

Vancouver Youth Model United Nations 2019



World Health Organization Background Guide

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My name is Vivian Liang and it is my distinct honour to welcome all of you to Vancouver Youth Model United Nations 2019. Currently a junior at York House School, I am beyond delighted to be serving as the director for the World Health Organization.

Model United Nations not only introduced me to the world of diplomacy, global affairs, and vivid debate, it also brought me some of my most cherished friendships—friendships that will last me a lifetime even past Model United Nations. As your director, I hope to foster a safe and friendly environment in which delegates have room for self-discovery, learning, and of course, a memorable time.

This year, we will be exploring two significant topics: Access to Primary Healthcare and the Rise of Biotechnology. Our first topic, Access to Primary Healthcare, although seemingly irrelevant to Canada is the basis of global health which affects every nation. Parallel to WHO's mission: to "improve health particularly among disadvantaged populations"¹, primary health care works to guarantee quality health care to all. In this topic, delegates will need to develop a solid understanding of their own country policy as regional stances will vary greatly.

Our second topic, the Rise of Biotechnology, has quickly become one of the most promising methods of medical treatment while also being one of the most debated and argumentative topics in modern health care. All delegates must keep an open mind when approaching this issue staying wary of the effects of any policy change.

If you have any questions or concerns, please do not hesitate to contact me at who@vymun.com. Alongside my fantastic staff members Sean, Tessa, and Ben, I look forward to meeting you all in October.

Best wishes,
Vivian Liang
Director of WHO | VYMUN 2019

¹ https://www.who.int/bulletin/mission_statement/en/

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Rise of Biotechnology

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Topic 1: Access to Primary Healthcare

Questions to Consider

1. What are the current healthcare systems used in your country?
2. How much of your country's population has access to primary health care? What are some of the local contributing factors to that number?
3. What is the main reason current primary health care systems are insufficient and lacking? How can the committee work towards changing that?
4. How should countries deal with circumstances where the government is too corrupt to focus on developing health care?
5. Where should the funding for these programs come from? Should cross-national aid be encouraged and endorsed by the committee?
6. How can the committee incentivize countries to prioritize primary health care for their citizens?

Overview

Since 2000, the world's child mortality rate has decreased by almost 50 percent alongside HIV/AIDS infection rates that have dropped by 40 percent². Although, these statistics seem to represent great health improvements in the modern world, in reality, these numbers hide the fact that over half the world still lacks access to basic health services.³ Today, nearly 400 million people do not have access to primary health care with another 100 million forced into extreme poverty due to healthcare spending⁴.

The definition of primary health care as defined by WHO is based on three components: helping people meet their health needs throughout their lifetimes, addressing broader circumstances that affect one's health such as economic or social conditions through informed policy changes and governmental action, and empowering citizens to prioritize their health and

² <https://www.economist.com/leaders/2017/08/24/why-developing-countries-must-improve-primary-care>

³ <https://www.who.int/news-room/detail/13-12-2017-world-bank-and-who-half-the-world-lacks-access-to-essential-health-services-100-million-still-pushed-into-extreme-poverty-because-of-health-expenses>

⁴ <https://www.who.int/mediacentre/news/releases/2015/uhc-report/en/>

well-being⁵. Primary health care also addresses key elements required for better health security as well as addressing the prevention of health threats such as epidemics and antimicrobial resistance, through community engagement, education, and even surveillance. Although the terms ‘primary health care’ and ‘primary care’ are used interchangeably, there is one significant difference: primary health care is a “whole-of-society” approach that addresses the many aspects and determinants of ‘health’ while primary care is used simply to describe the first line of health providers⁶.

For WHO, the approach that is taken in primary health care (PHC) aligns directly with the committee’s *13th Global Programme of Work* which indicates WHO’s goals and resolutions to be achieved by 2023⁷. The actions enacted in PHC makes progress and builds upon numerous resolutions such as universal health coverage and strengthening the health system.

PHC has shown to be an efficient and highly effective approach to address the leading causes of poor public health in our world today. PHC is also well adapted in responding to quick social, economic, and demographic changes which in a recent analysis proved to be around half the reasoning for all health improvements made between 1990 to 2010⁸. Stronger PHC is also necessary to attaining any health-related goals such as those in the Sustainable Development Goals (SDG’s). PHC can also be a contributing aspect to other non-health oriented goals including those on hunger, education, gender equality, sanitation, world and economic growth, and more.

Arguably one of the most difficult areas in approaching this topic is the fast-changing needs in varying situations based upon their economic, social, and geographical conditions. Essentially, this means that there is no single approach that can be taken to solve this issue, instead, solutions must be curated to fit the different conditions present in each country. As globalization is continuing to put countries under the pressure of social coherence, health systems—a focal component of modern societies—are clearly not as developed as required. People are becoming increasingly dissatisfied with the ineptitude of current health systems failing to meet their needs. The current disease-focused system is clearly outdated, therefore, a stronger, more efficient PHC system is necessary.

⁵ <https://www.who.int/news-room/fact-sheets/detail/primary-health-care>

⁶ https://www.cna-aiic.ca/~media/cna/page-content/pdf-en/bg7_primary_health_care_e.pdf?la=en

⁷ <https://www.who.int/about/what-we-do/thirteenth-general-programme-of-work-2019-2023>

⁸ <https://www.who.int/news-room/fact-sheets/detail/primary-health-care>

Timeline

April 1948: The World Health Organization is founded in Geneva, Switzerland.

