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Factors Contributing to the "Dominican Paradox" of Maternal Mortality

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Factors Contributing to the "Dominican Paradox" of Maternal Mortality

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Abstract

Despite having one of the highest rates of institutionalized birth in the region, Dominican maternal mortality rates are higher than the regional average. This phenomenon is referred to as the “Dominican Paradox.” The purpose of this paper is to identify factors beyond the established healthcare system that may contribute to the “Dominican Paradox.” Literature about the “Dominican Paradox” often attempts to explain the paradox in terms of the current healthcare system alone. Over reliance on the healthcare system has likely contributed to the “Dominican Paradox.” Most of prevalent causes of maternal mortality in the Dominican Republic are strongly linked to maternal obesity. Obesity is a major, and potentially the most important, behavioral risk factor that could explain the “Dominican Paradox.” For this reason it is important to explore the other domains that influence health when considering this issue. Preconception care is an intervention that could help empower Dominican women to take control of preventable risk and ensure healthy pregnancies.

Keywords: Dominican Paradox, maternal mortality, determinants of health

Factors contributing to the "Dominican Paradox" of Maternal Mortality

The Dominican Republic is unique within the Latin American and Caribbean (LAC) region because it is the only country that has not followed the typical trend in which mortality rates decrease as institutionalized births increase. Despite having one of the highest rates of institutionalized birth in the region, Dominican maternal mortality rates are higher than the regional average (see Table 1) (Pablos-Mendez, Valdivieso, & Flynn-Saldaña, 2013). This phenomenon is referred to as the “Dominican Paradox” (Mavalankar, 2003; Miller et al., 2003; Miller, Lester, & Hensleigh, 2004; Ruminjo, Cordero, Beattie, & Wegner, 2003).

Table 1.

Maternal Mortality and Institutionalized Birth in Latin American and Caribbean Countries

Countries	Maternal Mortality Rate (/100,000 live births)	Institutionalized Birth
Bolivia	190	68%
Dominican Republic	150	98%
Guatemala	120	52%
Honduras	100	67%
Nicaragua	95	74%

For many years this paradox has been mentioned in literature. There have been attempts to understand why the Dominican Republic has not followed the same pattern of improving outcomes as its neighboring countries (Mavalankar, 2003; Miller et al., 2003; Miller et al., 2004; Ruminjo et al., 2003). Most literature typically attempts to explain the paradox in terms of the current healthcare system alone. There is a lack of literature that explores the possibility of reducing the “Dominican Paradox” by preventing modifiable risk, which is a health risk that can be treated or controlled by behavior modification.

Purpose Statement

The purpose of this study was to identify factors beyond the established healthcare system that may contribute to the “Dominican Paradox.”

Review of Literature

The Dominican Republic is a Spanish-speaking country in the Caribbean Sea that shares the island of Hispaniola with the French-speaking nation of Haiti. The Dominican Republic has had one of the fastest growing economies in the (LAC) region. The World Bank (2015) considers the Dominican Republic a middle-income country. The 2014 per capita income was 6,163 USD. Despite the country’s growing economy, poverty remains high and there are still large socioeconomic gaps between high and low earning populations (The World Bank, 2015).

Causes of Maternal Mortality

In the LAC region nearly 9,000 mothers die annually, due to mostly preventable causes (Pablos-Mendez et al., 2013). Most maternal death in the LAC region occurs during childbirth or within the first hours postpartum. The leading causes of maternal mortality can be attributed to hypertension related complications, hemorrhage, sepsis, and other direct and indirect causes (Gongora & Wenger, 2015; Miller et al., 2003; Pablos-Mendez et al., 2013).

Hypertension is diagnosed by finding blood pressure that is higher than 140/90 mmHg pre-pregnancy or before 20 weeks of gestation. Pre-eclampsia is a complication that is characterized by the development of hypertension at or after 20 weeks of gestation. Pre-eclampsia may progress into eclampsia, which can lead to liver rupture, renal failure, and death. Pre-eclampsia is the most significant cause of maternal mortality and morbidity in both high and low-income countries (Conde-Agudelo & Belizán, 2000; Ghulmiyyah & Sibai, 2012; Gongora & Wenger, 2015).

