### AFF- Global Disease

#### squo IP protections are horrible for public health—deteriorated global innovation, millions of annual deaths, and disease propagation occurs

Merran Eby University of Waterloo’s Masters in Global Governance program based at the BSIA. et al., Balsillie School of International Affairs, 2018 ["Canada’s Progressive Trade Agenda and Global Health ", https://www.balsillieschool.ca/wp-content/uploads/2019/02/Graduate-Fellows-Anthology-2019.pdf#page=15, 8-26-2021] AWS

In the ongoing debate on the benefits of **IP protection** versus the costs of barriers to the dissemination of knowledge, the general consensus among economists is that the current balance is tilted too far towards protective measures to the overall detriment of public well-being, and that proponents of enhanced IP protection paint a toosimplistic view of what is in truth a far more complicated issue (Dosi and Stiglitz 2013; Blit 2017). The basic argument made by supporters of strong IP is one of market failure, in which the free availability of created knowledge leads to lowered incentives to invest in research and development (as everyone “free rides”), **and** by consequence leads to underproduction and underinvestment. By allowing creators to profit from their work through rents, the argument continues, IP rights provide an incentive to innovate. The problem with this argument, however, is that IP rights differ in one significant way from other types of property right: that is, knowledge is a non-rival resource, the value of which never diminishes in proportion to the number of people making use of it. The challenge of this issue is that the private sector often tends to be the source of innovation for a product that is considered to be a public good. When it comes to innovation, the greatest resource available is access to existing knowledge upon which to build. Every gain is based on what has been learned before; enhanced IP protection may stifle the sharing of research. Such knowledge as is produced and consequently patented by the private sector is kept out of the pool freely available to most researchers, in what has been called by some economists the tragedy of the anti-commons. This “**fencing off** ” of access is an inefficient use of knowledge that could have otherwise contributed to the development of follow-on innovations by others. Furthermore, a **strict IP regime creates monopolies on knowledge — by disincentivizing further innovation** both for the firms holding the monopolies and for the smaller firms who know they will be outcompeted if they try — and by presenting a needless complication to technological advancement — as knowledge is divided and subdivided into many smaller separate claims, making the process of recombining them for further research an arduous one. The process of avoiding or searching out patent infringements has become its own industry, and sometimes researchers are given no choice but to spend their time finding ways to work around existing patents instead of using what has already been discovered. Do Patents Lead to Greater Innovation? Although there is no clear consensus on the question, the balance of studies suggests that there is not a direct causal relationship between enhanced IP protection and increased innovation. Proponents of strong IP rights maintain that the upsurge in patents filed in recent decades is the result of greater protective measures. On the other hand, it could be explained equally by the general uptick in new opportunities for technology, such as in the burgeoning fields of IT and biotechnology. The following section presents responses related to innovation from the Canadian Generic Pharmaceutical Association (CGPA) and Innovation Medicines Canada (IMC) to Bill C-30: “An Act to implement the Comprehensive Economic and Trade Agreement between Canada and the European Union and its Member States and to provide for certain other measures.” The CGPA compiled a report analysing Bill C-30 that would see CETA implemented into law. Before CETA negotiations, Canada already had very strong levels of IP protection, exceeding levels seen in the US. The biggest and most controversial change came from a new form of intellectual property protection called certificates of supplementary protection (CSP), which would see protection extended for an additional two years (CGPA 2016). The CGPA predicts that this additional level of protection will cost Canadian taxpayers upwards of $200 million annually (ibid.). An important note made in the report is that Bill C-30 will still allow generic manufacturers the ability to export during this additional period of protection. This will be vital in attracting and competing in new and existing markets going forward. IMC is the association that represents Canada’s brandname pharmaceutical companies. Overall, IMC has been highly supportive of CETA and its regime of enhanced IP protection (IMC 2018). In particular, IMC has outlined the importance of patent term restoration, offering an additional two years of monopoly and the right of appeal that sees companies more easily able to appeal decisions where patents have been ruled to be invalid (Douglas 2016). The claims made that higher protections for IP lead to job growth and investment, and through these concepts new innovations, is unsubstantiated. The lack of investment is seen in Canadian brand-name pharmaceutical companies who pledged to the government to invest 10 percent of all revenue in R&D in exchange for substantive legislation in 1987 (Lexchin and Gagnon 2014). However, the 2016 annual report conducted by the Patented Medicine Prices Review Board showed that the R&D-to-sales ratio had fallen to 4.9 percent, marking the fourteenth consecutive year that companies had failed to live up this commitment (Levine 2017). While enhanced IP protection has been producing gains for companies based in the industrialized world, it has imposed costs on Canadian taxpayers and created losses for the Global South, all while stifling innovation. IP Law and Development Developed and developing countries are separated by a gap in the knowledge to which they have access. A poorly designed IP regime may present a major barrier to addressing this gap, and by extension to the development of emerging economies. Limiting the access of lowerincome countries to life-saving medicines, for example, is not only endangering the right to life of their citizens, but also hampering knowledge that could have be used to contribute to their development, and even their capacity to build on that shared knowledge for further future innovations. The strengthening of IP law in America has been followed by a drop in the rate of innovations by pharmaceutical companies. Part of this is that, as for-profit actors, the private sector is concerned not only with the genuine creation of new products, but also with marketing those products, asserting against infringements, finding similar products on which to capitalize (“me-too drugs”) and the like — all of which divert resources away from innovation towards rent-seeking and weaken the overall social return. These concerns exert a considerable influence on the sorts of research and development projects that receive funding as well: in 2010, for example, the amount of money put towards finding a cure for male-pattern baldness was double that spent on HIV/AIDS research, and quadruple that spent on malaria. Given that most major pharmaceutical companies are located in the developed world, it seems unlikely that the social value of certain forms of medication — that, while they affect many times more people in the developing world, offer fewer potential returns on investment — will always be taken into consideration before deciding what research on which to expend resources. While the TRIPS agreement contains crucial flexibilities to ensure access to medicines, many countries have failed to take advantage. This is often attributed to a lack of technical expertise and institutional capacity (Matthews 2005). Research has indicated that developed countries could play a greater role by implementing policies that promote technology transfers and strategic R&D spending. Therefore, the provisions allowing for the access to medicines among developing nations would be fully utilized (Hopkins 2006). The Impact of Increased IP on Developing Countries Millions of people across the world lack access to pharmaceuticals, and as a result many die every year from curable or treatable diseases like tuberculosis and AIDS. Additionally, non-communicable diseases are on the rise in all parts of the world, hitting hardest in the Global South. These trends pose grave threats to public health and have increased the need for pharmaceuticals to prevent and manage illness. A strong IP regime such as that encompassed by **TRIPS** and TRIPS Plus — while it may be of benefit to private companies seeking to maximize the rents they receive — threatens to ignore or impede the most successful ways in which knowledge transfer enables the development of emerging economies. It **is**, moreover, a barrier to development that is being enforced by countries which themselves used those very same methods (such as reverse engineering, imitation and open source knowledge) to industrialize in their own right before IP law gained traction. Indeed, the US itself openly considered compulsory licensing in 2001 to reduce the price of a drug used to treat anthrax (Sell and Prakash 2004). By demanding high rents from developing countries for patented medications — some by a mark-up of up to 400 percent since TRIPS was introduced — we arrive at a situation where “to decrease the gap in knowledge, developing countries are being asked to increase the gap in resources…without evidence that these higher prices have led either to more drug innovation in general, let alone more innovation attempting to address the needs of those in developing countries” (Dosi and Stiglitz 2013).

#### Sub-point A is COVID-19

#### IPP’s are destroying COVID-19 vaccine roll-out. The developing world has received only .2% of vaccines—and this is unlikely to change

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The United States caught the world by surprise on 5 May 2021 when it announced its intention to support a World Trade Organization proposal that would temporarily waive intellectual property rights on covid-19 vaccines. While this move is encouraging, the Biden administration’s support is the first step of many required.1 **Waiving intellectual property rights is essential to tackle serious inequity in the global distribution of covid-19 vaccines**, whereby wealthy countries currently control the lion’s share of existing supplies. **By the end of April, over 1.3 billion doses had been administered worldwide, but only 0.2% of vaccines had been given in low income countries**.2 More than one year into the pandemic, the situation is at a low point globally. **The average number of weekly deaths in April was over 36 000 in just India and Brazil,3 and variants are proliferating. Experts fear a devastating second wave across Asia and Africa.** **Voluntary action has not worked— whether timely sharing of doses with low and middle income countries or sharing knowledge** through the World Health Organization. **It’s time for mandatory rules** and legal commitments that can help put an end to this pandemic. The proposed intellectual property waiver is appropriate as **vaccine manufacturers have relied heavily on publicly funded research into coronaviruses.5 Together, companies holding intellectual property rights are estimated to have benefited from government funding of around €93bn [109 billion USD] (£80bn; $110bn).6 The Moderna vaccine was funded almost exclusively by the US government**.7 **A successfully negotiated intellectual property waiver would ensure manufacturers cannot block production or access to raw materials and finished products for covid-19 technologies worldwide**. A waiver would also prevent companies from charging unaffordable prices while insulated from competition. Lack of competition in the vaccines market has a long history. **Previously, the two companies with a duopoly for the human papillomavirus (HPV) vaccine held patents that prevented competition. According to one estimate, low income countries paid up to 10 times the estimated cost of production for these vaccines.9 Millions of girls globally are still unable to access this critical protection against cervical cancer.** Similarly, Pfizer successfully enforced secondary patents on its pneumococcal vaccine through legal proceedings in India10 and South Korea,11 which delayed competition. Pneumonia remains the leading cause of death globally among children under 5 years old.12 Many middle income countries have low coverage because of the high price of the vaccine, often 5-10 times higher than the lowest price available globally.13 Inadequate access to essential vaccines is predictable in a system that prioritises monopolies—and this will repeat itself in the absence of an intellectual property waiver for covid-19 vaccines. A successfully negotiated waiver would meet four important criteria. The waiver’s primary aim should be to save as many lives as possible. The Biden administration wants the waiver to focus on vaccines. This constraint should be removed. The original proposal applies to all medical technologies related to covid-19, including diagnostics, medicines, and ventilators. Many people are likely to become sick even if vaccination rates improve worldwide. Secondly, negotiations should be completed quickly. Governments should make substantial progress ahead of the WTO meeting on 8 June 2021. Thirdly, any waiver should be straightforward, unambiguous, for a reasonable duration, and limit manufacturers’ ability to file legal challenges that impede access. Finally, negotiating texts should be fully disclosed, with negotiations transparent to ensure all countries negotiate as equals. In the past, powerful nations have used their leverage to extract concessions from less powerful countries behind closed doors.14 **Opponents of a waiver question whether manufacturers in lower income countries have the required capabilities. This argument was also made in the 1980s when Merck and GSK dominated the market for complex recombinant hepatitis B vaccines. It was discredited in 1997, when Indian manufacturer Shantha Biotechnics launched a vaccine that reduced the cost of a dose from up to $23 to just $1.** Many millions of people worldwide have since been successfully immunised.15 Manufacturers in low and middle income countries are already critical to overall immunisation efforts worldwide: **in 2018, they [low income manufacturers] provided over half of the 2.4 billion vaccine doses procured by Unicef.**Suppliers worldwide are gearing up to meet this moment. New mRNA vaccines are under development in India17 and China,18 and several companies in middle income countries are already manufacturing covid-19 vaccines.1920 WHO is establishing a technology transfer hub to support local production of mRNA vaccines.21 Although follow-on manufacturers can produce complex vaccines without support from holders of technology, sharing knowledge would save time and lives. As we enter into a new era of global pandemics, we must fundamentally rethink the global intellectual property system. The ability to respond swiftly to global crises cannot be left to a handful of private companies in a few wealthy countries. We need a more cooperative global response to this and future public health emergencies.

#### Developing world transmission risks mutations which restart COVID

[Jeremy Farrar](javascript:void(0);), PHD and director of welcome trust, China CCDC Weekly, 2021 ["COVID-19 — 2021: A New, Less Predictable Phase of the Pandemic", http://weekly.chinacdc.cn/en/article/doi/10.46234/ccdcw2021.032, 9-1-2021] AWS

The recent emergence of more transmissible COVID-19 variants with higher case fatality poses a serious threat to efforts to control the pandemic ([3](javascript:;)-[4](javascript:;)). Those variants already identified render anti-viral treatments ineffective, evade immunity from natural infection and, with emerging evidence that some variants reduce efficacy of the first-generation vaccines. It is inevitable that further variants will emerge that pose a more significant threat to vaccine efficacy. Most first-generation **vaccines** and treatments target a single virus protein, the spike protein, and **are** very vulnerable to mutations and emergence of new strains. Given that we are currently only finding variants where we have the capability to sequence, and not necessarily where they are occurring, this could already be the case. It is not coincidence that the three new variants have been picked up in the last quarter of 2020, we can expect a more rapid evolution of the virus in 2021 and more new variants as it adapts to humans (biological adaptation) and is now under **increasing immunological pressure from infection and vaccination** (immunological adaptation). Since viral mutation is fundamentally a function of global prevalence, there is an imperative to reduce transmission everywhere. Otherwise, mutations will **erode** the efficacy of our **tools** faster than we can adapt them. In this instance the adage “no one is safe until everyone is safe” is not just rhetoric, but epidemiological fact. A massive global reduction in prevalence would result in slower evolution and thus make the virus easier to control. We have either to face a vicious cycle of greater prevalence leading to faster **mutation** and continued reverberation of this pandemic, a pandemic within a pandemic. **Or** a virtuous **cycle of lower prevalence** resulting in less mutation and the ability to stay ahead of this pandemic.

#### COVID is the make-or-break on near-term extinction – reduced industrial activity spikes temperatures and results in mass deforestation & crop loss before the year ends.

Guy R McPherson, in Earth & Environmental Science Research & Reviews, 4-24-2020 McPherson is Professor Emeritus, University of Arizona [“Will COVID-19 Trigger Extinction of All Life on Earth?” Volume 3, Issue 2, https://opastonline.com/wp-content/uploads/2020/04/will-covid-19-trigger-extinction-of-all-life-on-earth-eesrr-20-.pdf, accessed 9-1-2021] AWS

Small lives matter. Indeed, the “human body contains about 100 trillion cells, but only maybe one in 10 of those cells is actually — human” [1]. We are comprised of bacteria and other tiny living organisms, as well as non-living entities such as viruses. One such virus has captured the attention of the world, and with good reason. The novel coronavirus could trigger extinction of humans, and therefore the extinction of all life on Earth. I frequently hear and read that COVID-19 is a nefarious attempt by the so-called “elite” among us to depopulate the burgeoning human population on Earth. Other conspiracy theories abound, including COVID-19 as an attempt to further reduce human rights, promote expensive medical therapies, and otherwise enrich the wealthy at the expense of the bamboozled masses. I do not doubt the ability of the informed wealthy to fleece the ignorant masses. Nor do I doubt the ability of the informed wealthy to turn virtually any situation into an opportunity for monetary gain. A quick glance at the past two centuries provides plenty of examples. However, I doubt the monetarily wealthy among us are interested in accelerating human extinction, even for financial gain. As I explain below, the ongoing **reduction in industrial activity as a result of COVID-19** almost certainly leads to loss of habitat for human animals, hence **putting us on the fast track to** human **extinction**. I doubt the knowledgeable “elite” are interested in altering the sweet deal they are experiencing with the current set of living arrangements. The aerosol masking effect, or global dimming, has been described in the peer-reviewed literature since at least 1929 [2, 3]. Coincident with industrial activity adding to greenhouse gases that warm the planet, industrial **activity** simultaneously **cools the planet by adding aerosols to the atmosphere**. These aerosols block incoming sunlight, thereby keeping cool our pale blue dot. Reducing industrial activity by as little as 35 percent is expected to cause a global-average temperature rise of 1 degree Celsius within a few weeks, according to research on the aerosol masking effect [4]. Such research was deemed collectively too conservative by a paper in the 17 January 2019 issue of Science [5]. As pointed out by the lead author of the latter paper on 22 January 2019 “Global efforts to improve air quality by developing cleaner fuels and burning less coal could end up harming our planet by reducing the number of aerosols in the atmosphere, and by doing so, diminishing aerosols’ cooling ability to offset global warming” [6]. The cooling effect is “nearly twice what scientists previously thought,” and the paper by Rosenfeld et al. [5] cites the conclusion by Levy et al. [4], indicating as little as 35% reduction in industrial activity drives a 1 C global-average rise in temperature, thereby suggesting that as little as a 20% reduction in industrial activity will drive a 1 C spike in temperature within a few weeks [7]. Additional, recent support for the importance of the aerosol masking effect comes from [8, 9]. Furthermore, **loss of aerosols exacerbates heat waves** [10]. Human extinction might have been triggered several years ago when the global-average temperature of Earth exceeded 1.5 C above the 1750 baseline. According to a comprehensive overview published by European Strategy and Policy Analysis System in April, an “increase of 1.5 degrees is the maximum the planet can tolerate; … at worst, [such a rise in temperature above the 1750 baseline will cause] the extinction of humankind altogether” [11, 12]. Earth’s global-average temperature hit 1.73 C above the 1750 baseline by April, 2018 the highest global-average temperature experienced by Homo sapiens on Earth [13, 14]. **By March 2020, 2 C** above the 1750 baseline **was crossed** [11]. In other words, human extinction via the death-by-a-thousandcuts route might be locked in with no further heating of Earth. In light of the ongoing pandemic, the ongoing Mass Extinction Event, and abrupt, irreversible climate change, it is pleasantly surprising that humans still occupy Earth. The pandemic-induced reduction in industrial activity may have already reduced the aerosol masking effect sufficiently to trigger a 1 C temperature spike. The outcome is not yet obvious because the timing of the outbreak of the novel coronavirus was favorable for human habitat. Trees produced leaves in the Northern Hemisphere spring of 2020 as a result of carbohydrates stored the previous year and grain crops were harvested before the novel coronavirus emerged. **Results of the recent and ongoing rise in temperature**, which have already been reported in China and India, **will become obvious** to most humans **when many more trees die**. Large-scale die-off of trees likely will approximately correspond with catastrophic crop failure. This might occur by the end of this year, although I would rather it not.Every civilization requires bread and circuses. There is little doubt the circuses attendant to industrial civilization will continue until the end of the planetary show for Homo sapiens. Bread, however, requires wheat. Wheat production requires a delicate balance of growing conditions that, like habitat for humans, teeters on the brink [15]. The path to near-term human extinction thus runs from a tiny virus underlying a pandemic through a reduction of industrial activity that overheats a planet already running a fever. The outbreak of **COVID-19 could very well be the event that accelerates human extinction** via reduction of industrial activity, hence loss of habitat for Homo sapiens. As **a result of the rapid environmental change likely** to follow, **we are almost certain to lose all life on Earth** [16]. History is replete with examples of human hubris. We thought we were mighty, and we certainly have left our mark on Earth. How embarrassing for the big-brained human species that a microscopic virus could pull the trigger on our extinction [15].

#### Subpoint B is Africa

#### The WTO patent laws are a textbook example of oppression, Africa against the creation of patent laws, yet had little say in the matter. Such patent laws were made by companies who wished to remove access to these medicines, due to these patent laws, millions in Africa are dying

Jae Sundaram, lecturer in International trade and Maritime Law at Buckingham University, in 2015 [“Access to Medicines and the TRIPS Agreement: What Next for Sub-Saharan Africa?” Information & Communications Technology Law Vol. 24, Issue 3 (2015) 242-261, https://doi.org/10.1080/13600834.2015.1084679]

