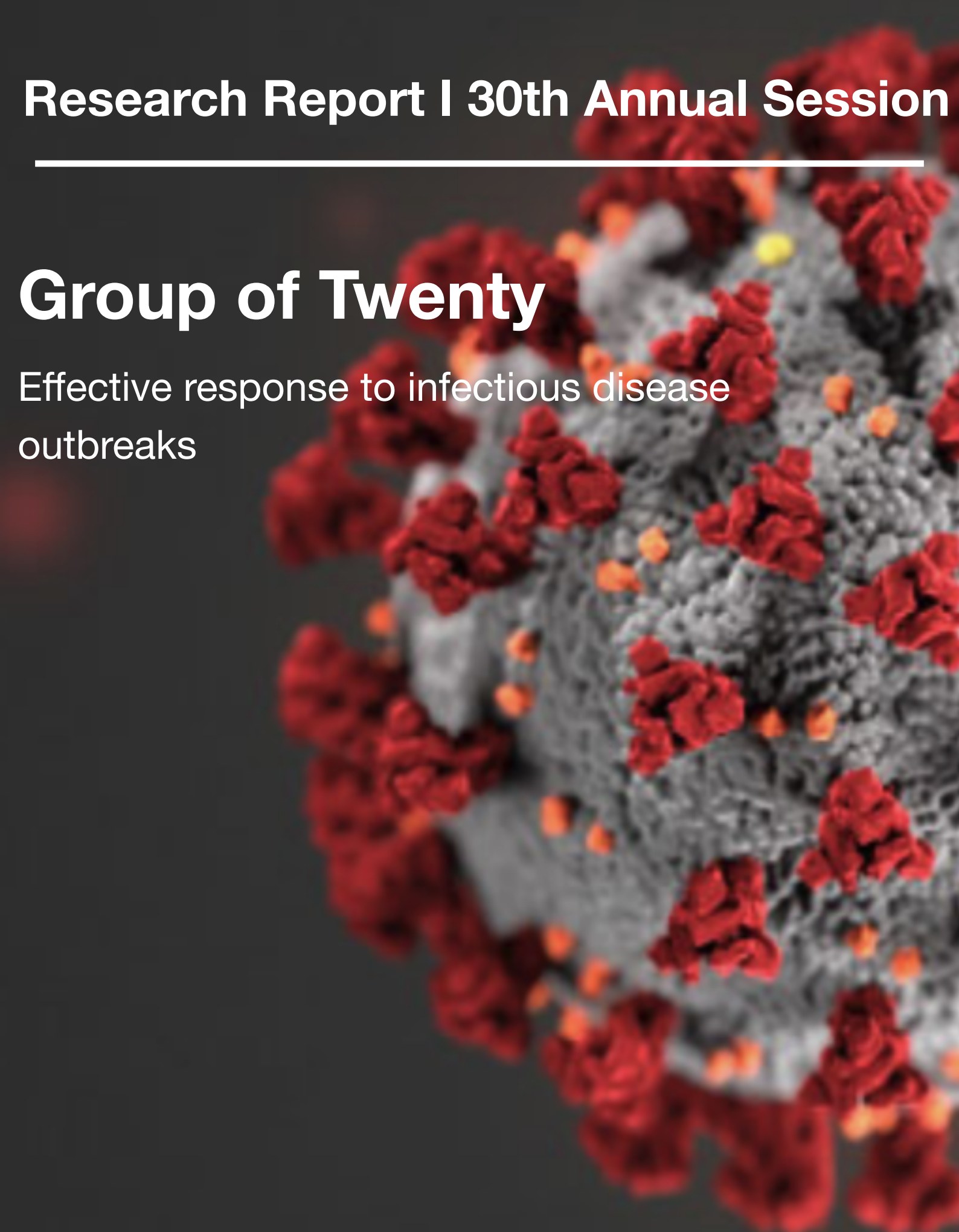
Research Report I 30th Annual Session

Group of Twenty

Effective response to infectious disease outbreaks



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Romeo Buet

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Student Officer:	Romeo Buet
Position:	President

Introduction

Disease and illnesses have troubled humanity since the start of our history. Nevertheless, it was not until the apparent evolution to agrarian societies that the number of disease outbreaks begun to grow to an alarming scale, and their spread increased dramatically. New opportunities generated by extensive trade for human and animal interactions sped up disease outbreaks to pandemics, which came to be our tragic undoing. Malaria, influenza, smallpox, and several others made their first appearance many centuries ago. As communities became more advanced and developed - with more populous cities, dense overcrowded environments, and ease to travel to distant lands – the risk of pandemic grew extensively, settling into our communities, becoming part of our daily lives.