Postpartum hemorrhage is also an important cause of maternal mortality worldwide, accounting for 25-30% of deaths in low and middle-income countries (Sosa, Althabe, Belizán, & Buekens, 2009). Postpartum hemorrhage is primarily caused by a lack of uterine muscle tone (uterine atony) (Weeks, 2015). This condition prevents the uterine muscles from contracting, thus causing excess blood loss after delivery (Miller et al., 2004; Sosa et al., 2009; Weeks, 2015). The World Health Organization ranked maternal sepsis as the sixth most common disease in women aged 15-44 (Hussein, Mavalankar, Sharma, & D'Ambruso, 2011). Maternal sepsis describes various obstetric and genito-urinary tract infections that can occur during childbirth (Hussein et al., 2011). It is estimated that nearly 62,000 maternal deaths result from maternal sepsis each year. Puerperal sepsis is infection that can be manifested postpartum within the first 42 days after delivery. Organisms that cause sepsis are introduced during invasive procedures including vaginal examination, instrumentation, or Cesarean surgery (Hussein et al., 2011).

The Dominican Health System

The Dominican Republic has had success offering healthcare to nearly all citizens. Although most citizens have access, it is not considered universal because not all people have access to quality health services without financial risk (La Forgia, Levine, Díaz, & Rathe, 2004; Moreno-Serra & Smith, 2012). Like many other countries in the LAC region, the Dominican health system follows a traditional segmented and vertical model of healthcare (see Figure 1) (Frenk, 2015; La Forgia et al., 2004).

		Social Groups			
		Non-Poor			Poor
Functions		Socially Insured	Privately insured	Uninsured	
Stewardship		↓	↓	↓	↓
Financing					
Delivery		↓	↓	↓	↓
		Social Security Institutions	Private Sector	Private Sector	Ministry of Health

Figure 1. Traditional vertical healthcare model.

In the traditional vertical model, healthcare is delivered differently depending on respective financing sources. Each group has separate facilities and personnel to attend to the needs of those within the specific groups. This segmented model of healthcare is referred to by Julio Frenk, the former minister of health of Mexico as a “medical apartheid” (Frenk, 2015, p. 1248). Although this system does not legally prohibit medical treatment on the basis of race, it discriminates based on socio-economic status (Frenk, 2015). Frenk (2015) noted that one could readily recognize a man’s social class by how he afforded healthcare. This segmented healthcare system is a major barrier to overcoming gaps in healthcare coverage. Some LAC countries such as Brazil and Costa Rica have integrated their healthcare systems, and as a result have been able to close the gaps in coverage and offer their citizens universal healthcare (Atun et al., 2015; Frenk, 2015). In the 1980’s the Dominican Republic tried to make similar changes to unify their public healthcare funding system like their neighbors, but due to political opposition, efforts were unsuccessful (Cotlear et al., 2015).

This system is essentially divided into three segments that receive funding from the public, social insurance, or the private sector (see Figure 1). The public system is run by the ministry of health (MISPAS), which mainly focuses on the healthcare needs of the poorest population. MISPAS has medical facilities and services that are provided “free” of charge. However, due to the system being severely underfunded, MISPAS institutions typically are not sufficiently staffed nor have enough supplies to ensure their patients receive proper care. Often families have to pay out of pocket for items that the hospitals lack for treatments (La Forgia et al., 2004; Miller et al., 2003). The public health system suffers from “leakage;” the free services intended to assist the poor populations are used by those who do not need financial assistance. This in turn leaves the system with fewer resources for the poor and marginalized populations that need them the most (La Forgia et al., 2004).

The Social Security Institute (IDSS) provides coverage to workers who have formal salaries from which they can make contributions into the fund (Frenk, 2015). Only about 5 % of the population is covered under this system. Those who are covered often purchase secondary insurance plans to be covered in the private sector as well (La Forgia et al., 2004).

The largest supplier of healthcare in the Dominican Republic is the private sector. In many low and middle-income countries, especially in the LAC region, people have been depending more on private institutions for their healthcare needs than the public systems. Private institutions absorbed about 67% of healthcare spending in the Dominican Republic in 1996, which came mostly from out of pocket expenses billed by fee for service treatments (La Forgia et al., 2004). Many Dominicans prefer to be treated in private facilities because these facilities often have modern equipment and are better staffed (Arrieta, García-Prado, & Guillén, 2011; La Forgia et al., 2004). However there is a notorious lack of transparency and overall low

quality in the private sector (Arrieta et al., 2011). Private institutions in the LAC region provide less effective healthcare services than patients realize (Arrieta et al., 2011).