This article takes up for analysis the continued problems faced in access to medicines in sub-Saharan Africa in the post-TRIPS (The Agreement on Trade-Related Aspects of Intellectual Property Rights) era, and the way forward. It is well documented that the African countries along with developing countries from other continents were opposed to the introduction of an intellectual property (IP) protection even during the Uruguay Round of Negotiations; the proposal went ahead, regardless of the oppositions, resulting in the introduction of the TRIPS Agreement. The article studies the reasons behind the continued inability of the sub-Saharan African states in accessing affordable medicines, the difficulty or failure of sub-Saharan African countries to utilise flexibilities found in the TRIPS Agreement, and also raise the inevitable question as to what is keeping the sub-Saharan African countries from seeking an amendment of the TRIPS Agreement to remove pharmaceutical patents from the ambit of its operation. This article is divided into three parts, with the first part presenting the entry of the TRIPS Agreement, the flexibilities, the introduction of Doha Declaration in later years and the continuing problems faced by sub-Saharan African countries with regard to access to medicines, the second part providing the background to the current state of affairs as regards access to medicines in sub-Saharan Africa and the measures taken to find solutions. The second part will also identify the factors contributing to the continued failure of the sub-Saharan African countries to find a viable solution to the problems. The third part will focus on discussing the findings and suggesting the way forward to arrive at a permanent solution to counter the shortcomings of the TRIPS Agreement and the consequent problems. 2. TRIPS Agreement: troubled passage and entry The Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) is viewed as the most significant agreements to emerge out of the Uruguay Round of Negotiations2 and yet controversial of the covered agreements of the World Trade Organization (WTO). The TRIPS Agreement, which addresses a range of IP rights issues and mandates a global minimum standard for IP rights protection on all member countries, was drafted at the behest of patent rights holding developed countries.3 It has **far-reaching implications** on international IP rights protection and access to medicines in developing countries and LDCs. The expression ‘access to medicines’, although widely used, does not have a standard definition. The main reason the Agreement is considered as a serious threat to access to medicines is that the 20-year product patent protection introduced through the Agreement covers pharmaceutical patents,4 and also outlaws process patents. Process patent, as opposed to product patent, paved the way for affordable generic drugs and is much more affordable than patented/brand-name drugs produced by transnational pharmaceutical corporations.5 Interestingly, most sub-Saharan African countries rely on generic drugs,6 which are free of patent and hence cheaper and affordable. The TRIPS Agreement7 allows Member States to impose a more extensive protection of IP right if they wish to, and a minimum standard of protection from others who may not be in favour of an extensive protection. The TRIPS Agreement fully incorporates substantive rules contained in other international agreements and Conventions8 previously administered by the World Intellectual Property Organization (WIPO).9 Developing countries and least developed countries (LDCs) had little or no involvement in the development of the above IP Conventions/treaties, as most were negotiated in the colonial era,10 decades before the Uruguay Round of Negotiations that took place in the 1980s–1990s. It is worth pointing that a number of sub-Saharan African countries were made signatories to international Conventions even during the colonial period, without the need for them to be parties.11 The Agreement creates rights for producers of IP and obligations for the users, and speaks very little about the rights of the end-users of IP,12 in our case the rights of the consumers of such pharmaceutical products. The developing countries, led by India, Brazil and Argentina, strongly opposed the proposal,13 which was followed by a detailed paper submitted by India in July 1989 at the negotiations putting forward the developing countries’ reasons for opposition for inclusion of an international IP rights protection to the General Agreement on Tariffs and Trade (GATT) agenda.14 Although debated, the paper presented by India15 did not produce the desired effect, as towards the latter half of 1989 and the beginning of 1990 almost all developing countries changed their position on the inclusion of international IP rights protection to the GATT agenda,16 which effectively brought the curtains on any resistance to the introduction of an international IP rights protection regime in the multilateral trading system. 2.1. The TRIPS Agreement: flexibilities, the Doha Declaration & sub-Saharan Africa The TRIPS Agreement, by strengthening patent protection, had a significant impact on access to life-saving medicines in developing countries and LDCs.17 This had especially affected the poor countries that had no infrastructure to produce pharmaceuticals and solely relied on imported generics for their health-care needs.18 The TRIPS Agreement, most importantly, contains flexibilities in its implementation, which are primarily aimed at benefitting the developing countries and LDCs,19 and help them in the pursuit of access to affordable medicines. Scholarly articles, written on the subject of flexibilities contained in the TRIPS Agreement, point to the WTO’s failure to address the problem of the access to medicines in developing countries and LDCs.20 Some of the key pharmaceutical patent-related flexibilities identified include provision for grant of compulsory licensing, parallel importation, and provisions relating to patentable subject matter,21 the exhaustion of rights22 and parallel importation, scope of patentability and optional exclusion, exceptions to patent rights and enforcement.23 Not all developing countries were aware that the developed countries (the advocates of a wider global IP rights protection) had a strong public health-care system and will be unaffected by the pharmaceutical patent regime of the TRIPS Agreement,24 and that it will be the developing countries and the LDCs who will be left to face the enormous burden of a higher IP rights protection. As the public health challenges became explicitly linked to the regulation of international trade25 conducted through the WTO, it was becoming increasingly clear that the Agreement would severely restrict access to essential medicines for their citizens, and impede any efforts to control diseases including HIV/AIDS, tuberculosis and malaria. There was a lingering fear amongst the developing countries (including the sub-Saharan nations) that the inclusion of pharmaceutical patents under the extended IP rights protection of the TRIPS Agreement was likely to increase dependency on brand-name pharmaceutical products and affect them severely, resulting in essential medicines becoming unaffordable and beyond their reach.26 To complicate matters, the flexibilities afforded under the Agreement to the developing countries and the LDCs were viewed narrowly by patent-holding developed countries, which took the view that the only flexibility afforded under the Agreement was its staggered implementation in certain cases. This was in stark contrast to the view of the developing countries that the Agreement did not limit their sovereign powers when addressing domestic health crises, such as HIV/AIDS.27 The impact of the TRIPS Agreement on public health in developing countries and LDCs became a serious issue. A lack of clarity and consensus on the TRIPS flexibilities had hampered the efforts to widen access to antiretroviral (ARVs) treatment in developing and LDCs,28 which factor has affected the sub-Saharan African nations severely.29 The concerns of the developing countries (including the African countries) only intensified when the USA and EU, along with the transnational pharmaceutical corporations commenced an aggressive campaign against countries that proceeded to take advantage of the IP rights policy options contained in the TRIPS Agreement,30 with the most notable legal action being launched against the Republic of South Africa, which sought to amend its Medicines Act and grant unbridled powers to the government to issue compulsory licenses and parallel importing contracts to generic producers of HIV/AIDS drugs.31 The campaign against the South African government continued, and would only come to an end when the NGO protesters threatened to disrupt the political campaign of the then US Vice President Al Gore.32 Nevertheless, the patent-holding transnational pharmaceutical industry persisted with its litigation, and would only withdraw after the NGOs had inflicted public relations damage.33 The case not only prised open the debate on the precise meaning of the flexibilities contained in the TRIPS Agreement, but also the principles and objectives embodied in Articles 7 and 8 of the Agreement.34 With growing pressure from the African Group, the Council for TRIPS35 in June 2001 considered in detail the relationship between public health and TRIPS Agreement.36 In November 2001, the Doha Declaration on TRIPS and Public Health37 (Doha Declaration) was made to address the concerns of the developing countries, and also to clarify other divergent views held by the developed nations and developing nations on the application and ambit of the TRIPS Agreement.38 The Doha Declaration recognised the right of a Member States to grant compulsory licences, determine the grounds for the grant and also define as to what constituted a national emergency.39 The Doha Declaration and the 2003 Decision on Implementation of Paragraph 640 of the TRIPS Agreement while recognising the right of a country to gain access to medicines were intended to allow access to generic medicines for HIV/AIDS, malaria and tuberculosis.41 Paragraph 4 encapsulated the spirit of the Declaration in the following words: We agree that the TRIPS Agreement does not and should not prevent Members from taking measures to protect public health. Accordingly, while reiterating our commitment to the TRIPS Agreement, we affirm that the Agreement can and should be interpreted and implemented in a manner supportive of WTO Members’ right to protect public health and, in particular, to promote access to medicines for all. To a greater extent, the Declaration also for the first time recognised that IP and trade rules had a negative impact on access to medicines. Paragraph 3 of the Declaration states that ‘ … also recognise the concerns about access to medicines’. 42 Despite a Declaration coming from the highest trading body, and with a UN’s commitments in the form of Millennium Goals,43 much is still desired from the TRIPS Agreement in terms of access to medicines,44 as close to a third of the people worldwide lack affordable essential medicines due to exorbitant prices. The developing countries and LDCs45 still face big challenges when trying to implement the TRIPS flexibilities due to increased IP protection introduced under the TRIPS Agreement,46 and through TRIPS-plus provisions introduced through free trade agreements (FTAs).47 The Doha Declaration impacted the developing countries, as it has influenced their health policies and in particular their pharmaceutical patent legislation. To some extent, the Doha Declaration clarified the scope of the TRIPS Agreement, provided interpretative guidance and political space for the use of flexibilities policy embodied in the TRIPS Agreement,48 but unfortunately left unresolved the key issue of exporting products manufactured under a compulsory license to countries without domestic production capacity, besides not addressing the promise of increased R&D in exchange for higher levels of IP protection, which was used as a bargaining chip by the developed countries during the Uruguay Round of Negotiations on extended IP rights protection.49 If the TRIPS Agreement was a well-concerted effort by the developed countries and their transnational pharmaceutical corporations, then the Doha Declaration was a hard fought bargain by the developing countries and LDCs led by the African nations and well supported by the NGOs. The lack of clarity on the use of compulsory license under the TRIPS Agreement still proves a major stumbling block for the sub-Saharan African nations in accessing affordable medicines, especially when they **strongly rely** on generic drugs manufactured in countries like India for most of their health-care requirement.50 It is however to be noted that some developing countries have used the TRIPS flexibilities to produce and purchase generic ARVs medications, and there is also evidence of donor countries now permitting the use of their funds to procure generic ARVs medications for LDCs.51 Unfortunately, most sub-Saharan African countries do not fall under the category of developing countries that have utilised such flexibilities to their advantage, as do they do not possess the knowledge economy or the necessary infrastructure to manufacture medicines on their own. The UN Commission on Human Rights on IP and Human Rights goes as far as to state that the WTO is ‘a veritable nightmare’ for certain sectors of humanity,52 in that the TRIPS Agreement in some ways encourages, or has a side-effect **human rights violations**.53 The observations in the report are true in that the sub-Saharan African countries continue to suffer from the implementation of the TRIPS Agreement. The fact remains that the most marginalized global economic actor at the WTO, the African faction54 did not have a major role to play during TRIPS negotiations,55 but arguably played an important role in the post-TRIPS era in the lead up to the Doha Declaration.56 The African Groups raised the issue of patents and healthcare as part of the Doha Development Round,57 in such a way that it could not be ignored. 2.2. Problems facing sub-Saharan Africa: extended IP rights protection, the promised flexibilities and the ‘unachievable balance’ under TRIPS Improving access to affordable medicines in the disadvantaged parts of the world had been on the agenda of international bodies for well over four decades, and resulting in the adoption of numerous resolutions and declarations. In the 1980s, when the HIV/AIDS epidemic affected the populations across the globe, the most vulnerable populations were located in the developing and least developed parts of the world – needless to say that the concentration continues to be very high in sub-Saharan Africa. While progress has been made in the treatment of the disease, it still remains inaccessible to a majority of the population who suffer from it. Those affected by HIV/AIDS but with access to the best treatment options still live in developed countries, and those with little or no access to medicines and treatment live in developing countries and LDCs, with the majority concentrated in sub-Saharan Africa.58 The developed countries hold the patent rights to most medicines, which offer the best treatment options possible to treat HIV/AIDS. Medicines broadly fall under three categories namely, non-prescription drugs, generic prescription drugs and patented prescription drugs. Transnational pharmaceutical corporations from patent-holding developed countries dominate the market for patented prescription drugs, which are also responsible for the development of new therapies.59 Generic medication, which makes up for half the pharmaceutical market, developed in industrialised nations and released into the public domain in the 1970s,60 is the most sought after medicine in sub-Saharan Africa, as it is affordable and hence accessible. As mentioned earlier, most sub-Saharan African countries lack the necessary knowledge economy and research capabilities to identify and treat diseases that affect their countries, besides the necessary infrastructure to produce any medicines.61 This is also compounded by the fact that most sub-Saharan African nations also do not possess the necessary administrative and resource capacities to negotiate before international forums,62 which is **a huge disadvantage**, especially in a globalised economy where decisions, touching upon all aspects of human life, are taken on a daily basis. Due to reduced production costs (especially labour) prevalent in developing countries and LDCs, one may think that it would be possible to produce medication at a cheaper cost in African countries. However, this may not be the case in sub-Saharan Africa, where most countries are without industrial or environmental expertise, and only have limited internal markets and cannot therefore benefit from the economies of scale as enjoyed by larger countries and multinational companies.63 The history of the long drawn negotiations on an expanded IP rights enforcement regime and the entry of the TRIPS Agreement clearly demonstrate that the drafters’ intent, although from different ends of the spectrum, was to balance IP rights with access to affordable medicines,64 with the goal to provide access to essential medications in cases of national public health emergency by granting a compulsory license of a patented medication.65 While the extent of the IP rights protection has been clearly defined in the Agreement, the scope of compulsory licenses has not been defined properly,66 which does not help in balancing the countervailing goals of IP rights with access to medicines.67 Under the scheme rights, holders are seen as producers of goods, while individuals seeking a fairer access to affordable medicines are viewed as mere consumers, with both parties having deeply entrenched goals with differing primary priorities and interests.68 One of the major stumbling blocks in achieving the goal of access to medicines appears to be the need to balance the transnational pharmaceutical corporations’ profit-seeking behaviour with socially responsible business practice that will permit greater access to essential medicines,69 which clearly appears to favour the patent-holding pharmaceutical corporations, as there are no international mechanism, or national mechanisms in developing countries and LDCs to monitor their business practice. Also, most developing countries and LDCs in sub-Saharan Africa lack the necessary infrastructure to manufacture patentable drugs,70 and would prefer a weaker IP rights regime71 to permit the market entry of affordable generic drugs to its citizens. 2.3. TRIPS Agreement – a bane for sub-Saharan Africa The TRIPS Agreement effectively curtails a Member State’s options, and also severely restricts the development policies of State players in ways that were not experienced by developed countries during their own transformations into industrialised countries.72 One of the most affected from the Agreement is the sub-Saharan African Member States, as a number of them do not have sufficient infrastructure to compete with developed countries in production of pharmaceuticals and are constrained to rely on imported medicines produced by transnational pharmaceutical corporations. The sub-Saharan African countries that clearly fall under this category have come to increasingly rely on imported and affordable generic drugs from outside the continent. It is necessary to point out that the trade-off as promised by the developed countries during the Uruguay Round of Negotiations did not happen,73 although it is two decades since the introduction of the TRIPS Agreement into the multilateral trading system. To a great extent, the gap in the knowledge economy between the developed and the developing countries (North–South divide) contributed to their ignorance of the TRIPS Agreement’s implication and the flexibilities offered therein,74 needless to say that the African nations barely engaged in the TRIPS negotiations,75 which was to prove very costly. Sub-Saharan Africa, predominantly formed by developing countries and LDCs, is a classic case where knowledge economy is very nearly barren in the continent with the exception of a few countries, due to a number of reasons including poverty, illiteracy, long period of military dictatorship with no recourse to development, very poor governance, corruption, etc. Again, some of the diseases which are viewed as manageable and not so life threatening in the developed countries are still life threatening and not manageable in most parts of sub-Saharan Africa – the classic cases being AIDS/HIV, malaria, diabetes, etc. In sum, it is the WTO, led by the developed countries, which is solely responsible for creating a multilateral trading system that promotes private ownership of knowledge through the TRIPS Agreement.76 The current structures and incentives of the pharmaceutical industry, which is largely based on IP laws, do not incentivise research into medicines for neglected diseases that afflict citizens living in sub-Saharan African countries, but not to be found in developed countries.77 To address the inequality in research created by pharmaceutical corporations, some authors have suggested alternative schemes for incentivising pharmaceutical research,78 to make it more easily accessible in developing countries and LDCs. Here again, the Ebola79 outbreak, which was witnessed in parts of West Africa in 2014, presents us with a snapshot of the urgency with which transnational pharmaceutical corporations carry out research for potential cure, or treatment for diseases. Although the Ebola virus was first discovered in 1976, no breakthrough had yet been made in 2014 when parts of West Africa witnessed a major outbreak of the virus, which claimed close to 5000 lives.80 The most severely affected countries of the Ebola outbreak in 2014, namely, Guinea, Liberia and Sierra Leone, have very weak health-care systems, and lack human and infrastructural resources.81 To make matters worse, they have only in recent times emerged from long periods of conflict in the region and experience instability.82 To have high expectations of IP rights/law compliance in the above jurisdictions, as laid out under the TRIPS Agreement, is simply unacceptable and shocking, and makes one ask the question if the WTO had considered all of the arguments before giving the go-ahead for the implementation of the Agreement? The answer is easy to arrive at, as the negotiation history of the TRIPS would demonstrate that there was no level playing field in the late 1980s and 1990s when the extended IP protection under the multilateral trade agenda was debated. This brings us back to the point made earlier, that is the disengagement, or lack of any clear presence of African Group in the TRIPS negotiation process, their lack of understanding of the gravity of the process that would introduce a system of IP protection on them through the WTO, which would have a damning effect on their health care.83 It was pointed out earlier84 that sub-Saharan African countries are weak on knowledge economy and also lack the capacity to participate/represent in international forums, a factor which would make them a very vulnerable player in a high-level negotiation debating the introduction of IP rights protection globally through the soon-to-be-born WTO. To postpone compliance to the TRIPS Agreement cannot be a solution to the problems facing sub-Saharan Africa.85 Currently, the LDC Member Countries are not required to apply most of the substantial rules of the TRIPS Agreement until 1 July 2021, and in particular, they have no obligation to provide any protection for clinical test data or to grant patents, including on pharmaceutical products or processes.86 As recently as February 2015, LDCs, led by Bangladesh, have presented a proposal to the TRIPS Council to have their deadline extended for protecting and enforcing pharmaceutical patents and clinical data as long as the Member State remains an LDC.87 Some of the reasons stated for the extension included the lack of technological base and local pharmaceutical manufacturing capacity in the LDCs.88 It can also be added that this proposal received support from a number of developing countries, developed countries (including the Holy See, Chile and Norway) and the WHO in the meetings held in June 2015, and will be taken up for further discussion when the council meets on 15–16 October 2015.89 There are currently 48 LDCs in the United Nations’ (UN) list, of which 34 are WTO Member States, and most importantly they are predominantly located in the sub-Saharan Africa and Asia.90 In the view of leading economists, the patent system is identified as giving rise to high cost of medicines, which in turn impedes access to life-saving drugs for **billions**.91 One of the main reasons the transnational pharmaceutical industry was strongly advocating for an extended IP rights protection regime through TRIPS was that they wanted to **reduce access** to generic medicines, as the prices of generic drugs are very low and are favoured over the much higher priced patented drugs.92 And also, any competition with the generics drugs will drive down the price of the brand-name drugs. Also, the lower prices in turn lower the profits of the brand-name pharmaceutical companies, and that it is understandable why the transnational pharmaceutical corporations pushed so hard and also contributed for international IP rights protection.93 The developed nations who advocated for a wider, global IP protection are clearly not affected by the rising cost of access to affordable medicines, as they have in place a robust health-care system through which medicines are accessible to its citizens.94 Importantly, ARV drugs, in developed countries, have ‘transformed AIDS from a death sentence to a chronic illness and saved thousands of lives’, but in sharp contrast, in sub-Saharan Africa, even at the reduced price of $300 per year the drugs remain out of reach for millions suffering from HIV and AIDS.95 Sub-Saharan Africa is the region most affected by the HIV/AIDS epidemic, and although it boasts only 10% of the world’s population, it nonetheless accounts for 66% of all HIV cases and more than 75% of AIDS-related deaths worldwide.96 It is well known that ARVs are the only proven means of staving off AIDS, and that so many in sub-Saharan Africa do not have access to ARVs is problematic – both morally and medically.97 Unfortunately, for the AIDS patients living in sub-Saharan Africa, the ARVs for frontline treatment are inaccessible due to its exorbitant price, which is fixed by transnational pharmaceutical corporations.98 Patients from sub-Saharan Africa suffer most from the impact of TRIPS, as the implementation of the Agreement has seen the price of patented drugs rise exponentially in a very short time, defying any logic.99 The only option available for countries in sub Saharan Africa is the use of generics, the procurement of which has now become highly problematic due to restriction placed on parallel imports and compulsory licensing under the Agreement. It will not be an exaggeration to state that the production and procurement of generics has almost been outlawed by the implementation of the TRIPS Agreement. One should bear in mind that the rules regulating the governance of multilateral trade are key to the future of HIV/AIDS treatment across the globe, particularly in poorer regions, subSaharan Africa being one, where price concerns can mean the difference between life and death.100 The extensive sufferings witnessed in sub-Saharan Africa due to HIV/ AIDS over the decades have prompted some to refer to the region as ‘ground zero’ of HIV/AIDS.101 Some writers opine that the TRIPS Agreement has only struck a discord, by making access to life-saving medicines an even more difficult task to achieve in subSaharan Africa and other disadvantaged parts of the world.

#### Lack of access to medicines and resources only leads to more suffering in the long term, the rise of infectious disease and an inability to deal with outbreaks leads to violence, social unrest, and economic turmoil

Celina Menzel, BA in public policy from hertie school of governance in berlin, in 2017 {“ THE IMPACT OF OUTBREAKS OF INFECTIOUS DISEASES ON POLITICAL STABILITY: EXAMINING THE EXAMPLES OF EBOLA, TUBERCULOSIS AND INFLUENZA,” KACIRISS, https://www.kas.de/documents/252038/253252/7\_dokument\_dok\_pdf\_52294\_1.pdf/95dc732e-2eda-2698-b01f-7ac77d060499?version=1.0&t=1539647543906}