1978: The Declaration of Alma Ata is created⁹. This declaration signified an international commitment to primary health care and declared that health is a human right. The Alma Ata declaration of 1978 was the first attempt to unite all ideas surrounding health within a single policy framework¹⁰.

1979: Enthusiasm for investments in health care is greatly decreased due to the global economic crisis. The crisis results in a push for vertical programs such as selective PHC.

1987: Efforts for improved PHC systems and lower user fees for medicine are led by the Harare Declaration and Bamako Initiative in Africa¹¹

1990s: The World Bank promotes the use of user fees to finance struggling health systems: “public sector efficiency could be improved by privatizing the health sector and by introducing user fees, which in theory would raise the additional revenue necessary to make the health sector financially viable”(10). Medicines are the largest out-of-pocket expenditure in most low and middle income countries. User fees result in “widespread ‘financial catastrophe (for households) associated with direct payments for health services’”(10). Three decades after the widespread adoption of user fees, there is now a worldwide movement to more equitable financing and universal health coverage.

1993: The World Development Report 1993: Investing in Health is released. This report supports investing in health as a means of increasing economic development and a better division of health expenses. The report recommends “redirect[ing] government spending away from specialized care and toward low-cost and highly effective activities such as immunization... and control and treatment of infectious diseases”¹²

2000: The 2000 World Health Report, Health Systems: Improving Performance, published by WHO, emphasizes the importance of quality and equal health care¹³.

⁹ https://www.who.int/publications/almaata_declaration_en.pdf

¹⁰ https://www.who.int/alliance-hpsr/resources/FR_Ch2_Annex.pdf

¹¹ https://www.researchgate.net/figure/Timeline-of-key-policy-developments-about-primary-healthcare-PHC-relevant-to-South_tbl1_283792582

¹² <https://www.nap.edu/read/5513/chapter/4>

¹³ https://www.who.int/whr/2000/en/whr00_en.pdf

2001: WHO releases the Report of the Commission on Macroeconomics and Health recommending increased scaling up of resources spent for the health sector in developing countries. The report also emphasizes the need to tackle non-financial related obstacles limiting the delivery of health services¹⁴.

2005: Member states of WHO make a commitment to work towards universal healthcare coverage in resolution WHA58.33.

2007: Everybody's Business: Strengthening Health Systems to Improve Health Outcome, an outline framing necessary steps of action is published by WHO¹⁵.

2008: Medicines Transparency Alliance (MeTA) is created. MeTA is a network of individuals and organizations working together with the goal of improving access to medicines through methods of transparency and accountability¹⁶.

2008: The 2008 World Health Report, Primary Health Care (Now More Important than Ever), is published by WHO. This report highlights the use of PHC to better the response to demanding health needs in the population¹⁷.

September 2009: The Health Systems Funding Platform is developed by the three largest multilateral funders of health systems strengthening (HSS): the GAVI Alliance (GAVI), the Global Fund to Fight AIDS, Tuberculosis and Malaria (GF), and the World Bank (WB) and is facilitated by the WHO. This platform is created to help regulate aid provided for health systems¹⁸.

2014: The executive board of WHO passes a resolution focused on access to medicine and addressing the complexity of implementing PHC.

Historical Analysis

The importance and effectiveness of primary health care have been a topic of debate for decades. Regardless of whether countries had access to PHC or not, this issue has significantly impacted the international community; specifically developing countries. With our global health context changing remarkably over the past six decades, the approach to primary healthcare has and must continue to face new changes as well.

¹⁴ <http://www1.worldbank.org/publicsector/pe/PEAMMarch2005/CMHReport.pdf>

¹⁵ https://www.who.int/healthsystems/strategy/everybodys_business.pdf

¹⁶ <http://haiweb.org/what-we-do/medicines-transparency-alliance/>

¹⁷ https://www.who.int/whr/2008/whr08_en.pdf

¹⁸ <https://globalizationandhealth.biomedcentral.com/articles/10.1186/1744-8603-7-16>

During the late 1960s and early 1970s, the final decades of the Cold War, the US was directly involved in its own battle of leadership and it was under this circumstance that the concept of primary health care first appeared¹⁹. During this time period, vertical health care approaches adopted by WHO and countries such as the US were beginning to receive backlash and criticism. It was at this point where new proposals and ideas for the healthcare system began to appear. Books such as *Health and the Developing World* written by John Bryant became popular and brought to mainstream attention. With criticisms such as lack of focus on prevention and being an extremely hospital central system, the effectiveness of present health care systems came into question.

Moving into the 1970s, many leading health organizations received overwhelming critiques and public dissatisfaction for the numerous health and disease eradication campaigns put into place. Many of these campaigns were based on the idea of using vertical programs, thus further enhancing public frustration. Continued failures implementing these campaigns evolved into the realization that improving public health required more than just delivering medical care.

Under great criticism, a newfound political will for international cooperation and the redevelopment of the health care system pushed vertical ideologies out of the way. This political will made way for a new conception emphasizing ‘bottom up’ policies, change in socioeconomic status, redistribution of resources, and the arrangement of basic primary health services titled *Human Development*.

In the early 1960s, a movement of rural medical services in China—a rigorously communist country at the time—acted as another driving force for primary health care. This movement was lead by a small group of health workers called the ‘barefoot doctors’ who emphasized rural health care systems through work in their own local communities. The work of these barefoot doctors resulted in massive health gains in China proving the effectiveness of community-based health programs²⁰.