Determinants of Health

Institutionalized medical care has limited impact on population health. Health is shaped more by experiences and circumstances that range across a spectrum of five (5) domains referred to as *The Determinants of Health*. Behavior accounts for 40%, genetic predisposition 30%, social circumstances 15%, healthcare 10%, and environmental exposure 5% of health outcomes (see Figure 2) (McGinnis, Williams-Russo, & Knickman, 2002).

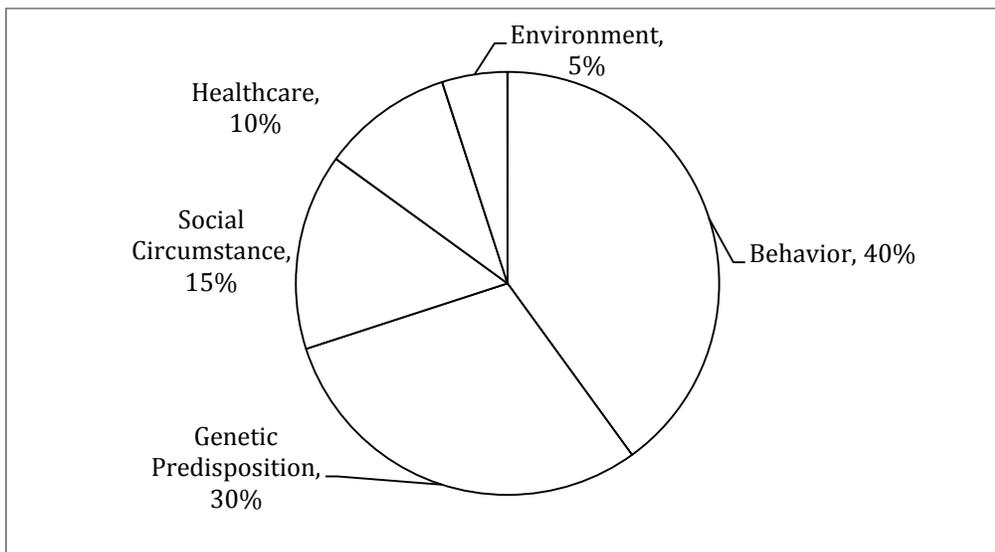


Figure 2. The five determinants of health: Impact on health outcomes.

There is a dearth of literature that explores the possibility of reducing the “Dominican Paradox” by reducing modifiable risk, which is a health risk that can be treated or controlled by behavior modification (McGinnis et al., 2002; Miller et al., 2003).

Use of Determinants of Health in the United States of America

Over the years the United States has been assessing its health outcomes, and similar to the Dominican Republic, has been trying to make improvements. Although the United States and the Dominican Republic are different in many ways with respect to expenditure on

healthcare, they face similar paradoxes surrounding health outcomes. The United States spends about a trillion dollars on direct patient services each year, more than other high-income countries, yet has some of the poorest health outcomes in comparison (Bayer, Fairchild, Hopper, & Nathanson, 2013; McGinnis et al., 2002). In order to improve health outcomes, the U.S. Public Health Service established the Healthy People Initiative. This initiative sets measurable goals for health improvement that are implemented over a 10-year period. At the conclusion of the first period it was discovered that most of the measured success could be attributed to behavioral and social interventions, and not solely healthcare. Since the initiative's inception, goals have been broadened to include 26 priority areas including disease reduction and prevention, and also social determinants of health that promote healthy behaviors (McGinnis et al., 2002).

Methods

Journal articles were found using Wright State University's QuickSearch to search subscription journal content available through Wright State University Libraries. PubMed and Google Scholar were also used. The following search terms were used to gather information: maternal mortality, maternal mortality Dominican Republic, Dominican Paradox, risk factors maternal mortality, maternal mortality hypertension Dominican Republic, maternal mortality sepsis, postpartum hemorrhage, Dominican Republic healthcare, determinants of health, maternal mortality prevention, and preconception care maternal mortality.