Over the last two decades, outbreaks of severe acute respiratory syndrome (SARS), avian flu, swine flu, and ebola have reminded the world of the risks associated with outbreaks of infectious diseases. Since the 1960s, a growing number of such previously unknown disease agents have emerged. Simultaneously, well-known pathogens like cholera, malaria, and tuberculosis (TB) have **re-emerged** (Braun 2016: 1, Patrick 2011: 209, Fonkwo 2008: 13). Not only have factors like increased human mobility and migration, global trade and travel, population growth, urbanisation, changing agricultural practices, and ecological disruption have facilitated the emergence and re-emergence of infectious diseases (Patrick 2011: 233-234, WHO 2012: 24, Fonkwo 2008: 14, Gayer et al. 2007: 1625), but new global communication technologies facilitated the ***rapid spread*** of information, images, and stories about health crises to a wider audience (McInnes 2016: 384). Numerous health experts warn of growing risks of infectious disease outbreaks, especially with accelerated anti-microbial resistances and increasing non-compliance with vaccination policies (NIAID 2004: 71). This does not only pose a **severe risk** to human health and well-being, but also affects **societal, economic, and political prospects**. One aspect of the issue is the effect that infectious disease outbreaks can have on **political stability.** It is well-established that instability and conflict facilitate the (re-)emergence of infectious diseases, e.g. through destroyed health infrastructure, the disruption of disease control programs, limited access to health services, flight of trained health workers, and population displacements (Gayer et al. 2007: 1625, Patrick 2011: 230-231, McPake et al. 2015: 1-3). Yet, there is growing awareness that severe outbreaks of infectious diseases may also **negatively affect political stability** in afflicted countries. Although the link may not always be clear and there remains room for debate, many researchers, practitioners, and policymakers today assume that an indirect or direct link exists In 2012, the World Health Organisation (WHO) stated that “Infectious diseases have **shaped societies**, **driven conflict** and **spawned the marginalization of infected individuals and communities** throughout history” (WHO 2012: 10). Similarly, the Munich Security Conference (MSC) report from 2016 asserts that “In addition to the human toll, major outbreaks can also have significant impacts on economies and pose a **political risk** to governments, particularly those in **fragile states** that fail to control the disease” (MSC 2016: 42). In practice, the most recent 2014-2015 ebola outbreak in West Africa showed clear destabilising potential in the most-affected countries, particularly as unprepared health systems **broke down,** economies were **strongly affected**, human development and well-being **suffered severely**, and fear **spread widely.** The outbreak sparked unrest, as clinics and health facilities were violently attacked, patients and hospital items removed, and health staff threatened (Murrey 2014). In contrast, high TB rates in the region have not sparked any comparable reaction. For instance, Sierra Leone ranks near the top in TB death rates worldwide, with TB-induced deaths constituting a multiple of the deaths caused by ebola (World Life Expectancy 2016). The cursory observation of this empirical example indicates that some diseases may be more prone than others to affect political stability, although they objectively do not pose a greater risk to human well-being and development. This puzzle informs the following research question: Do outbreaks of different diseases - namely ebola, tuberculosis, and influenza - differ in their impact on the political stability of a country where an outbreak occurs? If that is the case, what can explain these differences? This research question is of interest for several reasons: Although political change is often necessary for positive development and inherent to democracy, frequent (and unconstitutional) political changeovers can pose challenges to effective governance (Steinberg 2012: 261). Therefore, political instability can impair the **social, economic, political, and human development** of a country and society, e.g. by hampering tax collection, high-quality education, adequate health systems, social programmes, economic productivity and investment, and law enforcement. If political instability is so rampant that it severely undermines the state’s capacity to fulfil its functions, the country may become a **breeding ground** for organised crime, terrorist groups, or militias, operating across borders and regions. Thus, gaining insights on the different factors that affect political stability is crucial. However, resources and political commitment are not inexhaustible, wherefore it is delusive to believe that all diseases can be effectively targeted. Therefore, a better understanding of which infectious diseases are particularly prone to political destabilisation may be helpful to inform policy decisions on targeted responses. This thesis makes a modest attempt to examine whether ebola, tuberculosis and influenza differ in their impact on political stability and provides possible explanations for such differences. In doing so, the thesis proceeds as follows: First, I present the state of research on the link between infectious diseases, security, and political stability, before providing a brief presentation of the three diseases in question. Subsequently, I give an overview of my quantitative analysis, including the chosen model and variables, descriptive statistics, and regression results for each of the three diseases. In order to go beyond statistical correlations and gain further information about the forces at play, I link the quantitative results to findings from interviews with public health and medical professionals as well as diplomats in West Africa. Finally, I discuss the results through a social-constructivist approach, focusing on the example of the 2014-2015 ebola outbreak in West Africa, before making concluding remarks. Although numbers are declining, infectious diseases are still the **leading cause** of death worldwide, killing more people than all wars and natural disasters combined (Braun 2016: 3, Patrick 2011: 210). In recent years, attention has increasingly shifted to non-communicable diseases (NCDs) as a major cause of morbidity, but many NCDs are linked to prior infection with pathogens (WHO 2012: 17-18). Since the 1960s, a growing number of previously unknown disease agents have emerged, while well-known pathogens like cholera, malaria, and tuberculosis have re-emerged (Braun 2016: 1, Patrick 2011: 209, Fonkwo 2008: 13). The (re-)emergence of infectious diseases has been facilitated by a range of factors, including increased human mobility and migration, global trade and travel, population growth and increased urban density, altered agricultural practices, close contact with livestock, deforestation and ecological disruption, conflict, weak institutions, misuse of anti-microbial drugs, decreased compliance with vaccination policies, and poverty (Patrick 2011: 233-234, WHO 2012: 24, Fonkwo 2008: 14, Gayer et al. 2007: 1625, NIAID 2004: 71). These factors allow pathogens to interact and mutate, spread to and amongst human populations, and to disseminate over large distances. Along with the growing risk of epidemics and pandemics, health issues have attracted attention from national security communities and the notion of ‘health security’ has become commonplace (Braun 2016: 1). For example, the U.S. National Science and Technology Council (NSTC) identified infectious diseases as a national security threat in 1995. In 2000, the U.S. National Intelligence Council (NIC) released a report stating that (re-)emerging infectious diseases threatened U.S. citizens and armed forces, and exacerbated social and political instability in countries and regions of U.S. interest (Patrick 2011: 209). More recently, outbreaks of SARS, avian flu, swine flu, and ebola have caught global attention, and in 2016 the MSC put infectious diseases on its agenda, stating: “Because of their threat to human health, to economies, and to the stability of states as a whole, lapses in health security can become issues of international security” (MSC 2016: 42). In the literature, Garrett (1994) pioneered in showing how the proliferation of diseases threatens the national security and global interests of the U.S.. Her work was pivotal for bringing issues of health security to the attention of policymakers (Garrett n.d., Price-Smith 2002: 9). Similarly, Pirages (1995) was among the first to link infectious diseases to state security and foreign policy, suggesting a range of further research avenues (Pirages 1995, Price-Smith 2002: 9). Today, issues of health security and infectious diseases are to an unprecedented extent on the agendas of policymakers and world leaders (NIAID 2004: 72). Nevertheless, the fields of health and security are still characterised by mutual scepticism. While health is regarded a rather ‘soft’ issue in the security community, health experts fear a ‘militarisation’ of health, undermining transparency and the political neutrality of humanitarian workers (Braun 2016: 1-2, Davies and Rushton 2016: 429). Both sides have their points. Since civilian capacities in outbreak emergencies are limited, the military or medical and logistical reserves can be rapidly mobilised to fill gaps (Hirschmugl 2015: 107, Braun 2016: 2). Davies and Rushton (2016) examine the role the UN Mission in Liberia (UNMIL) could have played during the 2014-2015 ebola outbreak. They discuss the provision of medical and humanitarian assistance by peacekeeping missions and examine advantages and downfalls, including the undermining of humanitarian neutrality and the dangers of ill-prepared interventions through insufficiently trained soldiers (Davies and Rushton 2016: 429-430). Other concerns over addressing health in security terms include the notion that health issues may become a priority only when the West feels threatened (Roemer-Mahler and Rushton 2016: 375, Abeysinghe 2016). Finally, Anderson and Beresford (2015) criticise that viewing health as a security issue entails security-driven, reactive responses, overlooking the underlying structural, socio-economic and political underpinnings of health crises. Clearly, the securitisation of health should not be promoted mindlessly. Nevertheless, health security includes a range of important issues to be considered. One is the link between infectious diseases, political stability, and state capacity. Relying on largely anecdotal evidence, historians have examined the effects of infectious diseases on societies and their role in the downfall of empires and civilisations (Price-Smith 2002: 10). Watts (1997) examines the destructive impact the bubonic plague had on Venice, its economic power and international role in the 14th century. Based on anthropological evidence, McNeill (1976) declares that debilitating pathogens may have played an important role in the expansion and collapse of various societies throughout history. For instance, the plague that struck Athens during the Peloponnesian War fatally affected Athenian war efforts and governance, and thus contributed to the fall of Athens. He also attributes decreases in power of the Byzantine Roman Empire in the 6th century to plague outbreaks. Finally, he shows that the collapse of feudalism may be linked to repeated waves of pneumonic and bubonic plague that struck Europe in the 14th and 15th century. These recurrent episodes of mass mortality likely undermined the legitimacy of authority structures like the Roman Catholic Church and resulted in labour shortages that allowed bondsmen to claim more rights. Initiated by these events, the Protestant rebellion ultimately resulted in the Thirty Year’s War (McNeill 1976, Price-Smith 2002: 11). Focusing on contemporary times, Patrick (2011) describes the **reciprocal spiral dynamic** between the spread of infectious diseases and weak state capacity. He argues that weak states are not only incapable of adequately preventing and addressing disease outbreaks, but that outbreaks can **further weaken fragile states**, **exacerbate poverty and instability, and undermine resilience to exogenous shocks** (Patrick 2011: 207-209). He argues that high disease prevalence can increase the **risk of violence** and **instability** by undermining traditional coping mechanisms of households, impairing economic productivity, increasing the risk of food shortages, and leading to population age structures with large youth cohorts, all of which reinforce a country’s propensity to turmoil. Moreover, rampant outbreaks could induce a loss of political legitimacy when national budgets, the provision of services, and state capacity erode. However, he also stresses that the empirical link between infectious diseases, state capacity, and violence is less clear than often claimed (Patrick 2011: 236). In contrast, Price-Smith (2002) provides **quantitative empirical** evidence for the existence of a **significant negative correlation** between infectious disease rates and state capacity. This association holds across regions and considerable time periods (Price-Smith 2002: 49-66). He argues that higher levels of infectious diseases act as stressors on state capacity by **generating political, social and economic instability**, and eroding governmental capacities (Price-Smith 2002: 22). The combination of increased demand on the government, mounting pathogen-induced deprivation, and declining government capacity can then lead to **political destabilisation and intra-state violence** (Price-Smith 2002: 15, 171-172). More specifically, high levels of infectious diseases can destabilise national economies, decrease per capita income and living standards, deplete work forces, affect productivity, reduce fiscal resources and government revenue, divert government expenditure, affect tourism and trade, and reinforce perceived and real income inequalities (Price-Smith 2002: 115-116, WHO 2012: 13-14, Fonkwo 2008: 15-16). According to the state weakness hypothesis in the security and conflict literature, the corresponding resource scarcity and poverty can act as **stressor variables** that create opportunities and incentives for citizens to participate in **collective violence against the status quo**. Moreover, in a situation of shrinking resource availability, political elites enter into competition for their share, political polarisation increases, and intra-elite violence (e.g. a coup d’état) becomes more likely (Price-Smith 2002: 124, Fonkwo 2008: 15). In addition, the disease poses a threat to the well-being of the population as guaranteed by the state. If the state is incapable of providing adequate protection of its citizens against the impact of pathogens, the citizen-state contract is shaken and **legitimacy is weakened**. Thus, debilitation and death do not only lead to psychological stress among the population, but also undermine the legitimacy of the ruling elites and authority structures, increase anti-governmental activities, aggravate institutional fragility, and impede effective governance (Price-Smith 2002: 124-130). Following a slightly different focus, Cervellati et al. (2011) examine whether a high and persistent exposure to infectious diseases increases a country’s risk of civil conflict. For their analysis, they use a new measure of disease prevalence to circumvent endogenous factors linked to economic development and socio-economic conditions (e.g. the quality of health infrastructure, education, and general health conditions). For this purpose, they use data on the geographic distribution of infectious disease pathogens that are endemic to a country to construct exogenous indices of extrinsic disease richness or disease environment for each country (Cervellati et al. 2011: 3). They find that large disease richness has a **statistically robust** and **quantitatively relevant** effect on the risk of civil conflict. Presumably, exposure to harsh disease environments, poor health, and high mortality rates reduce opportunity costs of engaging in violent activities (Cervellati et al. 2011: 2). In sum, the existing literature on health security provides detailed accounts of the link between infectious diseases and political stability or state capacity. However, little attention has been paid to whether certain infectious diseases are more likely to affect political stability than others. That is surprising because a better understanding of which diseases are prone to destabilisation would be useful to develop more targeted responses. In the following sections, I make an attempt to examine whether ebola, tuberculosis, and influenza differ in their impact on political stability.

Disease and instability in Africa breeds multiple different threats to global secutity

Grant T Harris, Professional lecturer of International Affairs at George Washington University, in 2017 ["Why Africa matters to US national security," Atlantic Council, 5-25-2017, https://www.atlanticcouncil.org/in-depth-research-reports/report/why-africa-matters-to-us-national-security/]

  The United States cannot afford to underinvest in Africa, a continent of over a billion people with growing political and economic power. And yet, there is a **persistent misconception** prevalent among the American public—and even many foreign policy professionals—that Africa is largely irrelevant to US national security. This is dangerous, for three reasons. First, transnational threats from Africa are **persistent and real.** The continent’s uneven democratic and economic growth and pockets of conflict contribute to a disproportionate number of **weak and failed states**, which threaten US interests at home and abroad by opening the door to **terrorism, criminal activity, and pandemics**. For example, the Islamic State of Iraq and al-Sham (ISIS) and other groups are **expanding** their reach across Africa1 and, but for a swift global response, the Ebola crisis of 2014 to 2016 could have caused well over a million deaths and vast economic harm. Second, economic and political needs will inevitably draw the United States to Africa. Though the continent is currently underrepresented in the global economy, that will not last forever. Africa boasts a growing middle class and, by 2050, will constitute a quarter of the world’s population.2 While US businesses are underinvested in African markets, China and other global competitors are making deep economic inroads that are feeding jobs in their own countries and creating economic ties that translate into **greater political influence**. Though not always a zero-sum calculus, China’s deepening ties to the region will undoubtedly reduce US influence. Moreover, African states are forming an increasingly unified voice and salient voting bloc on global issues, particularly in multilateral fora; these developments could help either advance or block key aspects of the United States’ global agenda on issues ranging from counterterrorism to nuclear security. Third, incidences of conflict, humanitarian crisis, and mass atrocities in Africa put significant pressure on the United States to act, in fulfillment of the nation’s historic global leadership role. Though some question the value of maintaining the United States’ role as “global policeman,” military and counterterrorism strategists staunchly agree that, in today’s complex and dangerous global environment, it is insufficient to merely keep Americans safe on American soil. Indeed, the rationale for promoting stability and development goes much further; it gets to how the United States has traditionally seen itself in the world, by promoting leadership and values that advance human dignity.3 Serious engagement in Africa is needed, even if one’s view of US national security imperatives is limited to countering transnational threats. The logic is simple: instability **breeds threats**, and unilateralism **breeds failure**. More to the point, advancing the stability and partnerships needed to protect Americans ultimately requires promoting local economies, supporting good governance, and addressing conflict in African countries. Furthering stability—the only durable solution to transnational threats—depends on economic growth and good governance. Nothing illustrates the stakes more clearly than Africa’s demographic shifts. Given the region’s young population (with a median age of eighteen), African leaders must create eighteen million jobs per year.4 This is a tall order, requiring US trade and assistance. Success would propel strong economic growth, but failure would create a large pool of youth who lack opportunities and are potentially susceptible to radicalization, thereby directly increasing the **terrorist threat** facing the United States. Though the causes of radicalization vary and are complex, a recent study of Boko Haram recruits identified financial incentives, more than religion, as a key driver of group membership.5 In fact, West African youth have joined jihadist causes for financial inducements of less than $600.6 The fundamental importance of stability is further illustrated by the current migration crisis, with a significant proportion of migrants fleeing economic hardship, conflict, and governance problems in Africa.7 US allies in Europe view this mass migration as a grave national security threat, affecting their political focus, resource allocation, and relationships with specific African states in a manner that trades off against other US priorities. Similarly, the United States needs willing and capable African partners to protect itself from transnational threats, which also requires investment in Africa’s economic development. To be “willing,” African governments must believe that the United States treats them with respect, shares their interests, and invests in their futures. To be “capable,” African governments often need assistance to effectively combat threats, particularly to do so in a manner consistent with US values. Fostering genuine partnerships therefore means supporting development and economic growth in African countries; transactional relationships will not yield the strong and deep partnerships needed to protect US interests. Nor is the United States the only possible partner for African governments; other major powers—with different interests—are competing for influence and offering investment, military cooperation, and assistance. Beyond transnational threats, however, there is a broader set of issues at stake, including the United States’ interest in being optimally competitive in Africa’s growing markets; garnering political support for a global agenda that advances US interests and values; and maintaining the kind of leadership that comes from being generous and principled in working to protect innocent people from natural and man-made disasters. Engagement with Africa is frequently considered altruistic (i.e., of marginal benefit to the United States), or a national security imperative only with respect to counterterrorism. The former view is completely misguided, while the latter is myopic. In reality, African countries are linked to a wide and growing range of US national security and economic interests, and a broader recognition of these links is urgently needed to better inform policy and strengthen United States-Africa relations.8 The perception that US engagement with Africa is optional or irrelevant to core interests will, at best, diminish the tools available to policy makers (including financial resources and high-level attention), stunt US relationships on the continent, and cause missed opportunities. At worst, underinvestment in key partnerships and capacity in the region will increase the threat to Americans both at home and abroad, and diminish US influence in the international order. In an effort to dispel the harmful myth of Africa’s secondary importance to US national security and economic prosperity, this paper outlines the United States’ material interests in Africa through the following lenses: transnational threats, economic growth, access to natural resources, and promoting an international order that benefits the United States. Transitional threats Return to table of contents﻿ It has long been recognized that weak and failed states incubate **instability** that directly threatens US national **security**. Unfortunately, Africa is home to most of the world’s fragile states: in 2016, African countries took nineteen out of the top twenty-five slots in the Fund for Peace’s Fragile States Index.9 Whether the threat is terrorism or a deadly virus, the United States requires willing and capable African partners that can participate in broad, cooperative—and often regional—responses, particularly because many of these threats are overlapping and mutually reinforcing. Terrorism Terrorist groups based in Africa are inflicting terrible suffering and directly threaten the interests of the United States and its allies. In 2015, the number of people killed in terrorist attacks in Africa was the same or higher as the number of fatalities caused by the Islamic State of Iraq and al-Sham (ISIS) in the Middle East.10 While it cannot be emphasized enough that the vast majority of this misery has fallen on Africans, terrorist groups also endanger Americans and US interests. Multiple Africa-based groups maintain links with primary US adversaries like **ISIS and al-Qaeda,** which carried out the bombings of two US embassies in Kenya and Tanzania in 1998. More recently, there are growing concerns about terrorist organizations in the Sahel with links to al-Qaeda.11 ISIS has also been looking to Africa to expand its reach; the group is fully operational in eighteen countries, including eight in Africa (of which three are in North Africa),12 and it secured allegiance from Boko Haram in Nigeria in 2015.13 As described by a previous commander of the United States Africa Command (AFRICOM), “Terrorists with allegiances to multiple groups are expanding their collaboration in recruitment, financing, training, and operations, both within Africa and trans-regionally.”14 African-based groups such as Boko Haram—the second most lethal terrorist group in the world15—and al-Qaeda in the Islamic Maghreb (AQIM) espouse dangerous anti-American and/or anti-Western ideologies. Both have been responsible for targeting establishments frequented by Westerners, including attacks by Boko Haram against a United Nations (UN) building in Nigeria (2011), and by Africa-based al-Qaeda affiliates against hotels in Mali (2015), Burkina Faso (2016), and Côte d’Ivoire (2016). AQIM made more than $90 million kidnapping Europeans for ransom from 2008-2014.16 In addition, al-Shabaab, which is an affiliate of al-Qaeda, has conducted various attacks in East Africa, including at a restaurant and rugby club in Uganda (2010) and the Westgate Mall in Kenya (2013). Terrorist activities by these groups do not just pose localized threats: their anti-American messages reach potential audiences far and wide, including across Africa and in the United States. Al-Shabaab has solicited US residents and citizens (including among the approximately 150,000 strong Somali immigrant community in the United States17) for funding,18 new members,19 and to encourage attacks on US soil.20 In 2009, Nigerian Umar Farouk Abdulmutallab, the “Underwear Bomber,” was inspired by al-Qaeda to attempt to explode an airplane bound for the United States.21 Indeed, the characteristics of weak and failed states—including corruption, poor governance, and insecurity—breed terrorist threats by providing safe havens for perpetrators, avenues for profitable illegal activities, and opportunities to recruit disaffected individuals. In some cases, fragile states lack the capacity to act. In other cases, they may be unwilling to crack down on terrorism, as when Sudan provided refuge to Osama bin Laden in the early 1990s. In some circumstances, the threats are so pressing that the United States has sometimes been left with little choice but to take direct action, which is greatly facilitated by having a physical foothold in Africa and access to key infrastructure. As a case in point, Camp Lemonnier in Djibouti is critical to US counterterrorism efforts on the continent and in the Middle East, including operations against al-Shabaab in Somalia and al-Qaeda in the Arabian Peninsula (AQAP) in Yemen.22 Ultimately, however, successful counterterrorism endeavors require motivated and capable partners. The United States could not do it alone even if it wanted to—it would be an unwise investment and, more to the point, ineffective. In addition to direct military action, the United States must invest in strengthening partners’ ability to confront and prevent regional threats, including before they can escalate and affect US interests (abroad, and especially at home). This includes providing vital security cooperation and assistance to increase African partner capacity, which is neither a quick nor a small task. Mounting a meaningful security relationship depends on strong diplomacy and building partnerships across military, law enforcement, intelligence, and other channels. It may also require, as in the case of Nigeria or Kenya, confronting human rights issues to ensure compliance with US laws (e.g., Leahy human rights vetting of foreign security forces) that would otherwise prevent the US provision of certain types of assistance to specific units or individuals. In contrast, divorcing short-term counterterrorism operations from a deeper partnership that incorporates security and other assistance to African states could backfire if partner states lack the necessary will or ability to pursue comprehensive and effective strategies. To that end, the United States has increased its security partnerships in Africa. In 2015, AFRICOM conducted seventy-five joint operations, twelve major joint exercises, and four hundred security cooperation activities.23 In addition, supporting African-led interventions (such as in Somalia and the Lake Chad Basin region) can improve effectiveness and lend military operations a greater sense of legitimacy in countering threats that, in any case, demand regional solutions to be effective. Supporting African forces in addressing conflicts and conducting counterterror operations has minimized US boots on the ground, saving American lives in the process.24 Combating terrorism requires not just partners, but also a holistic approach to address development challenges and prevent extremism. Security tools are necessary but not sufficient to address and prevent terrorism; overreliance on tactics like military missions, intelligence gathering, and border policing will not adequately protect US interests. Instead, countering violent extremism requires tackling the underlying structural challenges that may expose individuals to radicalization and motivate violent acts. As is stated in President George W. Bush’s Freedom Agenda, “It is in the best interests of our Nation to alleviate the despair that can allow extremism to take hold by fighting hunger and disease, supporting basic education initiatives, and advancing global economic development.”25 Unfortunately, many African countries face just such development challenges, coupled with an exploding youth population that could either be an incredible economic boon or a substantial risk for national and regional stability. “During the next five years, growing African populations will become more youthful, urban, mobile, and networked, and better educated—and more demanding of a voice,” explains the National Intelligence Council.26 African governments must implement forward-thinking policies, including democratic and economic reforms to invest public resources wisely, tamp down corruption, and improve investment climates to attract private capital. Just to absorb the growing labor force, Africa will need to create approximately eighteen million jobs every year until 2035.27 Alternatively, misguided policy or denying opportunities to youth for short-term political gain will fuel discontent, extremism, and conflict. In dire situations, it can take very little to persuade disaffected youth to join extremist groups. In West Africa, young recruits receive less than $600 to join terrorist groups.28 A recent study of Boko Haram recruits identified financial incentives, more so than religion, as a key driver of group membership.29 This suggests that, among the many other complex factors that lead to radicalization, addressing poverty and governance issues remains central to tackling the root causes of terrorism. This further suggests that, without good alternatives, the number of terrorist recruits will continue to increase. According to General Thomas D. Waldhauser, the current commander of AFRICOM, African youth join extremist groups for jobs more than ideology; for that reason, he testified to Congress, “We have got to find a way to get at education, health care, hopelessness, livelihood, and the like…” because “we cannot kill our way to victory here.”30 Viewing Africa only through the soda straw of security tools and direct action would impede sustainable solutions, pervert Washington’s choice of partners, and prevent the United States from being effective in eliminating threats to its interests. Partnerships with African countries are therefore critical, not only to create jobs and opportunities for youth, but also to work with governments to address policies and corruption that create grievances and foster radicalization. Health threats In a globalized world, **communicable diseases can easily cross oceans and borders**. Combating such threats depends on capable partners with effective institutions to detect and prevent epidemics before they can spread. Developing these capacities requires substantial funding and coordination to strengthen early warning systems and healthcare services. But it is a far better option than risking American lives, resorting to expensive emergency measures, and enduring economic shocks that may have long-term negative implications. First, US leadership has been critical in reducing the direct and indirect impacts of devastating epidemics in Africa. The President’s Emergency Plan for AIDS Relief (PEPFAR) created under President George W. Bush saved some 740,000 lives over four years.31 With the 2014-2016 Ebola outbreak in West Africa, action by the United States and its allies—including military involvement—helped avoid a worst-case scenario of 1.4 million cases in four months.32 Early intervention decreased the chances of US citizens becoming infected, and minimized the possibility of a viral mutation; had that happened, the risks to the global population would have been enormous.33 Second, the United States cannot completely isolate itself in the face of such health crises. At the time of the Ebola outbreak, some 3,000—6,000 passengers a week were traveling between West Africa and the United States.34 The United States would have been much more directly impacted—and much sooner—had Ebola been more concentrated in a country like Nigeria, with greater travel and commercial links to the United States. Nor is simply closing the borders a practical response, as illustrated by ineffective travel restrictions to contain the spread of H1N1 influenza in 2009.35 There is also the risk of **weaponizing a highly infectious disease for bioterrorism purposes**. Though the likelihood of this happening with Ebola is low due to logistical and financial hurdles, that has not stopped state and non-state actors from trying in the past,36 and the possibility that such a threat could emanate from Africa should not be overlooked. Additionally, epidemics can have long-lasting destabilizing effects that undermine US security. PEPFAR was founded on the realization that “the devastation caused by HIV/AIDS would depress economic development, inhibit good governance, and decrease the size and productivity of the workforce—conditions that breed instability and conflict.”37 In the case of Ebola, even though Americans had a slim chance of contracting the disease, President Obama rightly determined that out-of-control infections could lead to panic and the economic collapse of affected African countries, with **global security** implications.38 Third, new and/or more frequent outbreaks are a distinct possibility in the future, partly as a result of growing and urbanizing populations in Africa and elsewhere, and the increased incidence of human-to-animal interactions. “Emerging diseases against which humans have no preexisting immunity or effective therapies pose significant risks of becoming pandemics,” warned former Director of National Intelligence James Clapper.39 Moreover, Africa’s generally weak national health systems heighten the likelihood that a localized disease will expand into a pandemic. For example, countries in Africa are the least likely of any region to have pandemic preparedness plans for avian influenza, which is especially worrying in light of recent outbreaks of “highly pathogenic” strains that have affected millions of birds across Europe, Asia, and Africa.40 If these strains succeeded in transferring to humans, the Center for Disease Control (CDC) cautions, “an influenza pandemic could result, with potentially high rates of illness and death worldwide.”41

#### Extinction – No burnout, harder to monitor.

**Piers Millett, Senior Research Fellow, and Andrew Snyder-Beattie, Director of Research, University of Oxford Future of Humanity Institute, Health Security Journal, 2017** ["Existential Risk and Cost-Effective Biosecurity", Volume 15, Number 4, DOI: 10.1089/hs.2017.0028, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5576214/, 1-31-2019] JRB