Another significant influence on the development of PHC was through the work of Christian missionaries. In the late 1960s, a specialized organization of the World Council of Churches and the Lutheran World Federation was created. This organization—formed primarily by medical missionaries in developing countries—worked to equip local village workers with basic medical skills. In 1970, the term ‘primary health care’ began to appear for the first time through a journal created by the organization titled *Contact*. Over the next decade, various

¹⁹ <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1448553/>

²⁰ <http://www.uniteforsight.org/global-health-history/module5>

versions of the journal began to appear circulating up to 10, 000 copies. John Bryant and Carl Taylor, both authors and founding supporters of primary health care, were members of the Christian Medical Commission formalized in 1974.

These shifts led to changes and new proposals made by some developed countries. In 1974, a resolution on ‘Establishment of a New International Economic Order’ was formed by the United Nations. China also curated its own model for primary health care and pressed for a conference of recognition. The Soviet Union also followed promptly creating a model of their own. At this time, the model used by the western world was not seen as a template and sought-after system.

Since the system used in the United States and Western Europe was no longer characterized as the model of modernization, many developing countries also became interested in primary health care hoping to gain recognition for a model of their own. This resulted in mass favouritism of developing primary health care in many decolonized African nations. This was also during the spread of national, leftist movements in developing countries which furthered the incentive of investing in these programs.

This phase lasted until 1978 where all countries gathered together for the Alma-Ata conference. The conference resulted in the Declaration of Alma Ata outlining health as a human right and the following policy changes necessary. This declaration was the first attempt in unifying views about health into one single document, however, the model that emerged maintained many flaws that continue to hamper the PHC movement—even today.

Past UN Action

The United Nations–WHO in particular–has been heavily involved in ongoing efforts to improve primary health care and work towards universal medical coverage. The Declaration of Alma Ata written in 1978 marked the first time the United Nations formally addressed primary health care as a topic requiring attention. Following the conference, primary health care has been addressed in numerous WHO Global Health Reports–included in UN development goals–and has been the focal conversation in multiple global conferences.

Whether introduced by WHO or other UN committees, a collection of reports, declarations, action plans, and networks have been established and endorsed. The most significant document that has been introduced is the 1978 Declaration of Alma Ata. This declaration laid the foundation for universal primary health care, however, progress within the past four decades has been significantly unstable. Today, 50% of the world population still lacks access to basic care; nonetheless, the overarching care noted in the declaration.

One of the first attempts to provide developing countries and communities with financial support was led by the United Nations Children's Fund and the Bamako initiative²¹. The initiative was to give medicine kits to poor countries in which they can sell in turn for a profit. This financial aid was aimed to be used as an investment towards community-based healthcare initiatives, however, plagued by a lack of public support, government corruption, and poor infrastructure, the initiative gained minimal interest resulting in mass bankruptcy for many citizens. In the interest of reducing the repercussions of the initiative, an alternative provided was community-based health insurance (CBHI). Unfortunately, this alternative's purpose was quickly deteriorated from an incentive designed to improve the lives of citizens in poverty to a scheme for profit. Payments were forced to be made in cash and were rarely reciprocated for the previously promised benefits. The CBHI was immensely popular in Africa in which the majority of the population fell under the target audience of the scheme. The conclusion drawn from the deficiency of CBHI proved that programs like so were only complementary to countries with pre-established health financing programs.

First conceived in 2012 and later adopted in 2017, Universal Health Coverage Day has been celebrated annually on December 12. Supported by WHO, Universal Health Coverage Day seeks to broaden the platform for health care and expand the influence of primary health care across the globe. This celebration aims to call upon health leaders to make “bigger and smarter investments” for health care systems and reminds the public that health is a human right, not a privilege²². Since this incentive is relatively new, the goal is to achieve universal health coverage by 2030. This form of public awareness may be a route that delegates may consider to aid the current situation.

Current Situation

In society, primary health care has always been an approach constituted as controversial and multifaceted, however, due to rapid globalization, the implementation of universal primary health care is facing added challenges. In an age where contemporary renewal of primary health care is required, many countries have registered notable progress, yet, have continued to share uneven gains across varying demographics. Despite the improvements, health gaps between countries even within different social groups have widened. Below, the most prevalent issues of concern will be outlined.

²¹ <https://news.un.org/en/story/2018/12/1028331>

²² <http://universalhealthcoverageday.org/about/>

Unequal Growth

Around thirty years ago, 38% of the world's population was situated in cities; in 2008, an estimate of more than 50% of the population would be.²³ Considerably, in 2030, nearly 5 billion people will be living in an urban area. Most of this population growth took place—and will continue to—in smaller cities of the poor, developing countries located particularly in southern and eastern Asia. Due to the sudden growth in very centralized areas—most of which are in developing countries—the majority of this population is concentrated in slums with the majority of them living in poverty. Statistics all lead to a similar conclusion: developing countries tend to have a lower average life expectancy for their citizens. This conclusion comes as the result of unequal population growth. Since one-third of the urban population is forced to live in slums prone to flooding, landslides, pollution, disease/infection, and violence, this large proportion of people cannot receive any health care. The funding and financial stability of these areas do not align with the required resources for the large scale population growth these areas hold. This imbalance results in mass numbers of people living without any form of health care.

