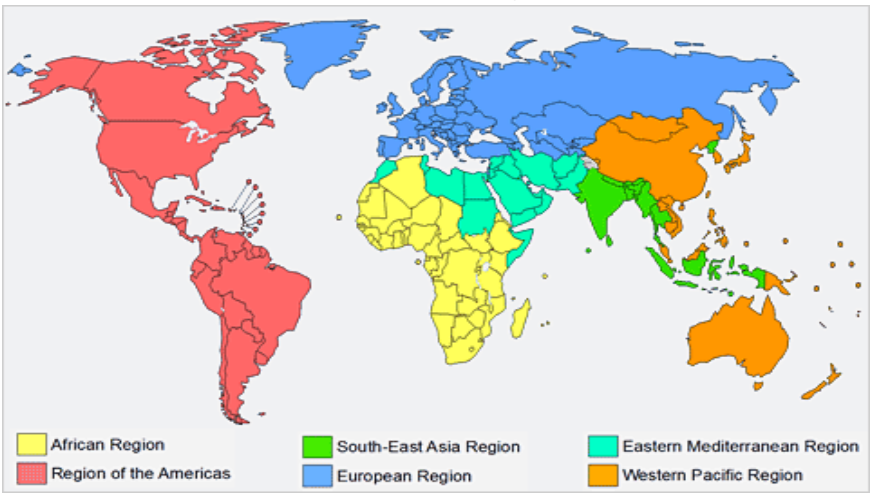
World Health Organization

Introduction to the Body

The World Health Organization's goal is "to build a better, healthier future for people all over the world"[1]. First established in 1948, the WHO is now the premier international health body within the United Nation[2]. All countries which are Members of the United Nations are members of the WHO. Currently, there are 194 Member States[3] divided up into 6 WHO geographic regions - Americas, Africa, Europe, South-East Asia, Eastern Mediterranean and Western Pacific. WHO works across the world in its Member States and has active offices in 150 countries.

WHO Regions



http://www.who.int/about/regions/en/WHO_Regions.gif

Recently, in May 2017 Dr. Tedros Adhanom Ghebreyesus was appointed as the new WHO Director General. Dr. Tedros succeeds Dr. Margaret Chan who has served as the Director General since January 2007. Dr. Tedros comes from an extensive background of work in health care and health policy. Originally from Ethiopia, he served as Minister of Health from 2005-2012 and served as a chair on international health initiatives such as the Global Fund to Fight AIDS, Tuberculosis and Malaria, the Roll Back Malaria Partnership Board, and the Board of the Partnership for Maternal, Newborn and Child Health. Additionally, Dr. Tedros has particular knowledge in health system reform efforts. As Minister of Health in Ethiopia he led an

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[1] "About WHO." *World Health Organization*. World Health Organization, n.d. Web. 10 Dec. 2016. http://who.int/about/en/ .

[2] Charles, John. "Origins, history, and achievements of the World Health Organization." *British Medical Journal* 2.5600 (1968): 293-96. Web.

[3] "Countries." *World Health Organization*. World Health Organization, n.d. Web. 10 Dec. 2016. http://www.who.int/countries/en/.

expansion of the country's health infrastructure by creating new health centers, expanding the healthcare workforce and financing mechanisms to expand health insurance coverage [4].

WHO works to provide assistance to countries in scaling up prevention, treatment and care services through their health systems as well as set national guidelines, targets and regulations to establish international health standards. WHO works in many health fields such as infectious diseases like HIV and malaria, noncommunicable diseases like cancer and diabetes, maternal and child health, air and water quality, medicine and vaccination production and distribution, and more.

The WHO supports its member states in many different ways. WHO is engaged in regular policy reviews within broader UN bodies, inter-agency efforts to strengthen UN presence in specific countries, and discussions on how to effectively support country's individual efforts towards sustainable development and healthy communities. WHO has to collaborate with other UN bodies, NGOs, private donor groups and foundations, academic institutions and Member States' governments and health officials. Navigating and balancing how to most efficiently and effectively work through each of these channels to implement positive change is a constant challenge for WHO.

WHO works actively within many bodies of the UN as health is a pertinent issue and integral part of policy decisions in the UN. Health is discussed in the General Assembly, the Economic and Social Council (ECOSOC) and the Security Council. In September 2015 the UN adopted a new set of goals to end poverty and ensure prosperity called the Sustainable Development Goals, the third of which "Ensure healthy lives and promote well-being for all at all ages", directly relates to health and involves the WHO each and every day[5]. In all of its work, the WHO should strive to establish effective policy to honor their goals, aid the health agencies of their Member States and advance progress on Goal 3 of the Sustainable Development Goals. Health is an increasingly interdisciplinary issue, thus, in all its work, the WHO will have to create multi-faceted policy and work in tandem to other bodies of the UN to best implement their goals.

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[4] "World Health Assembly elects Dr Tedros Adhanom Ghebreyesus as new WHO Director-General." *World Health Organization*, World Health Organization, n.d. Web. 1 Jan. 2018. www.who.int/mediacentre/news/releases/2017/director-general-elect/en/ .

[5] "Health - United Nations Sustainable Development." *Sustainable Development Goals*. United Nations, n.d. Web. 1 Jan. 2017. <http://www.un.org/sustainabledevelopment/health/>.

Topic A: Cholera Outbreak Control

Background on Cholera

Cholera is an infectious disease caused by the bacterium *Vibrio cholerae*[6]*.* Infection of the bacteria results in severe diarrhea and dehydration. The primary symptom of cholera is diarrhea – but this symptom often leads to severe dehydration and other symptoms such as vomiting, wrinkled skin, low blood pressure, rapid heart rate, thirst, unusual tiredness, and more. In severe cases, the dehydration can lead to renal failure, fever, severe vomiting, seizures and death.

Cholera is transmitted by contaminated water sources that contain the causative bacterium *Vibrio cholera.* Contaminated foods such as unwashed fruits and raw shellfish can also transmit cholera. It is important that those that are infected be treated immediately for their dehydration to prevent severe consequences. The main treatment for cholera is fluid and electrolyte replacement which is often achieved through the use of Oral Rehydration Salts (ORS) and/or IV fluids.

