Injuries cause not only death but can permanently disable victims and lead to serious economic consequences. Trauma care can cost developing nations up to US$ 100 billion dollars a year and send millions of people into poverty. This is one example of how surgical disease can cause the disability and mortality reflected in DALYs.

**Future Directions**

As the significant and increasing burden of surgical disease becomes clearer, the next concern is how to address it. Until recently, global surgery often took the form of short term interventions either for a specific condition, such as Operation Smile for cleft lip or Heartlink for congenital cardiac defects, or in response to conflict/disasters. However, more long-term efforts are required to address the ongoing needs for surgery in developing countries.

**Education**

**Enhancing Local Education**: The Pan-African Academy of Christian Surgeons (PAACS) is one of the few programs training surgeons in Africa. Since 1996 they have developed eight 5-year programs in 6 countries and have a goal of training 100 new surgeons by 2020. These programs have the advantage of training surgeons in a wide variety of procedures that reflect the needs of the communities.
“Twinning”: This refers to a practice where Western healthcare institutions partner with an institution in a developing country for the exchange of education and research. While these programs can provide aid to individual hospitals, they do not address overall deficiencies.  

**Task-shifting:** This refers to the strategy of teaching surgical skills to non-physicians to meet the need for simple surgeries. It is a way to increase personnel but critics are concerned that this technique can result in poorer outcomes.

**Infrastructure:** In 2005 the WHO created the Global Initiative for Emergency and Essential Surgical Care (GIEESC) in order to characterize the epidemiology of surgical disease and assess options for improvement. As part of their work the GIEESC developed tool kits to help hospitals assess and improve their practices. Tool kits included best-practice manuals, instructional videos and research topics. The GIEESC works with regional and local surgeons and now includes over 400 surgeons in over 60 countries. These measures, along with other investment by governments and international aid organizations in overall health infrastructure, can help improve access to surgical care in developing countries.

**Ethical Considerations**

It is important to consider the value judgments behind the feedback loop of measuring health, allocating aid and measuring its effect on health. While the changing metrics of health reflect the epidemiologic shift happening in the world, they also reflect a changing set of values. Health, as defined by the WHO is, “a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity.” The
DALY reflects that belief by accounting for anything less than complete year of health. However, it does not treat all years equally.

The age weighting of DALYs reflects the belief that people in young adulthood have more value that either infants or the elderly. This is clearly linked to their earning potential. Do you think that DALY should include an age weight? Why might some argue that an age weight be necessary when calculating the cost-effectiveness of a health intervention?

Women often have a lower earning potential than men due to time away for pregnancy and child-rearing; should the genders have different weights when calculating the DALY? Why or why not?

Consider now the implications of using the DALY instead of mortality as the ultimate cost-effective measure. When measuring with DALYs it becomes clear that non-fatal conditions such as depression and back pain cause a lot of disability (DALYs) throughout the world. In fact, unipolar depression was the 3rd leading cause of DALYs in 2004, preceded only by lower respiratory infections and diarrheal diseases. While much of the DALYs in lower respiratory infections and diarrheal disease are due to premature
death, depression is generally not fatal. However, the DALY model treats years lost to premature death (YLL) as equal to years lost to disability (YLD). (DALY = YLL + YLD)

If resources are to be distributed based on disease burden as measured in DALYs, is it appropriate to favor depression over other, more lethal conditions? If not, how could you change the metric to reflect a different value?

Additional Resources:

Visit GapMinder.org to hear Hans Rosling’s talk on the *The Joy of Stats* and how statistics influence global health.

http://www.gapminder.org/videos/the-joy-of-stats/

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5 Natuzzi et al., “Surgical Issues in Global Health.”
9 Ibid.
10 Natuzzi et al., “Surgical Issues in Global Health.”
12 Natuzzi et al., “Surgical Issues in Global Health.”
13 Johnson, “Surgery as a Global Health Issue.”
17 Wahlberg and Rose, “The Governmentalization of Living: Calculating Global Health.”
Martin, “Epidemiology, Biostatistics, and Surveillance.”


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Wall, “Ethics in Global Surgery.”


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Farmer and Kim, “Surgery and Global Health: A View from beyond the OR.”