How worthwhile is it spending resources to study and mitigate the chance of human extinction from biological risks? The risks of such a catastrophe are presumably low, so a skeptic might argue that addressing such risks would be a waste of scarce resources. In this article, we investigate this position using a cost-effectiveness approach and ultimately conclude that the expected value of reducing these risks is large, especially since such risks jeopardize the existence of all future human lives. Historically, disease events have been responsible for the greatest death tolls on humanity. The 1918 flu was responsible for more than 50 million deaths,[1](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5576214/#B1) while smallpox killed perhaps 10 times that many in the 20th century alone.[2](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5576214/#B2) The Black Death was responsible for killing over 25% of the European population,[3](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5576214/#B3)while other pandemics, such as the plague of Justinian, are thought to have killed 25 million in the 6th century—constituting over 10% of the world's population at the time.[4](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5576214/#B4) It is an open question whether a future pandemic could result in outright human extinction or the irreversible collapse of civilization. A skeptic would have many good reasons to think that existential risk from disease is unlikely. Such a disease would need to spread worldwide to remote populations, overcome rare genetic resistances, and evade detection, cures, and countermeasures. Even evolution itself may work in humanity's favor: Virulence and transmission is often a trade-off, and so **evolutionary pressures could push against maximally lethal wild-type pathogens**.[5](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5576214/#B5),[6](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5576214/#B6) While these arguments point to a very small risk of human extinction, **they do not rule the possibility out** entirely. Although rare, there are recorded instances of species going extinct due to disease—primarily in amphibians, but also in 1 mammalian species of rat on Christmas Island.[7](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5576214/#B7),[8](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5576214/#B8) There are also historical examples of large human populations being almost entirely wiped out by disease, especially when multiple diseases were simultaneously introduced into a population without immunity. The most striking examples of total population collapse include native American tribes exposed to European diseases, such as the Massachusett (86% loss of population), Quiripi-Unquachog (95% loss of population), and the Western Abenaki (which suffered a staggering 98% loss of population).[9](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5576214/#B9) In the modern context, no single disease currently exists that combines the worst-case levels of transmissibility, lethality, resistance to countermeasures, and global reach. But many diseases are proof of principle that each worst-case attribute can be realized independently. For example, some diseases exhibit nearly a 100% case fatality ratio in the absence of treatment, such as rabies or septicemic plague. Other diseases have a track record of spreading to virtually every human community worldwide, such as the 1918 flu,[10](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5576214/#B10) and seroprevalence studies indicate that other pathogens, such as chickenpox and HSV-1, can successfully reach over 95% of a population.[11](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5576214/#B11),[12](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5576214/#B12) Under optimal virulence theory, natural evolution would be an unlikely source for pathogens with the highest possible levels of transmissibility, virulence, and global reach. But advances in biotechnology might allow the creation of diseases that combine such traits. Recent controversy has already emerged over a number of scientific experiments that resulted in viruses with enhanced transmissibility, lethality, and/or the ability to overcome therapeutics.[13-17](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5576214/#B13) Other experiments demonstrated that mousepox could be modified to have a 100% case fatality rate and render a vaccine ineffective.[18](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5576214/#B18) In addition to transmissibility and lethality, studies have shown that other disease traits, such as incubation time, environmental survival, and available vectors, could be modified as well.[19-21](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5576214/#B19) Although these experiments had scientific merit and were not conducted with malicious intent, their implications are still worrying. This is especially true given that there is also a long historical track record of state-run bioweapon research applying cutting-edge science and technology to design agents not previously seen in nature. The Soviet bioweapons program developed agents with traits such as enhanced virulence, resistance to therapies, greater environmental resilience, increased difficulty to diagnose or treat, and which caused unexpected disease presentations and outcomes.22 Delivery capabilities have also been subject to the cutting edge of technical development, with Canadian, US, and UK bioweapon efforts playing a critical role in developing the discipline of aerobiology.23,24 While there is no evidence of state-run bioweapons programs directly attempting to develop or deploy bioweapons that would pose an existential risk, the logic of deterrence **and mutually assured destruction** could **create** such **incentives** in more unstable political environments or following a breakdown of the Biological Weapons Convention.25 The possibility of a war between great powers could also increase the pressure to use such weapons—during the World Wars, bioweapons were used across multiple continents, with Germany targeting animals in WWI,26 and Japan using plague to cause an epidemic in China during WWII.27 Non-state actors may also pose a risk, especially those with explicitly omnicidal aims. While rare, there are examples. The Aum Shinrikyo cult in Japan sought biological weapons for the express purpose of causing extinction.28 Environmental groups, such as the Gaia Liberation Front, have argued that “we can ensure Gaia's survival only through the extinction of the Humans as a species … we now have the specific technology for doing the job … several different [genetically engineered] viruses could be released”(quoted in ref. 29). Groups such as R.I.S.E. also sought to protect nature by destroying most of humanity with bioweapons.30 Fortunately, to date, non-state actors have lacked the capabilities needed to pose a catastrophic bioweapons threat, but this could change in future decades as biotechnology becomes more accessible and the pool of experienced users grows.31,32 What is the appropriate response to these speculative extinction threats? A balanced biosecurity portfolio might include investments that reduce a mix of proven and speculative risks, but striking this balance is still difficult given the massive uncertainties around the low-probability, high-consequence risks. In this article, we examine the traditional spectrum of biosecurity risks (ie, biocrimes, bioterrorism, and biowarfare) to categorize biothreats by likelihood and impact, expanding the historical analysis to consider even lower-probability, higher-consequence events (catastrophic risks and existential risks). In order to produce reasoned estimates of the likelihood of different categories of biothreats, we bring together relevant data and theory and produce some first-guess estimates of the likelihood of different categories of biothreat, and we use these initial estimates to compare the cost-effectiveness of reducing existential risks with more traditional biosecurity measures. We emphasize that these models are highly uncertain, and their utility lies more in enabling order-of-magnitude comparisons rather than as a precise measure of the true risk. However, even with the most conservative models, we find that reduction of low-probability, high-consequence risks can be more cost-effective, as measured by quality-adjusted life year per dollar, especially when we account for the lives of future generations. This suggests that despite the low probability of such events, society still ought to invest more in preventing the most extreme possible biosecurity catastrophes. Go to: The Impact Spectrum of Various Biothreats Here, we use historical data to analyze the probability and severity of biothreats. We place biothreats in 6 loose categories: incidents, events, disasters, crises, global catastrophic risk, and existential risk. Together they form an overlapping spectrum of increasing impact and decreasing likelihood (Figure 1).\* Figure 1. A spectrum of differing impacts and likelihoods from biothreats. Below each category of risk is the number of human fatalities. We loosely define global catastrophic risk as being 100 million fatalities, and existential risk as being the total extinction of humanity. Alternative definitions can be found in previous reports,33 as well as within this journal issue.34 The historical use of bioweapons provides useful examples of some categories of biothreats. Biocrimes and bioterrorism provide examples of incidents.† Biological warfare provides examples of events and disasters. These historical examples provide indicative data on likelihood and impact that we can then feed into a cost-effectiveness analysis. We should note that these data are both sparse and sometimes controversial. Where possible, we use multiple datasets to corroborate our numbers, but ultimately the “true rate” of bioweapon attacks is highly uncertain. Biocrimes and Bioterrorism Historically, risks of biocrime‡ and bioterrorism§ have been limited. A 2015 Risk and Benefit Analysis for Gain of Function Research detailed 24 biocrimes between 1990 and 2015 (0.96 per year) and an additional 42 bioterrorism incidents between 1972 and 2014 (1 per year).36 This is consistent with other estimates of biocrimes and bioterrorism frequency, which range from 0.35 to 3.5 per year (see supplementary material, part 1, at http://online.liebertpub.com/doi/suppl/10.1089/hs.2017.0028). Most attacks typically result in no more than a handful of casualties (and many of these events include hoaxes, threats, and attacks that had no casualties at all). For example, the anthrax letter attacks in the United States in 2001, perhaps the most high-profile case in recent years, resulted in only 17 infections with 5 fatalities.37 The 2015 Risk and Benefit Analysis for Gain of Function Research detailed only a single death from the recorded biocrimes.\*\* Only 1 of the bioterrorism incidents in the report had associated deaths (the 2001 anthrax letter attacks).36 Based on this data, for the purposes of this article, we assume that we could expect 1 incident per year resulting in up to tens of deaths. Biological Warfare Academic overviews of biological warfare†† detail 7 programs prior to 1945.38 A further 9 programs are recorded between 1945 and 1994.39 For most of the last century, at least 1 program was active in any given year (Table 1). Table 1. The duration of state-run offensive biological weapons programs detailed in key historical reviews up to 1945 and from 1945 to 2000.5,6 State Duration (Review up to 1945) Duration (Review from 1945-2000) Canada 1925-1945 1945-1969 France 1921-1926 and 1935-1940 1947-1972 Germany 1915-1918 — Hungary — 1938-1944 Iraq — 1974-1990 Japan 1931-1945 — Poland — 1945-1960? South Africa — 1981-1994 Soviet Union 1920-1945 1945-1992 United Kingdom 1925-1945 1945-1957 United States 1942-1945 1945-1969 The actual use of bioweapons by states is less common: Over the 85 years covered by these histories (1915 to 2000), 18 cases of use (or possible use) were recorded, including outbreaks connected to biological warfare (see supplementary material, part 2, at http://online.liebertpub.com/doi/suppl/10.1089/hs.2017.0028). Extrapolating this out (dividing 18 by 85), we would have about a 20% chance per year of biowarfare. It is worth noting the limitations of these data. Most of these events occurred before the introduction of the Biological Weapons Convention and were conducted by countries that no longer have biological weapons programs. Since many of these incidents occurred during infrequent great power wars, we revise our best guess to around 10% chance per year of biowarfare. We use 2 sets of data to estimate the magnitude of such events. The first dataset was Japanese biological warfare in China,40 where records indicate a series of attacks on towns resulted in a mean of 330 casualties per event and 1 case in which an attack resulted in a regional outbreak causing an estimated 30,000 deaths (see supplementary material, part 3, at http://online.liebertpub.com/doi/suppl/10.1089/hs.2017.0028). The second data set came from disease events that were alleged to have an unnatural origin.41 In one case study, a point source release of anthrax resulted in at least 66 deaths. In a second case study, a regional epidemic of the same disease resulted in more than 17,000 human cases. While these events were not confirmed as having been caused by biological warfare, contemporary or subsequent analysis has suggested that such an origin was at least feasible. Combined, these figures provide an estimated impact of between 66 to 330 and 17,000 to 30,000. For the purposes of this analysis, we are assuming the lower boundary figures from biological warfare are indicative of events, with a likelihood of 10% per year and an impact ranging between tens and thousands of fatalities. The upper boundary figures from biological warfare are indicative of disasters, with a likelihood of 1% per year and an impact range of thousands to tens of thousands of fatalities.‡‡ Go to: Global Catastrophic and Existential Risk Unlike standard biothreats, there is no historical record on which to draw when considering global catastrophic or existential risks. Alternative approaches are required to estimate the likelihood of such an event. Given the high degree of uncertainty, we adopt 3 different approaches to approximate the risk of extinction from bioweapons: utilizing surveys of experts, previous major risk assessments, and simple toy models. These should be taken as initial guesses or rough order-of-magnitude approximations, and not a reliable or precise measure. Model 1: Survey of 2008 Global Catastrophic Risk Conference An informal survey at the 2008 Oxford Global Catastrophic Risk Conference asked participants to estimate the chance that disasters of different types would occur before 2100. Participants had a median risk estimate of 0.05% that a natural pandemic would lead to human extinction by 2100, and a median risk estimate of 2% that an “engineered” pandemic would lead to extinction by 2100.42 The advantage of the survey is that it directly measures the quantity that we are interested in: probability of extinction from bioweapons. The disadvantage is that the estimates were likely highly subjective and unreliable, especially as the survey did not account for response bias, and the respondents were not calibrated beforehand. We therefore also turn to other models that, while indirect, provide more objective measures of risk.§§ Model 2: Potentially Pandemic Pathogens Recent controversial experiments on H5N1 influenza prompted discussions as to the risks of deliberately creating potentially pandemic pathogens. These agents are those that are highly transmissible, capable of uncontrollable spread in human populations, highly virulent, and also possibly able to overcome medical countermeasures.44 Previous work in a comprehensive report done by Gryphon Scientific, Risk and Benefit Analysis of Gain of Function Research,36 has laid out very detailed risk assessments of potentially pandemic pathogen research, suggesting that the annual probability of a global pandemic resulting from an accident with this type of research in the United States is 0.002% to 0.1%. The report also concluded that risks of deliberate misuse were about as serious as the risks of an accidental outbreak, suggesting a 2-fold increase in risk. Assuming that 25% of relevant research is done in the United States as opposed to elsewhere in the world, this gives us a further 4-fold increase in risk. In total, this 8-fold increase in risk gives us a 0.016% to 0.8% chance of a pandemic in the future each year (see supplementary material, part 4, at http://online.liebertpub.com/doi/suppl/10.1089/hs.2017.0028). The analysis in Risk and Benefit Analysis of Gain of Function Research suggested that lab outbreaks from wild-type influenza viruses could result in between 4 million and 80 million deaths,36 but others have suggested that if some of the modified pathogens were to escape from a laboratory, they could cause up to 1 billion fatalities.45 For the purposes of this model, we assume that for any global pandemic arising from this kind of research, each has only a 1 in 10,000\*\*\* chance of causing an existential risk. This figure is somewhat arbitrary but serves as an excessively conservative guess that would include worst-case situations in which scientists intentionally cause harm, where civilization permanently collapses following a particularly bad outbreak, or other worst-case scenarios that would result in existential risk. Multiplying the probability of an outbreak with the probability of an existential risk gives us an annual risk probability between 1.6 × 10–8 and 8 × 10–7.††† Model 3: Naive Power Law Extrapolation Previous literature has found that casualty numbers from terrorism and warfare follow a power law distribution, including terrorism from WMDs.46 Power laws have the property of being scale invariant, meaning that the ratio in likelihood between events that cause the deaths of 10 people and 10,000 people will be the same as that between 10,000 people and 10,000,000 people.‡‡‡ This property results in a distribution with an exceptionally heavy tail, so that the vast majority of events will have very low casualty rates, with a couple of extreme outliers. Past studies have estimated this ratio for terrorism using biological and chemical weapons to be about 0.5 for 1 order of magnitude,47 meaning that an attack that kills 10x people is about 3 times less likely (100.5) than an attack that kills 10x–1 people (a concrete example is that attacks with more than 1,000 casualties, such as the Aum Shinrikyo attacks, will be about 30 times less probable than an attack that kills a single individual). Extrapolating the power law out, we find that the probability that an attack kills more than 5 billion will be (5 billion)–0.5 or 0.000014. Assuming 1 attack per year (extrapolated on the current rate of bio-attacks) and assuming that only 10% of such attacks that kill more than 5 billion eventually lead to extinction (due to the breakdown of society, or other knock-on effects), we get an annual existential risk of 0.0000014 (or 1.4 × 10–6). We can also use similar reasoning for warfare, where we have more reliable data (97 wars between 1820 and 1997, although the data are less specific to biological warfare). The parameter for warfare is 0.41,47 suggesting that wars that result in more than 5 billion casualties will comprise (5 billion)–0.41 = 0.0001 of all wars. Our estimate assumes that wars will occur with the same frequency as in 1820 to 1997, with 1 new war arising roughly every 2 years. It also assumes that in these extreme outlier scenarios, nuclear or contagious biological weapons would be the cause of such high casualty numbers, and that bioweapons specifically would be responsible for these enormous casualties about 10% of the time (historically bioweapons were deployed in WWI, WWII, and developed but not deployed in the Cold War—constituting a bioweapons threat in every great power war since 1900). Assuming that 10% of biowarfare escalations resulting in more than 5 billion deaths eventually lead to extinction, we get an annual existential risk from biowarfare of 0.0000005 (or 5 × 10–7). Perhaps the most interesting implication of the fatalities following a power law with a small exponent is that the majority of the expected casualties come from rare, catastrophic events. The data also bear this out for warfare and terrorism. The vast majority of US terrorism deaths occurred during 9/11, and the vast majority of terrorism injuries in Japan over the past decades came from a single Aum Shinrikyo attack. Warfare casualties are dominated by the great power wars. This suggests that a typical individual is far more likely to die from a rare, catastrophic attack as opposed to a smaller scale and more common one. If our goal is to reduce the greatest expected number of fatalities, we may be better off devoting resources to preventing the worst possible attacks. Why Uncertainty Is Not Cause for Reassurance Each of our estimates rely to some extent on guesswork and remain highly uncertain. Technological breakthroughs in areas such as diagnostics, vaccines, and therapeutics, as well as vastly improved surveillance, or even eventual space colonization, could reduce the chance of disease-related extinction by many orders of magnitude. Other breakthroughs such as highly distributed DNA synthesis or improved understanding of how to construct and modify diseases could increase or decrease the risks. Destabilizing political forces, the breakdown of the Biological Weapons Convention, or warfare between major world powers could vastly increase the amount of investment in bioweapons and create the incentives to actively use knowledge and biotechnology in destructive ways. Each of these factors suggests that our wide estimates could still be many orders of magnitude off from the true risk in this century. But uncertainty is not cause for reassurance. In instances where the probability of a catastrophe is thought to be extremely low (eg, human extinction from bioweapons), greater uncertainty around the estimates will typically imply greater risk of the catastrophe, as we have reduced confidence that the risk is actually at a low level.48 §§§ Given that our conservative models are based on historical data, they fail to account for the primary source of future risk: technological development that could radically democratize the ability to build advanced bioweapons. If the cost and required expertise of developing bioweapons falls far enough, the world might enter a phase where offensive capabilities dominate defensive ones. Some scholars, such as Martin Rees, think that humanity has about a 50% chance of going extinct due in large part to such technologies.49 However, incorporating these intuitions and technological conjectures would mean relying on qualitative arguments that would be far more contentious than our conservative estimates. We therefore proceed to assess the cost-effectiveness on the basis of our conservative models, until superior models of the risk emerge. How Bad Would Human Extinction Be? Human extinction would not only end the 7 billion lives in our current generation, but also cause the loss of all future generations to come. To calculate the humanitarian cost associated with such a catastrophe, one must therefore include the welfare of these future generations. While some have argued that future generations ought to be excluded or discounted when considering ethical actions,50 most of the in-depth philosophical work around the topic has concluded that future generations should not be given less inherent value.51-55 Therefore, for our calculations, we include future lives in our cost-effectiveness estimate.\*\*\*\* The large number of future generations at stake mean that reducing existential risk even by a small amount may have very large expected value. The Earth is thought to be habitable for roughly another billion years;56 our closest relative, homo erectus, lasted over 1.6 million years,57 and the typical mammalian species also lasts on the order of 1 to 2 million years.58 Following Matheny,29 if we were to assume that humanity would otherwise maintain a global population of 10 billion for the next 1.6 million years, human extinction would jeopardize on the order of 1.6 × 1016 life years. Go to: Cost-Effective Biosecurity How should we balance speculative risks of human extinction in a biosecurity portfolio? Here we turn to cost-effectiveness analysis, which is one method of prioritizing public projects.29 Cost-effectiveness analysis is helpful if our goal is to maximize the effect of our resources to achieve a measurable aim (such as life-years saved or cases of disease averted). Here we compare the cost-effectiveness of reducing risks in the categories of incidents, events, disasters, and existential risks. Calculating Costs The US federal government was projected to spend almost $13 billion on health security–related programs in 2017.59 To our knowledge, there has not been a quantitative assessment of how this spending has reduced the chances of bioterrorism, biowarfare, or even naturally occurring pandemics. However, the World Bank estimates that it would cost $1.9 billion to $3.4 billion per year over 5 years to bring all human and animal health systems up to minimal international standards, and it suggests that these measures would prevent at least 20% of pandemics.60†††† Many countries do not currently have healthcare systems that meet international standards—for example, in 2014 only 33% of countries reported their national arrangements met those required under the International Health Regulations.61 These mitigation measures would be adopted to be effective regardless of whether a disease outbreak originates naturally, accidentally, or deliberately.‡‡‡‡ The ability to rapidly detect and characterize the agent involved helps fast-track public health and R&D responses. Acting promptly enables basic public health measures that might decrease the likelihood of spread (such as social distancing) and track its emerging epidemiology (providing critical input for tailoring the responses). Even if we lack existing or candidate vaccines or therapeutics, having the capacity to treat symptoms can have a dramatic impact on case fatality rates.§§§§ We therefore assume that strengthening healthcare systems to meet international standards would have an impact on mitigating all types of disease risk, ranging from incidents and events to existential risks.\*\*\*\*\* We extend the World Bank's assumptions to include bioterrorism and biowarfare—that is, we assume that the healthcare infrastructure would reduce bioterrorism and biowarfare fatalities by 20%. We conservatively assume that existential risks will be reduced by only 1%, since any potential existential risk would likely be deliberately designed to overcome medical countermeasures. We calculate that purchasing 1 century's worth of global protection in this form would cost on the order of $250 billion, assuming that subsequent maintenance costs are lower but that the entire system needs intermittent upgrading.††††† To calculate the cost per life-year saved, we use the equation C/(N × L × R), where C is the cost of reducing risk, N is the number of biothreats we expect to occur in 1 century, L is the number of life-years lost in such an event, and R is the reduction in risk achieved by spending a given amount (specified by C). For nonextinction risks, we increase L 50 times over to denote 50 life-years saved per life. The denominator N × L × R denotes the total number of life-years saved.‡‡‡‡‡ In a subsequent model we also apply a discount rate to represent policymakers concerned only about lives in the short term. Go to: Results Including future generations into our cost-effectiveness calculations demonstrates that reducing existential risks, even if they are improbable, can be incredibly cost-effective in expectation (Table 2). Depending on the model used, we estimate that we can purchase 1 quality adjusted life-year in expectation for 10s of dollars (with outliers suggested around 12 cents to $1,600). Even with the most conservative estimates of existential risk, reducing the risk of human extinction is at least 100 times more cost-effective than standard biosecurity interventions, and possibly up to 1 million times more cost-effective. Table 2. Cost-effectiveness estimates of reducing risks of different magnitudes Point on Biothreat Spectrum N Expected number of events in 1 century L Expected number of lives lost per event R Reduction in risk by spending $250 billion Cost per life-year saved (assuming 50 years per life) Indicative Incident 100 1-10 20% $25m-$250m Indicative Event 10 100-1,000 20% $2.5m-$25m Indicative Disaster 1 10,000-100,000 20% $250k-$2.5m Existential Risk Model 1 0.0005 to 0.02 1016 life years 1% $0.125-$5.00 Model 2 1.6 × 10–6 to 8 × 10–5 1016 life years 1% $31.00-$1,600 Model 3 5 × 10–5 to 1.4 × 10–4 1016 life years 1% $18.00-$50.00 It is important to note that this result does not depend on the $250 billion figure—if we found a cheaper intervention that reduced all risks by a similar amount, cost-effectiveness of all the interventions would increase, but the relative merits of reducing existential risk would remain the same.§§§§§ There are certainly cheaper ways to reduce the low-level risks of biocrime and bioterrorism, and so our estimates of cost-effectiveness could be far too pessimistic. Examples of cheaper interventions might include dramatically increasing resources for specialized law enforcement prevention and interdiction, or increased surveillance on potential perpetrators. However, there are likely also far cheaper ways of reducing the more extreme risks that threaten extinction, and there is no reason to think similar efficiency gains could not be made in this area as well. Despite the vast resources spent on counterterrorism, governments may have neglected low-probability, high-impact risks.65,66 This therefore constitutes a critically underdeveloped area of research, for which there is likely low-hanging fruit. Even if the humanitarian case for reducing existential risk is clear, most policymakers will be responsible primarily for the interests of a more limited constituency comprising only the current generation and near future.\*\*\*\*\*\* It is therefore instructive to evaluate how well these cost-effectiveness results hold up when we largely ignore the benefits to future generations. We therefore repeat the cost-effectiveness estimates with a discount rate imposed on the benefits and costs borne in future years, and we find that the merits of reducing existential risk still hold. If we ignore distant future generations by discounting, the benefits of reducing existential risk fall by between 3 and 5 orders of magnitude (with a 1% to 5% discount rate), which is still far more cost-effective than measures to reduce small-scale casualty events. Under our survey model (Model 1), the cost per life-year varies between $1,300 and $52,000 for a 5% discount rate and between $770 and $30,000 for a 1% discount rate. These costs are even competitive with first-world healthcare spending, where typically anything less than $100,000 per quality adjusted life-year is considered a reasonable purchase.29 This suggests that even if we are concerned about welfare only in the near term, reducing existential risks from biotechnology is still a cost-effective means of saving expected life if the future chance of an existential risk is anything above 0.0001 per year. Our conservative models (with much lower risk) suggest that existential risk prevention is not cost-effective when compared to basic healthcare spending: Model 2 results in a cost per life-year between $330,000 and $16 million for a 5% discount rate and $190,000 and $9.7 million for a 1% discount rate, while Model 3 results in a cost per life-year of between $190,000 and $500,000 for a 5% discount rate and between $110,000 and $310,000 for a 1% discount rate. These conservative numbers would suggest that healthcare spending is a better purchase than marginal biosecurity funding, but even these numbers still support the notion that we are better off focusing on low-probability, high-impact risks rather than low-casualty biosecurity risks. For a biosecurity portfolio, even policy with limited time horizons is likely better off investing in measures that prevent the worst-case scenarios. Go to: Conclusions Although the probability of human extinction from bioweapons may be extremely low, the expected value of reducing the risk (even by a small amount) is still very large, since such risks jeopardize the existence of all future human lives. An initial attempt to estimate the cost-effectiveness of reducing these risks finds that it takes likely between 10 cents and 10s of dollars to save 1 life-year, assuming we value future human lives. Although this result is striking, it is not unprecedented. Similar analysis done by Matheny found that spending $1 billion on an asteroid deflection system would have a similar cost-effectiveness, at about $2.50 per life-year.29 Although preventing existential risks might be a far more cost-effective way to save lives than many existing biosecurity measures, this does not imply that we ought to devote all of our resources to protecting against existential risks. Many actions that fall under the rubric of standard health spending also likely reduce existential risk, and many of the resources spent reducing existential risk would in turn help address less extreme risks. Moreover, occasionally there are other opportunities that might be particularly cost-effective—for example, smallpox eradication cost less than $300 million (roughly $1.5 billion in 2017 dollars) and likely saved millions of lives.68 The conclusion is thus not that we should abandon all other health interventions for the sake of saving future lives, but rather that on balance we should increase investments that reduce these low-probability, high-stakes risks. We propose several steps forward. Given the high uncertainty around our estimates, we can expect a high value of information for additional research, implying that resources should be allocated to further assessment of these risks before large sums are directly allocated on the basis of unreliable evidence. Areas for basic research could include examining existential risk using the tools of technological horizon scanning, red-teaming, ecosystem and epidemic modeling, analyzing historical epidemic death tolls, and examining past species that have gone extinct due to disease, among others. And if existential risk could be as important as we claim, more work should be done to assess possible existential risks and countermeasures. Many actions that would reduce existential risk are already being pursued by those in biosecurity and public health. But there are also measures that would be particularly important in the context of existential risk—including measures that may be unduly neglected without a special focus on existential risk. One particularly inexpensive measure would be to invest in contingency plans for worst-case scenarios. Countering a pandemic does not typically require a large fraction of worldwide economic output, so there is not a clear path forward for rapidly pivoting to a total war footing in which a large percentage of worldwide GDP is spent on countermeasures. Running small experiments with easily scalable interventions could be a cheap way to explore avenues for rapidly turning resources into protection (examples of such experiments might include paying bounties to individuals or companies to avoid flu infection for a year while conducting essential services, such as power and sanitation).†††††† Countering existential risks could also result in reprioritizing current approaches—for example, favoring broad-spectrum diagnostics and countermeasures, as opposed to those tailored to a single pathogen. The worst possible attacks could come from built-up arsenals of multiple pathogens, possibly designed with long incubation periods and traits to overcome vaccination or medical treatment. Platform technologies that allow customizable countermeasures (eg, phages for bacteria, generalized vaccine templates) or pathogen-blind diagnostics (eg, distributed sequencing and improved software to interpret novel pathogens before symptoms occur) will stand a better chance against such threats.‡‡‡‡‡‡ An existential risk focus also would place extraordinary weight on avoiding arms races or the widespread weaponization of biotechnology. The near collapse of the 8th Review Conference of the Biological Weapons Convention in December 2016 demonstrates how fragile this regime is and how far current instruments are from the ideal. Strengthening the global norm against biological weapons might go a long way toward reducing the risks associated with state actors. The current 3-person Implementation Support Unit costs less than $1 million per year to support.71 In comparison, the 2017 budget for the work of the Organization for the Prohibition of Chemical Weapons is around $77 million (and provides for more than 450 fixed-term posts).72 Increasing the human capacity currently focusing on biological weapons risks by several orders of magnitude would be notably cheaper than the costs associated with building core capacities in public and animal health. More generally, any action that reduces the chance of arms races or great power conflict could substantially reduce the probability of existential risk from biotechnology in the century to come.