Adapting to New Health Challenges

Children in Africa are at a far higher risk of being killed in a traffic incident today than in many developed countries in Europe; a shift that would have seemed impossible thirty years ago²⁴. The circumstances and conditions that affect health have shifted in a similar manner. Urbanization, ageing, and globalized lifestyle changes have combined creating chronic and noncommunicable diseases such as depression, diabetes, cardiovascular disease and various forms of cancer—all of which are identified by WHO as part of the world's top 10 leading causes of death²⁵. There has also been a striking shift in the distribution of infectious diseases now affecting not only the younger population but much of the ageing population as well. Increased rates of drug-related deaths and traffic accidents have also become focal health concerns within the last few decades. The necessary actions and facilities required to better health across all age groups now remain in question. All health systems must deal with an increasing demand for care in new fields making universal primary health care virtually an impossible task without far more attention and data.

Harmful Trends

Strong policies and leadership are imperative to developing stronger primary health care systems, however, health systems are extremely subjected to powerful influences that derail the system from their intended purposes. These influences—often political—could result in very damaging effects if not properly addressed.

²³ https://www.who.int/whr/2008/whr08_en.pdf

²⁴ https://www.who.int/whr/2008/whr08_en.pdf

²⁵ <https://www.who.int/news-room/fact-sheets/detail/the-top-10-causes-of-death>

A trend that has been adopted for much of the 20th century is hospital-centrism. Simply, many current health systems are built around hospitals and specialists focused on medical treatment. Today, this disproportionate reliance on hospitals and specialized care has become a leading source of inequality and inefficiency. Within the premise of primary health care, the emphasis lies in prevention, yet, hospitals have a fixated goal of solely treatment. While hospitals are still immensely important, they require extensive funding and resources—many of which are easily wasted; resources that could be going towards first contact care, curative care, and health promotion. Furthermore, with the presence of profit as an incentive for many private organizations, hospitals have become a space of inequality. In many systems, the rich are able to afford health care and the poor are rejected from aid. This comes from trends such as priority programs; programs in which the wealthy have an indisputable advantage. The difference between urban and rural health has also become progressively more fragmented with resources centred around certain demographics.

Health systems have also drifted towards commercialization. Under this circumstance, commercialization would be defined as the “unregulated fee-for-service” practice of health care.²⁶ Additionally, extensive donors to hospitals are also likely to use their influence towards more profiting specialization programs which enhances the commercialization of health care.

Changing Values and Expectations

A large reason for the aforementioned hospital-centralization and commercialization is because the system is responding to our demand. The current systems in place act as a reflection of societal ‘consumer culture’, however, with an increasing population of educated, knowledgeable citizens, the expectation for health care is also rising. Delegates will have to come up with comprehensive solutions that encompass these changes.

Possible Solutions

It is clear that the imbalance of primary health care is a global problem that must be addressed, and factors such as cultural backgrounds and religious philosophies cannot be easily reformed. Elements such as extreme poverty, corruption, absence of regulation, and lack of funding can be retaliated with solutions that will be discussed in the following paragraphs.

Mobilizing for Health Equity

Current health systems in place are customarily inequitable; high-quality services are geared towards the prosperous instead of the marginalized poor who need them most. To achieve universal primary health care coverage, reforms need to shift towards a greater and more equal

²⁶ <https://www.ncbi.nlm.nih.gov/pubmed/25565616>

demographic with the insured commitment of the highest political groups. There are two areas that are especially significant in stimulating health equity. The first would be to raise the visibility of health inequities in a public manner through public awareness and policy debates. Doing so would require more data to be measured, resulting in more informed actions being taken. The second would be the creation of a space for civilians to participate and voice their suggestions on PHC reforms. In general, over the course of history, most progress made in the PHC system can be linked back to social movements²⁷. Reform in these two areas may effectively increase the inadequate political will for change in current society. However, the difficulty with this solution is ensuring that countries actually dedicate their attention and providing funding towards the targeted areas. Developing nations will especially be hesitant to allocate a large portion of resources towards mobilization, as they would consider it as an issue of minor concern.

Organizing Primary-Care Networks

Primary care teams are unable to ensure the care of an entire population without the support of other specialized services, organizations, and social groups that work outside their own team parameters. A proposed solution would be to transform the current primary care system into a network in which the connection between a primary care team and other specialized groups is no longer a hierarchy system. This would entail transforming the centralized primary health care team into a mediator between exterior community services and local aid providers. This solution would help people navigate the intricate layers of health services and facilities more easily accessible to patients with referrals, and support when needed. There are two areas of concern within this solution: the monitoring process and the requirement of established infrastructure. Countries will have to keep these two obstacles in mind when approaching this solution.

Public Policies

People expect their governments to establish policies that promise security and promote health within their own communities. PHC, with its focus on universal access and social protection, represents the key areas that could be responded to fulfill those expectations. Better policies can make very significant differences depending on the change. Policies have the ability to mobilize societies around health issues, they can provide legal and social support more favourable towards health-focused outcomes, and can even help anticipate and prevent problems that may arise in the future. As a UN committee, WHO does not have the ability to enforce policy changes, however it may be imperative to encourage and advocate for certain changes to be made. Treaties and agreements may also be encouraged in terms of policies regarding medicine, drugs, and rapid response initiatives.