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TOPIC SEVEN: MENTAL HEALTH AND THE CULTURAL CONTEXT OF GLOBAL HEALTH
Learning Objectives:

1. Describe what defines culture at the population level and at the individual level
2. Assess the cultural components of mental illness
3. Compare the concepts of cultural competence and cultural humility in the setting of global health

Culture in Global Health

Culture is a complicated concept that has important implications in global health. Take a moment and consider your own culture. What comes to mind? Where your ancestors came from? The country you live in now? Culture is a term that can change definitions depending on the context. Below are two definitions that serve as a starting point for understanding what “culture” is. In concrete terms culture, “encompasses social history over generations, rituals, beliefs and material artifacts.”1 While this version points out the visible aspects of a culture at the population level, it does not address what culture can mean at the individual level. The Association of American Medical Colleges (AAMC) defines cultural identity as being based on, “heritage as well as circumstances and personal choice, but may be affected by race, ethnicity, age, language, country of origin, acculturation, sexual orientation, gender, socioeconomic status, religious/spiritual beliefs, physical abilities and occupation.”2 The differences between these two views reveal an interesting dichotomy in culture. At the population level, culture is a term that groups people together and it is defined by what is the same, but at the individual level, culture can be about the uniqueness of identity based on all the different groups we belong to.
The field of global health encounters culture at both the population and individual level as it seeks to expand access to health care. In order to be successful, groups like the World Health Organization (WHO) must take into account the cultural context of the disease or condition they are trying to address. To that end, here is a third concept of culture: “culture is to society what memory is to the individual” (Kuckhohn & Kroeber, 1952). Culture here is defined more by its use then its content. In this view culture is a medium of communication for how people experience and respond to the world. In this way, the rituals and artifacts of a culture can provide a common meaning and give guidance about how to interpret new experiences. This concept can be especially helpful when looking at issues within healthcare.

**Cultural Concepts of Illness**

Think for a moment the times when you have started to fall ill. Maybe you were “fighting off a cold” or just woke up not feeling like your usual self. That experience of losing health is not defined by the diagnostic test you might undergo to find out what is wrong or the treatment that makes you feel better. That experience is an individual phenomenon and how we interpret them has a lot to do with our culture. Medical anthropologists have studied beliefs about health across the globe and have identified some common categories of what people believe causes disease.

**Natural Causation:** Illness is an episodic, individualized loss of health due to an unseen, natural agent, such as genes, viruses, bacteria or stress. For example, the common cold is the result of a *rhinovirus* infection.

**Mystical Causation:** Illness is caused by an act or experience of the individual, such as fate, contagion, or mystical retribution. It is the act or experience which brings on the
illness. For example, attributing illness to astrological alignment or the violation of social taboos such as coming in contact with a menstruating woman.

**Animistic Causation:** Illness is caused by a personalized supernatural being. This encompasses beliefs such as bad spirits causing illness or the idea of “soul loss”. Another example would be seeing cancer as being “God’s will”.

**Magical Causation:** Illness is caused by a person or persons using magic. An example is the “evil eye” or one person causing illness to another by casting a jealous glance.

There are several important things to keep in mind with the above categorizations. First, while the “natural causation” view is popular in the Euro-American tradition, it is not the most popular view throughout the world. Second, beliefs about mystical, animistic or magical causes are common in industrialized nations as well as in the developing world. This is in part because, third, most people hold more than one belief about what causes ill health. This pluralism is evident in the cancer patient who takes chemotherapy, while asking friends to pray for a cure.

The pluralism evident in peoples’ understanding of what causes illness extends to interpretation of treatments and the role of healthcare providers. The cultural context of a disease can have a great impact on how individuals are diagnosed and treated. Perhaps, nowhere is this more evident than in the field of mental health.

**Global Mental Health**

Mental Health encompasses a number of different conditions including psychosis (schizophrenia, delusional disorders), mood disorders (depression, bipolar), anxiety disorders, dementia and substance abuse (alcohol, and other drugs). It is estimated that over 400 million people in the world live with mental illness and less than half receive...
needed care. In the WHO 2004 report on the Global Burden of Disease, mental health conditions made up 7.4% of DALYs (disability-adjusted life year), a measurement that accounts for the disability or premature death caused by a condition. In that report major depression was the number one cause of DALYs in high- and middle-income countries and the 8th leading cause of DALYs in low-income countries.