#### Sub-point C is external natural pandemics

#### Future pandemics are incoming—COVID is just the beginning

Natalie Brown, graduated with a Bachelor of Journalism from Queensland's University of Technology NZ Herald, January 2021 ["Covid 19 coronavirus: US Army scientists warn that deadlier pandemics are coming", https://www.nzherald.co.nz/world/covid-19-coronavirus-us-army-scientists-warn-that-deadlier-pandemics-are-coming/5UQACBIWS3OPQRJZEBS6IPVAQI/, 9-2-2021] AWS

A group of American scientists have warned that the coronavirus pandemic "may not be the big one", with fears deadlier viruses are on the horizon and could occur within this generation's lifetime. The US Army scientists, based in the emerging infectious diseases branch at the Walter Reed Army Institute of Research, have spent the past year finding vaccines and therapeutics to stop not only the "original" strain of Covid-19 but also any new variants. The director of the branch, Dr Kayvon Modjarrad, told the Defence One 2021 Tech Summit on Monday that the likelihood this generation will see another pandemic during its lifetime is "high". "We have seen the acceleration of these pathogens and the epidemics that they precipitate." "And it may not be a coronavirus, this may not be the big one. There may be something that's more transmissible and more deadly ahead of us. "We have to think more broadly, not just about Covid-19, not just about coronavirus, but all emerging infectious threats coming into the future." Modjarrad joins a chorus of virologists and infectious diseases experts who, almost since coronavirus first emerged in Wuhan in late 2019, have said it's "inevitable" that other diseases are waiting in the wings, and that humans could play a role in how severe those outbreaks might be and where they'll come from. Speaking to the Guardian last week, Kirby Institute virologist Professor Stuart Turville said that how much responsibility we take for our impact on the environment could be a defining factor. "We are clever and unfortunately naive at the same time with respect to the planet. "Economics and big leaps and bounds in technology bring great standards of living across the globe, but can unearth many unwanted nasties." While about three-quarters of all novel emerging viral diseases over the past 20 years have been zoonotic (transmitted from an animal source) – most often birds, rodents or bats – missing from discussions of their origins is the role of humans, Turville added. "Unfortunately, things like climate change and habitat destruction will bring with them 'surprises' as animals struggle to deal with their changing environments courtesy of us." Medical virologist Professor Dominic Dwyer – a member of the World Health Organisation (WHO) team investigating the origins of the Covid-19 pandemic – agreed, adding that a key part of planning for future pandemics will be understanding animal, environment and human interaction. "All the viruses that have emerged in the last 50 years have come from either animals or the environment, and the connection, the network, between those factors and humans is so important," he told the Guardian. "Preparing and planning includes considering demographics, the crowded environments people live in, the healthcare environments that allow some things to spread but not others, climate change and the influence of the way we use the land and interact with wildlife, the way we do trade, farming and tourism. "All of those things have an impact on what lets a pandemic emerge and get going." Researcher in viral immunology at Murdoch University, Professor Cassandra Berry, said Australia needs to "start training and investing in its next generation of virus hunters now" in order to respond to future threats more rapidly. "There are viruses just waiting in the wings. The next pandemic will likely be an airborne virus that's highly transmissible, already out there, highly mutable and with an animal reservoir. "It will be particularly dangerous if it has no visible signs, if it spreads by stealth. "We are way overdue for another flu pandemic, and there are ones out there a few mutations away from moving from birds to humans. We need the funding invested now in our researchers to prepare." Next pandemic 'could be next year' In March, researchers [discovered a series of 24 new coronaviruses](https://www.nzherald.co.nz/world/covid-19-coronavirus-chinese-researchers-find-24-new-coronaviruses-in-bats/YMD42TGGOXLML4GJ3JKDWXS5IU/) in bats in a small region of the Yunnan province, in China's southwest. "In total, we assembled 24 novel coronavirus genomes from different bat species, including four SARS-CoV-2 like coronaviruses," the team wrote in a report, published in the journal Cell. One of the 24 – viral sample RpYNO6 – was the closest strain yet to Covid-19, though it had genetic differences on the spike protein, the knoblike structure that the virus uses when attaching to cells, the researchers said. "Together with the SARS-CoV-2 related virus collected from Thailand in June 2020, these results clearly demonstrate that viruses closely related to SARS-CoV-2 continue to circulate in bat populations, and in some regions might occur at a relatively high frequency," they wrote. Speaking to NPR, University of Sydney virologist Edward Holmes, who was part of the team, said "we're only just starting to scratch the surface" in terms of how many coronaviruses could be across the world. "The virusphere of coronaviruses is just immense." Peter Daszak, who helped lead a 2018 study of how these viruses jump from animals into people and how often they make people sick, said new coronaviruses are constantly jumping from bats and other animals into humans, though the vast majority of "spillover" events don't lead to a pandemic. "It's happening every day," he said. "I look at the spillover event a bit like rain or snow. These viruses are getting into and trickling across our populations." Both he and Holmes warned the next coronavirus outbreak could be right around the corner. "I think we need to face reality here," Holmes said. "Coronavirus pandemics are not a once in 100 year event. The next one could come at any time. It could come in 50 years or in 10 years. Or it could be next year."

#### IP nationalism ensures failed pandemic response – non-research, artificial scarcity, and prices

Cynthia M. Ho Loyola University Chicago School of Law, 8-23-2021 ["IP Nationalism: Addressing the COVID Crisis and Beyond", https://papers.ssrn.com/sol3/papers.cfm?abstract\_id=3910806, 9-2-2021] AWS

IP nationalism during a pandemic may ironically be contrary to economic assumptions. As explained earlier, IP nationalism generally assumes that strong IP rights will result in an increase in domestic GDP. However, as multiple studies have shown, a continued global pandemic causes economic losses to all countries, including wealthy ones.208 In other words, to the extent that IP nationalism contributes to medical nationalism, which is prolonging COVID, embracing strong IP rights during the COVID pandemic is contrary to global economic interests of all. Another important question is whether IP nationalism is valuable for promoting innovation. Some have attributed the plethora of effective COVID vaccines in record time to IP.209 However, these vaccines are of no help if IP rights result in artificial scarcity that deprives many individuals of access to them. Even setting aside the major problem of inequitable global access to effective vaccines, it is questionable whether IP is primarily responsible for these developments. After all, many of the vaccines were developed by companies that received direct funding and advance purchase orders.210 As many innovation scholars have previously recognized, sources of funding besides IP rights promote innovation, which the current pandemic now clearly shows is true. Even though IP may not be solely responsible for innovation, some countries seem resistant to foregoing that assumption. The prior discussion of objections to the proposed IP waiver highlights not only resistance, but incomplete statements that likely reflect a blind spot. Such countries insist no changes need to be made to IP norms. However, we obviously live in an interconnected and interdependent global world, such that until COVID is addressed everywhere, there will be a drag on the global economy. There have been repeated examples of supply chain disruptions during COVID; for example, electronic chips that are necessary for a wide range of products are currently in short supply since manufacturers in South-east Asia are presently hard hit by COVID. 211 The IMF has suggested that if forty percent of the world could be vaccinated by the first half of 2022, this would effectively inject $9 trillion into the global economy by 2025 due to faster resumption of economic activity and that wealthy countries would stand to capture forty percent of increased global GDP gains.212 2. Is IP Nationalism Worthwhile Outside a Global Pandemic? Whether IP nationalism is appropriate outside an infectious pandemic is less clear cut. As will be discussed, there are not only different economic impacts on countries, but also different impacts on innovation as well as access to treatments. Unlike the present situation, strong IP rights outside a pandemic would not necessarily result in economic losses to all countries. Rather, countries with strong IP exports would seem to obtain increased GDP from stronger global IP rights. Countries that are primarily IP importers, such as developing countries, on the other hand, arguably pay more in terms of more expensive imports of IP-proteccted goods. However, since IP rights are part of international trade agreements including, but not limited to the WTO that generally provide developing countries better access to other markets for export of non-IP products such as agriculture, there could be some economic benefit to strong global IP.213 However, even if strong global IP might have economic benefits for countries, there are countervailing considerations. First, there is a question of whether strong global IP rights are promoting socially desirable innovation. Second, even if desirable innovation occurs, there is another important question of whether it results in affordable treatments since IP legally permits its owners to charge high prices that many cannot afford. Neither of these questions are novel; in fact, the 2016 UN High Level Panel on Access to Medicine attempted to address how the existing international legal infrastructure can better promote socially desired and affordable innovation. Strong global IP rights do not necessarily lead to socially desirable innovation. Since IP rights such as patents provide the same exclusivity for all innovations (that meet the standards), companies are incentivized to pursue the most profitable, but not necessarily most socially needed discoveries. This means that conditions predominant in wealthy countries are the primary focus of companies. 214 Although 70% of global deaths are from neglected diseases, such diseases are generally ignored by the pharmaceutical industry due to lack of profitability.215 Even among the most well-funded neglected diseases such as tuberculosis and malaria, spending often is inadequate since these do not impact wealthy countries; the amount of money spend on COVID vaccines for which wealthy countries had an interest dwarfs the amount spent on a TB vaccine that is primarily of interest to poor countries.216 In contrast, companies may pursue “orphan diseases” that by definition only impact a small percent of wealthy populations because there are profitable and incentivized by extra IP exclusivity. 217 Companies may also overlook low-cost options to treat conditions for which IP rights are not possible since there is no ability to obtain IP-enhanced profits even in wealthier countries.218 Strong global IP rights associated with IP nationalism also leads to artificial scarcity of affordable drugs, which to someone that lacks resources is exactly the same as scarcity of vaccines during COVID. Although wealthy countries occasionally face trouble affording expensive new drugs,219 poor countries regularly face extreme difficulty accessing affordable drugs under patent protection. 220 Inadequate supply of affordable drugs can arguably be addressed by existing IP tools such as compulsory licenses. However, as previously discussed, countries face pressure using this legitimate tool, such that most avoid doing so despite repeated urging of public health advocates, as well as UN.221 In addition, while the poorest countries might obtain donor aid, many citizens in low income and lower middle income countries do not. The artificial scarcity of affordable drugs has an impact on global economics, albeit in a less different manner than during the present pandemic. Unlike an infectious disease that impacts all countries, inadequately treated diseases and conditions in one country do not automatically impact another. Nonetheless, inadequate access to medical treatment causes unnecessary global disparities that can create the same types of inequitable health outcomes discussed during COVID. 222 For example, poor health can result in lower GDP by fifteen percent due to premature death and lost productivity.223 Moreover, although some suggest that non-medical preventative measures such as better nutrition can improve health and economic outcomes, there are times where affordable, yet patented medical treatments are essential;224 for example, non-infectious, yet curable conditions such as Hepatitis C can result in unnecessary loss of workplace productivity and economic productivity due to premature deaths.225 3. Is IP Nationalism Consistent with Other Policies? Another relevant consideration is whether IP nationalism is consistent with historical IP policy, as well as policy underlying international human rights and global equity. As this section will explain, IP nationalism is inconsistent with these policies. Current IP nationalism is a far cry from historical use of IP even by countries that today embrace it. IP used to be a policy lever that each nation could decide on its own whether to use, and tailor to its domestic conditions. A country that prioritized access to medicine could legitimately decline to patent medical products to ensure more affordable drugs; even wealthier countries such as Portgual and Spain pursued this approach until the late 1980s. 226 In addition, since countries at an earlier stage of economic development often find it helpful to copy not just technology, but material generally, it was common in an earlier era for currently wealthy countries to have weak IP. 227 Notably, although the US in recent times has claimed that strong IP rights are essential, US history includes a period of copying from other countries when the US was still developing. 228 The most exclusive type of IP, patents, were historically granted not primarily to ensure profits to inventors, but, rather, to promote sharing of technology. Patents were originally granted only to inventors that would make the the patented invention in the patent-granting nation to ensure transfer of knowledge concerning the invention to benefit domestic citizens. 229 The importance of patents to transfer technology was considered so important that the patent would be revoked if the inventor failed to use the invention domestically and transfer these skills.230 In addition, in that earlier era, a nation that granted patents did not affirmatively harm other countries since no country was pressuring others to have certain IP rights. Rather, that only happened in the late 1980s after countries with strong IP-exporting industries lobbied for creation of global laws that would increase their global revenues. International human rights also do not align with IP nationalism. Creators as well as companies may assert that they have an international human right to benefit from their creations.231 However, the same international covenant that companies claim provides them rights to economic benefit also declares that all should benefit from scientific progress, including progress that is protected by IP rights.232 In other words, IP should benefit not just creators, but also users, as repeatedly recognized by UN committees. 233 Moreover, there are additional human rights that suggest that IP rights should be limited; in particular, the human right to enjoy to “highest attainable standard” of health is relevant since IP rights can negatively impact attainment of the right to health since IP can permit drugs to be priced beyond the reach of many to achieve health. 234 And, specifically, the UN has asserted that nations have a core obligation to make “essential medicines” available and accessible.235 The UN Commissioner has stated that in the event of conflict between IP and public health, IP rights should yield to the right to public health, which has been reaffirmed by other UN subcommittees.236 Of course, it is practically tricky to balance competing human rights obligations since there is no hierarchy among these rights since all human rights are inalienable, indivisible and interdependent.237 As other scholars have noted, it can be difficult to resolve conflicts among rights.238 Although human rights have generally not modified international IP agreements, they should nonetheless be considered as relevant policy for what norms should be. B. The Road (not) Yet Taken: The Global Public Good Approach This Section argues that since IP nationalism is fundamentally flawed during a pandemic, at minimum, IP for essential drugs and vaccines to treat a pandemic should be considered a global public good that should be freely available to all to ensure adequate access. However, there is also an argument that IP for essential drugs and vaccines outside a pandemic be considered global public goods as well. This would be true whether there were inadequate supplies as well as if supplies were unaffordable. 1. Pandemic Implications of IP of Essential Drugs as Global Public Goods In the midst of a pandemic, there is a strong case for IP related to treatments and especially vaccines to be considered global public goods to be shared by all as recommended by many including UN secretary General239 as well as individual countries.240 In May 2020, just months after global recognition of the pandemic, the WHO proposed a pool to facilitate sharing and transfer of all technology and IP concerning COVID241 as part of its call for global solidarity.242 The UN as well as UNESCO have also argued for companies to share IP related to COVID consistent with considering this to be a public good.243 Beyond the efforts of international groups, some world leaders have stated that COVID treatments should be a public good, although typically without any corollary action.244 The Open COVID Pledge started by a number of individuals to make it easy for companies to pledge to make IP freely available to manage the pandemic is also consistent with considering IP related to COVID as a global public good.245 Given that most of these calls for voluntary donations of IP have been unanswered by the pharmaceutical industry, a different method for considering IP related to vaccines to be a public good is the proposed TRIPS waiver. Although the waiver could be considered consistent with a public good approach, it would likely be less effective/efficient than the original WHO proposal that companies voluntarily not only share IP, but transfer related technology needed to make vaccines to ensure that trade secrets can also be obtained. As discussed earlier, the waiver includes waiver of enforcement of trade secrets, but these may still be difficult to legally force companies to disclose under some domestic laws. Theoretically, a country with the ability to force companies to disclose, such as the US, could consider COVID 19 vaccines a public good and mandate this disclosure.246 However, that does not seem to be something that is being actively discussed.

#### Natural pandemics risk extinction—mutations and response uncertainty makes it uniquely dangerous

Wolfgang Ehringer, Henrik Söderström, Master Students, Halmstad University, Digitala Vetenskapliga Arkivet, 2017 [“Framing Global Catastrophic Risk - Recent and Future Research”, <https://www.diva-portal.org/smash/record.jsf?pid=diva2%3A1077151&dswid=7618>, 9-2-2021] AWS

In this paper, we have touched several areas that are associated with the topic global catastrophic risk. Catastrophic climate change, nuclear war/winter, natural pandemics, exogenous risks, emerging risks and other/unknown risks. They all have in common that they are a threat to the earth and all living species on it. These global risks should be of concern, as Cotton-Barratt et al. (2016) states that all of them have the ability to affect at least 10 per cent of the human population. The global catastrophic risks have different chances to become reality, some have a higher risk than others. But when considering the risk it is important to keep in mind what Toby et al. (2010) suggest, namely that there are problems calculating the exact risk. To be able to calculate global catastrophic risks, some given conditions are required. We think that this should be highlighted, since even the smallest error can lead to major percentage deviations of the risk. This should be considered by politicians and other decision makers when planning and implementing strategies about countermeasures. The conditions need to be understood well to make the correct estimation of the risk. Furthermore, the main focus today, as we can see in politics and social contexts, is the catastrophic climate change. This is the case, because it is the risk which is most plausible for us to relate to and, as Baum (2015a) writes in his report, we humans have more motivation to act and reduce the risk of events that can happen in our lifetime. The climate change has still uncertain consequences on a global scale, but according to Tsur and Withagen (2011) it has already started to show a devastating effect on our planet and since it is affecting the earth in general, international efforts must be taken to reduce the negative trend. We have to act fast, as Schuur et al. (2015) mention, when the permafrost in the arctic starts to melt in huge scales, because then the point of no return for catastrophic global risk will be achieved. At this time, it will no longer be a risk, it will be reality. Global catastrophic climate change will not solely affect the planet, it will also be catastrophic for human health, since the access to fresh water will be reduced around the world (Papworth et al., 2015). Another GCR that is discussed and a relevant topic for our generation is nuclear war. Ever since the end of World War 2 the moral questions about nuclear technology have been a hot topic around the globe. If we just look at the history, we have already seen what catastrophic impact nuclear technology can have on our planet. Toon et al. (2008) write in their paper what consequences nuclear technology can have on the environment and humanity, but they additionally mention implications for political actions that could be done to prevent a catastrophe. The important point to highlight is that there are countermeasures which should be implemented by politicians. In many ways, nuclear technology is a political factor, to show strength in form of army power. As a consequence to the cold war between the U.S. and Russia, the number of nuclear weapons in the world increased, a way for the countries to emphasize strength (Figure 2). Even if this is only between two countries and no nuclear rockets were fired, it could have gone wrong for the entire world. According to Barrett et al. (2013) and Mosher et al. (2003), a nuclear war between the U.S. and Russia would be devastating for the entire planet. Several authors mention consequences about what nuclear technology can result in. One of the consequences of a nuclear war is nuclear winter, which is a side effect of a nuclear war. This should not be forgotten, although politicians often talk primarily about the direct impact of nuclear war and not about the other consequences that will follow many years after. We think, in the future it will be important to include education about nuclear technology in the regular school education for example. Hence, the next generation will grow up with a deeper understanding about the impacts and how a sustainable future without weapons of mass destruction can be built. Nuclear war/winter is a risk that humans have created themselves. Not as the natural pandemics, that is a part of nature, it is linked to human activity but not fully created by humans. Natural pandemics will always involve high uncertainty and can occur at any time. Since pandemics are complex and often hard for scientists to understand, we may not be able to have a proper vaccine ready for an outburst. The frequency of pandemics is high and since we are becoming a more global world, the spread of a huge pandemic could have devastating consequences. Possibly, we could observe a spread in a way that we have never seen before in history. According to Wraith and Stephenson (2009) and Cotton-Barratt et al. (2016), the next pandemic event could be the avian influenza which has the potential to spread across the globe in more rapid speed, compared to events in the past. If the reader wants to know more about the avian influenza, we recommend the article by Fouchier et al. (2012). Since it is that hard to exactly know how the next pandemic will rise, the best way to reduce the impact is progress in healthcare technology. Moving on to something that is completely independent from humans and often difficult to fully understand, the exogenous risks. This includes super-volcanic eruptions, large asteroid and comet impacts on earth. This risk is an existential risk with high level of uncertainty. It is nearly impossible to predict or know when the next event will occur. Additionally, if this happens, most of us will not survive probably. The impact from super-volcanic eruptions may have similar effects, compared to a nuclear war (Rampino, 2008). One of the most well-known potential super-volcanoes is in Yellowstone, North America. Christiansen et al. (2007) explains the hazards of Yellowstone in more detail and Lowenstern et al. (2006) focus on how to monitor super-volcanoes. This will give an overview of the potential risk that stem from super-volcanoes, and what impact an eruption in Yellowstone can have for the planet. It is not very likely that an eruption will happen during our generation. Additionally, it is hard to do anything to reduce the risk. Regarding large asteroid and comet impacts, there is a small chance that the earth will be affected during this century (Chapman and Morrison, 1994). So, it is a topic which may not be focused until asteroids or comets closely miss or even hit the earth. Napier (2008) and Morrison (2006) give a good overview on the risk from asteroids and comets and what could be done to prevent a potential disaster. By looking at our planet history, we already know what damage asteroids and comets can do. This is a GCR that is in many ways hard to understand, because the universe is extremely large and we do not know what space objects will be exposed and a threat for the earth in the future.