Notwithstanding the persistence of outbreaks throughout history, a trend stays consistent over time, a progressive continuous decline in the death rate. Some geographic regions with high spark risk (where a pandemic is likely to arise), including a significant part of Africa as well as southeast Asia and South America, lag behind the rest of the globe in pandemic preparedness. Pandemics can critically affect the mortality and morbidity rates on a large scale; in recent years, data points towards the fact that mortality rates in LMICs are disproportionally higher, and numerous reported disease outbreaks are likely responsible for this change.

Pandemics are bound to cause severe damage in a multitude of different areas of our society, impacting not only our global health but our economic and financial well-being. In nations with anemic governments and legacies of political instability, increase political stresses and tensions ensue as a result of pandemics. While in LICs, disease outbreaks can eradicate whole communities and dramatically affect the mortality rate and life expectancy. Overall, infectious disease outbreaks are a growing threat that requires a global united targeted response.

Definition of Key Terms

Infectious Disease

An infectious disease is a disease arising from the presence and activity of a microbial agent, such as bacteria, viruses, parasites, or fungi; it is transmissible by infection or contagion directly or through a vector. They can also arise from animals and are called zoonotic diseases.

Epidemiology

Epidemiology looks at the distribution as well as the determinants of health-related states and spread in specific communities and the application of this study to control health problems.

Vaccine

A vaccine is a substance made up of attenuated or killed microorganisms (viruses, bacteria, etc.), employed for stimulating the production of antibodies that provide immunity against diseases; it is administered for prevention, amelioration, or treatment of infectious diseases.

Pandemic

A disease outbreak affecting large populations or a whole region, country, or continent. A seasonal pandemic occurs annually in each of the temperate southern and northern hemispheres, going over international borders, and disturbing a large number of people.

Herd Immunity

It is a form of protection occurring when a sufficient percentage of people in a particular region/area is immune to an infectious disease that it cannot spread to others, through a multitude of ways including vaccination or previous infections, thereby reducing the likelihood of infection for individuals who lack immunity

Influenza Virus

Influenza is a viral infection that strikes your respiratory system — your nose, throat, and lungs; influenza is more commonly referred to as the flu. Human influenza viruses: A and B cause seasonal epidemics of disease (known as the flu season) almost every winter. Influenza is the only type of virus known to cause flu pandemics;

in other words, it is responsible for most of the global epidemics. They can occur when a mutated type of influenza A virus emerges that infects populations with a high rate of transmission.

Communicable diseases

Communicable diseases are diseases that are caused by any bacteria, viruses, or other pathogens that can spread from person to person; they are also known as transmissible diseases.

General Overview

Infectious disease outbreaks have plagued since the start of civilization; however, over the course of recent years, their occurrence has drastically increased as well as their significance with communities. A number of factors are responsible for this alarming and menacing trend, from population growth to new inner workings of societies and behavioral changes, which need to be identified and mitigated.

Fortuitously, over the years, we have made significant improvements and technological progress in the field of epidemiology, which has contributed significantly to mitigating the spread of current diseases along with preventing new outbreaks. Such advances include tremendous expansion in the delivery of healthcare, from intensive care to vaccine centers, which can be mainly attributed to the total global aggregate expenditure on healthcare, which in the past two decades has stayed relatively stable, notwithstanding a slow yet steady increase.