²⁷ https://www.who.int/whr/2008/whr08_en.pdf

Bloc Positions

South-East Asia

The idea of PHC has taken considerably longer to be rooted in society within South-East Asian countries—especially in countries with limited funding, interest, and existing infrastructure²⁸. Countries in this demographic have sustained regional support and resolutions that encourage the concept of PHC, however, the reality in most countries is that even publicly-funded services are significantly under-resourced. These countries lack almost all the necessary resources ranging from financial support to staff and service support. This situation was noticeably aggravated during the 1997 Asian Financial Crisis²⁹. Access to PHC became a political issue which affected all countries—distinctly in Indonesia and Thailand. This time period marked the beginning of an ongoing battle of financial concern for PHC.

Africa

African nations all bear the intention of improving their existing medical systems. Regardless, their attempts at reform and improvement have been futile due to the lack of political will and leadership. The poor health infrastructure and a mass shortage of trained health professionals limit African nations' ability to construct a better health care program. In the African region, the coverage of necessary health interventions lacks greatly in quality and safety. There are an estimated 2.7 million newborn infants that die annually from birth or preventable illnesses³⁰. Improving safety, political will, and equity will be of utmost priority for African countries.

Middle East

In this quite problematic region, PHC has faced several challenges, especially with numerous countries overwhelmed by long-standing conflicts and emergencies resulting in massive displacements of citizens both within the country itself and in neighbouring nations. These circumstances have been detrimental to the health of such vulnerable populations and should be kept in mind with any PHC approach. Despite the conflict, the middle-eastern region has repeatedly reaffirmed its commitment to PHC; most notably in the Qatar Declaration on Primary Health Care, an international conference for the 30th anniversary of the Alma-Ata Declaration³¹. Unfortunately, challenges of rapid growth, changing demographics, rise in

²⁸https://www.who.int/docs/default-source/primary-health-care-conference/phc-regional-report-south-east-asia.pdf?sfvrsn=1c2a8e85_2

²⁹ <https://www.ncbi.nlm.nih.gov/pubmed/12740322>

³⁰https://www.who.int/docs/default-source/primary-health-care-conference/phc-regional-report-africa.pdf?sfvrsn=73f1301f_2

³¹https://www.who.int/docs/default-source/primary-health-care-conference/phc-regional-report-eastern-mediterranean.pdf?sfvrsn=2a5a2528_2

technology, and financial protection impede the region's ability to move past a disease-focused system. The role of empowered communities and social environment play a great role in improving PHC in this region.

Europe

Across the European region, variation in PHC is frequent. A focus on PHC is consistent however, countries need to work towards improving the information infrastructure used to facilitate and manage PHC work. Not all countries hold a clear vision for PHC and in a majority of the countries, national-level governments have been so heavily decentralized, they have little to no control over the system. Rules for quality of care, medical education, and clinical guidelines are often absent or require more oversight.

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Topic 2: Rise of Biotechnology

Questions to Consider

1. How developed is biotechnology in your country? How reliant is your country on biotechnology for medical care?
2. What are the current concerns propelling the advancements of biotechnology? Can those issues be addressed without the use of biotechnology?
3. How should countries deal with circumstances where the use of biotechnology in medical care is highly dependant on an individual's economic stability?
4. How can the committee come together and discuss ethical concerns surrounding biotechnology on an international scale as countries all have varying beliefs?
5. How can the committee keep track of the development and use of biotechnology in different countries?

Overview

Advancements in medical biotechnology have, over the past 3 decades, impacted the lives of millions. Though generally unnoticed by the vast majority, in 2013, more than \$175 billion, about 19 percent of the total prescription medication sales worldwide, were products of biotechnology. The reach of medical biotechnology stretches from simple vaccines to mapping the entire human genome.

Medical biotechnology refers to the use of living cell material in research for the production of diagnostic and pharmaceutical treatments to human diseases. Examples of such treatments include the vaccine used to control the 2014 Ebola virus outbreak in West Africa, genetic testing, artificial tissue growth, and genetic editing.

Although only recently becoming of attention in the public eye, biotechnology has been in the works since the early 20th century. Decades of research later, current 21st-century biotechnologists have launched into a new world of biotechnological research and breakthroughs. Scientists with the ability to manipulate cells and edit entire genomes with ease are to be expected in the coming years. These cells could continue and develop into cures for

cancer, detectors of disease, and even the secret to never-ending life. Biotechnology may be the answer to many of the most crucial issues we face today.

However, these advancements come at enormous risk. One of the top concerns being that this exact technology used to extend and save our lives could be used instead as a weapon to end them. As researchers change and manipulate human DNA to better understand the greater possibilities of a living cell, the public might view the tradeoff as legitimate: the complete control of personal information and data. Similar risks apply to virus and disease research as well.

The uncertainty of biotechnology has been debated over for decades, however, the increasing need for these life-changing advancements calls upon a discussion on adaptive changes to amend the situation at hand. The new realm of maturity in biotechnology solidify the benefits of these techniques, however, many risks remain in question. While concerns of bioterrorism, ethical dilemmas, and possible out-of-lab experimenting increase, it is crucial that this committee takes a proactive stance before it becomes necessary to address physical damages.

Timeline

1919: The word “biotechnology” is first used by agricultural engineer Karl Ereky. He describes biotechnology as “all lines of work by which products are produced from raw materials with the aid of living things”³².

April 1948: The World Health Organization is founded in Geneva, Switzerland

1958: DNA is made inside a test tube for the first time by Dr. Arthur Kornberg of Washington University³³.

1980: The first automatic gene synthesizing machine is developed in California³⁴.

1982: A biologic protein is approved by the US Food and Drug Administration (FDA) for the first time³⁵.