### Solvency

#### Plan: Member nations of the World Trade Organization ought to reduce intellectual property protections for medicines related to global pandemics. To clarify, the aff only addresses patents and trade secrets. We spec pandemics as the parameters by the WHO

#### The plan creates a new goldilocks patent law that exempts pandemics

Lindsey, JD Harvard, 21

(Brink, <https://www.brookings.edu/blog/up-front/2021/06/03/why-intellectual-property-and-pandemics-dont-mix/>, 6-3)

Waiving patent protections is certainly no panacea. What is needed most urgently is a massive drive of technology transfer, capacity expansion, and supply line coordination to bring vaccine supply in line with global demand. Dispensing with patents in no way obviates the need for governments to fund and oversee this effort. Although focusing on these immediate constraints is vital, we cannot confine our attention to the short term. First of all, the COVID-19 pandemic is far from over. Although Americans can now see the light at the end of the tunnel thanks to the rapid rollout of vaccines, most of the world isn’t so lucky. The virus is currently raging in India and throughout South America, overwhelming health care systems and inflicting suffering and loss on a horrific scale. And consider the fact that Australia, which has been successful in suppressing the virus, recently announced it was sticking to plans to keep its borders closed until mid-2022. Criticisms of the TRIPS waiver that focus only on the next few months are therefore short-sighted: this pandemic could well drag on long enough for elimination of patent restrictions to enable new vaccine producers to make a positive difference. Furthermore, and probably even more important, this is almost certainly not the last pandemic we will face. Urbanization, the spread of factory-farming methods, and globalization all combine to increase the odds that a new virus will make the jump from animals to humans and then spread rapidly around the world. Prior to the current pandemic, the 21st century already saw outbreaks of SARS, H1N1, MERS, and Ebola. Everything we do and learn in the current crisis should be viewed from the perspective of getting ready for next time. THE NATURE OF THE PATENT BARGAIN When we take the longer view, we can see a fundamental mismatch between the policy design of intellectual property protection and the policy requirements of effective pandemic response. Although patent law, properly restrained, constitutes one important element of a well-designed national innovation system, the way it goes about encouraging technological progress is singularly ill-suited to the emergency conditions of a pandemic or other public health crisis. Securing a TRIPS waiver for COVID-19 vaccines and treatments would thus establish a salutary precedent that, in emergencies of this kind, governments should employ other, more direct means to incentivize the development of new drugs. Here is the basic bargain offered by patent law: encourage the creation of useful new ideas for the long run by slowing the diffusion of useful new ideas in the short run. The second half of the bargain, the half that imposes costs on society, comes from the temporary exclusive rights, or monopoly privileges, that a patent holder enjoys. Under U.S. patent law, for a period of 20 years nobody else can manufacture or sell the patented product without the permission of the patent holder. This allows the patent holder to block competitors from the market, or extract licensing fees before allowing them to enter, and consequently charge above-market prices to its customers. Patent rights thus slow the diffusion of a new invention by restricting output and raising prices. The imposition of these short-run costs, however, can bring net long-term benefits by sharpening the incentives to invent new products. In the absence of patent protection, the prospect of easy imitation by later market entrants can deter would-be innovators from incurring the up-front fixed costs of research and development. But with a guaranteed period of market exclusivity, inventors can proceed with greater confidence that they will be able to recoup their investment. For the tradeoff between costs and benefits to come out positive on net, patent law must strike the right balance. Exclusive rights should be valuable enough to encourage greater innovation, but not so easily granted or extensive in scope or term that this encouragement is outweighed by output restrictions on the patented product and discouragement of downstream innovations dependent on access to the patented technology. Unfortunately, the U.S. patent system at present is out of balance. Over the past few decades, the expansion of patentability to include software and business methods as well as a general relaxation of patenting requirements have led to wildly excessive growth in these temporary monopolies: the number of patents granted annually has skyrocketed roughly fivefold since the early 1980s. One unfortunate result has been the rise of “non-practicing entities,” better known as patent trolls: firms that make nothing themselves but buy up patent portfolios and monetize them through aggressive litigation. As a result, a law that is supposed to encourage innovation has turned into a legal minefield for many would-be innovators. In the pharmaceutical industry, firms have abused the law by piling up patents for trivial, therapeutically irrelevant “innovations” that allow them to extend their monopolies and keep raising prices long beyond the statutorily contemplated 20 years. Patent law is creating these unintended consequences because policymakers have been caught in an ideological fog that conflates “intellectual property” with actual property rights over physical objects. Enveloped in that fog, they regard any attempts to put limits on patent monopolies as attacks on private property and view ongoing expansions of patent privileges as necessary to keep innovation from grinding to a halt. In fact, patent law is a tool of regulatory policy with the usual tradeoffs between costs and benefits; like all tools, it can be misused, and as with all tools there are some jobs for which other tools are better suited. A well-designed patent system, in which benefits are maximized and costs kept to a minimum, is just one of various policy options that governments can employ to stimulate technological advance—including tax credits for R&D, prizes for targeted inventions, and direct government support. PUBLIC HEALTH EMERGENCIES AND DIRECT GOVERNMENT SUPPORT For pandemics and other public health emergencies, patents’ mix of costs and benefits is misaligned with what is needed for an effective policy response. The basic patent bargain, even when well struck, is to pay for more innovation down the road with slower diffusion of innovation today. In the context of a pandemic, that bargain is a bad one and should be rejected entirely. Here the imperative is to accelerate the diffusion of vaccines and other treatments, not slow it down. Giving drug companies the power to hold things up by blocking competitors and raising prices pushes in the completely wrong direction.

#### Waiving IPR is the vital internal link to equitable distribution- patents are a key deterrent to expanded manufacturing capabilities

Kang, PhD, et al., 7-14-21

(Hyo Yoon Kang is Reader in Law at the University of Kent. Aisling McMahon is Assistant Professor of Law in the Department of Law at Maynooth University. Graham Dutfield is Professor of International Governance at the University of Leeds. Luke McDonagh is Assistant Professor of Law in the Department of Law at the LSE. Siva Thambisetty is Associate Professor of Law in the Department of Law at the LSE. https://blogs.lse.ac.uk/politicsandpolicy/covid19-trips-waiver/)

The temporary TRIPS waiver – as proposed by India and South Africa and supported by more than 100 countries – is a necessary and proportionate legal measure towards the clearing of existing intellectual property barriers to scaling up of production of COVID-19 health technologies in a direct, consistent and effective fashion. We call on the governments of the United Kingdom of Great Britain and Northern Ireland, Australia, Brazil, Japan, Norway, Switzerland and the European Union to drop their opposition to the TRIPS Waiver proposal at the World Trade Organisation and to support the waiver. Intellectual Property (IP) rights – including patents, copyrights, trade secrets and other undisclosed information – are not, and have never been, absolute rights and are granted and recognised under the condition that they serve the public interest. IP rights must not be allowed to stand in the way of measures designed to make accessible the health technologies needed to fight the COVID-19 pandemic, where universal global access is essential for the global public good. We acknowledge that legal factors beyond IP, such as trade and export restrictions, also shape the ability to produce and access COVID-19 vaccines and therapeutics. Nonetheless, it is the case that IP rights, and monopolies over tacit and informal information, are also implicated in the current lack of global capacity for vaccine production and other health technologies, as well as in enabling their inequitable distribution. Current strategies to address the vast inequity in the distribution of COVID-19 vaccines have focused on solutions which build on the existing IP system, such as the World Health Organisation (WHO) COVAX initiative or voluntary licensing provisions. Such proposals have had limited and insufficient success to date at providing vaccines to low- and middle-income countries. We note that as of June 2021 the voluntary COVAX donation scheme has delivered only 90m out of a promised 2bn doses. Pharmaceutical companies who hold relevant IP rights have also failed to engage with the WHO’s voluntary COVID-19 Technology Access Pool (C-TAP) of IP and know-how. Meanwhile, several solicitations of collaboration to produce vaccine by companies, such as from Teva in Israel, Biolyse in Canada, Bavarian Nordic in Denmark, and Incepta in Bangladesh, have not engendered a positive response from vaccine IP holding companies. Moreover, the shortcomings of vaccine production are not the only problem: distribution of existing vaccine supply has been profoundly unequal, with pre-purchasing and hoarding of doses by several high-income countries. This has underlined the need for globally distributed, local vaccine manufacturing hubs in low and middle-income countries in order to guarantee sustainable supply. Given the ongoing absence of sufficient voluntary engagement by the pharmaceutical industry with proposed global mechanisms to share IP rights, data and know-how to address the pandemic, the ability to suspend rules under the TRIPS Agreement is crucial to enable a radical increase in manufacturing capacity, and thus supply, of COVID-19 vaccines. This will facilitate a globally coordinated and transparent pathway to achieve global equitable access. The proposed TRIPS waiver would provide more companies with the freedom to operate in order to produce COVID-19 vaccines and other health technologies without the fear of infringing another party’s IP rights and the attendant threat of litigation. Furthermore, in light of the considerable public financing of COVID-19 vaccine research, development, production and purchase, claims of inviolability of private IP monopoly rights cannot be justified. The IP system has failed in the past to create market incentives for vaccine development – a finding that is acknowledged and analysed by scholars in the field. In the case of COVID-19 vaccines, such a market failure has been mitigated with unprecedented public funding and de-risking of R&D costs through advance market commitments by governments. These tailored public interventions addressed the pressing need for vaccine development, and in doing so compensated for the failure of IP incentives on their own to promote vaccine research and development. The TRIPS waiver is necessary at this time because the existing provisions within the TRIPS Agreement are not sufficient in a pandemic context, whereby global access to vaccines produced at speed and scale is in all our interests. For example, compulsory licence provisions under Art. 31 and Art. 31bis of TRIPS are insufficient to tackle already existing and emerging patent thickets and data exclusivity rules that impede production by manufacturers other than the IP rightsholders. Furthermore, compulsory licences do not address the need for technology transfer and the sharing of know-how needed to build local and regional manufacturing capacity. Building such capacity would enable sustainable solutions for this and future pandemics by increasing domestic/regional manufacturing capacity for vaccine production. Governments must work with IP holders to make available and incentivise the disclosure of information held as trade secrets (and other undisclosed information) on grounds of Art. 73 (b)(iii) TRIPS, as well as through the strengthening of domestic public interest provisions under Art. 39(3) TRIPS. There are precedents for this, including US production of penicillin in WWII in which the US government oversaw the necessary pooling of technology and knowledge by companies and universities to rapidly increase penicillin production. Last year, the US government used the Defense Production Act to prioritise the production of components for national supply as needed to combat COVID-19. The proposed TRIPS waiver will enable the temporary suspension of the relevant TRIPS rules for the duration of the COVID-19 pandemic, allowing freedom to operate. It is thus a necessary ingredient as part of a multi-pronged approach to combat the pandemic. This approach must also encompass other steps, including: global co-ordination of supply chains; streamlining regulatory approval processes and sharing exclusive data from regulatory dossiers; and investment in the WHO’s C-TAP and the mRNA technology transfer hub in South Africa. The TRIPS waiver will thus facilitate the technical resilience of lower- and middle-income countries in view of present and future pandemic action and preparedness. This is in line with the commitment in the TRIPS Agreement to balance the rights of IP holders in high-income countries with the promise of technology transfer to lower- and middle-income countries. It is time to fulfil this promise and, in so doing, to end the pandemic.

### FW

#### The standard is Maximizing respective well being

#### Prefer –

#### Actor specificity, policy impacts must be decided under a util lens since we must make tradeoffs with limited resource

Mack 4 [(Peter, MBBS, FRCS(Ed), FRCS (Glasg), PhD, MBA, MHlthEcon) “Utilitarian Ethics in Healthcare.” International Journal of the Computer, the Internet, and Management Vol. 12, No.3. 2004. Department of Surgery. Singapore General Hospital.] SJDI

Medicine is a costly science, but of greater concern to the health economist is that it is also a limitless art. Every medical advance created new needs that did not exist until the means of meeting them came into existence. Physicians are reputed to have an infinite capacity to do ever more things, and perform ever more expensive interventions for their patients so long as any of their patients’ health needs remain unfulfilled. The traditional stance of the physician is that each patient is an isolated universe. When confronted with a situation in which his duty involves a competition for scarce medications or treatments, he would plead the patient’s cause by all methods, short of deceit. However, when the physician’s decision involves more than just his own patient, or has some commitment to public health, other issues have to be considered. He then has to recognise that the unbridled advocacy of the patient may not square with what the economist perceives to be the most advantageous policy to society as a whole. Medical professionals characteristically deplore scarcities. Many of them are simply not prepared to modify their intransigent principle of unwavering duty to their patients’ individual interest. However, in decisions involving multiple patients, making available more medication, labour or expenses for one patient will mean leaving less for another. The physician is then compelled by his competing loyalties to enter into a decision mode of one versus many, where the underlying constraint is one of finiteness of the commodities. Although the medical treatment may be simple and inexpensive in many instances, there are situations such as in renal dialysis, where prioritisation of treatment poses a moral dilemma because some patients will be denied the treatment and perish. Ethics and economics share areas of overlap. They both deal with how people should behave, what policies the state should pursue and what obligations citizens owe to their governments. The centrality of the human person in both normative economics and normative ethics is pertinent to this discussion. Economics is the study of human action in the marketplace whereas ethics deals with the “rightness” or “wrongness” of human action in general. Both disciplines are rooted in human reason and human nature and the two disciplines intersect at the human person and the analysis of human action. From the economist’s perspective, ethics is identified with the investigation of rationally justifiable bases for resolving conflict among persons with divergent aims and who share a common world. Because of the scarcity of resources, one’s success is another person’s failure. Therefore ethics search for rationally justifiable standards for the resolution of interpersonal conflict. While the realities of human life have given rise to the concepts of property, justice and scarcity, the management of scarcity requires the exercise of choice, since having more of some goods means having less of others. Exercising choice in turn involves comparisons, and comparisons are based on principles. As ethicists, the meaning of these principles must be sought in the moral basis that implementing them would require. For instance, if the implementation of distributive justice in healthcare is founded on the basis of welfare-based principles, as opposed to say resource-based principles, it means that the health system is motivated by the idea that what is of primary moral importance is the level of welfare of the people. This means that all distributive questions should be settled according to which distribution maximises welfare. Utilitarianism is fundamentally welfarist in its philosophy. Application of the principle to healthcare requires a prior understanding of the welfarist theory as expounded by the economist. Conceptually, welfarist theory is built on four tenets: utility maximisation, consumer sovereignty, consequentialism and welfarism. Utility maximisation embodies the behavioural proposition that individuals choose rationally, but it does not address the morality of rational choice. Consumer sovereignty is the maxim that individuals are the best judge of their own welfare. Consequentialism holds that any action or choice must be judged exclusively in terms of outcomes. Welfarism is the proposition that the “goodness” of the resource allocation be judged solely on the welfare or utility levels in that situation. Taken together these four tenets require that a policy be judged solely in terms of the resulting utilities achieved by individuals as assessed by the individuals themselves. Issues of who receives the utility, the source of the utility and any non-utility aspects of the situation are ignored

#### 2nd - Revisionary intuitionism is reliable and proves it’s is the only coherent ethic

YUDKOWSKY 8 Researcher Eliezer Yudkowsky, Less Wrong, 1/28/2008, is an American AI researcher and writer best known for popularising the idea of friendly artificial intelligence.[2][3] He is a co-founder and research fellow at the Machine Intelligence Research Institute (MIRI), a private research nonprofit based in Berkeley, California. ["The "Intuitions" Behind "Utilitarianism"", <http://lesswrong.com/lw/n9/the_intuitions_behind_utilitarianism/>] bcr 2-21-2018