Data from the World Health Organisation (found in the World Development Indicators) goes to show total healthcare spending as a percentage of GDP has seen an overall enhancement of approximately 1.5 perceptual points over twenty years, with a relatively constant share of resources from the public sector, with countries reaching above 5000$ health expenditure per capita. Furthermore, other data points towards a positive future with an increase in world average life expectancy of more than five years (from 66.3 to 71.4), jointly with a decrease in infant mortality rate from 7.71% to 3.91%.

Enhanced knowledge has also been a powerful tool in mitigating the impacts of pandemics in recent years, comprehension of viral pattern and bacterial spread had aided us in setting up specific restrictions and policies to reduce the growth of

infectious disease outbreaks. However, access to information has also caused individual behavioral changes, which are a primary cause of adverse shocks to economic growth; behavioral patterns such as fear-induced aversion to public gathering areas are indirect impacts of pandemics.

In the current global economic and political climate, we cannot afford to let pandemics perdure within our population, damaging our global health, economy, social state; therefore, we must take direct action, creating a practical response framework, forming new policies, and restrictions, founding multilateral area focused health institutions on behalf of WHO, to alter our current disadvantageous actions and install constructive response framework.

COVID-19

The COVID-19 pandemic began in December 2019, as a new infectious respiratory disease emerging in Wuhan, China; it is considered the most crucial global health calamity of the past hundred years and sits as the most severe challenge the humankind faced of the century. The report from the World Health Organization (as of April 18, 2020) states that the current outbreak of COVID-19 has affected over 2,164,111 people and killed more than 146,198 people worldwide in over 200 nations. The main issue with Covid-19 still stands from the fact that there is no result of any clinically approved antiviral drugs or vaccines proven effective against it. Since then, it has rapidly spread worldwide, forming colossal health, economic, and social challenges to the entire global population. The coronavirus outbreak has severely disrupted the global economy and labor market along with it. As of now, almost all countries are attempting to minimize the transmission of the disease through targeted testing & treating highrisk patients, quarantining suspected active cases employing contact tracing, restricting the possibility for large gatherings, while maintaining some form of lockdown (complete or partial).

Due to uncertainty, unpredictability, irregularity, compared to previous infectious disease outbreaks, COVID-19 should not be taken as a prominent example for the creation and implementation of effective responses to pandemics. It is an unprecedented situation, which cannot account for the impacts and solutions necessary for more prevailing disease outbreaks. Moreover, this situation is continually evolving and is not predicted to come to an end soon; therefore, judgment and conclusions cannot yet be drawn.

Major Parties Involved

World Health Organisation (WHO)

The World Health Organisation or the WHO is a globally active specialized international organization that deals with global public health, continuously in function with 194 Member States, across all six continents, as well as 150 field offices worldwide. It is headquartered in Geneva, Switzerland. However, it has six semi-autonomous continental offices to improve its targeted response.
Its member nations govern the organization, all decisions made by the organization revolve around the central goal of the WHO, which states “the attainment by all peoples of the highest possible level of health.”

The WHO aims to build a better, healthier future for people all over the world; its primary goals are to reduce the spread of infectious diseases, strive to combat diseases form communicable diseases to non-communicable and hereditary diseases, as well as down to the most basic rights including ensuring the air they breathe is as safe as it can be, along with the food they may eat, the water from which they drink as well as their medical needs like medicines and vaccines.

World Bank (International Development Association/International Finance Corporation)

The World Bank is a specialized international financial institution which supplies loans and grants to governments of less opulent nations for the sole purpose of pursuing capital projects. The International Development Association (or IDA) supports LICs and MICs with interest-free loans, also referred to as credits, and grants, for them to not be hindered by their financial situation. The International Finance Corporation (or IFC) assists developing countries to achieve significant sustainable growth with subsidies and financing investment, mobilizing capital in international financial markets, and providing advisory services to businesses and governments. It is the largest international development institution directed exclusively in the private sector.

European Union (E.U.)/European Center for Disease Prevention and Control (ECDC)

Established on November 1, 1993, the European Union is an economic (customs union) and political union comprising 28 member states. The E.U. was created in the aftermath of the second world war to promote economic cooperation

between its member nations. As the E.U. grew in size, it sought to develop a large singular market to achieve its full economic potential.