³² <https://futureoflife.org/background/benefits-risks-biotechnology/?cn-reloaded=1>

³³ <https://profiles.nlm.nih.gov/ps/retrieve/Narrative/WH/p-nid/209>

³⁴ <https://www.biotechnology.amgen.com/timeline.html>

³⁵ <https://www.biotechnology.amgen.com/timeline.html>

Mid-1980s: Biotechnology is starting to grow into a promising industry with room for investment; especially in the US³⁶.

1987: The FDA approves both a diagnostic serum tumor marker test for ovarian cancer as well as a genetically engineered tissue activator to treat heart attacks.

2006: The National Institutes of Health (NIH) of the US launches a 10-year patient study using genetic tests and guiding biotechnological treatments that predict breast cancer recurrence and patterns³⁷.

2008: The first DNA molecule made almost entirely out of artificial parts is created by chemists in Japan³⁸.

2013: A group of researchers from Japan develop a fully functional human liver completely out of reprogrammed skin cells.

2014: A fully synthetic yeast chromosome is constructed by an international team of scientists. This advancement acted as a propeller for synthetic organism and tissue construction³⁹.

2015: After years of research, CRISPR hits multiple breakthroughs as a new gene-editing technology. Reported researchers in China use this technology to modify the genetics of a human embryo resulting in a lot of controversy⁴⁰.

2015: A group of researchers in Sweden develop a method of detecting cancer from it's early stage with a single drop of blood⁴¹.

2016: CRISPR is tested on human patients for the first time led by a team of Chinese students.

³⁶<https://geneticliteracyproject.org/2017/07/18/biotechnology-timeline-humans-manipulating-genes-since-dawn-civilization/>

³⁷ <https://www.nih.gov/>

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⁴⁰ <https://www.quantamagazine.org/crispr-natural-history-in-bacteria-20150206/>

⁴¹<https://geneticliteracyproject.org/2017/07/18/biotechnology-timeline-humans-manipulating-genes-since-dawn-civilization/>

Historical Analysis

While the term ‘biotechnology’ was not coined until the early 1900s, the practice of biotechnology itself has a long history. Biotechnology is divided into four different branches: red biotechnology, green biotechnology, blue biotechnology, and white biotechnology. Green biotechnology refers to agricultural biotechnology, blue refers to biotechnology in marine and aquatic environments, and white biotechnology encompasses all industrial processes such as the production of new chemicals. For our discussion at VYMUN 2019, our debate will be narrowed on red biotechnology; an area of medical studies.

The period before the 1800s is often referred to as the period of ancient biotechnology. During this period, human civilization held three main focuses: food, clothes, and shelter. Medical care was not the main focus in this era; subsequently, neither was medical biotechnology. The biotechnological focus in this era lay primarily within the other three branches.

The era of classical biotechnology, known as the second developmental phase of biotechnology, existed between the 1800s to the mid-twentieth century. For the first time, observations and theories were backed up by scientific evidence. Key developments in this era include the deciphering of the theory on the transfer of genetic information, the discovery of a cell’s nucleus, the discovery of DNA and more. These developments lay the stepping stones for our understanding of modern biology. Possibly one of the greatest achievements in this time was the first appearance of penicillin, an antibacterial toxin which was later discovered to be useful against many infectious diseases. This discovery marked the beginning of a new and very controversial era in medicine. Like many other developments in biotechnology, antibiotics was and continues to be met with a lot of criticism and controversy.

Beginning in the 1950s, the current era of biotechnology was known as the era of modern biotechnology. The Second World War brought major obstacles to scientific discovery however these scientific discoveries form the basis of this field and its current status. The post-war period brought significant attention and consensus surrounding authority in science and technology. During this time, new cultural and political frameworks emerged showing less leniency towards the improvement of the human condition and more towards better control over the status quo.

As of today, the biotechnology industry is almost fully developed and monitored by private corporations which an increasing number of people deem unreliable. While biotechnology is advancing at an unforeseen rate in the medical world, it is also being met with ethical criticism and cultural backlash posing some of this field's largest obstacles.

Past UN Action

Within the past two decades, the United Nations has become increasingly involved in biotechnology. Most significantly, biotechnology has been incorporated into the UN Sustainable Development Goals. While addressing mainly the other branches of biotechnology, medical biotechnology, as an example, is highlighted as a feasible method of enabling better development of health care. Biotechnology is also expected to offer new opportunities for global partnerships. The acknowledgement of biotechnology in this case “seek to foster internationally- agreed-upon principles to be applied to engender public trust and confidence, to promote the development of sustainable applications of biotechnology and to establish appropriate enabling mechanisms, especially within developing countries”.

Within a similar context, biotechnology is also addressed in the discussions surrounding the UN Millennium Development Goals. All 189 UN member states have committed to achieving these goals; significantly emphasizing the importance of biotechnology on the international stage. Medical biotechnology, being of rising popularity in the modern era, is expected to be a driving force to improving health conditions—especially in developing nations. While seeming difficult to put in place in developing nations, a global implementation initiative has also been endorsed by the UN.

Furthermore, within the UN, the United Nations Education, Scientific and Cultural Organization (UNESCO) has also created a biotechnology programme aimed at “strengthening capacity for research “ in this field of work. While increasing research, this programme has also successfully provided platforms for global collaboration and outreach.