I haven't said much about metaethics - the nature of morality - because that has a forward dependency on a discussion of the Mind Projection Fallacy that I haven't gotten to yet. I used to be very confused about metaethics. After my confusion finally cleared up, I did a postmortem on my previous thoughts. I found that my object-level moral reasoninghad been valuable and my meta-level moral reasoning had beenworse than useless. And this appears to be a general syndrome - people do much better when discussing whether torture is good or bad than when they discuss the meaning of "good" and "bad". Thus, I deem it prudent to keep moral discussions on the object level wherever I possibly can. Occasionally people object to any discussion of morality on the grounds that morality doesn't exist, and in lieu of jumping over the forward dependency to explain that "exist" is not the right term to use here, I generally say, "But what do you do anyway?" and take the discussion back down to the object level. Paul Gowder, though, has pointed out that both the idea of choosing a googolplex dust specks in a googolplex eyes over 50 years of torture for one person, and the idea of "utilitarianism", depend on "intuition". He says I've argued that the two are not compatible, but charges me with failing to argue for the utilitarian intuitions that I appeal to. Now "intuition" is not how I would describe the computations that underlie human morality and distinguish us, as moralists, from an ideal philosopher of perfect emptiness and/or a rock. But I am okay with using the word "intuition" as a term of art, bearing in mind that "intuition" in this sense is not to be contrasted to reason, but is, rather, the cognitive building block out of which both long verbal arguments and fast perceptual arguments are constructed. Isee the project of morality as a project of renormalizing intuition**.** We have intuitions about things that seem desirable or undesirable, intuitions about actions that are right or wrong, intuitions about how to resolve conflicting intuitions, intuitions about how to systematize specific intuitions into general principles. Delete all the intuitions, and you aren't left with an ideal philosopher of perfect emptiness, you're left with a rock. Keep all your specific intuitions and refuse to build upon the reflective ones, and you aren't left with an ideal philosopher of perfect spontaneity and genuineness, you're left with a grunting caveperson running in circles, due to cyclical preferences and similar inconsistencies. "Intuition", as a term of art, is not a curse word when it comes to morality - there is nothing else to argue from. Evenmodus ponens is an "intuition" in this sense - it's just that modus ponens still seems like a good idea after being formalized, reflected on, extrapolated out to see if it has sensible consequences, etcetera. So that is "intuition". However, Gowder did not say what he meant by "utilitarianism". Does utilitarianism say... That right actions are strictly determined by good consequences? That praiseworthy actions depend on justifiable expectations of good consequences? That probabilities of consequences should normatively be discounted by their probability, so that a 50% probability of something bad should weigh exactly half as much in our tradeoffs? That virtuous actions always correspond to maximizing expected utility under some utility function? That two harmful events are worse than one? That two independent occurrences of a harm (not to the same person, not interacting with each other) are exactly twice as bad as one? That for any two harms A and B, with A much worse than B, there exists some tiny probability such that gambling on this probability of A is preferable to a certainty of B? If you say that I advocate something, or that my argument depends on something, and that it is wrong, do please specify what this thingy is... anyway, I accept 3, 5, 6, and 7, but not 4; I am not sure about the phrasing of 1; and 2 is true, I guess, but phrased in a rather solipsistic and selfish fashion: you should not worry about being praiseworthy. Now, what are the "intuitions" upon which my "utilitarianism" depends? This is a deepish sort of topic, but I'll take a quick stab at it. First of all, it's not just that someone presented me with a list of statements like those above, and I decided which ones sounded "intuitive". Among other things, if you try to violate "utilitarianism",you run into paradoxes, contradictions, circular preferences, and other things that aren't symptoms of moral wrongness so much as moral incoherence**.** After you think about moral problems for a while, and also find new truths about the world, and even discover disturbing facts about how you yourself work, you often end up with different moral opinions than when you started out. This does not quite define moral progress, but it is how we experience moral progress. As part of my experienced moral progress, I've drawn a conceptual separation between questions of type Where should we go? and questions of type How should we get there? (Could that be what Gowder means by saying I'm "utilitarian"?) The question of where a road goes - where it leads - you can answer by traveling the road and finding out. If you have a false belief about where the road leads, this falsity can be destroyed by the truth in a very direct and straightforward manner. When it comes to wanting to go to a particular place, this want is not entirely immune from the destructive powers of truth. You could go there and find that you regret it afterward (which does not define moral error, but is how we experience moral error). But, even so, wanting to be in a particular place seems worth distinguishing from wanting to take a particular road to a particular place. Our intuitions about where to go are arguable enough, but our intuitions about how to get there are frankly messed up. After the two hundred and eighty-seventh research study showing that people will chop their own feet off if you frame the problem the wrong way, you start to distrust first impressions. When you've read enough research on scope insensitivity - people will pay only 28% more to protect all 57 wilderness areas in Ontario than one area, people will pay the same amount to save 50,000 lives as 5,000 lives... that sort of thing... Well, the worst case of scope insensitivity I've ever heard of was described here by Slovic: Other recent research shows similar results. Two Israeli psychologists asked people to contribute to a costly life-saving treatment. They could offer that contribution to a group of eight sick children, or to an individual child selected from the group. The target amount needed to save the child (or children) was the same in both cases. Contributions to individual group members far outweighed the contributions to the entire group. There's other research along similar lines, but I'm just presenting one example, 'cause, y'know, eight examples would probably have less impact. If you know the general experimental paradigm, then the reason for the above behavior is pretty obvious - focusing your attention on a single child creates more emotional arousal than trying to distribute attention around eight children simultaneously. So people are willing to pay more to help one child than to help eight. Now, you could look at this intuition, and think it was revealing some kind of incredibly deep moral truthwhich shows that one child's good fortune is somehow devalued by the other children's good fortune. But what about the billions of other children in the world? Why isn't it a bad idea to help this one child, when that causes the value of all the other children to go down? How can it be significantly better to have 1,329,342,410 happy children than 1,329,342,409, but then somewhat worse to have seven more at 1,329,342,417? Or you could look at that and say: "The intuition is wrong: the brain can't successfully multiplyby eight and get a larger quantity than it started with. But it ought to, normatively speaking." And once you realize that the brain can't multiply by eight, then the other cases of scope neglect stop seeming to reveal some fundamental truth about 50,000 lives being worth just the same effort as 5,000 lives, or whatever. You don't get the impression you're looking at the revelation of a deep moral truth about nonagglomerative utilities. It's just that the brain doesn't goddamn multiply. Quantities get thrown out the window. If you have $100 to spend, and you spend $20 each on each of 5 efforts to save 5,000 lives, you will do worse than if you spend $100 on a single effort to save 50,000 lives. Likewise if such choices are made by 10 different people, rather than the same person. As soon as you start believing that it is better to save 50,000 lives than 25,000 lives, that simple preference of final destinations has implications for the choice of paths, when you consider five different events that save 5,000 lives. (It is a general principle that Bayesians see no difference between the long-run answer and the short-run answer; you never get two different answers from computing the same question two different ways. But the long run is a helpful intuition pump, so I am talking about it anyway.) The aggregative valuation strategy of "shut up and multiply" arises from the simple preference to have more of something - to save as many lives as possible - when you have to describe general principles for choosing more than once, acting more than once, planning at more than one time. Aggregation also arises from claiming that the local choice to save one life doesn't depend on how many lives already exist, far away on the other side of the planet, or far away on the other side of the universe. Three lives are one and one and one. No matter how many billions are doing better, or doing worse. 3 = 1 + 1 + 1, no matter what other quantities you add to both sides of the equation. And if you add another life you get 4 = 1 + 1 + 1 + 1. That's aggregation. When you've read enough heuristics and biases research, and enough coherence and uniqueness proofs for Bayesian probabilities and expected utility, and you've seen the "Dutch book" and "money pump" effects that penalize trying to handle uncertain outcomes any other way, then you don't see the preference reversals in the Allais Paradox as revealing some incredibly deep moral truth about the intrinsic value of certainty. It just goes to show that the brain doesn't goddamn multiply. The primitive, perceptual intuitions that make a choice "feel good" don't handle probabilistic pathways through time very skillfully, especially when the probabilities have been expressed symbolically rather than experienced as a frequency. So you reflect, devise more trustworthy logics, and think it through in words. When you see people insisting that no amount of money whatsoever is worth a single human life, and then driving an extra mile to save $10; or when you see people insisting that no amount of money is worth a decrement of health, and then choosing the cheapest health insurance available; then you don't think that their protestations reveal some deep truth about incommensurable utilities. Part of it, clearly, is that primitive intuitions don't successfully diminish the emotional impact of symbols standing for small quantities - anything you talk about seems like "an amount worth considering". And part of it has to do with preferring unconditional social rules to conditional social rules. Conditional rules seem weaker, seem more subject to manipulation. If there's any loophole that lets the government legally commit torture, then the government will drive a truck through that loophole. So it seems like there should be an unconditional social injunction against preferring money to life, and no "but" following it. Not even "but a thousand dollars isn't worth a 0.0000000001% probability of saving a life". Though the latter choice, of course, is revealed every time we sneeze without calling a doctor. The rhetoric of sacredness gets bonus points for seeming to express an unlimited commitment, an unconditional refusal that signals trustworthiness and refusal to compromise. So you conclude that moral rhetoric espouses qualitative distinctions, because espousing a quantitative tradeoff would sound like you were plotting to defect. On such occasions, people vigorously want to throw quantities out the window, and they get upset if you try to bring quantities back in, because quantities sound like conditions that would weaken the rule. But you don't conclude that there are actually two tiers of utility with lexical ordering. You don't conclude that there is actually an infinitely sharp moral gradient, some atom that moves a Planck distance (in our continuous physical universe) and sends a utility from 0 to infinity. You don't conclude that utilities must be expressed using hyper-real numbers. Because the lower tier would simply vanish in any equation. It would never be worth the tiniest effort to recalculate for it. All decisions would be determined by the upper tier, and all thought spent thinking about the upper tier only, if the upper tier genuinely had lexical priority. As Peter Norvig once pointed out, if Asimov's robots had strict priority for the First Law of Robotics ("A robot shall not harm a human being, nor through inaction allow a human being to come to harm") then no robot's behavior would ever show any sign of the other two Laws; there would always be some tiny First Law factor that would be sufficient to determine the decision. Whatever value is worth thinking about at all, must be worth trading off against all other values worth thinking about, because thought itself is a limited resource that must be traded off. When you reveal a value, you reveal a utility. I don't say that morality should always be simple. I've already said that the meaning of music is more than happiness alone, more than just a pleasure center lighting up. I would rather see music composed by people than by nonsentient machine learning algorithms, so that someone should have the joy of composition; I care about the journey, as well as the destination. And I am ready to hear if you tell me that the value of music is deeper, and involves more complications, than I realize - that the valuation of this one event is more complex than I know. But that's for one event. When it comes to multiplying by quantities and probabilities, complication is to be avoided - at least if you care more about the destination than the journey. When you've reflected on enough intuitions, and corrected enough absurdities, you start to see a common denominator, a meta-principle at work, which one might phrase as "Shut up and multiply."Where music is concerned, I care about the journey. When lives are at stake, I shut up and multiply. It is more important that lives be saved, than that we conform to any particular ritual in saving them. And the optimal path to that destination is governed by laws that are simple, because they are math. And that's why I'm a utilitarian - at least when I am doing something that is overwhelmingly more important than my own feelings about it - which is most of the time, because there are not many utilitarians, and many things left undone.

#### No calc indites

#### empirically denied, policymakers use predictions successfully multiple times- proves that any action is better than no action

#### No intent foresight distinction, we forsee an outcome and it becomes part of our deliberations, making it intrinsic to our actions

### UV

#### Aff gets 1ar theory and metatheory otherwise the negative can engage in near infinite abuse without any check. Its drop the debater, it’s the only way to deter abuse, aff time skew means that there isn’t enough time for the aff to do both substance and theory. Competing interpretations reasonability is arbritary. No rvis, a) illogical, you don’t get a cookie for being fair, B) six mins of neg dumping skews the debate. No 2nr paradigm issues insofar as they can engage 6 mins dumping on a shell which skews the debate and prevents the aff from checking neg abuse

#### Fairness is a voter, debate is a competitive activity, the judge has to vote for the better debater which necessitates a fair round – if they contest this, drop them insofar as it means that they don’t care about the activity and are clearly planning to engage in abusive activity

#### Education is a voter as it is the pedagogical intent of debate and why schools fund it

#### T is an RVI: multiple warrants:

a. AFF flex – negative has the ability to win on either layer so the aff needs the same ability in the 2ar. 2AR is too short to win a new shell and play defense against the 2NR theory arguments so the AFF needs reciprocal layers rather than adding more unreciprocal avenues. That’s not a problem in the long 2nr.

b. reciprocity- Only the neg can read T because only the aff has a burden to be topical. Thus the aff needs an RVI to compensate for the neg’s unique avenue to the ballot.

c. key to deterring frivolous T – otherwise T is a no risk issue that moots the entirety of the 1AC and becomes a NIB. T being an RVI encourages substantive engagement with the aff which is key to real world skills.

### AFF- Global Disease

#### squo IP protections are horrible for public health—deteriorated global innovation, millions of annual deaths, and disease propagation occurs

Merran Eby University of Waterloo’s Masters in Global Governance program based at the BSIA. et al., Balsillie School of International Affairs, 2018 ["Canada’s Progressive Trade Agenda and Global Health ", https://www.balsillieschool.ca/wp-content/uploads/2019/02/Graduate-Fellows-Anthology-2019.pdf#page=15, 8-26-2021] AWS

In the ongoing debate on the benefits of **IP protection** versus the costs of barriers to the dissemination of knowledge, the general consensus among economists is that the current balance is tilted too far towards protective measures to the overall detriment of public well-being, and that proponents of enhanced IP protection paint a toosimplistic view of what is in truth a far more complicated issue (Dosi and Stiglitz 2013; Blit 2017). The basic argument made by supporters of strong IP is one of market failure, in which the free availability of created knowledge leads to lowered incentives to invest in research and development (as everyone “free rides”), **and** by consequence leads to underproduction and underinvestment. By allowing creators to profit from their work through rents, the argument continues, IP rights provide an incentive to innovate. The problem with this argument, however, is that IP rights differ in one significant way from other types of property right: that is, knowledge is a non-rival resource, the value of which never diminishes in proportion to the number of people making use of it. The challenge of this issue is that the private sector often tends to be the source of innovation for a product that is considered to be a public good. When it comes to innovation, the greatest resource available is access to existing knowledge upon which to build. Every gain is based on what has been learned before; enhanced IP protection may stifle the sharing of research. Such knowledge as is produced and consequently patented by the private sector is kept out of the pool freely available to most researchers, in what has been called by some economists the tragedy of the anti-commons. This “**fencing off** ” of access is an inefficient use of knowledge that could have otherwise contributed to the development of follow-on innovations by others. Furthermore, a **strict IP regime creates monopolies on knowledge — by disincentivizing further innovation** both for the firms holding the monopolies and for the smaller firms who know they will be outcompeted if they try — and by presenting a needless complication to technological advancement — as knowledge is divided and subdivided into many smaller separate claims, making the process of recombining them for further research an arduous one. The process of avoiding or searching out patent infringements has become its own industry, and sometimes researchers are given no choice but to spend their time finding ways to work around existing patents instead of using what has already been discovered. Do Patents Lead to Greater Innovation? Although there is no clear consensus on the question, the balance of studies suggests that there is not a direct causal relationship between enhanced IP protection and increased innovation. Proponents of strong IP rights maintain that the upsurge in patents filed in recent decades is the result of greater protective measures. On the other hand, it could be explained equally by the general uptick in new opportunities for technology, such as in the burgeoning fields of IT and biotechnology. The following section presents responses related to innovation from the Canadian Generic Pharmaceutical Association (CGPA) and Innovation Medicines Canada (IMC) to Bill C-30: “An Act to implement the Comprehensive Economic and Trade Agreement between Canada and the European Union and its Member States and to provide for certain other measures.” The CGPA compiled a report analysing Bill C-30 that would see CETA implemented into law. Before CETA negotiations, Canada already had very strong levels of IP protection, exceeding levels seen in the US. The biggest and most controversial change came from a new form of intellectual property protection called certificates of supplementary protection (CSP), which would see protection extended for an additional two years (CGPA 2016). The CGPA predicts that this additional level of protection will cost Canadian taxpayers upwards of $200 million annually (ibid.). An important note made in the report is that Bill C-30 will still allow generic manufacturers the ability to export during this additional period of protection. This will be vital in attracting and competing in new and existing markets going forward. IMC is the association that represents Canada’s brandname pharmaceutical companies. Overall, IMC has been highly supportive of CETA and its regime of enhanced IP protection (IMC 2018). In particular, IMC has outlined the importance of patent term restoration, offering an additional two years of monopoly and the right of appeal that sees companies more easily able to appeal decisions where patents have been ruled to be invalid (Douglas 2016). The claims made that higher protections for IP lead to job growth and investment, and through these concepts new innovations, is unsubstantiated. The lack of investment is seen in Canadian brand-name pharmaceutical companies who pledged to the government to invest 10 percent of all revenue in R&D in exchange for substantive legislation in 1987 (Lexchin and Gagnon 2014). However, the 2016 annual report conducted by the Patented Medicine Prices Review Board showed that the R&D-to-sales ratio had fallen to 4.9 percent, marking the fourteenth consecutive year that companies had failed to live up this commitment (Levine 2017). While enhanced IP protection has been producing gains for companies based in the industrialized world, it has imposed costs on Canadian taxpayers and created losses for the Global South, all while stifling innovation. IP Law and Development Developed and developing countries are separated by a gap in the knowledge to which they have access. A poorly designed IP regime may present a major barrier to addressing this gap, and by extension to the development of emerging economies. Limiting the access of lowerincome countries to life-saving medicines, for example, is not only endangering the right to life of their citizens, but also hampering knowledge that could have be used to contribute to their development, and even their capacity to build on that shared knowledge for further future innovations. The strengthening of IP law in America has been followed by a drop in the rate of innovations by pharmaceutical companies. Part of this is that, as for-profit actors, the private sector is concerned not only with the genuine creation of new products, but also with marketing those products, asserting against infringements, finding similar products on which to capitalize (“me-too drugs”) and the like — all of which divert resources away from innovation towards rent-seeking and weaken the overall social return. These concerns exert a considerable influence on the sorts of research and development projects that receive funding as well: in 2010, for example, the amount of money put towards finding a cure for male-pattern baldness was double that spent on HIV/AIDS research, and quadruple that spent on malaria. Given that most major pharmaceutical companies are located in the developed world, it seems unlikely that the social value of certain forms of medication — that, while they affect many times more people in the developing world, offer fewer potential returns on investment — will always be taken into consideration before deciding what research on which to expend resources. While the TRIPS agreement contains crucial flexibilities to ensure access to medicines, many countries have failed to take advantage. This is often attributed to a lack of technical expertise and institutional capacity (Matthews 2005). Research has indicated that developed countries could play a greater role by implementing policies that promote technology transfers and strategic R&D spending. Therefore, the provisions allowing for the access to medicines among developing nations would be fully utilized (Hopkins 2006). The Impact of Increased IP on Developing Countries Millions of people across the world lack access to pharmaceuticals, and as a result many die every year from curable or treatable diseases like tuberculosis and AIDS. Additionally, non-communicable diseases are on the rise in all parts of the world, hitting hardest in the Global South. These trends pose grave threats to public health and have increased the need for pharmaceuticals to prevent and manage illness. A strong IP regime such as that encompassed by **TRIPS** and TRIPS Plus — while it may be of benefit to private companies seeking to maximize the rents they receive — threatens to ignore or impede the most successful ways in which knowledge transfer enables the development of emerging economies. It **is**, moreover, a barrier to development that is being enforced by countries which themselves used those very same methods (such as reverse engineering, imitation and open source knowledge) to industrialize in their own right before IP law gained traction. Indeed, the US itself openly considered compulsory licensing in 2001 to reduce the price of a drug used to treat anthrax (Sell and Prakash 2004). By demanding high rents from developing countries for patented medications — some by a mark-up of up to 400 percent since TRIPS was introduced — we arrive at a situation where “to decrease the gap in knowledge, developing countries are being asked to increase the gap in resources…without evidence that these higher prices have led either to more drug innovation in general, let alone more innovation attempting to address the needs of those in developing countries” (Dosi and Stiglitz 2013).

#### Sub-point A is COVID-19

#### IPP’s are destroying COVID-19 vaccine roll-out. The developing world has received only .2% of vaccines—and this is unlikely to change

Priti Krishtel, (Priti Krishtel is a health justice lawyer and co-founder of I-MAK, a non-profit building a more just and equitable medicines system. She has spent nearly two decades exposing structural inequities affecting access to medicines and vaccines across the Global South and in the United States. ), BMJ, 5-28-2021 ["Suspend intellectual property rights for covid-19 vaccines", <https://www.bmj.com/content/373/bmj.n1344> ] mss Accessed 8-26-2021.

The United States caught the world by surprise on 5 May 2021 when it announced its intention to support a World Trade Organization proposal that would temporarily waive intellectual property rights on covid-19 vaccines. While this move is encouraging, the Biden administration’s support is the first step of many required.1 **Waiving intellectual property rights is essential to tackle serious inequity in the global distribution of covid-19 vaccines**, whereby wealthy countries currently control the lion’s share of existing supplies. **By the end of April, over 1.3 billion doses had been administered worldwide, but only 0.2% of vaccines had been given in low income countries**.2 More than one year into the pandemic, the situation is at a low point globally. **The average number of weekly deaths in April was over 36 000 in just India and Brazil,3 and variants are proliferating. Experts fear a devastating second wave across Asia and Africa.** **Voluntary action has not worked— whether timely sharing of doses with low and middle income countries or sharing knowledge** through the World Health Organization. **It’s time for mandatory rules** and legal commitments that can help put an end to this pandemic. The proposed intellectual property waiver is appropriate as **vaccine manufacturers have relied heavily on publicly funded research into coronaviruses.5 Together, companies holding intellectual property rights are estimated to have benefited from government funding of around €93bn [109 billion USD] (£80bn; $110bn).6 The Moderna vaccine was funded almost exclusively by the US government**.7 **A successfully negotiated intellectual property waiver would ensure manufacturers cannot block production or access to raw materials and finished products for covid-19 technologies worldwide**. A waiver would also prevent companies from charging unaffordable prices while insulated from competition. Lack of competition in the vaccines market has a long history. **Previously, the two companies with a duopoly for the human papillomavirus (HPV) vaccine held patents that prevented competition. According to one estimate, low income countries paid up to 10 times the estimated cost of production for these vaccines.9 Millions of girls globally are still unable to access this critical protection against cervical cancer.** Similarly, Pfizer successfully enforced secondary patents on its pneumococcal vaccine through legal proceedings in India10 and South Korea,11 which delayed competition. Pneumonia remains the leading cause of death globally among children under 5 years old.12 Many middle income countries have low coverage because of the high price of the vaccine, often 5-10 times higher than the lowest price available globally.13 Inadequate access to essential vaccines is predictable in a system that prioritises monopolies—and this will repeat itself in the absence of an intellectual property waiver for covid-19 vaccines. A successfully negotiated waiver would meet four important criteria. The waiver’s primary aim should be to save as many lives as possible. The Biden administration wants the waiver to focus on vaccines. This constraint should be removed. The original proposal applies to all medical technologies related to covid-19, including diagnostics, medicines, and ventilators. Many people are likely to become sick even if vaccination rates improve worldwide. Secondly, negotiations should be completed quickly. Governments should make substantial progress ahead of the WTO meeting on 8 June 2021. Thirdly, any waiver should be straightforward, unambiguous, for a reasonable duration, and limit manufacturers’ ability to file legal challenges that impede access. Finally, negotiating texts should be fully disclosed, with negotiations transparent to ensure all countries negotiate as equals. In the past, powerful nations have used their leverage to extract concessions from less powerful countries behind closed doors.14 **Opponents of a waiver question whether manufacturers in lower income countries have the required capabilities. This argument was also made in the 1980s when Merck and GSK dominated the market for complex recombinant hepatitis B vaccines. It was discredited in 1997, when Indian manufacturer Shantha Biotechnics launched a vaccine that reduced the cost of a dose from up to $23 to just $1.** Many millions of people worldwide have since been successfully immunised.15 Manufacturers in low and middle income countries are already critical to overall immunisation efforts worldwide: **in 2018, they [low income manufacturers] provided over half of the 2.4 billion vaccine doses procured by Unicef.**Suppliers worldwide are gearing up to meet this moment. New mRNA vaccines are under development in India17 and China,18 and several companies in middle income countries are already manufacturing covid-19 vaccines.1920 WHO is establishing a technology transfer hub to support local production of mRNA vaccines.21 Although follow-on manufacturers can produce complex vaccines without support from holders of technology, sharing knowledge would save time and lives. As we enter into a new era of global pandemics, we must fundamentally rethink the global intellectual property system. The ability to respond swiftly to global crises cannot be left to a handful of private companies in a few wealthy countries. We need a more cooperative global response to this and future public health emergencies.

#### Developing world transmission risks mutations which restart COVID

[Jeremy Farrar](javascript:void(0);), PHD and director of welcome trust, China CCDC Weekly, 2021 ["COVID-19 — 2021: A New, Less Predictable Phase of the Pandemic", http://weekly.chinacdc.cn/en/article/doi/10.46234/ccdcw2021.032, 9-1-2021] AWS

The recent emergence of more transmissible COVID-19 variants with higher case fatality poses a serious threat to efforts to control the pandemic ([3](javascript:;)-[4](javascript:;)). Those variants already identified render anti-viral treatments ineffective, evade immunity from natural infection and, with emerging evidence that some variants reduce efficacy of the first-generation vaccines. It is inevitable that further variants will emerge that pose a more significant threat to vaccine efficacy. Most first-generation **vaccines** and treatments target a single virus protein, the spike protein, and **are** very vulnerable to mutations and emergence of new strains. Given that we are currently only finding variants where we have the capability to sequence, and not necessarily where they are occurring, this could already be the case. It is not coincidence that the three new variants have been picked up in the last quarter of 2020, we can expect a more rapid evolution of the virus in 2021 and more new variants as it adapts to humans (biological adaptation) and is now under **increasing immunological pressure from infection and vaccination** (immunological adaptation). Since viral mutation is fundamentally a function of global prevalence, there is an imperative to reduce transmission everywhere. Otherwise, mutations will **erode** the efficacy of our **tools** faster than we can adapt them. In this instance the adage “no one is safe until everyone is safe” is not just rhetoric, but epidemiological fact. A massive global reduction in prevalence would result in slower evolution and thus make the virus easier to control. We have either to face a vicious cycle of greater prevalence leading to faster **mutation** and continued reverberation of this pandemic, a pandemic within a pandemic. **Or** a virtuous **cycle of lower prevalence** resulting in less mutation and the ability to stay ahead of this pandemic.

#### COVID is the make-or-break on near-term extinction – reduced industrial activity spikes temperatures and results in mass deforestation & crop loss before the year ends.

