

Dear Delegates,

My name is Julie Vu and I am your director for the World Health Organization committee for WMHSMUN XXXII. I am so excited to start working with you all during the weekend! I am currently a junior at William and Mary, and a biology major on the pre-medicine track. That means I am really passionate about the topics we will be discussing, and I hope after this weekend you will be too.

My experience with Model UN is limited; however, I am very passionate about public health. I am a nationally registered EMT, and have volunteered at my local free clinic for over a year, so access to healthcare has become very important to me. Often there is a disconnect between policy makers and the scientific community. As a biology major, I have developed my passion for the technical side of health through my coursework. With my background, I hope to provide a unique perspective on these topics. I am so excited to delve into these discussions with you all!

Outside of my classwork, I have a few other hobbies to occupy my time. I am on the William and Mary Fencing Team, where I serve as a Head Armorer. Another highlight of my week is volunteering at a local elementary school in a kindergarten class. I am also part of a marine biology research lab here at the College. I adore all the animals there and have two pets at home. Ask me how the critters are and I will gladly show you adorable pictures of lobsters, sea stars, and snails!

Regarding my expectations for the weekend, I want everyone to feel like they have learned and had fun! I picked these topics because they are very relevant to the modern health landscape. With that in mind, these topics may be more challenging to research due their very topical nature. However, I expect you to go the extra mile and find reliable, unbiased sources. This could be challenging specifically with biohacking, as a large majority of the articles are written as pop-science articles. I encourage you to dig deeper and find the primary sources for those articles with click-bait titles. Acceptable sources include, but are not limited to, first-hand accounts, articles from major news outlets, publications from peer-reviewed journals and reports from government agencies. I expect you to be well informed and prepared to discuss thoughtful, realistic solutions. Your job during the weekend is to problem solve, and to do that effectively, you need to be educated about the topics. If you have any questions, do not hesitate to contact me at jdvu@email.wm.edu.

Most importantly, remember that this experience should be about having fun. I hope to foster an open and informed discussion over the weekend, and I really look forward to working with you all!

Sincerely,
Julie Vu
Class of 2020

Background:

The World Health Organization was established in 1948 and aims to coordinate health directives for its 194 member states.¹ This includes preventing the spread of communicable and non-communicable diseases, supporting countries in implementing health systems and coordinating responses to health emergencies. It does this by setting guidelines for its member nations to follow, creating policy options, and shaping the research agenda.² It is also responsible for creating the World Health Report³, which provides background information about the current state of global health so that member nations can make informed policy decisions. Additionally, it serves as the leadership body in monitoring health situations, as well as directly providing support to countries in times of need.

One of the major achievements of the WHO was the complete eradication of smallpox. With WHO leading the immunization and surveillance effort, the formerly disastrous disease was fully eradicated in 1980.⁴ The Smallpox Eradication Programme ran from 1966 to 1980 and its success made smallpox the first disease to be eliminated by deliberate intervention. In the modern era, the WHO still monitors research conducted for smallpox treatments to ensure that the best solutions are being utilized and the virus does not make a return. Another success is the near eradication of polio. Since 1988 the number of cases has decreased by 99%.⁵ It aims to completely eradicate polio by the end of 2018 by promoting a worldwide immunization campaign and closely monitoring the outbreaks.

In addition to coordinating responses to communicable diseases, the WHO also provides guidelines on maintaining overall health for its member nations. It has a wide scope of authority,

¹ *World Health Organization* "History of WHO."

² *World Health Organization* "Constitution of WHO: principles."

³ *World Health Organization* "World health report - archive."

⁴ *World Health Organization* "Smallpox."

⁵ *World Health Organization* "Poliomyelitis (polio)."

and aims to better all aspects of public health for its member nations. Outside of infectious disease, it also directs initiatives for other health issues, such as chronic illnesses, resource availability and education. The WHO sent assistance to Nepal after the earthquake of April 2015, and is running a campaign to promote breastfeeding; the topics that the WHO oversees are very diverse. An example of an issue that organization is currently facing is that of worldwide air pollution. Although it is not an infectious disease, its effects are devastating, causing death in about 1 in 9 people worldwide. Currently, the WHO is campaigning to raise awareness about the issue, publishing guidelines, and creating initiatives to mitigate the effects of polluted air. The WHO has a long history of using a wide arsenal of tools to help and inform its member nations.

Since its conception, the World Health Organization has been a champion for health access and addressing global health threats. An important role of the WHO is to stay up-to-date on the status of health issues in the world and adapt its strategies accordingly. Even as the world rapidly changes, it has been at the forefront of addressing ailments that plague our communities.