The European Centre for Disease Prevention and Control or ECDC was established in 2004 in Solna, Sweden; it acts as an independent agency of the E.U. with a mission to strengthen Europe's defenses against infectious diseases.

Médecins sans Frontiers

Médecins Sans Frontières (or MSF), otherwise translated to Doctors without Borders, was founded in Paris back in 1971 by a group of journalists and doctors, all united by the idea of providing medical care to those in need of it. Today, it has grown to a worldwide movement of more than 67,000 people, which provides medical assistance to communities touched by conflict, epidemics, disasters, or exclusion from healthcare. Their on-ground teams are made up of tens of thousands of health professionals, logistic and administrative staff, all working their hardest to save lives every day. Principles of impartiality and medical ethics led to Medecins sans frontiers being a neutral, independent non-profit, self-governed, member-based organization.

MSF distributes teams around the globe in positively affected areas, where they conduct independent evaluations determining the medical needs and assistance required for improvement.

Centre for Disease Control and Prevention

The Centre for Disease Control and Prevention (or CDC) is a national public health institute in the United States; it stands by the federal agency under the Department of Health and Human Services, headquartered in Atlanta, Georgia. Its focal goal prevails to be to protect the public health and safety at a national as well as international level through the control and prevention of disease outbreaks. The CDC focuses on infectious viruses, foodborne pathogens, and bacterial diseases, looking to develop and apply disease control and prevention frameworks specifically designed an targeted.

Timeline of Key Events

Date	Description of event

July 1, 1946	Formation of the Centre for Disease Control and Prevention
April 7, 1948	Formation of the World Health Organization
December 22, 1971	Formation of Médecins Sans Frontieres
January 2000	Formation of GAVI, an international organization based in Geneva, Switzerland, which brings together public and private sectors with improving access to new and underused vaccines for children living in poverty.
April 26, 2000	GOARN framework was put then forth in a meeting in Geneva, attended by 67 participants; GOARN was formed with the intention of contributing resources, coordination, surveillance, and technical assistance towards combating infectious disease outbreaks.
Nov 16, 2002	SARS outbreak, a viral respiratory illness caused by a coronavirus, was first diagnosed in Asia in February of 2003; a total of 8,098 people in the whole world became sick, with 774 death overall.
September 28, 2004	Formation of the European Center for Disease Prevention and Control
March 1, 2006	Mumps in the U.S., more than 6,500 cases in 2006 were reported. Mumps spread through close contact activities such as sports, dancing, kissing, etc. Unusual symptoms include fever, puffy cheeks, and a swollen, tender jaw.
April 30, 2009	H1N1 virus outbreak eventually came to be a pandemic flu reaching 208 countries by December of the same year and resulting in over 12,220 deaths. The flu was first transmitted by pigs as respiratory disease and grew through contact with farm raisers or participation in fairs.
May 24, 2011	PIP (Pandemic Influenza Preparedness) framework comes into effect to improve and strengthen the reaction to influenza viruses with human pandemic potential.
June 23, 2012	Whooping cough, less commonly known as pertussis, is a respiratory disease surmounted to 48,277 cases in the U.S. alone. Coughing fits would last up to about ten weeks and could be life-threatening for infants. Overall, the estimation of whooping cough cases was estimated to 24.1 million, counting about 160,700 deaths per year, with data from the National Centre for Biotechnology Information.

January 22, 2012	Mers, or Middle East Respiratory Syndrome, first begun in the Arabian Peninsula back in 2012; it was associated with the coronavirus once the illness became viral like previous diseases. Outbreaks were ongoing until 2019, since which 2,494 cases have been reported, including 858 deaths.
May 24, 2014	Ebola was first encountered in Congo (DRC) near the Ebola River in 1976. Nonetheless, the most violent outbreak started in Guinea before spreading to neighboring nations. Sierra Leone was greatly affected by the highest cases: 14,124 and 3,956 deaths. Ebola reached outside the continent but only recorded a few cases and one fatality. Since then, a vaccine against the disease was announced, providing new hope.
February 2016	Zika virus is a communicable vector virus, which spread through mosquitoes, and mainly threatened pregnant women, as if bitten could risk a stillbirth in their pregnancy, or possibly preterm birth, and fetal loss. Since November of 2016, 84 countries had reported having active Zika virus cases and spreading in high numbers, including the one where it originated from Brazil.
January 30, 2020	COVID-19, originating from Wuhan, China. Like the SARS and MERS previously, the virus originated from individual animals before infecting humans and has spread quickly. The confirmed locations of the virus's presence are in Asia, the U.S., Canada, Australia, Europe, and Russia.