However, these aggregated numbers can be misleading as to the variability in mental health throughout the world. In 1990s the WHO developed the Composite International Diagnostic Interview (CIDI) as a means to identify mental health conditions in communities throughout the world. Questions in the CIDI are designed to pick up on symptoms of mental conditions such as anxiety, depression, suicide attempts, and substance abuse – as defined in the Diagnostic and Statistical Manual of Mental Disorders (DSM). As of 2010, 150,000 people in 28 countries were interviewed, and the results showed a high degree of variability in the prevalence and treatment of mental disorders. For example, the overall prevalence of persons living with at least one mental condition varied from < 8%, in Japan, Nigeria, and the Shanghai district of China, to greater than 25%, in the US and Sao Paulo, Brazil. This wide variability, in many ways, is related to the complicated interaction between mental illness and culture.

Stigma: One reason for the low prevalence of mental health conditions in some countries may be the fundamental invisibility caused by the stigma associated with mental disorders. Throughout the world, persons suffering from psychosis, intellectual impairment, and other mental conditions are marginalized and prevented from fully participating in society. This may be more pronounced in low- and middle-income countries where the lack of effect treatment and support can lead to imprisonment and
dehumanization of the mentally ill.\(^{10}\) Stigma can also affect the policy-making decisions at the level of governments and international aid. People tend to separate mental health from other areas of medicine, which can lead to the exclusion of mental health in global health priorities.\(^{11}\)

**Social Determinants:** The complex relationship of mental health and environment can lead to an over-emphasis on addressing the social determinants of mental illness, rather than addressing the disease itself.\(^{12}\) Take for example the incidence of post-traumatic stress disorder (PTSD) in areas of conflicts. While efforts to address the outcomes of conflict can include resettlement, medical care and direct aid, they do not always include consideration for resulting mental illness. Many individuals with chronic diseases, such as tuberculosis and HIV also suffer from mental illness, but efforts to relieve their suffering do not always count or consider the additional burden of mental illness.

**Westernization:** Another reason that surveys may result in vast discrepancies is the use of the DSM as the basis of diagnosis. The DSM is a tool developed and used mostly in the countries of Europe and North America and defines the symptoms of mental health conditions within that culture.\(^{13}\) So what happens when other cultures either have different types of conditions or different presentations? Take for example, “brain fatigue” – a syndrome that is known in several African cultures to affect students, mostly from rural backgrounds. Symptoms include “headaches, crawling sensations in the brain, [and] blurred vision” which can cause significant disability. This could be a different manifestation of depression or anxiety or, it may constitute a completely separate mental condition.\(^{14}\) The point is, that using a tool like the DSM to diagnose and measure mental
illness can fail to include cases of either culture-specific symptoms or culture-specific diseases.

**Medicalization:** On the other hand, the high prevalence of mental illness in places like the United States may be indicative of a paradox within mental health. While some countries marginalize and deny mental illness, others treat normal pain and suffering as a medical disorder. This can lead to the difficulty of trying to increase access to treatment in some countries, while at the same time trying to reduce use of pharmaceuticals in other parts of the world.

These are just some examples of how culture can affect the diagnosis and treatment of mental health. Cultural context is an important part measuring health and delivering healthcare, not just mental health, and addressing these issues will be important as efforts to address the burden of mental illness move forward.

**Cross-Culture Encounters: Two Approaches**

As discussed earlier, culture can be understood as a lens through which an individual interprets and explains their experiences. In an encounter between two different cultures it can be difficult to communicate due to fundamental differences in language, custom and beliefs. Below are two approaches towards improving the communication between individuals from different cultures.

**Cultural Competency:** An idea that has gained ground in US healthcare since the 1980s, cultural competency refers to developing the awareness and knowledge of other cultures in order to better respond to cultural differences. An example is a physician taking the time to become familiar with popular expressions of symptoms and illness in different cultures; “swimmy-headed” = dizziness, “attack of the nerves” = anxiety or depression.
- **Pros**: This approach has the benefit of being based in concrete knowledge that allows for easy incorporation into medical training.

- **Cons**: This approach tends to favor oversimplification, or stereotyping of individuals based on their background. In addition, it can emphasize cultural differences between providers and patients, which can diminish solidarity.

**Cultural Humility**: Humility, or the virtue of being humble, is about “having knowledge of one’s own deficiency” (Aquinas). Within cultural encounters it refers to providers recognizing their own cultural biases and avoiding arrogance. An example might be a physician who takes a moment to consider their own bias in treating individuals who abuse IV drugs in order to prevent themselves from stereotyping a new patient in the emergency room.