Topic 1: Biohacking

In recent years, the popularity of “biohacking” has skyrocketed, lending the self-proclaimed biohackers more media attention. Biohacking is essentially performing experiments outside of a formalized lab setting. The term comes from the idea of hacking, or optimizing something using a novel method. Without the supervision and regulation that traditional labs are subject to, the biohackers aim to efficiently create cost-effective solutions to modern day biological problems. The products of these experiments can range greatly in scope. Biohackers have attempted to synthesize medications, gene therapies and other solutions for medical conditions that are not currently treatable. Another sect of biohackers also experiment

with bodily modification, such as magnets or NFC implants. For the purposes of this topic, please focus less on the physical modification area of biohacking, and more on genetic engineering and pharmaceutical synthesis.

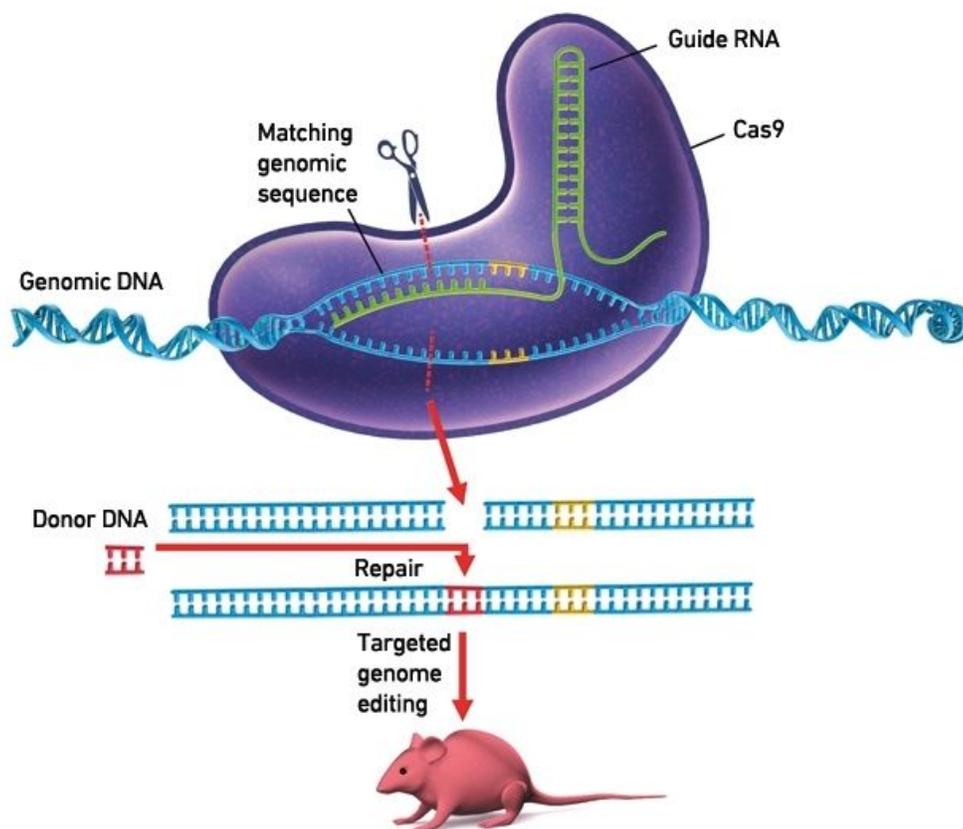
Biohackers come with all levels of education and experience. Some are people with no laboratory experience and some have doctorate biology degrees with years of formal training. Although their backgrounds can vary, the unifying factor for this group of people is their intent: the desire to improve an aspect of human health in some way. They claim that the traditional path of research with necessity for government approval is too slow, costly and stifles innovation. Many of them also intend to increase the accessibility of medical treatments, since conventional pharmaceuticals are climbing in price.

It is illegal to distribute medications without approval from government agencies. However, biohackers purchase commercially available compounds, which are not as regulated because they are usually sold to traditional laboratories.⁶ These materials include DNA fragments, CRISPR/Cas technology, and chemical compounds. Additionally, the products of genetic experimentation are usually tested on the experimenters themselves to avoid legal issues with using other test subjects. Biohackers argue that with open access synthetic biology, the convenience allows anyone to innovate— increasing the potential to find solutions for pressing health problems. Critics argue that having so little regulation introduces great risk, whether it be to the experimenters themselves or the world in the case of creating a mass bioweapon.