The Demographic Health Survey (DHS) program (2014) provides household survey data from many areas including socio economic status, education attainment and health. Data from the Demographic Health Survey (DHS) program were used as representative sample of the Dominican Republic's female reproductive population. The Statistical Package for the Social

Science (SPSS) was used to determine mean BMI and prevalence of chronic disease in the cases of women who had given birth within five years of the survey.

Results

A total of 6,800 women in the DHS data had given birth within five years of the survey. They had a mean age of 29 years. The mean BMI of those women was 26, which falls into the overweight category (see Figure 3). Over half of the women had high blood pressure readings and high cholesterol score values (see Figure 4) (The DHS Program, 2014). More women used medication to treat high blood pressure rather than lose weight or exercise (see Figure 5) (The DHS Program, 2014).

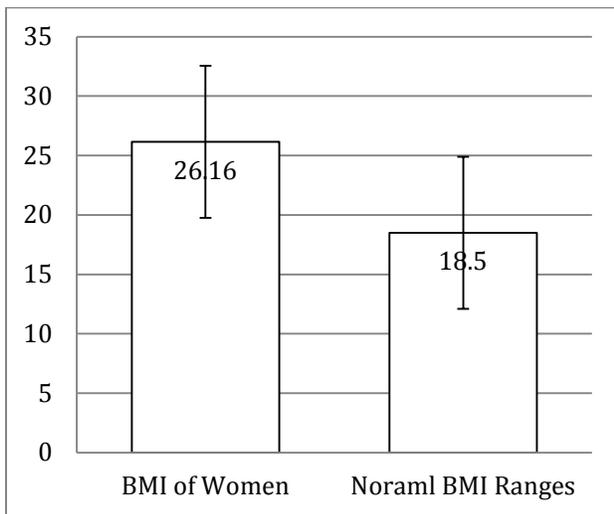


Figure 3. Percentage of women diagnosed with chronic conditions up to 12 months before interview.

Note: Normal BMI ranges from 18.5 to 24. The bars represent the full range (min to max).

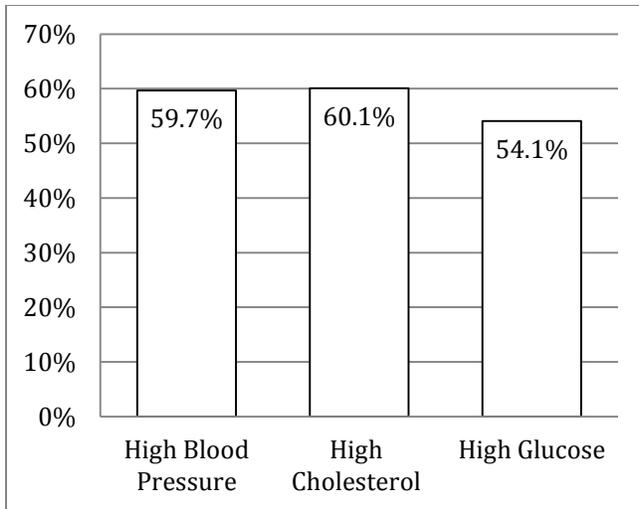


Figure 4. Percentage of women diagnosed with chronic conditions up to 12 months before interview.

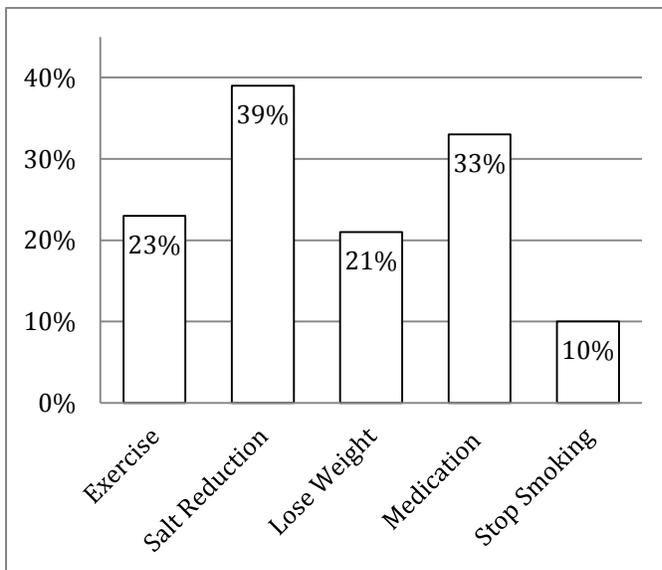


Figure 5: Treatment modalities for high blood pressure among women.