Addressing one of the top concerns surrounding biotechnology, ethics, in 2001, the General Assembly invited the Director-General to submit “the technical and legal studies undertaken regarding the possibility of elaborating universal norms on bioethics”. At the request of the Director-General, on June 13, 2003, the ‘Report of the IBC on the Possibility of Elaborating a Universal Instrument on Bioethics’ was finalized by the International Bioethics Committee (IBC). This report clearly outlined ethical issues faced in modern biotechnology and the suggested method of approach, however, as of today, not much success has been seen.

Current Situation

Majority of the public has come to a consensus that the revolution of biotechnology has opened up immense possibilities for humans whether through medical aid and curing diseases, or through the newfound ability to manipulate and change our genetic heritage. It is easy to see how biotechnology has changed the way we approach medicine, however, the recent advances in biotechnology present both benefits and risks. The committee must discuss the impact on the

general public to better prepare them for the changes brought by biotechnology. The tool of medical biotechnology is extraordinarily powerful and when used responsibly, has the potential to produce great benefits to mankind.

Bioterrorism

Biotechnology has made exponential progress within the past several decades. Less than a century ago, scientists were still unsure of the purpose of DNA, while today, scientists can read, create, and manipulate genomes with increasing ease. Yet, biotechnology is a double-sided tool—easily manipulated for bad purposes. As these techniques become more advanced and ubiquitous, it also becomes increasingly easy to access the tools necessary to manipulate this technology. Bioterrorism, as a result, is one of the most pressing concerns of modern biotechnology.

As defined by the Centers for Disease Control and Prevention (CDC), bioterrorism is the deliberate release of viruses, bacteria or other agents used to cause illness or death in people, and also in animals or plants. Bioterrorism is enacted to create casualties, economic and social disruption, and terror. The ‘success’ of a bioterrorist attack relies heavily upon the factor of fear, therefore, the actual number of casualties is not the most significant effect to be concerned with.

Case Study: 2001 Anthrax Attacks

The 2001 Anthrax Attacks, officially known as Amerithrax was a series of mailed letter attacks that occurred in the United States. Mail including anthrax spores was mailed to several post offices contaminating thousands of people yet only 5 casualties resulted from this series of attacks. However, the impact of this incident is felt to this day seen through the repeated number of powdered packages that are still regularly sent to post offices. Fear remains that more detrimental tactics will arise alongside the development of biotechnology as techniques become increasingly accessible.

Laboratory Safety

In addition to the intentional harm of biotechnology through bioterrorism and bio crime, unintentional laboratory accidents fall directly under the concern of medical biotechnology and research. While conducting research, it is imperative to test products which often hold unpredictable results. For example, as well-equipped scientists are to prevent and contain familiar pathogens, if a new and unexpected pathogen were to be created during the research process, there is no way to confirm for sure the safety of all those affected. Moreover, compared to many weapons of mass destruction, engineered pathogens require significantly fewer resources to fund and build. This means the likelihood of an accident turning into an act of bioterrorism is increased as well.

Ethical Dimensions

In current medical care, biotechnology is presented with the challenge that most scientific advancements face: defining its ethical borders. These borders need to encompass research, costs, and privacy issues that impact a chain reaction of people.

The first issue of debate lies within the realm of the protection of human subjects in clinical trials. This issue has been debated over the past 20 years and continues to be debated as the line between privacy and research becomes very blurry under this circumstance. In most cases, research projects and clinical trials give scientists full access to all personal information. Often, information concerning family members is also sacrificed unknowingly. A further complication is presented as patients—especially suffering patients—are very prone to trying new things and performing high-risk clinical trials fully aware of possible unknown consequences. While under full consent under this scenario, personal information and safety are at risk.

Another ethical dilemma in medical care is the cost and accessibility to these treatments. The effective treatments arising from biotechnology are extremely expensive. Examples include tissue plasminogen activator, used to break up heart attacks and stroke-causing clots, and erythropoietin and colony-stimulating factors, used alongside chemotherapy. Even in developed countries, the population that can afford such treatments are relatively small, resulting in extreme difficulty while attempting to implement such treatments in developing nations.

Protecting patient privacy is also a growing concern for modern biotechnology—especially technology that allows scientists to decode a patient's entire genome. The ethical concern appears when deciphering an individual's genome and genetic makeup also means the possibility of gaining undesired information about the individual's future. This poses a great concern for example if a prospective employee is set to have a lung disease in 20 years, do others have the right to that information. Will this information impact the other aspects of the individual's life, for instance, their ability to find a job, housing, education? Once this information is known, the big question surrounding who has the right to know this information is proposed.

Case Study: CRISPR-Cas 9

CRISPR-Cas 9 is a gene-editing technology that allows scientists to delete genes, add new genes, activate dead genes, and control gene activity levels. CRISPR is currently used in the medical industry to prevent human diseases, drug development, and artificial transplant organs; in the agricultural industry to produce stronger crops; to create new material; for bioenergy. While extremely powerful, since its discovery in 1987, the CRISPR technique has been heavily debated and criticized. When genes are edited in embryos, the result will likely be passed onto

subsequent generations. This is commonly referred to as the practice of creating ‘designer babies’ which allows individuals to pick and choose the features and abilities of their offspring. Another ethical concern for CRISPR is the increase of economic disparity within existing healthcare. While still newly developing, CRISPR will likely only be accessible to the wealthiest population. Lastly, there are many moral and religious oppositions to gene editing as well. While CRISPR is only one of many modern biotechnological techniques, all aspects of the ethical dimensions are relevant and are of discussion.