U.N. involvement, Relevant Resolutions, Treaties and Events

- G20 Osaka Summit on Global Health, June 28, 2019
- Conference on the International Health Regulation, General Assembly
- Global health and foreign policy: Word Health Organization, General Assembly, Resolution A/RES/72/13
- Resolution A/RES/73/131, Scope, modalities, format, and organization of the High-Level Meeting on Universal Health Coverage
- World Health Summit, October 2019

Past Attempts to Resolve the Issue

As shown in the timeline, there have been various attempts to create organizations and solutions to form effective responses to the various infectious disease outbreaks across the world over the last twenty years. However, despite the success of several ones, more intervention is imperative to mitigate the spread and impact of infectious disease outbreaks. The World Health Organisation alone has had several attempts at, but its primary focus has always been to solve the problem slowly, looking attend to the disease outbreak at hand. Over the past few decades, the WHO and other multilateral government organizations, such as but not limited to the United Nations, are also equally involved in the discussion, have been able to increase access to healthcare while simultaneously decreasing mortality rates. The WHO goes through a rigorous process of and discussion before deciding on the outcomes and solutions for disease outbreaks. These solutions are often based on the broad principals held by the WHO and signed off on by its member nations.

- International Health Regulations (IHR)
- Pandemic Influenza Preparedness Framework (PIP)
- Global Outbreak Alert and Response Network Framework (GOARN)

The first principle is used as a guideline when dealing with the most common forms of international disease outbreaks, setting up essential policies and primary responses. The second principle serves an elemental framework to answer pandemic stemming from the influenza virus; due to their predictability, a singular response system is most appropriate, which would improve and strengthen reaction. In contrast, the third principle is focused on contributing resources, coordination, surveillance, and technical assistance towards combating infectious disease outbreaks.

Multiple summits have been held, several new organizations have been founded, constructive resolutions have been passed to the highest level, new response frameworks have been inaugurated; despite all of that progress, infectious disease outbreaks continue to perdure. As although most of the WHOs member nations agree that uncoordinated response to pandemics is detrimental to a stable, effective solution, the real problem stems from the inability to gain unanimous support behind a single solution. Member nations still cannot agree upon the most efficient way of instituting global scale policy to mitigate the spread of infectious diseases as well as the adequate response framework.

Possible Solutions

We already know that past attempts to create a single framework that would have failed due to complications and unpredictability of infectious disease outbreaks.

The first method requires all the member states of the WHO or another group of multilateral health organizations, which could include the CDC and ECDC, convene and set up new organizations to or create a set of rules and regulations around the procedures to follow when a threat or pandemic appears. It is also essential to help developing countries grow financially in a stable manner, allowing them to improve national health care as there is a direct correlation between GDP and aggregate health expenditure. Disease outbreaks of pandemic potential vary widely in the resources, capacities, and strategies required for their mitigation; however, standard shared requirements for effective preparedness and response exist. They have been identified over the years. Nonetheless, spending and costs associated explicitly with pandemic preparedness and response efforts are poorly tracked, notwithstanding that there is still a lack of accepted, consistent methodology to form estimation of the direct and indirect economic impacts of pandemics. As the central part of the data regarding the impacts of global disease outbreaks, including the benefits and costs of mitigation measures, is recorded from high-income countries (HICs), it leads to bias conclusions and in potential blind spots with respect to the uncertainties, consequences, and optimal interventions specific to LMICs. Tracking the spending and costs seriously, extensive research for a vaccine, eliminating bias and blind spots from reports should prove very profitable in mitigating the impacts of infectious diseases outbreaks.