Discussion

The risk factors associated with maternal mortality are similar around the globe. However, deaths are mostly prevented in high-income countries because symptoms are diagnosed early and are handled with proper interventions such as Cesarean surgery, induction of labor, and managed labor (Goldenberg & McClure, 2015). In low and middle-income countries,

where the healthcare systems may be weak, dangerous complications are often left undiagnosed and untreated, leading to maternal and infant mortality.

Healthcare is neither the only nor the most important predictor of health outcomes. Most Dominicans have access to healthcare. However, the fragmented Dominican healthcare system is not properly equipped to treat maternal complications intrapartum or postpartum. This lack of infrastructure emerges as a significant factor in the high maternal mortality rate of the country. Over reliance on the healthcare system has likely contributed to the “Dominican Paradox.”

Most of the prevalent causes of maternal mortality in the Dominican Republic are strongly linked to maternal obesity. Women on average in this study were overweight; over half had high blood pressure and high cholesterol, and more women used medication to control chronic conditions rather than lose weight or exercise. Obesity is a major, and potentially the most important, behavioral risk factor that could explain the “Dominican Paradox.” For this reason it is important to explore the other domains that influence health when considering this issue.

Recommendations

This study demonstrates a promising potential to reduce maternal mortality in the Dominican Republic by decreasing modifiable risk through interventions that target behavioral determinants.

Preconception care is defined as “any intervention provided to women regardless of pregnancy or desire for pregnancy in efforts to improve maternal, newborn, and infant outcomes (Dean, Lassi, Imam, & Bhutta, 2014a, p.1).” These interventions aim to modify risks including those related to social, biomedical, and behavioral determinants in order to better ensure positive outcomes. Management and prevention of these associated risks have a greater impact when

integrated as part of a preconception care plan than prenatal care alone (Dean et al., 2013).

Preconception care can especially impact women in resource poor settings such as the Dominican Republic.

Preconception nutrition interventions programs that focused on diversity of diet, micronutrient supplementation/fortification, and achieving optimal BMI have been found to be among the highest ranked research options with regard to functionality and feasibility (Dean et al., 2013; Dean, Lassi, Imam, & Bhutta, 2014b). Preconception programs that focus on nutrition are cost effective because they can be incorporated into pre-existing nutrition and/or health programs. Preconception care was found to have the potential to reduce mortality by 82% and to have a long-term impact of 90% (Dean et al., 2013).

Integrating interventions of this nature could empower Dominican women to take control of preventable risk. This could help ensure healthy pregnancies and eventually reduce or eliminate the “Dominican Paradox.”