Tristan Roberts, a biohacker, in partnership with Ascendant Technologies, a company that funds biohacking projects, looked to find an effective alternative to conventional HIV

⁶ *Baumgaertner, Emily* "As D.I.Y. Gene Editing Gains Popularity, 'Someone Is Going to Get Hurt'."

treatment. Researchers at Ascendant Technologies made a solution based on traditional research findings and clinical trials. He injected himself with a gene that stimulates production of an antibody that the NIH has identified as very potent against HIV.⁷ The treatment has appeared to have no dramatic effect, though his viral load has gone up⁸, however, this may not be directly due to the treatment. This is just one case that highlights the potential risks of unregulated experimentation.



⁷ National Institute of Allergy and Infectious Diseases “NIH Scientists Identify Potent Antibody That Neutralizes Nearly All HIV Strains.”

⁸ Roberts, Tristan “HIV N6 Experimental Therapy - Results @ 1 Month.”

Figure 1: CRISPR/Cas9 technology allows people to edit genomes of living cells using commercially available DNA fragments⁹

One instance of synthetic biology causing great concern occurred in late 2016. A lab at the university of Alberta recreated the horsepox virus, an extinct relative to smallpox, using only commercially available materials and tools and publicly available information. In a report, the WHO warns that “given the advent of synthetic biology it was no longer possible for society to entirely rid itself of... dangerous pathogens”¹⁰. Currently, there are regulations set in place by WHO to limit the purchase of components for the actual smallpox virus.¹¹ The scientific community has known for years that the possibility for easily re-creating a smallpox virus existed. However, this definitively confirmed the speculation. The potential dangers of synthetic biology needed to be addressed, but it had to be worded as to prevent limitation for funding to synthetic biology. The WHO noted that an effective communication strategy about this issue was needed as the results of similar research have been invaluable to public health, such as the influenza vaccine and many more.

Current regulations for biohacking are often outdated, as the technology has progressed so rapidly in the last few years. Additionally, the dual role of synthetic biology has led to controversy as to the limitation regulating it would place. As more information within this field becomes available and citizen laboratories grow in ability and scope, the necessity to address this issue grows.

⁹ *Microbiology Society* “CRISPR-Cas: from mechanism to applications”

¹⁰ [World Health Organization WHO Advisory committee on variola virus research: report of the eighteenth meeting](#)

¹¹ *Kupferschmidt, Kai* "How Canadian researchers reconstituted an extinct poxvirus for \$100,000 using mail-order DNA."

Questions to consider:

1. What guidelines should WHO set for its member nations to address the potential effects of biohacking?
2. How should WHO prepare against possible harmful effects of citizen science?
3. How should member nations balance the role of being cautious for the harmful effects of biohacking without restricting innovation in the field of synthetic biology and citizen science?

Topic 2: Sexual and Reproductive Health and Education

Historically, the issue of sexual and reproductive education has been controversial due to the nature of the subject. However, providing a comprehensive sex education is a necessity for public health, despite its contentious nature. A lack of comprehensive reproductive health education is correlated to many problems such as increases in sexually transmitted infections (STIs), unintended pregnancy and violence related to sex and gender. Engaging in risky sexual behaviour, such as unprotected sex, is less likely with education programs. With this topic, you should focus on the distribution of sex and reproductive health education for adolescents, as well as programs that would supplement a comprehensive education program and make it more effective.

Literature shows that sex education reduces frequency of risky sexual behavior, increases contraceptive use, and delays sexual initiation. Current common education programs focus on topics such as STI/HIV spread, contraceptive use, and teen pregnancy prevention. In January

2018, the United Nations Populations Fund published an updated international technical guide on sexuality education. The previous edition was published in 2009, and the revised version places more emphasis on the importance of sexuality education and reframing sexual education programs in the context of human rights and gender equality. However, there is evidence that even less controversial aspects of sex education, such as the spread of STI's are still taught inadequately.¹² Interventional education programs are effective in increasing adolescents' knowledge regarding reproductive health.¹³ Education about these topics is a public health concern, yet it is often ignored due to its taboo nature.