The prognosis of cholera ranges from excellent to poor. Rapid treatment with fluid and electrolytes result in better outcomes while people with other health problems beside cholera or those who are not rapidly replenished with fluid treatments tend to have a poorer prognosis. In epidemic outbreaks in underdeveloped countries where little or no treatment is available, the mortality (death) rate can be as high as 50%-60%[7]. People who drink or eat food that has not been treated properly (i.e. liquids need to be chemically treated, boiled, or pasteurized, and foods need to be cleaned and cooked), are at high risk for cholera.

The spread of cholera can be exacerbated by weak health systems, poor infrastructure, and densely populated living conditions that promote bad hygiene. Weak health systems and the lack of formalized infrastructure that is not set up to treat dehydration and symptoms of cholera can lead to cholera dehydration becoming severe. Additionally, poor sanitation and poor systems to manage waste removal can perpetuate the spread of unclean water. The "urbanization without sanitation" problem plagues many densely populated developing cities that do not have financial resources to set up proper waste management systems.

History of the Topic

Historically there have been several outbreaks throughout history. The 1854 Broad Street cholera outbreak in the Soho district of London is remembered as one of the most severe and rapid cholera outbreaks in history. It is particularly noted for its influence on advancing public health policy and waste management infrastructure. Additionally, out of this outbreak it was discovered how cholera spread. A doctor named John Snow was the primary proponent of the water-borne theory for cholera transmission, and although his ideas were initially resisted,

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[6] PhD, Charles Patrick Davis MD. "Cholera Treatment, History, Prevention & Causes." *MedicineNet*, www.medicinenet.com/cholera/article.htm#what_is_cholera.

[7] PhD, Charles Patrick Davis MD. "Cholera Treatment, History, Prevention & Causes." *MedicineNet*, www.medicinenet.com/cholera/article.htm#what_is_cholera.

over time the theory was eventually accepted by the medical community and changed the future of cholera prevention and outbreak management.

In his investigation of the 1854 outbreak, Snow determined that cholera was being spread through the Broad Street water pump. This was supposedly the community's source of "clean" and "filtered" water, but through precise statistical evidence Snow determined this was the only logical source of contamination. In the middle of the 1854 outbreak, Snow addressed the Board of Governors in London to remove the pump handle of the Broad Street water well. Following this, the epidemic died down and it is clear looking back that Snow's actions prevented the epidemic from exacerbating further.

Historian Steven Johnson discusses how Snow's investigation of the Broad Street 1854 epidemic marked a milestone in public health work. London was encouraged to prioritize water quality and began engineering sewer systems in cities to manage waste water. Cities around the world followed their lead and were finally able to deal with the population density problems they were facing. Johnson highlights this tremendous advancement stating, "Establishing sanitary water supplies and waste removal systems became the central infrastructure project of every industrialized city on the planet…it was the building of the invisible grid of sewer lines and freshwater pipes that made the modern city safe"[8] (Johnson 214).

Today, the megacities of the developing world are wrestling with the same problems of the unmanaged and unsustainable growth that faced London 150 years ago. With over 50% of the global population currently living in urban areas, the density of humans is becoming more and more concentrated[9]. This exacerbates the spread of disease and creates massive slums and impoverished areas creating poor sanitation and health environments. Looking back at this historical example, we can learn from the past to implement effective solutions to combat cholera in the present and future.

Current Outbreaks - Case Study: Cholera in Yemen 2016-present

In October 2016 The Ministry of Public Health and Population in Yemen announced the occurrence of cholera in its capital city Sana'a. This was the beginning of an epidemic of astronomical size that is ongoing as this paper is being written. Currently, as most recently reported on December 31st 2017, there have been 1,019,044 cases of cholera with 2,237 deaths[10]. While the low mortality rate is encouraging, the exponential number of cases is alarming. With no hope in sight of an end to the civil war in Yemen in sight the situation is likely to only get worse. This has been declared as the largest and fastest spreading outbreak of cholera in modern history[11].

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[8] Johnson, Steven. *The Ghost Map.* New York: Riverhead Books, 2006.

[9] "Population Growth and the Spread of Diseases." Population Education. N.p., 8 Apr. 2014. Web. 2 Jan. 2017. <https://www.populationeducation.org/content/population-growth-and-spread-diseases>.

[10] World Health Organization Early Warning, Alert and Response Systems (EWARS). (Dec 25-Dec 31). *Weekly Epidemiological Bulletin on Cholera Response in Yemen* (WHO Publication). Retrieved from: http://www.emro.who.int/images/stories/yemen/Yemen_Cholera_Response_-_Weekly_Epidemiological_Bulletin_-_W52_2017_28Dec_25-Dec_3129.pdf?ua=1 .

[11] Lyons, Kate. "Yemen's cholera outbreak now the worst in history as millionth case looms." *The Guardian*, Guardian News and Media, 12 Oct. 2017, www.theguardian.com/global-development/2017/oct/12/yemen-cholera-outbreak-worst-in-history-1-million-cases-by-end-of-year .

The cholera outbreak is tied to the ongoing civil war that has been present in Yemen since March 2015. The war has killed more than 10,000 people since it began. The fighting has created an astronomical humanitarian crisis pushing the country to the brink of famine, displacing thousands, and spreading disease across the population. The cholera epidemic is one particularly devastating part of it. In a joint statement from UNICEF Executive Director Anthony Lake and former WHO Director-General Margaret Chan in June 2017 confirmed that, "this deadly cholera outbreak is the direct consequence of two years of heavy conflict" They further explained that, "Collapsing health, water and sanitation systems have cut off 14.5 million people from regular access to clean water and sanitation, increasing the ability of the disease to spread. Rising rates of malnutrition have weakened children's health and made them more vulnerable to disease"[12] . Even before the civil war however, Yemen was among the most water-stressed countries in the world afflicted by droughts and a severe lack of water[13] . These conditions and the extreme poverty of the population made the country ripe for cholera.