- **Pros**: As humility begins with the provider, this approach is adaptable to each cultural encounter and fosters respect and openness to cultural exchange.

- **Cons**: It is a more ambiguous concept that makes developing cultural humility in medical training more difficult. It takes time and a commitment to self-reflection.

In practice, it is usually a combination of both approaches that can be most effective. While self-awareness is important for good communication, knowledge about other cultures is an important component.

**Future Directions**

It has only been in the past few decades that mental health has become part of the discussion in global health. The WHO’s Mental Health Surveys and Global Burden of Disease Report (2008) have demonstrated the significant disability that comes with mental illness. However, when combined with neurological conditions, such as epilepsy,
neuro-psychological disorders make up 11.5% of DALYs but account for only 3.8% of healthcare expenditures.\(^{17}\)

**Research:** Addressing questions about the validity of surveys and treatments across cultures will require more research on mental health within developing countries. A 2001 analysis of international mental health journals revealed that 90% of all literature is derived from Western societies.\(^{18}\) A better understanding of cultural differences in mental illness through research in low- and middle-income countries will allow for the development of culture-specific interventions.

**Awareness:** Traditionally, development efforts have tried to focus on vulnerable populations, such as women, children and the poor. Certainly, in many countries, the mentally ill are stigmatized and marginalized and represent a very vulnerable population.\(^{19}\) Increasing awareness of the burden of mental illness will aid efforts to prioritize mental health in the global health agenda.

**Cultural Differences in Treatment**

The story of mental illness in global health illustrates how cultural context can influence how disease are recognized and experienced in different cultures. In addition to having different explanations of what causes disease, cultures across the world have different methods of treating disease and illness. When global health interventions, based in Western medicine, are brought different areas of the world health beliefs can conflict.

Consider the following case from Anji Wall’s, *Ethics for International Medicine: A Practical Guide for Aid Workers in Developing Countries* (2012):
Case 1.4: Sorcery and Tuberculosis

A twenty-three-year-old man presents to a clinic in rural Haiti with a history of weight loss, fevers, night sweats, and a cough productive of bloody sputum. He has gotten so weak that he is unable to work in his fields. The medical aid worker clinically diagnoses him with tuberculosis and collects a sputum sample to send to the lab for confirmation and resistance testing. When the man is told that he has tuberculosis, he says that he is sure that his neighbor gave it to him through a curse.

The medical aid worker explains to the man that there are medications available to treat tuberculosis, but they have to be taken every day for nine months in order to be effective. The clinic will provide him with these medications free of charge. The man agrees to take the medications but comments that what he really needs is for his neighbor to reverse the curse. The medical aid worker wonders whether it is appropriate to initiate this intense treatment regimen, given that the man does not understand the etiology of his disease or the purpose of treatment, and if so, whether he should try to change the patient’s beliefs regarding the etiology of his condition.

In this case, an individual from the Western tradition encounters a very different view on what causes illness.

Does the man have to understand the etiology of tuberculosis in order to receive treatment?

Is it appropriate for the medical aid worker to try and change the patient’s beliefs?
How would the concept of cultural competence apply in this situation? How would the concept of cultural humility apply in this situation?

4 Ibid.
5 Ibid.
7 Becker et al., “The Unique Challenges of Mental Health and MDRTB: Critical Perspectives on Metrics of Disease.”
8 The World Health Organization, “Burden of Disease: DALYs.”
12 Patel, “Why Mental Health Matters to Global Health.”
13 Becker et al., “The Unique Challenges of Mental Health and MDRTB: Critical Perspectives on Metrics of Disease.”
15 Kleinman, “Medical Anthropology and Mental Health: Five Questions for the Next Fifty Years.”
17 Becker et al., “The Unique Challenges of Mental Health and MDRTB: Critical Perspectives on Metrics of Disease.”
18 Ibid.
19 Funk et al., *Mental Health and Development: Targeting People with Mental Health Conditions as a Vulnerable Group.*
CONCLUSION

Global health is complex. This is the overall concept that I hope is conveyed by these articles. Though students’ time in global health may be brief, by donating money or participating in short-term volunteer work, it is important for them to consider their impact in the larger picture of global health and international aid. The topics are designed to introduce students to the complexities of global health and to encourage them to consider the ethics inherent in global health work. These articles are tools to increase understanding and help students become informed participants in global health.
REFERENCES


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