Possible Solutions

Biotechnology has the potential to greatly benefit society, however, it also has the potential to do great harm. At its core, biotechnology is about gaining a better understanding of life, then using that understanding to benefit larger populations of people. To reach its full potential, the power of biotechnology demands caution to ensure the safety and ethicality within the industry.

Surveillance

Concerning one of the most pressing issues brought forth by biotechnology, bioterrorism, surveillance and rapid detection of danger is essential to an effective and efficient response. Delayed detection often leads to enhanced terror and aggressive counter-attack measures. While practically impossible to predict with accuracy when and where a bioterrorist attack is going to take place, improving current systems for a faster response may still propose significant improvements. A comprehensive surveillance system is not simple. It will require the integration of human resources, laboratory research, legal support, and management initiatives. Currently, several surveillance systems tailored for this purpose are in use or are being developed. For example, ESSENCE, an automated surveillance system used in many health care systems in the US is quite mature and has reached over 300 installations around the world. Though very important, advanced surveillance systems are put to their own ethical controversies around the world. While working with this solution, the line between privacy and security comes needs to be attended to with close attention.

Policy Reforms

Public policies are essential to any new technology. Creating stricter policies and regulations regarding patient privacy, consumer privacy, as well as research privacy may be the solution to many safety concerns. An example of a policy reform may be to restrict testing and research on humans or genomes until approved by a legislative board. In the US, this may look like regulating the testing of vaccines until the maturity of the drug is approved by the FDA. Particularly surrounding medical biotechnology, policy reforms face many obstacles. Different state and international legal systems, the maturity of biotechnology in different areas, and the

limitation of full technological potential are all variables that must be considered when addressing public policy reforms.

Education

Ethical tension plays a large role in the dispute over medical biotechnology. While near impossible to ensure all biotechnological advancements fall within a set ethical framework, an approach that may be better suited for the current situation is better education. Education, in this case, applies to all levels of the affected population. Firstly, for policymakers and legal participants, being better educated on the actual processes of biotechnological research will help them make better policies surrounding the matter. For everyday citizens, a better understanding may result in a stronger ability to make good decisions for themselves. Education and STEM programs may be extremely effective in this matter—especially starting from the younger population. While effective, this solution may not be the priority for many countries in which educational systems are extremely lacking.

Bloc Positions

Asia

Compared to the US and many western countries, the biotechnology industry in Asia is still relatively new. However, in recent years, the epidemic of biotechnology expansion equating economic development has taken over several Asian countries. Many developed governments in Asia have begun to incentivize the growth of biotechnology companies in their nation. Leading the way for biotechnological growth in Asia are Japan and China. In the past, both countries have set up relationships with large US corporations, but recently, both governments have invested large amounts of money into their domestic industries. In Japan, government funding, low-cost loans, and preferential treatment are principle tactics used to boost Japan's domestic market. China's own "medicine valley" has also been in the works with entire zones dedicated entirely to the research and development of new biotech products and medical equipment. Hong Kong and Singapore have also indicated the interest of using biotechnology centres similar to China's "medicine valley". The main concern that Asia faces in the new era of biotechnology is ensuring the smaller developing nations benefit from biotechnology as well. Cooperation and dealing with the large scale income difference will be the main focus within this region.

Africa

In Africa, the application of DNA work and genome research has resulted in several breakthroughs. On average, countries in this region are ranked relatively low on the Human Development Index, thus, the significance of biotechnology has been seen really clearly through the effects of vaccines and anti-infectives. Malaria kills around 1-2 million children a year in this region alone and although vaccines are quite mature in other regions around the world, very few

have actually reached the stage of clinical trials due to large scale production issues. This is one of the most prominent issues in this region: lack of support. The role of African scientists in this field vary, yet in the majority of cases, agricultural scientists have made enormous breakthroughs while there have been almost no African advancements in technologies involving genetic engineering. The difficulty of developing a strong biotechnological base in Africa is due to a lack of government commitment and investment. The fact that biotechnology is an expensive industry to invest in becomes the most difficult barrier scientists must overcome. Consequently, this is also the number one barrier countries must address in this region.

Middle East

A large number of wealthy, oil-producing countries in the Middle East have become increasingly influential and crucial to biotech start-up corporations. The biotech industry is a costly one, however, for countries like Saudi Arabia, Dubai, Abu Dhabi, and Qatar, money is not the problem. These countries have full incentive to invest in this industry as for them, it is full of potential. Although relying heavily on Europe and the US for its biotech industry in the past, regional foundations are beginning to take the spotlight in the Middle East. While an important factor, however, money does not guarantee success. The main issue faced in this region is the lack of prior research, engagement, legal and economic understanding of this field. Also, due to their historical lack of engagement, creating the aura of thriving research culture will be the main obstacle when in an effort to enter into the international stage.

Europe

While technically and resourcefully advanced, Europe faces its own set of challenges: regulatory divide. In recent years, Europe has earned an emerging image as ‘anti-science’. While not necessarily true—seen through \$2 billion investments per year, oppositions to biotechnology are also the most apparent in Europe. For example, in Switzerland, opposition to biotechnology had become so intense that a national referendum limiting genetic engineering activity was scheduled for 1998. Similarly, Germany also faced serious opposition to biotechnology, but it is now a technological leader in this field. In Europe, the main focus is the need for public trust and credible regulations. This may require work with EU nations as each member state rules slightly different on this issue.

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