In terms of international action, the efforts have been mainly spearheaded by the World Health Organization. Because of the collapsed government, Yemen has been able to do little as a uniformed country to address the outbreak. In the 4th and most recent *Yemen cholera situation report* published by WHO on July 19th 2017, summary of the statistics of the epidemic, prevention efforts, treatment methods and future challenges is laid out [5]. The report summarizes the results of their approach on both the prevention side as well as treatment.

In terms of prevention, the report states that the WHO has led the redesign of National Emergency Operations Centers (EOCs) to encourage collaboration among UN agencies, NGOs and local government authorities. They have deployed a team of 40 international staff including cholera coordinators, epidemiologists, WASH and risk communications experts. These staff have helped educate the community and prevent the spread of cholera by teaching the community proper clean water techniques. In terms of cholera treatment efforts, the WHO has established 46 diarrhea treatment centers and 278 oral rehydration therapy corners[14]. Following the statement of the progress they made, the WHO discussed the remaining challenges they face, such as: "the country's health system has been heavily affected by more than 2 years of intense conflict", "Fewer than half of the country's health centers are fully functional" and "Access to affected populations is challenging in conflict-affected areas". Other problems include the slow delivery of medical supplies, the lack of access to clean water and sanitation and the fact that health and sanitation workers have not received their salaries regularly in more than ten months ultimately limiting the supply of workers available. How long the unpaid worker force will last without conflict or revolt is unclear.

Surveillance and tracking the spread of disease seems to be one of the most challenging parts of this epidemic. In a report published by the WHO following field visits to Ibb and Hudaydah (cities with priority diarrheal treatment centers and oral rehydration centers that

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[12] UNICEF Yemen Media Centre. (24 June 2017). Statement from UNICEF Executive Director Anthony Lake and WHO Director-General Margaret Chan on the cholera outbreak in Yemen as suspected cases exceed 200,000 Retrieved from: https://www.unicef.org/yemen/media_12062.html

[13] Qadri, F., Islam, T., & Clemens, J. D. (2017). Cholera in Yemen — An Old Foe Rearing Its Ugly Head. *New England Journal of Medicine*, *377*(21), 2005–2007. https://doi.org/10.1056/NEJMp1712099

[14] Yemen Situation Reports, World Health organization. (19 July 2017). Yemen Cholera Situation Report no.4. Retrieved from: http://www.emro.who.int/yem/yemeninfocus/situation-reports.html

reported sudden increased in cholera cases) the written Action Points and Immediate Recommendations emphasize this issue of accurate data surveillance and reporting [6]. They found that the basic standards of data collection and reporting are not being met and the majority of cases reported do not meet the case definition of cholera. Among their key findings include: “Quality of data collection and reporting needs improvement. Most reports continue to be submitted by sending photographs of register pages via WhatsApp” and “There is confusion over reporting lines with some reports being sent to District Health Office and Governorate health office in parallel”. They state that there is “inconsistent adherence to case definition and protocols for lab testing” and “variable frequency of reporting by partners: sometimes daily, sometimes weekly”[15] .

The fighting has created an astronomical humanitarian crisis pushing the country to the brink of famine, displacing thousands, and spreading disease across the population. In an environment as chaotic as Yemen – war torn and devastated – it is especially important to be able to gather accurate information to gain a full understanding of the severity of the disease to determine the next steps to take. Because of the brokenness in the government, they are unable to rebuild broken infrastructure, unable to deliver aid and health care and unable to have the resources for proper surveillance on cholera cases. It is now up to local healthcare workers and third parties (Researchers, doctors, WHO officials, private NGOs, etc.) to take matters into their own hands. While this outbreak should be by no means the only focus of this committee, current outbreaks such as this demand attention and should be heavily considered when drafting resolutions to address the world-wide cholera problem.

Relevant International Action

2014 – Global Task Force on Cholera Control

In 2014 the Global Task Force on Cholera Control was revitalized by WHO. This task force works to, “promote the design and implementation of global strategies to contribute to capacity development for cholera prevention and control globally; provide a forum for technical exchange, coordination, and cooperation on cholera-related activities to strengthen country capacity to prevent and control cholera; and support countries for the implementation of effective cholera control strategies and monitoring of progress”[16]. The task force will be important in implementing policy, initiatives and research and their expertise and guidance should be consulted and utilized when writing resolutions.

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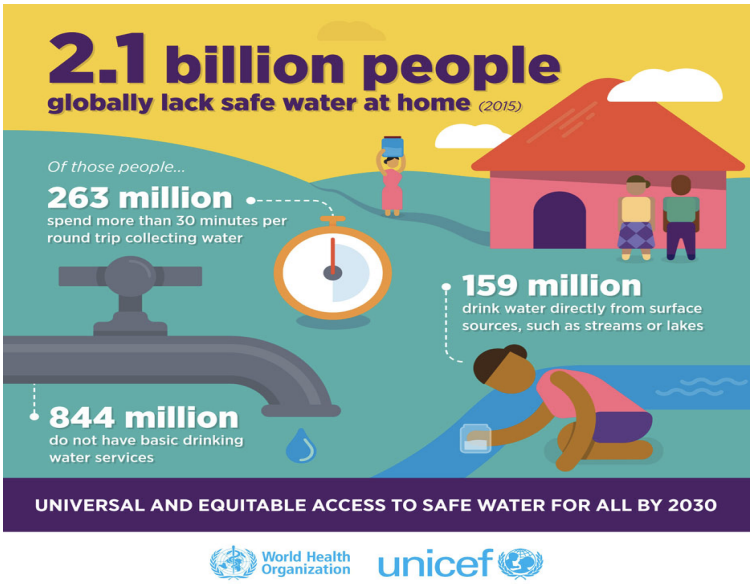
[15] Yemen Situation Reports, World Health Organization. (17 September 2017). Yemen Cholera Response Field visits to Ibb and Hudaydah: Summary of immediate action points and recommendations. Retrieved from: http://www.emro.who.int/yem/yemeninfocus/situation-reports.html

[16] “The Global Task Force on Cholera Control.” *World Health Organization*, World Health Organization, www.who.int/cholera/task_force/en/.