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Appendix

List of Competencies Met in CE

Tier 1 Core Public Health Competencies

Domain #1: Analytic/Assessment Skills
Describes factors affecting the health of a community (e.g., equity, income, education, environment)
Identifies quantitative and qualitative data and information (e.g., vital statistics, electronic health records, transportation patterns, unemployment rates, community input, health equity impact assessments) that can be used for assessing the health of a community
Uses information technology in accessing, collecting, analyzing, using, maintaining, and disseminating data and information
Selects valid and reliable data
Selects comparable data (e.g., data being age-adjusted to the same year, data variables across datasets having similar definitions)
Identifies gaps in data
Collects valid and reliable quantitative and qualitative data
Describes public health applications of quantitative and qualitative data
Uses quantitative and qualitative data
Describes assets and resources that can be used for improving the health of a community (e.g., Boys & Girls Clubs, public libraries, hospitals, faith-based organizations, academic institutions, federal grants, fellowship programs)
Explains how community health assessments use information about health status, factors influencing health, and assets and resources
Describes how evidence (e.g., data, findings reported in peer-reviewed literature) is used in decision making
Domain #2: Policy Development/Program Planning Skills
Identifies current trends (e.g., health, fiscal, social, political, environmental) affecting the health of a community
Gathers information that can inform options for policies, programs, and services (e.g., secondhand smoking policies, data use policies, HR policies, immunization programs, food safety programs)
Describes implications of policies, programs, and services
Explains the importance of evaluations for improving policies, programs, and services
Gathers information for evaluating policies, programs, and services (e.g., outputs, outcomes, processes, procedures, return on investment)
Describes how public health informatics is used in developing, implementing, evaluating, and improving policies, programs, and services (e.g., integrated data systems, electronic reporting, knowledge management systems, geographic information systems)
Domain #3: Communication Skills
Communicates in writing and orally with linguistic and cultural proficiency (e.g., using age-appropriate materials, incorporating images)
Suggests approaches for disseminating public health data and information (e.g., social media, newspapers, newsletters, journals, town hall meetings, libraries, neighborhood gatherings)
Conveys data and information to professionals and the public using a variety of approaches (e.g., reports, presentations, email, letters)
Communicates information to influence behavior and improve health (e.g., uses social marketing methods, considers behavioral theories such as the Health Belief Model or Stages of Change Model)
Describes the roles of governmental public health, health care, and other partners in improving the health of a community
Domain #4: Cultural Competency Skills
Describes the concept of diversity as it applies to individuals and populations (e.g., language, culture, values, socioeconomic status, geography, education, race, gender, age, ethnicity, sexual orientation, profession, religious affiliation, mental and physical abilities, historical experiences)
Describes the diversity of individuals and populations in a community
Describes the ways diversity may influence policies, programs, services, and the health of a community
Recognizes the contribution of diverse perspectives in developing, implementing, and evaluating policies, programs, and services that affect the health of a community
Addresses the diversity of individuals and populations when implementing policies, programs, and services that affect the health of a community
Describes the effects of policies, programs, and services on different populations in a community

Domain #5: Community Dimensions of Practice Skills
Describes the programs and services provided by governmental and non-governmental organizations to improve the health of a community
Recognizes relationships that are affecting health in a community (e.g., relationships among health departments, hospitals, community health centers, primary care providers, schools, community-based organizations, and other types of organizations)
Suggests relationships that may be needed to improve health in a community
Domain #6: Public Health Sciences Skills
Describes the scientific foundation of the field of public health
Describes how public health sciences (e.g., biostatistics, epidemiology, environmental health sciences, health services administration, social and behavioral sciences, and public health informatics) are used in the delivery of the 10 Essential Public Health Services
Retrieves evidence (e.g., research findings, case reports, community surveys) from print and electronic sources (e.g., PubMed, Journal of Public Health Management and Practice, Morbidity and Mortality Weekly Report, The World Health Report) to support decision making
Recognizes limitations of evidence (e.g., validity, reliability, sample size, bias, generalizability)
Describes evidence used in developing, implementing, evaluating, and improving policies, programs, and services
Describes the laws, regulations, policies, and procedures for the ethical conduct of research (e.g., patient confidentiality, protection of human subjects, Americans with Disabilities Act)
Contributes to the public health evidence base (e.g., participating in Public Health Practice-Based Research Networks, community-based participatory research, and academic health departments; authoring articles; making data available to researchers)
Domain #7: Financial Planning and Management Skills
Describes the structures, functions, and authorizations of governmental public health programs and organizations
Describes government agencies with authority to impact the health of a community
Adheres to organizational policies and procedures
Describes public health funding mechanisms (e.g., categorical grants, fees, third-party reimbursement, tobacco taxes)
Uses evaluation results to improve program and organizational performance
Domain #8: Leadership and Systems Thinking Skills
Describes public health as part of a larger inter-related system of organizations that influence the health of populations at local, national, and global levels
Describes the ways public health, health care, and other organizations can work together or individually to impact the health of a community
Contributes to development of a vision for a healthy community (e.g., emphasis on prevention, health equity for all, excellence and innovation)
Identifies internal and external facilitators and barriers that may affect the delivery of the 10 Essential Public Health Services (e.g., using root cause analysis and other quality improvement methods and tools, problem solving)
Describes the impact of changes (e.g., social, political, economic, scientific) on organizational practices
Describes ways to improve individual and program performance

Concentration Specific Competencies

Global Health:
Exhibit interpersonal skills that demonstrate willingness to collaborate, trust building abilities, and respect for other perspectives
Apply the health equity and social justice framework for the analysis of strategies to address health disparities across different populations
Conduct evaluation and research related to global health
Apply systems thinking to analyze a diverse range of complex and interrelated factors shaping health at local, national, and international levels