While attempts to increase global health expenditure have come through and flourished greatly like the talks in the General Assembly on global health and finance, very high global inequality in health spending per capita persists and prevails even now. In the Central African Republic, solely 25 international-$ is spent per capita while on the other end of the distribution, in the U.S., 9,403 international-$ are spent. The ratio between the two countries comes up to 376; on average, Americans spent more on health per day than a person in the Central African Republic spends in an entire year. Therefore, a focus on raising health expenditure per country must be set; it could be set out effectively through a specific summit and resolutions dictating exact terms, like possible subsidies or target results.

In several countries, funding and resource efforts are stemming from extensive public policies and coordinated civil-society interventions. An essential part of the private funding for healthcare takes the form of ‘out-of-pocket’ spending. This refers to direct outlays made by households, including gratuities and in-kind payments, to

healthcare providers. In high-income countries, a trend can be spotted, this outlay tends to make up for merely a small part of the aggregate expenditure on healthcare (e.g., France, where it stayed below 8% since 2000); on the other hand, in developing countries, they account for the majority of funding (e.g., Afghanistan, where the percentage of out-of-pocket expenditure reached 87.7% in 2002). Several nations have reduced this expenditure (particularly in the developing world) following the negative analysis. Withal, some nations have still not taken up this change, bringing up this issue at the General Assembly along with the publication of research reports would prove useful to turning the remaining countries in the right direction.

Medicine availability in low-income countries persists in standing as a barrier to affordable medical care access; there exist multiple factors required in ensuring everyone has access to essential medicines; firstly, they must be available, and secondly, they must be affordable. Increasing the resources of active organizations, such as the Médecins sans Frontiers, would help provide the linkage between the patients and the production if needed funds may be taken from a financial institution such as the World Bank in the form of a grant or interest-free loan.

The most promising and prudent strategies for increasing pandemic preparedness, particularly taking into account the resource-constrained settings, consist of investing in strengthening core public health infrastructure, including water and sanitation systems, on top of increasing situational awareness and rapidly extinguishing new outbreaks that could lead to pandemics. As soon as a pandemic has begun, a coordinated response must be implemented, targeting the attention on maintaining situational awareness through public health messaging and possible reduction of transmission, as well as the delegation of patients to different departments focusing on the ones requiring intensive care. Successful contingency planning and response also require surge capacity, which is the ability to upsurge the delivery of health missions in proportion to the severity of the event, and conceivably the population at risk.

Several countries are poorly prepared and not ready to face and sustain the impacts of pandemics; foreign aid providers can offer surge capacity; this strategy is tenable in particular during localized outbreaks. However, global surge capacity is limited in size that likely will be reached in times of a full-scale global pandemic. Additional risk transfer mechanisms, such as but not limited to risk pooling and sovereign-level catastrophe insurance, may provide a manageable option for dealing with the pandemic risk.

Finally, scientific research organizations such as the WHO, the CDC, and ECDC, as well as the IDRI and SBRI to research deeper into infectious diseases to further our knowledge and understanding of pandemics, allowing us to make sustained informed decisions with improving technological advancements. Additionally, to implement effective responses to infectious disease, outbreaks would form more region-specific institutions like the ECDC, CDC, GAVI, and GOARN should serve as examples to encourage countries to unite and work jointly. This solution would still have significant drawbacks like the logistical costs of creating individualized plans or the time taken for implementation for these plans.

It is essential to consider that epidemiology is an ever-fluctuating field where at any moment, especially in times of uncertainty such as today, a significant breakthrough may arise. Therefore, all delegates should keep up to date on the subject as things may stand differently by the time of the MUNISH.

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Additional resources

- Harvard University Health Medical Dictionary: https://www.health.harvard.edu/a-through-c.
- 2019 Statistics about infectious disease outbreaks: https://www.wto.org/english/res_e/publications_e/world_trade_report18_e.pdf
- Global health expenditure database: https://apps.who.int/nha/database.