2017 – Ending Cholera: A Roadmap to 2030

In October 2017 the GTFCC committed to a strategy aimed at reducing cholera. The strategy, *Ending Cholera: A roadmap to 2030, "*aims to reduce cholera deaths by 90% and to eliminate cholera in as many as 20 countries by 2030"[17]. The strategy relies on strong commitments from the countries affected by cholera, developed countries, and international donors. It is based on three strategic axes:

Axis 1: Early detection and quick response to contain outbreaks at an early stage
Axis 2: A multisectoral approach to prevent cholera in hotspots in endemic countries
Axis 3: An effective mechanism of coordination for technical support, resource mobilization, and partnership at the local and global level[18]



With a roadmap set, it is up to the nations at this 36th DUMUNC Conference to determine how these aims and goals will be implemented and met through the collaborative resolutions you develop.

Treatment and Prevention Efforts

Prevention

Prevention of cholera epidemics comes from investing money and resources into good sanitation and water quality and promoting good hygiene practices. Health education campaigns, adapted to local culture and beliefs, should emphasize appropriate hygiene practices such as hand washing with soap and the proper cleaning and disposal of feces and waste, particularly feces ruined clothes of young children.

Additionally, proper water and food preparation methods should be promoted to citizens through education campaigns. The methods of obtaining clean water and sanitizing water (boiling water, chlorine drops, etc.) and preparing food are also areas education could focus on.

Another important area to focus prevention efforts on is surveillance. Proper surveillance and tracking of cholera cases and outbreaks is crucial. By monitoring developing countries and

[17] "Cholera Fact Sheet." *World Health Organization*, World Health Organization, Dec. 2017, www.who.int/mediacentre/factsheets/fs107/en/ .
[18] *Ending Cholera: A Global Roadmap to 2030*. October , 2017, *WHO.*

areas that have been previous hot-spots for cholera, the WHO will be better prepared when outbreaks occurred and better at preventing the spread of cholera.

Treatment

Oral Rehydration Salts

One of the most drastic side effects of cholera is acute diarrhea that can lead to severe dehydration and death is untreated. Thus, it is of upmost importance to treat this symptoms in order to prevent devastating effects. If symptoms are treated timely and effectively, than mortality can be reduced to rates as low as less than 1%. One of the most popular and cost-efficient ways to treat dehydration is with Oral Rehydration Salts (ORS). Although ORS do not cure cholera or influence the actual bacterial infection process, they treat dehydration and are very effective in saving lives[19]. ORS are quick acting and easily distributed particularly during emerging epidemics. Additionally, ORS can be given by non-medical personnel, family members and volunteers (as opposed to other medically technical methods such as rehydration via intravenous fluids)[20]. Many lives can be saved when ORS are used early at home. This can act as a full treatment or as an intermediate treatment until individuals can access proper health care centers. Particularly in areas lacking health care centers or those with particularly weak health care facilities this method is ideal.

Vaccines

Although the long term solution for cholera control remains access to safe water, hygiene promotion and sanitation, there is mounting evidence that high coverage with oral

[19] Global Task Force on Cholera Control. "WHO position paper on Oral Rehydration Salts to reduce mortality from cholera." *WHO*, World Health Organization, www.who.int/cholera/technical/en/.
[20] Global Task Force on Cholera Control. "WHO position paper on Oral Rehydration Salts to reduce mortality from cholera." *WHO*, World Health Organization, www.who.int/cholera/technical/en/.

cholera vaccines (OCV) results in significant reduction of cholera transmission in various settings, especially in immediate outbreak efforts[21].

There are 3 OCVs that are currently pre-qualified by WHO – Dukoral®, Shanchol ™ and Euvichol®[22]. In 2013, WHO formally established an OCV stockpile with an initial amount of 2 million doses of OCV for outbreak control and emergencies. However, requests for OCVs outpaced production capacity in 2015. Production doubled in 2016 and is expected to increase again to more than 10 million doses in 2017 and 2018. WHO and partners of the Global Taskforce on Cholera Control (GTFCC) have over the years organized workshops and training meetings on OCV at the local country level, produced numerous guidelines for OCV use, and conducted thorough monitoring, evaluation and research on the effectiveness of the campaigns. In June 2016, the FDA approved an oral vaccine for use in the U.S. for travelers to cholera-endemic areas to protect them from getting cholera and according to the CDC this oral vaccine is about 80% effective for three months after a single oral dose[23].

Since 2010, the WHO recommendation is to use these vaccines in conjunction with other prevention and control strategies in areas where the disease is endemic and in areas at risk for outbreaks[24]. However, there is debate over the extent to which vaccinations should be developed. There are logistical barriers to vaccine administration such as having a cold fridge to store vaccines, a health care facility to hold supplies and health care workers to administer vaccines. While some argue in favor for increased vaccination production and distribution, others argue that vaccination enthusiasm disrupts the provision of other health system interventions to control or prevent cholera. With limited funding and resources, the balance between treatment and prevention is crucial and prioritization of one over the other is hotly debated.

Bloc Positions

High Income Countries (HICs)

Safe drinking water and advanced sanitation and waste management systems have made many HICs cholera free for decades. Major cities in Europe and North America have been able to develop sanitation systems that successfully address the problems associated with urbanization and densely populated cities. This urban development is the result of substantial resource investment, successful government collaboration and many years of city planning and health system strengthening. While the development processes are long and require significant investment of resources, higher income, developed, countries can serve as consultants to low income countries. They can provide guidance on how they developed sanitation systems and

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[21] Global Task Force on Cholera Control. "Oral Cholera Vaccines." *WHO*, World Health Organization, http://www.who.int/cholera/vaccines/en/ .

[22] *Introduction to oral cholera vaccines: characteristics, stockpile and production*. March 15, 2017, WHO.

[23] PhD, Charles Patrick Davis MD. "Cholera Treatment, History, Prevention & Causes." *MedicineNet*, www.medicinenet.com/cholera/article.htm#what_is_cholera.