BOX 2.2

Key categories and topics that constitute comprehensive sexuality education

Category	Topics
Sexual and reproductive physiology	Puberty/physical changes in the body; reproductive organs; menstruation; pregnancy and childbirth
HIV/STI prevention	HIV and AIDS; other STIs; where to access STI/HIV services
Contraception and unintended pregnancy	Contraceptive methods; where to get contraceptive methods; how to use contraceptive methods; abortion
Values and interpersonal skills	Communicating within relationships; decision-making skills; sex in exchange for money or gifts; sexual behavior; abstinence/chastity; moral issues related to sexuality
Gender and SRH rights	Sexual and reproductive rights; equality between men and women; prevention of violence and sexual abuse; sexual orientation

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¹² *McManus, Alexandra, and Lipi Dhar* "Study of knowledge, perception and attitude of adolescent girls towards STIs/HIV, safer sex and sex education: (A cross sectional survey of urban adolescent school girls in South Delhi, India)."

¹³ *Lena, A, et al.* "Effectiveness of Reproductive Health Education among Rural Adolescent Girls: A School Based Intervention Study in Udupi Taluk, Karnataka."

Figure 2: Comprehensive sexuality education, recommended by the WHO and UNFPA covers the role of sexuality, values surrounding sexuality, and human rights in addition to the topics traditionally taught in sex education curricula. ¹⁴

Adolescents and women are those often most at risk for sexually transmitted infections. AIDS-related illnesses are the second leading cause of death in adolescents globally, and the number of resulting deaths has tripled from 2000 to 2015.¹⁵ Not only is education paramount in preventing the spread of sexually transmitted infections, it also encourages adolescents to get tested for STIs. Additionally, because many adolescents worldwide are unaware of their disease, it is not uncommon for them to go for years without treatment. Complications then arise such as further spread and mother to child transmission. Proper education and programs to treat and prevent sexually transmitted infections are a necessity to public health.

Adolescent pregnancy is another health issue that affects all communities around the world. Although some pregnancies are planned and wanted, many result from social pressure and lack of available contraception. Complications during pregnancy and childbirth are the leading cause of death for 15 to 19 year-old girls globally. Additionally, mothers aged 10 to 19 are at a higher risk of eclampsia, puerperal endometritis, and systemic infections.¹⁶ Education about the potential harmful effects of pregnancy and contraception use could save the lives of countless mothers.

¹⁴ *Guttmacher Institute* "From Paper to Practice: Sexuality Education Policies and Their Implementation in Ghana"

¹⁵ *Nekell, Patsy, and Suzanne Beukes* "Adolescent deaths from AIDS tripled since 2000."

¹⁶ *World Health Organization* "Adolescent Pregnancy"

TABLE 1

ADOLESCENT SEXUAL AND REPRODUCTIVE HEALTH**Selected statistics on the sexual and reproductive health of young women in developing regions, 2016**

	Africa	Asia	Latin America and the Caribbean	All
No. of women aged 15-19 (in 000s)	61,600	163,300	27,500	252,300
% ever had sex, age 16	27	11	28	17
% married, age 16	14	8	13	10
% ever had sex, age 19	66	41	67	50
% married, age 19	43	33	37	36
No. of pregnancies and outcomes among women aged 15-19 (in 000s)				
Pregnancies	8,900	8,300	3,600	20,700
Births	5,700	4,700	1,700	12,100
Abortions	1,900	2,400	1,400	5,600
Miscarriages	1,300	1,200	500	3,000
Percentage distribution of pregnancies, by intention status and outcome				
Intended	55	57	26	51
Births	46	48	22	42
Miscarriages	9	10	4	9
Unintended	45	43	74	49
Births	18	9	27	16
Abortions	21	28	38	27
Miscarriages	6	5	9	6
Total	100	100	100	100

NOTE: Numbers may not add up to totals because of rounding. SOURCE: reference 10.

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Figure 3: Creating comprehensive sexuality education programs would have a profound effect on all communities throughout the world¹⁷

These issues, among others, are becoming more pressing as the population of adolescents is rising. The problems that surround a lack of education have health consequences and often intertwined with other economic and societal components, which has made addressing them a

¹⁷ Darroch, Jaqueline, et al. "Adding It up: Costs and Benefits of Meeting the Contraceptive Needs of Adolescents."

difficult endeavor. However, ensuring that education is provided to the youth of the world is paramount to public health and should not be overlooked.¹⁸

Questions to consider:

1. How should WHO ensure that comprehensive sex education is distributed on an individualized level, taking into account the local community values?
2. How can WHO ensure that disadvantaged populations are receiving adequate support in matters of sexual and reproductive health care?
3. What are some other components of reproductive health services that would supplement sexual and reproductive health education into a more effective strategy?

¹⁸ Kirby, Douglas B., et al. "Sex and HIV Education Programs: Their Impact on Sexual Behaviors of Young People Throughout the World."

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