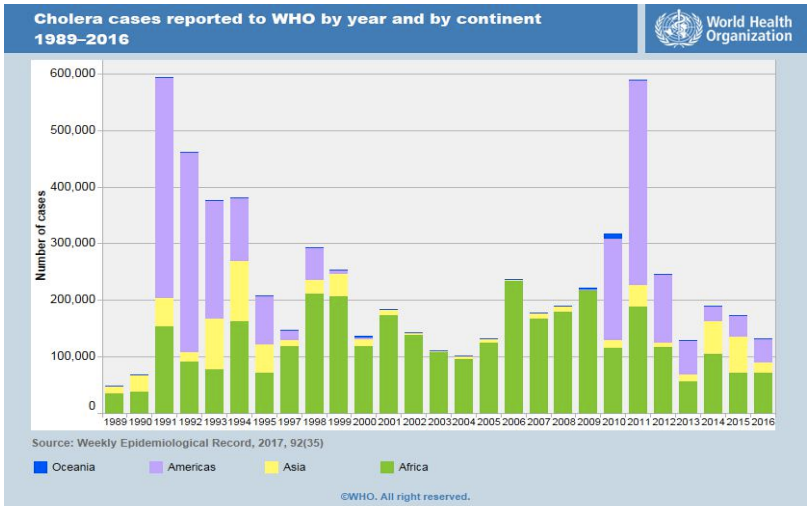
[24] *Introduction to oral cholera vaccines: characteristics, stockpile and production*. March 15, 2017, WHO.

addressed the fundamental causes of densely populated cities, overcrowding, and poverty that perpetuate the spread of cholera.

In addition to providing oversight and advice, high income countries can also provide financial resources in terms of funding for vaccines, health system development and particularly the WHO goals and action plans. The GTFCC *Ending Cholera: A roadmap to 2030* strategy calls for targeted investments in WASH sanitation programs, health system improvement and increasing the use of OCVs. They estimate that cholera has a significant economic burden on cholera endemic countries, with an estimated annual cost of about US $2 billion globally[25]. Additionally, estimates indicate that the successful implementation of the preventative measures of cholera control may allow up to 50% savings compared to the perpetual average yearly cost of continuously responding to emerging cholera outbreaks as a crisis-management solution. Financial investment up front could prove to be more fiscally favorably for countries that have previously funded cholera efforts. Additionally, high income countries can call upon the private NGOs and donors of their country as potential sources of funding.

Lower-Middle Income Countries (LMICs) and Cholera Hot Spot Countries

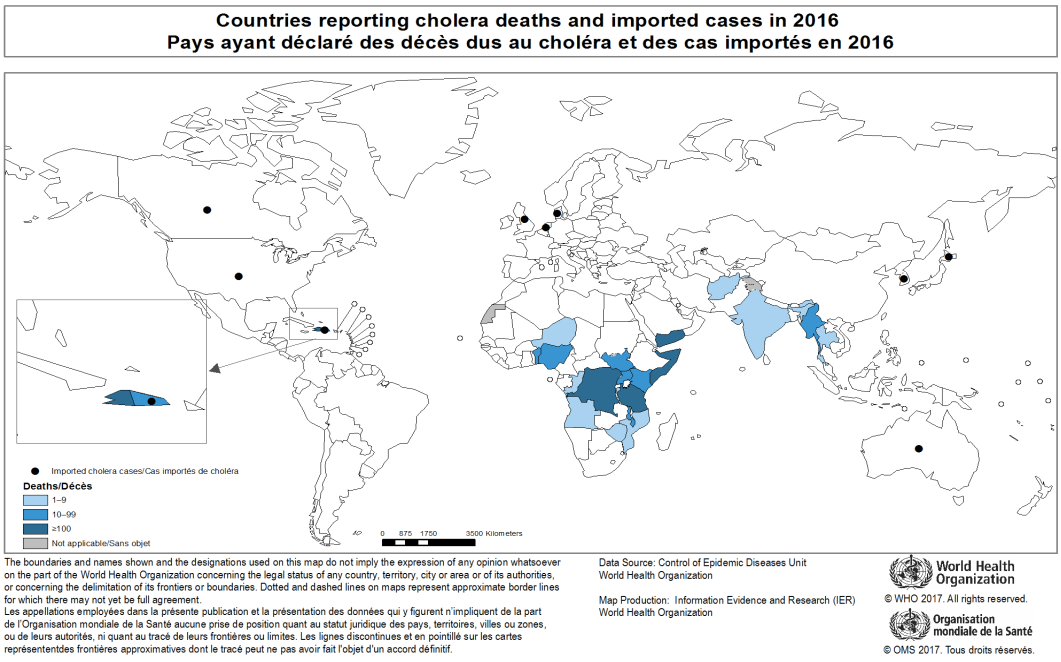
In 2016, 132 121 cholera cases and 2420 deaths were reported to WHO worldwide. Of these cases, 54% of cases were reported from Africa, 13% from Asia and 32% from Hispaniola. Cholera remains a major public health problem and affects primarily developing world populations and LMICs (Low-Middle Income Countries) with no proper access to adequate water and sanitation resources.



The WHO has identified 27 Cholera Countries as priority locations for cholera surveillance. The 27 countries are: Angola, Benin, Cameroon, Chad, Comoros, Republic of the Congo, Côte d'Ivoire, Djibouti, Guinea, Guinea-Bissau, Haiti, Iraq, Kenya, Laos, Malawi, Mali, Mozambique, Niger, Nigeria, Papua New Guinea, Senegal, Sierra Leone, Tanzania, Vietnam, Zambia, Zanzibar and Zimbabwe. In these countries, either single major cholera outbreaks have

[25] *Ending Cholera: A Global Roadmap to 2030*. October , 2017, *WHO.*

occurred recently and/or cholera outbreaks are regular and linked to climatic and cultural features. The WHO regularly monitors cholera levels in these countries and has published "Cholera Country Profiles" for these high priority countries[26]. This is by no means an exhaustive list – some more recent and current outbreaks (Yemen, South Sudan, etc.) are not yet as actively monitored and under surveillance by the WHO, but nevertheless are just as important and relevant to the cholera discussion.



Countries that have experience with Cholera outbreaks will be particularly valuable during this conference and they should be prepared to be consulted for their advice based on past handling of Cholera in their own country. While countries that have cholera are always in flux, the WHO has great online resources to examine your country and identify if they have experienced a cholera outbreak recently. The WHO Global Health Atlas[27] has an extensive data base reporting the yearly total number of cholera cases from 1973 to 2012 for each WHO country.

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Cholera is a disease of inequity – a disease that kills only the poorest and most vulnerable of people. Every death from cholera is preventable with the tools and resources available to the world today. Putting an end to this disease is possible and it is up to the global health leaders of today to determine the steps to take to make this possibility a reality.

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[26] Global Task Force on Cholera Control. "Cholera Country Profiles." *WHO*, World Health Organization, http://www.who.int/cholera/countries/en/ .

[27] Global Health Atlas: Data Query. *WHO*, World Health Organization, http://apps.who.int/globalatlas/DataQuery/default.asp
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Questions A Resolution Should Consider

1. Is the WHO strategy effective as it stands to tackle the issue of Cholera?
2. What are the immediate issues that need to be addressed in a resolution?
3. Does the resolution focus on short-tem solutions to current outbreaks? Or long-term solutions to the underlying causes of cholera and poverty? Or both?
4. What are the strengths and Weaknesses of the GTFCC 2030 Strategy? How can this strategy be effectively adapted and implemented by countries at national, regional and global levels?
5. How can public awareness of the issue be raised and effective education promoted? How can current public mentality on the matter be changed?
6. How can the WHO work with other UN bodies such as World Bank, ECOSOC, etc. towards creating policies and guidelines for countries that encourage sustainable city development?
7. Does your resolution tackle this problem equally for both developing and developed countries? How can the WHO make a resolution that successfully satisfies both interests?
8. How will the initiatives in your proposed resolution be funded? By local governments? National governments? Private donors? High income countries?

Topic B: Improving Maternal Mortality Outcomes

From 1990 to 2015, the world saw a 44% reduction in maternal mortality rates. But what can we *really* gleam from this statistic?

Maternal mortality is a cross cutting health issue. With determinants including socioeconomic status, race, gender inequality and access to healthcare, developing effective interventions often requires context specific approaches to address the particular underlying causes at play. One could imagine the diversity of approaches resulting in this reduction and ought to note that no single intervention will be appropriate for all communities. Moreover, one ought to consider the distribution of this statistic. In other words, not all countries have nations have experienced equal reductions in maternal mortality. Certain regions have been more successful than others, and a few countries have even defied this global trend experiencing increases in maternal mortality in the past few decades. Such anomalies- both positive and negative- ought to be scrutinized for clues on what works and what barriers remain on our quest to eliminate maternal mortality by 2030. After all, reaching this goal will require more than tripling the pace of current progress – from the 2.3% annual improvement in maternal mortality rate that recorded between 1990 and 2015, to 7.5% per year beginning next year. This background guide will give a general overview exploring the current state of global maternal mortality, and how we got to this point. By examining global progress, existing interventions, underlying biology, national case studies, and our future goals, my hope is that by the end of this guide you will be thoroughly familiar with the global overview of maternal mortality and capable of researching the context of your own country.

Maternal mortality is defined as the “death of a woman *while* pregnant or *within 42 days of termination of pregnancy*, irrespective of the duration and the site of the pregnancy, and can stem from any cause related to or aggravated by the pregnancy or its management, but not from accidental or incidental causes.” Maternal mortality is frequently reported as the maternal mortality ratio (MMR) defined as the or number of maternal deaths per 100,000 live births, divided by the total # of live births occurring within the reference period. This is the most widely used statistic to describe maternal mortality.

The maternal mortality ratio is calculated as:

$$\frac{\text{All maternal deaths occurring within a reference period (usually 1 year)}}{\text{Total \# of live births occurring within the reference period}} \times 100{,}000$$

The Biology Behind Maternal Mortality

There are a variety of complications that result in maternal mortality. Hemorrhage (severe bleeding mostly after childbirth), sepsis (infections usually after childbirth), hypertension (high pressure including pre-eclampsia and eclampsia), complications from delivery, and unsafe abortion account for 75% of all maternal deaths. Remaining 25% of deaths are associated with diseases including malaria and AIDS during pregnancy.

Many of these complications, however, can be mitigated by existing treatments. Severe bleeding can be countered by immediate oxytocin injection, infection and sepsis can be avoided by good hygiene, and blood pressure can be lowered by drugs like magnesium sulfate to prevent the development of eclampsia. That being said, some of these complications present very suddenly and require immediate attention. One of the most extreme examples, postpartum hemorrhage, leave women with just 2 hours before death. These swift timelines highlight the importance of prevention and nuanced data collection that allow clinics to assess risk and enhance preparedness upon admitting a patient.

However, maternal mortality extends beyond the realm of biology. In fact, “maternal mortality is widely acknowledged as a general indicator of the overall health of a population, of the status of women in society, and of the functioning of the health system.” This reflective quality can be attributed to the intersectionality of maternal mortality, which spans the sectors of health, government, and economics, and is influenced by sociocultural norms.

Millennium Development Goals and Sustainable Development Goals

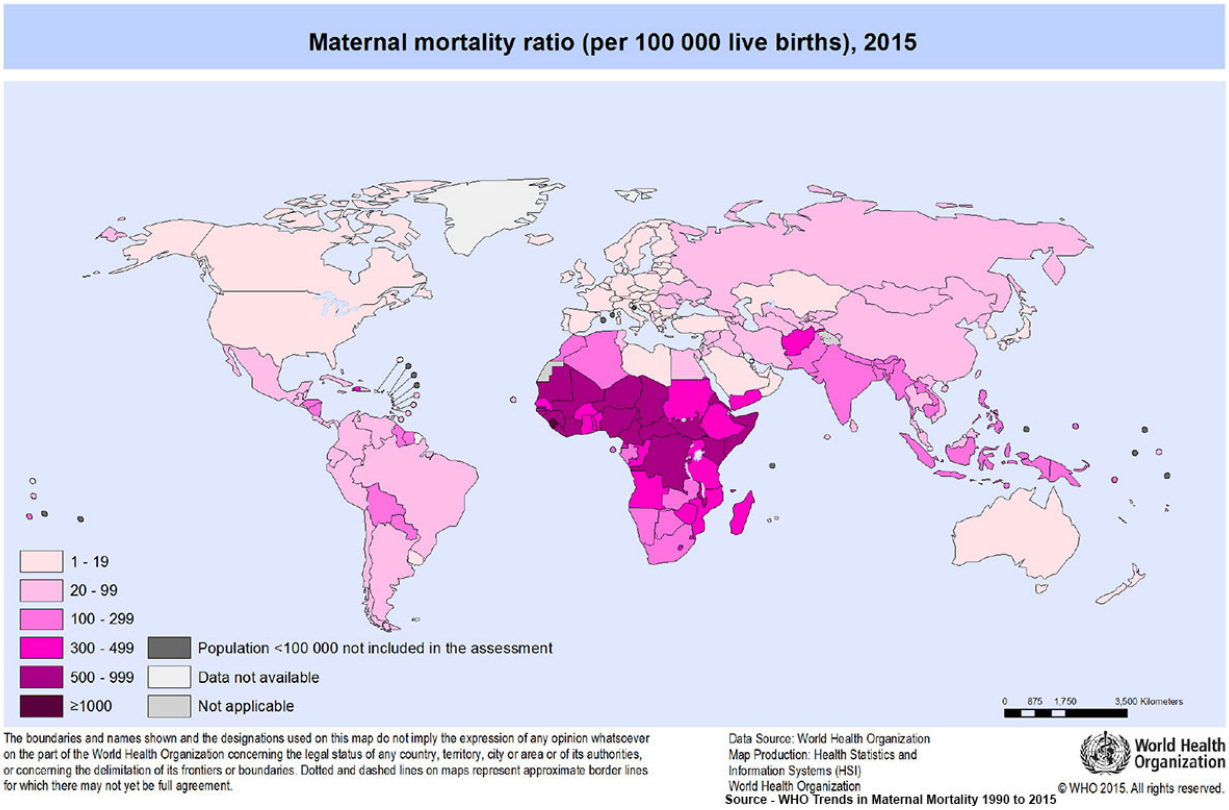
Most maternal deaths are preventable. Falling from approximately, 532,000 global deaths in 1990, maternal deaths have dropped by 44% since 1990. Still, however, approximately ~303,00 women die in a year (2015) because of complications

during pregnancy and birth. There is therefore, still a great deal of work to be done as improving maternal health remains one of the top priorities of the World Health organization.

This priority can be highlighted by the sustained focus on maternal mortality in both the Millennium Development Goals (2000-2015). MDG 5, improve maternal health, aimed to reduce the maternal mortality ratio by 75% by 2015 and by 2015, achieve universal access to reproductive healthcare. While not explicitly stated, other MDGs including combatting disease and gender equality, for example, are tangentially related to maternal mortality outcomes.

The Sustainable Development Goals (2016-2030), a set of 17 goals set to replace the MDGs. Goal 3, "Ensure healthy lives and promote well-being for all at all ages," by focusing on universal health coverage, unmet contraception need, clean water and sanitation, and reducing the spread of communicable diseases. Specifically, SDG 3 aims to reduce maternal mortality to under 70 per 100,000 live births. This sustained focus emphasizes the importance of maternal mortality in achieving improved health outcomes worldwide and may partially explain the tremendous efforts that underwent the 44% reduction from 1990 to 2015.

Dissecting the Bigger Picture



Source - WHO Trends in Maternal Mortality 1990 to 2015

Globally, approximately 99% of all maternal deaths occur in developing nations with a huge concentration of these deaths occurring in sub-Saharan Africa. That is not to say, however, that maternal mortality does not affect high income countries. In fact, in the United States maternal mortality remains to be a huge public health issue which has

more than doubled from an estimated 12 to 28 maternal deaths per 100 000 births between 1990 and 2013.

And on the other hand, the only nine countries worldwide to achieve MDG 5, reducing the maternal mortality ratio by at least 75% between 1990 and 2015 were Bhutan, Cabo Verde, Cambodia, Iran, Lao People's Democratic Republic, Maldives, Mongolia, Rwanda and Timor-Leste. While many of these averages still remain above the global average, they illustrate the potential for tremendous improvement, even in resource limited settings. Regionally speaking, Eastern Asia exhibited the greatest improvement in MMR with a 72% reduction from 95 to 27 deaths per 100 000 live births. In developed regions maternal mortality fell 48% between 1990 and 2015, from 23 to 12 per 100 000 live births similar to the 45% decrease in MMR observed in Sub-Saharan, from 987 to 546 per 100 000 live births between 1990 and 2015. However, note that despite the similar reduction in percentages, note the discrete numbers of Sub-Saharan Africa that remain much higher.

There are a few countries that have managed to reduce or maintain a low MMR despite economic, political, and natural strife. For example, Nepal, in the same timeframe boasts a 71% reduction in its maternal mortality ratio despite enduring civil war and a major earthquake. Alternatively, despite the severe economic crisis, Greece remains one of the safest places to deliver a child. While these are just two examples, a multitude of such "exceptions" exist which ought to be studied to observe and identify the highly effective methods responsible.

Identified Causes and Approaches

There are two primary approaches that can be taken to address this nuanced issue. First, one can try to bridge the lack of access that is the number one causal factor. Lack of access to skilled medical care is the #1 obstacle to improving maternal health. Women do not see health professionals enough during pregnancy for a variety of reasons ranging from poverty, distance, lack of information, inadequate services, and cultural practices. In turn, they receive subpar or discontinuous medical care and are more likely to suffer from complications that result in mortality. Ensuring access to high quality services and increasing the number of available midwives and other health workers with midwifery skills can mitigate these negative outcomes. Alternatively, one can focus on related determinants like gender inequality, education inequality, or co-morbidities to attack the determinants or issues that exacerbate maternal mortality. For example, education may offer women the knowledge that enables them to challenge

traditional practices that endanger them and their children. In any case, when designing such interventions it is imperative to work closely with community leaders to ensure that national and community needs are accounted for and reflected in intervention work.

The Problem with Statistics

Given the complexity and sensitivity of maternal mortality, data can be difficult to obtain and results can be difficult to interpret. In fact, one of the biggest challenges in attacking maternal mortality is obtaining data that reliably allows us to understand the current state of the issue. There are a myriad of reasons that impede us from obtaining thorough maternal mortality data. One aspect is cultural, where healthcare individuals may fear punitive action or shame by reporting a case of mortality. In other cases, data reporting infrastructure that includes civil and vital registration systems like births, deaths and the causes of death may simply not exist.

Currently, maternal death review (MDR) is the most widely employed system used to evaluate maternal deaths. However, the efficacy of maternal death review truly varies as there many countries where the MDR process ends with community or facility based reviews with no further follow-up or action based on the findings. In response, the World Health Organization has begun implementing a new reporting program, Maternal Death Surveillance and Responses. This program differs from traditional MDR primarily in its dynamic nature and focus on action. Specifically, there are four essential components, where MDR is just one of four:

a) identification and notifying maternal deaths
b) maternal death reviews (MDR)
c) analysis and recommendations
d) response and monitoring

The Maternal Death Surveillance and Response system measures and tracks all maternal deaths in real time. This “real-time” reporting is critically important for dynamic responses, which differs greatly from the more stagnant traditional MDR practices. Moreover, it helps us understand the underlying factors contributing to the deaths, and stimulates and guides actions to prevent future deaths. It is worth noting that one fourth of MDSR focuses exclusively on response and evaluation. This emphasis on action is what makes MDSR a unique program to not only obtain and synthesize data findings, but to then to eliminate preventable maternal mortality at large.

In theory, MDSR is a significant first step required to improve maternal mortality data collection and devising action plans. There are however, a series of complications that may arise when transitioning a community from MDR-like systems to centralized, dynamic systems like MDSR which to overcome requires coordination at all levels. First, strong government commitment is required to devote the necessary resources to a program like MDSR. This quality is best exemplified by the United Kingdom, whose death review and the methodology used is considered the global standard and has the longest running review system. Other countries like Malaysia, RSA, Nigeria, and Kenya may have mandatory reporting or free maternal resources to spearhead efforts. Second, important for long-term sustainability is that professional organizations are the drivers of MDR. This is particularly important in low resource settings that may not have abundant public resources. Third, legal frameworks must be conducive to honest reporting. For example, punitive policies may deter reporting of maternal deaths and thus confidential and non-punitive frameworks ought to be carefully developed to honor both honest reporting and patient safety. Finally, in the quest for eliminating preventable maternal mortality, culture is a critically important component. For example, in Malaysia MDR is conducted as a 'no shame, no blame' process. Instead, the emphasis is on teaching and learning from each death to improve the health system at large. Similar cultures

High MMR indicates problems but doesn't clarify information regarding the causes of high maternal mortality or the interventions required to reduce maternal deaths. For this reason, a dynamic, centralized, and navigable system like MDSR will be required to efficiently report maternal deaths in a way that allow us to consolidate findings and take decisive action.

Looking to the Future

There are a series of questions that will be critical to future improvements in maternal health. First, how can we improve maternal mortality data collection? Concerted efforts to improve the reliability, frequency, and, organization of this data will be central to addressing this question. Second, we ought to ask how to interpret the statistics we receive. Statistics regarding maternal mortality are often challenging to assess on both a small community scale, and a large global scale. For example, in a community cases are frequently so few that it is hard to draw broad conclusions about causal determinants. On a global scale, reductions in MMR may be difficult to interpret as advances may not be unanimous and the intervention responsible may not be obvious. Finally, we ought to consider cultural competency in this sensitive issue of

health. How can we work within religious, ethical, and cultural frameworks to implement sustainable solutions that are wanted by the community themselves?

There is a distinct role for all nations to play in the fight against maternal mortality. Whether a nation's MMR is the highest or lowest in the world, extending successful strategies, absorbing new methods, and working on international agreements include just some of the important tasks that will take place through the WHO. I encourage you each to look at the state of maternal mortality, gender equality, and healthcare access in your countries and regions specifically. Look at any previous policies or steps that have been taken to improve maternal mortality outcomes. If none have been taken, look to similar countries; what strategies have been successful and what models of healthcare may be implementable in your nation? Additionally, consider the geopolitical state of your country. Maternal mortality is greatly exacerbated in countries where instability, conflict and protracted crises are prevalent. If this is the case in your nation, your approach may be quite different. In all cases, be cognizant of your national resources, alliances, and infrastructure to ensure that proposed solutions are viable given their context. Finally, don't forget to think about international policies that the World Health Organization may implement that would be widely beneficial. Such broad policies will certainly be critical in overcoming this worldwide issue and fostering global partnership and accountability.

Best of luck!

Your chair,
Matina Kakalis

References

Filippi, Véronique. “Levels and Causes of Maternal Mortality and Morbidity.” *Reproductive, Maternal, Newborn, and Child Health: Disease Control Priorities, Third Edition (Volume 2).*, U.S. National Library of Medicine, 5 Apr. 2016, www.ncbi.nlm.nih.gov/books/NBK361917/.

World Health Organization and partner organizations. “Maternal death surveillance and response: technical guidance. Information for action to prevent maternal death.” 2013, apps.who.int/iris/bitstream/10665/87340/1/9789241506083_eng.pdf?ua=1.

"Developing Capacities of Community Health Workers in Sexual and Reproductive, Maternal, Newborn, Child, and Adolescent Health: A Mapping and Review of Training Resources.", archive.org/stream/pubmed-PMC3988080/PMC3988080-journal.pone.0094948_djvu.txt.

“Reproductive Health.” *Centers for Disease Control and Prevention*, Centers for Disease Control and Prevention, 9 Nov. 2017,

“Sustainable development goals.” *United Nations*, United Nations,

“Maternal mortality.” *World Health Organization*, World Health Organization,

“Maternal mortality ratio (MMR).” *Maternal mortality ratio (MMR) - MEASURE Evaluation*, 26 Jan. 2017, www.measureevaluation.org/prh/rh_indicators/womens-health/sm/maternal-mortality-ratio-mmr

“MDG 5: improve maternal health.” *WHO*, World Health Organization, www.who.int/topics/millennium_development_goals/maternal_health/en/.

“Maternal mortality and morbidity in the United States of America.” *WHO*, World Health Organization, www.who.int/bulletin/volumes/93/3/14-148627/en/.