Guy R McPherson, in Earth & Environmental Science Research & Reviews, 4-24-2020 McPherson is Professor Emeritus, University of Arizona [“Will COVID-19 Trigger Extinction of All Life on Earth?” Volume 3, Issue 2, https://opastonline.com/wp-content/uploads/2020/04/will-covid-19-trigger-extinction-of-all-life-on-earth-eesrr-20-.pdf, accessed 9-1-2021] AWS

Small lives matter. Indeed, the “human body contains about 100 trillion cells, but only maybe one in 10 of those cells is actually — human” [1]. We are comprised of bacteria and other tiny living organisms, as well as non-living entities such as viruses. One such virus has captured the attention of the world, and with good reason. The novel coronavirus could trigger extinction of humans, and therefore the extinction of all life on Earth. I frequently hear and read that COVID-19 is a nefarious attempt by the so-called “elite” among us to depopulate the burgeoning human population on Earth. Other conspiracy theories abound, including COVID-19 as an attempt to further reduce human rights, promote expensive medical therapies, and otherwise enrich the wealthy at the expense of the bamboozled masses. I do not doubt the ability of the informed wealthy to fleece the ignorant masses. Nor do I doubt the ability of the informed wealthy to turn virtually any situation into an opportunity for monetary gain. A quick glance at the past two centuries provides plenty of examples. However, I doubt the monetarily wealthy among us are interested in accelerating human extinction, even for financial gain. As I explain below, the ongoing **reduction in industrial activity as a result of COVID-19** almost certainly leads to loss of habitat for human animals, hence **putting us on the fast track to** human **extinction**. I doubt the knowledgeable “elite” are interested in altering the sweet deal they are experiencing with the current set of living arrangements. The aerosol masking effect, or global dimming, has been described in the peer-reviewed literature since at least 1929 [2, 3]. Coincident with industrial activity adding to greenhouse gases that warm the planet, industrial **activity** simultaneously **cools the planet by adding aerosols to the atmosphere**. These aerosols block incoming sunlight, thereby keeping cool our pale blue dot. Reducing industrial activity by as little as 35 percent is expected to cause a global-average temperature rise of 1 degree Celsius within a few weeks, according to research on the aerosol masking effect [4]. Such research was deemed collectively too conservative by a paper in the 17 January 2019 issue of Science [5]. As pointed out by the lead author of the latter paper on 22 January 2019 “Global efforts to improve air quality by developing cleaner fuels and burning less coal could end up harming our planet by reducing the number of aerosols in the atmosphere, and by doing so, diminishing aerosols’ cooling ability to offset global warming” [6]. The cooling effect is “nearly twice what scientists previously thought,” and the paper by Rosenfeld et al. [5] cites the conclusion by Levy et al. [4], indicating as little as 35% reduction in industrial activity drives a 1 C global-average rise in temperature, thereby suggesting that as little as a 20% reduction in industrial activity will drive a 1 C spike in temperature within a few weeks [7]. Additional, recent support for the importance of the aerosol masking effect comes from [8, 9]. Furthermore, **loss of aerosols exacerbates heat waves** [10]. Human extinction might have been triggered several years ago when the global-average temperature of Earth exceeded 1.5 C above the 1750 baseline. According to a comprehensive overview published by European Strategy and Policy Analysis System in April, an “increase of 1.5 degrees is the maximum the planet can tolerate; … at worst, [such a rise in temperature above the 1750 baseline will cause] the extinction of humankind altogether” [11, 12]. Earth’s global-average temperature hit 1.73 C above the 1750 baseline by April, 2018 the highest global-average temperature experienced by Homo sapiens on Earth [13, 14]. **By March 2020, 2 C** above the 1750 baseline **was crossed** [11]. In other words, human extinction via the death-by-a-thousandcuts route might be locked in with no further heating of Earth. In light of the ongoing pandemic, the ongoing Mass Extinction Event, and abrupt, irreversible climate change, it is pleasantly surprising that humans still occupy Earth. The pandemic-induced reduction in industrial activity may have already reduced the aerosol masking effect sufficiently to trigger a 1 C temperature spike. The outcome is not yet obvious because the timing of the outbreak of the novel coronavirus was favorable for human habitat. Trees produced leaves in the Northern Hemisphere spring of 2020 as a result of carbohydrates stored the previous year and grain crops were harvested before the novel coronavirus emerged. **Results of the recent and ongoing rise in temperature**, which have already been reported in China and India, **will become obvious** to most humans **when many more trees die**. Large-scale die-off of trees likely will approximately correspond with catastrophic crop failure. This might occur by the end of this year, although I would rather it not.Every civilization requires bread and circuses. There is little doubt the circuses attendant to industrial civilization will continue until the end of the planetary show for Homo sapiens. Bread, however, requires wheat. Wheat production requires a delicate balance of growing conditions that, like habitat for humans, teeters on the brink [15]. The path to near-term human extinction thus runs from a tiny virus underlying a pandemic through a reduction of industrial activity that overheats a planet already running a fever. The outbreak of **COVID-19 could very well be the event that accelerates human extinction** via reduction of industrial activity, hence loss of habitat for Homo sapiens. As **a result of the rapid environmental change likely** to follow, **we are almost certain to lose all life on Earth** [16]. History is replete with examples of human hubris. We thought we were mighty, and we certainly have left our mark on Earth. How embarrassing for the big-brained human species that a microscopic virus could pull the trigger on our extinction [15].

#### Subpoint B is Africa

#### The WTO patent laws are a textbook example of oppression, Africa against the creation of patent laws, yet had little say in the matter. Such patent laws were made by companies who wished to remove access to these medicines, due to these patent laws, millions in Africa are dying

Jae Sundaram, lecturer in International trade and Maritime Law at Buckingham University, in 2015 [“Access to Medicines and the TRIPS Agreement: What Next for Sub-Saharan Africa?” Information & Communications Technology Law Vol. 24, Issue 3 (2015) 242-261, https://doi.org/10.1080/13600834.2015.1084679]

This article takes up for analysis the continued problems faced in access to medicines in sub-Saharan Africa in the post-TRIPS (The Agreement on Trade-Related Aspects of Intellectual Property Rights) era, and the way forward. It is well documented that the African countries along with developing countries from other continents were opposed to the introduction of an intellectual property (IP) protection even during the Uruguay Round of Negotiations; the proposal went ahead, regardless of the oppositions, resulting in the introduction of the TRIPS Agreement. The article studies the reasons behind the continued inability of the sub-Saharan African states in accessing affordable medicines, the difficulty or failure of sub-Saharan African countries to utilise flexibilities found in the TRIPS Agreement, and also raise the inevitable question as to what is keeping the sub-Saharan African countries from seeking an amendment of the TRIPS Agreement to remove pharmaceutical patents from the ambit of its operation. This article is divided into three parts, with the first part presenting the entry of the TRIPS Agreement, the flexibilities, the introduction of Doha Declaration in later years and the continuing problems faced by sub-Saharan African countries with regard to access to medicines, the second part providing the background to the current state of affairs as regards access to medicines in sub-Saharan Africa and the measures taken to find solutions. The second part will also identify the factors contributing to the continued failure of the sub-Saharan African countries to find a viable solution to the problems. The third part will focus on discussing the findings and suggesting the way forward to arrive at a permanent solution to counter the shortcomings of the TRIPS Agreement and the consequent problems. 2. TRIPS Agreement: troubled passage and entry The Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) is viewed as the most significant agreements to emerge out of the Uruguay Round of Negotiations2 and yet controversial of the covered agreements of the World Trade Organization (WTO). The TRIPS Agreement, which addresses a range of IP rights issues and mandates a global minimum standard for IP rights protection on all member countries, was drafted at the behest of patent rights holding developed countries.3 It has **far-reaching implications** on international IP rights protection and access to medicines in developing countries and LDCs. The expression ‘access to medicines’, although widely used, does not have a standard definition. The main reason the Agreement is considered as a serious threat to access to medicines is that the 20-year product patent protection introduced through the Agreement covers pharmaceutical patents,4 and also outlaws process patents. Process patent, as opposed to product patent, paved the way for affordable generic drugs and is much more affordable than patented/brand-name drugs produced by transnational pharmaceutical corporations.5 Interestingly, most sub-Saharan African countries rely on generic drugs,6 which are free of patent and hence cheaper and affordable. The TRIPS Agreement7 allows Member States to impose a more extensive protection of IP right if they wish to, and a minimum standard of protection from others who may not be in favour of an extensive protection. The TRIPS Agreement fully incorporates substantive rules contained in other international agreements and Conventions8 previously administered by the World Intellectual Property Organization (WIPO).9 Developing countries and least developed countries (LDCs) had little or no involvement in the development of the above IP Conventions/treaties, as most were negotiated in the colonial era,10 decades before the Uruguay Round of Negotiations that took place in the 1980s–1990s. It is worth pointing that a number of sub-Saharan African countries were made signatories to international Conventions even during the colonial period, without the need for them to be parties.11 The Agreement creates rights for producers of IP and obligations for the users, and speaks very little about the rights of the end-users of IP,12 in our case the rights of the consumers of such pharmaceutical products. The developing countries, led by India, Brazil and Argentina, strongly opposed the proposal,13 which was followed by a detailed paper submitted by India in July 1989 at the negotiations putting forward the developing countries’ reasons for opposition for inclusion of an international IP rights protection to the General Agreement on Tariffs and Trade (GATT) agenda.14 Although debated, the paper presented by India15 did not produce the desired effect, as towards the latter half of 1989 and the beginning of 1990 almost all developing countries changed their position on the inclusion of international IP rights protection to the GATT agenda,16 which effectively brought the curtains on any resistance to the introduction of an international IP rights protection regime in the multilateral trading system. 2.1. The TRIPS Agreement: flexibilities, the Doha Declaration & sub-Saharan Africa The TRIPS Agreement, by strengthening patent protection, had a significant impact on access to life-saving medicines in developing countries and LDCs.17 This had especially affected the poor countries that had no infrastructure to produce pharmaceuticals and solely relied on imported generics for their health-care needs.18 The TRIPS Agreement, most importantly, contains flexibilities in its implementation, which are primarily aimed at benefitting the developing countries and LDCs,19 and help them in the pursuit of access to affordable medicines. Scholarly articles, written on the subject of flexibilities contained in the TRIPS Agreement, point to the WTO’s failure to address the problem of the access to medicines in developing countries and LDCs.20 Some of the key pharmaceutical patent-related flexibilities identified include provision for grant of compulsory licensing, parallel importation, and provisions relating to patentable subject matter,21 the exhaustion of rights22 and parallel importation, scope of patentability and optional exclusion, exceptions to patent rights and enforcement.23 Not all developing countries were aware that the developed countries (the advocates of a wider global IP rights protection) had a strong public health-care system and will be unaffected by the pharmaceutical patent regime of the TRIPS Agreement,24 and that it will be the developing countries and the LDCs who will be left to face the enormous burden of a higher IP rights protection. As the public health challenges became explicitly linked to the regulation of international trade25 conducted through the WTO, it was becoming increasingly clear that the Agreement would severely restrict access to essential medicines for their citizens, and impede any efforts to control diseases including HIV/AIDS, tuberculosis and malaria. There was a lingering fear amongst the developing countries (including the sub-Saharan nations) that the inclusion of pharmaceutical patents under the extended IP rights protection of the TRIPS Agreement was likely to increase dependency on brand-name pharmaceutical products and affect them severely, resulting in essential medicines becoming unaffordable and beyond their reach.26 To complicate matters, the flexibilities afforded under the Agreement to the developing countries and the LDCs were viewed narrowly by patent-holding developed countries, which took the view that the only flexibility afforded under the Agreement was its staggered implementation in certain cases. This was in stark contrast to the view of the developing countries that the Agreement did not limit their sovereign powers when addressing domestic health crises, such as HIV/AIDS.27 The impact of the TRIPS Agreement on public health in developing countries and LDCs became a serious issue. A lack of clarity and consensus on the TRIPS flexibilities had hampered the efforts to widen access to antiretroviral (ARVs) treatment in developing and LDCs,28 which factor has affected the sub-Saharan African nations severely.29 The concerns of the developing countries (including the African countries) only intensified when the USA and EU, along with the transnational pharmaceutical corporations commenced an aggressive campaign against countries that proceeded to take advantage of the IP rights policy options contained in the TRIPS Agreement,30 with the most notable legal action being launched against the Republic of South Africa, which sought to amend its Medicines Act and grant unbridled powers to the government to issue compulsory licenses and parallel importing contracts to generic producers of HIV/AIDS drugs.31 The campaign against the South African government continued, and would only come to an end when the NGO protesters threatened to disrupt the political campaign of the then US Vice President Al Gore.32 Nevertheless, the patent-holding transnational pharmaceutical industry persisted with its litigation, and would only withdraw after the NGOs had inflicted public relations damage.33 The case not only prised open the debate on the precise meaning of the flexibilities contained in the TRIPS Agreement, but also the principles and objectives embodied in Articles 7 and 8 of the Agreement.34 With growing pressure from the African Group, the Council for TRIPS35 in June 2001 considered in detail the relationship between public health and TRIPS Agreement.36 In November 2001, the Doha Declaration on TRIPS and Public Health37 (Doha Declaration) was made to address the concerns of the developing countries, and also to clarify other divergent views held by the developed nations and developing nations on the application and ambit of the TRIPS Agreement.38 The Doha Declaration recognised the right of a Member States to grant compulsory licences, determine the grounds for the grant and also define as to what constituted a national emergency.39 The Doha Declaration and the 2003 Decision on Implementation of Paragraph 640 of the TRIPS Agreement while recognising the right of a country to gain access to medicines were intended to allow access to generic medicines for HIV/AIDS, malaria and tuberculosis.41 Paragraph 4 encapsulated the spirit of the Declaration in the following words: We agree that the TRIPS Agreement does not and should not prevent Members from taking measures to protect public health. Accordingly, while reiterating our commitment to the TRIPS Agreement, we affirm that the Agreement can and should be interpreted and implemented in a manner supportive of WTO Members’ right to protect public health and, in particular, to promote access to medicines for all. To a greater extent, the Declaration also for the first time recognised that IP and trade rules had a negative impact on access to medicines. Paragraph 3 of the Declaration states that ‘ … also recognise the concerns about access to medicines’. 42 Despite a Declaration coming from the highest trading body, and with a UN’s commitments in the form of Millennium Goals,43 much is still desired from the TRIPS Agreement in terms of access to medicines,44 as close to a third of the people worldwide lack affordable essential medicines due to exorbitant prices. The developing countries and LDCs45 still face big challenges when trying to implement the TRIPS flexibilities due to increased IP protection introduced under the TRIPS Agreement,46 and through TRIPS-plus provisions introduced through free trade agreements (FTAs).47 The Doha Declaration impacted the developing countries, as it has influenced their health policies and in particular their pharmaceutical patent legislation. To some extent, the Doha Declaration clarified the scope of the TRIPS Agreement, provided interpretative guidance and political space for the use of flexibilities policy embodied in the TRIPS Agreement,48 but unfortunately left unresolved the key issue of exporting products manufactured under a compulsory license to countries without domestic production capacity, besides not addressing the promise of increased R&D in exchange for higher levels of IP protection, which was used as a bargaining chip by the developed countries during the Uruguay Round of Negotiations on extended IP rights protection.49 If the TRIPS Agreement was a well-concerted effort by the developed countries and their transnational pharmaceutical corporations, then the Doha Declaration was a hard fought bargain by the developing countries and LDCs led by the African nations and well supported by the NGOs. The lack of clarity on the use of compulsory license under the TRIPS Agreement still proves a major stumbling block for the sub-Saharan African nations in accessing affordable medicines, especially when they **strongly rely** on generic drugs manufactured in countries like India for most of their health-care requirement.50 It is however to be noted that some developing countries have used the TRIPS flexibilities to produce and purchase generic ARVs medications, and there is also evidence of donor countries now permitting the use of their funds to procure generic ARVs medications for LDCs.51 Unfortunately, most sub-Saharan African countries do not fall under the category of developing countries that have utilised such flexibilities to their advantage, as do they do not possess the knowledge economy or the necessary infrastructure to manufacture medicines on their own. The UN Commission on Human Rights on IP and Human Rights goes as far as to state that the WTO is ‘a veritable nightmare’ for certain sectors of humanity,52 in that the TRIPS Agreement in some ways encourages, or has a side-effect **human rights violations**.53 The observations in the report are true in that the sub-Saharan African countries continue to suffer from the implementation of the TRIPS Agreement. The fact remains that the most marginalized global economic actor at the WTO, the African faction54 did not have a major role to play during TRIPS negotiations,55 but arguably played an important role in the post-TRIPS era in the lead up to the Doha Declaration.56 The African Groups raised the issue of patents and healthcare as part of the Doha Development Round,57 in such a way that it could not be ignored. 2.2. Problems facing sub-Saharan Africa: extended IP rights protection, the promised flexibilities and the ‘unachievable balance’ under TRIPS Improving access to affordable medicines in the disadvantaged parts of the world had been on the agenda of international bodies for well over four decades, and resulting in the adoption of numerous resolutions and declarations. In the 1980s, when the HIV/AIDS epidemic affected the populations across the globe, the most vulnerable populations were located in the developing and least developed parts of the world – needless to say that the concentration continues to be very high in sub-Saharan Africa. While progress has been made in the treatment of the disease, it still remains inaccessible to a majority of the population who suffer from it. Those affected by HIV/AIDS but with access to the best treatment options still live in developed countries, and those with little or no access to medicines and treatment live in developing countries and LDCs, with the majority concentrated in sub-Saharan Africa.58 The developed countries hold the patent rights to most medicines, which offer the best treatment options possible to treat HIV/AIDS. Medicines broadly fall under three categories namely, non-prescription drugs, generic prescription drugs and patented prescription drugs. Transnational pharmaceutical corporations from patent-holding developed countries dominate the market for patented prescription drugs, which are also responsible for the development of new therapies.59 Generic medication, which makes up for half the pharmaceutical market, developed in industrialised nations and released into the public domain in the 1970s,60 is the most sought after medicine in sub-Saharan Africa, as it is affordable and hence accessible. As mentioned earlier, most sub-Saharan African countries lack the necessary knowledge economy and research capabilities to identify and treat diseases that affect their countries, besides the necessary infrastructure to produce any medicines.61 This is also compounded by the fact that most sub-Saharan African nations also do not possess the necessary administrative and resource capacities to negotiate before international forums,62 which is **a huge disadvantage**, especially in a globalised economy where decisions, touching upon all aspects of human life, are taken on a daily basis. Due to reduced production costs (especially labour) prevalent in developing countries and LDCs, one may think that it would be possible to produce medication at a cheaper cost in African countries. However, this may not be the case in sub-Saharan Africa, where most countries are without industrial or environmental expertise, and only have limited internal markets and cannot therefore benefit from the economies of scale as enjoyed by larger countries and multinational companies.63 The history of the long drawn negotiations on an expanded IP rights enforcement regime and the entry of the TRIPS Agreement clearly demonstrate that the drafters’ intent, although from different ends of the spectrum, was to balance IP rights with access to affordable medicines,64 with the goal to provide access to essential medications in cases of national public health emergency by granting a compulsory license of a patented medication.65 While the extent of the IP rights protection has been clearly defined in the Agreement, the scope of compulsory licenses has not been defined properly,66 which does not help in balancing the countervailing goals of IP rights with access to medicines.67 Under the scheme rights, holders are seen as producers of goods, while individuals seeking a fairer access to affordable medicines are viewed as mere consumers, with both parties having deeply entrenched goals with differing primary priorities and interests.68 One of the major stumbling blocks in achieving the goal of access to medicines appears to be the need to balance the transnational pharmaceutical corporations’ profit-seeking behaviour with socially responsible business practice that will permit greater access to essential medicines,69 which clearly appears to favour the patent-holding pharmaceutical corporations, as there are no international mechanism, or national mechanisms in developing countries and LDCs to monitor their business practice. Also, most developing countries and LDCs in sub-Saharan Africa lack the necessary infrastructure to manufacture patentable drugs,70 and would prefer a weaker IP rights regime71 to permit the market entry of affordable generic drugs to its citizens. 2.3. TRIPS Agreement – a bane for sub-Saharan Africa The TRIPS Agreement effectively curtails a Member State’s options, and also severely restricts the development policies of State players in ways that were not experienced by developed countries during their own transformations into industrialised countries.72 One of the most affected from the Agreement is the sub-Saharan African Member States, as a number of them do not have sufficient infrastructure to compete with developed countries in production of pharmaceuticals and are constrained to rely on imported medicines produced by transnational pharmaceutical corporations. The sub-Saharan African countries that clearly fall under this category have come to increasingly rely on imported and affordable generic drugs from outside the continent. It is necessary to point out that the trade-off as promised by the developed countries during the Uruguay Round of Negotiations did not happen,73 although it is two decades since the introduction of the TRIPS Agreement into the multilateral trading system. To a great extent, the gap in the knowledge economy between the developed and the developing countries (North–South divide) contributed to their ignorance of the TRIPS Agreement’s implication and the flexibilities offered therein,74 needless to say that the African nations barely engaged in the TRIPS negotiations,75 which was to prove very costly. Sub-Saharan Africa, predominantly formed by developing countries and LDCs, is a classic case where knowledge economy is very nearly barren in the continent with the exception of a few countries, due to a number of reasons including poverty, illiteracy, long period of military dictatorship with no recourse to development, very poor governance, corruption, etc. Again, some of the diseases which are viewed as manageable and not so life threatening in the developed countries are still life threatening and not manageable in most parts of sub-Saharan Africa – the classic cases being AIDS/HIV, malaria, diabetes, etc. In sum, it is the WTO, led by the developed countries, which is solely responsible for creating a multilateral trading system that promotes private ownership of knowledge through the TRIPS Agreement.76 The current structures and incentives of the pharmaceutical industry, which is largely based on IP laws, do not incentivise research into medicines for neglected diseases that afflict citizens living in sub-Saharan African countries, but not to be found in developed countries.77 To address the inequality in research created by pharmaceutical corporations, some authors have suggested alternative schemes for incentivising pharmaceutical research,78 to make it more easily accessible in developing countries and LDCs. Here again, the Ebola79 outbreak, which was witnessed in parts of West Africa in 2014, presents us with a snapshot of the urgency with which transnational pharmaceutical corporations carry out research for potential cure, or treatment for diseases. Although the Ebola virus was first discovered in 1976, no breakthrough had yet been made in 2014 when parts of West Africa witnessed a major outbreak of the virus, which claimed close to 5000 lives.80 The most severely affected countries of the Ebola outbreak in 2014, namely, Guinea, Liberia and Sierra Leone, have very weak health-care systems, and lack human and infrastructural resources.81 To make matters worse, they have only in recent times emerged from long periods of conflict in the region and experience instability.82 To have high expectations of IP rights/law compliance in the above jurisdictions, as laid out under the TRIPS Agreement, is simply unacceptable and shocking, and makes one ask the question if the WTO had considered all of the arguments before giving the go-ahead for the implementation of the Agreement? The answer is easy to arrive at, as the negotiation history of the TRIPS would demonstrate that there was no level playing field in the late 1980s and 1990s when the extended IP protection under the multilateral trade agenda was debated. This brings us back to the point made earlier, that is the disengagement, or lack of any clear presence of African Group in the TRIPS negotiation process, their lack of understanding of the gravity of the process that would introduce a system of IP protection on them through the WTO, which would have a damning effect on their health care.83 It was pointed out earlier84 that sub-Saharan African countries are weak on knowledge economy and also lack the capacity to participate/represent in international forums, a factor which would make them a very vulnerable player in a high-level negotiation debating the introduction of IP rights protection globally through the soon-to-be-born WTO. To postpone compliance to the TRIPS Agreement cannot be a solution to the problems facing sub-Saharan Africa.85 Currently, the LDC Member Countries are not required to apply most of the substantial rules of the TRIPS Agreement until 1 July 2021, and in particular, they have no obligation to provide any protection for clinical test data or to grant patents, including on pharmaceutical products or processes.86 As recently as February 2015, LDCs, led by Bangladesh, have presented a proposal to the TRIPS Council to have their deadline extended for protecting and enforcing pharmaceutical patents and clinical data as long as the Member State remains an LDC.87 Some of the reasons stated for the extension included the lack of technological base and local pharmaceutical manufacturing capacity in the LDCs.88 It can also be added that this proposal received support from a number of developing countries, developed countries (including the Holy See, Chile and Norway) and the WHO in the meetings held in June 2015, and will be taken up for further discussion when the council meets on 15–16 October 2015.89 There are currently 48 LDCs in the United Nations’ (UN) list, of which 34 are WTO Member States, and most importantly they are predominantly located in the sub-Saharan Africa and Asia.90 In the view of leading economists, the patent system is identified as giving rise to high cost of medicines, which in turn impedes access to life-saving drugs for **billions**.91 One of the main reasons the transnational pharmaceutical industry was strongly advocating for an extended IP rights protection regime through TRIPS was that they wanted to **reduce access** to generic medicines, as the prices of generic drugs are very low and are favoured over the much higher priced patented drugs.92 And also, any competition with the generics drugs will drive down the price of the brand-name drugs. Also, the lower prices in turn lower the profits of the brand-name pharmaceutical companies, and that it is understandable why the transnational pharmaceutical corporations pushed so hard and also contributed for international IP rights protection.93 The developed nations who advocated for a wider, global IP protection are clearly not affected by the rising cost of access to affordable medicines, as they have in place a robust health-care system through which medicines are accessible to its citizens.94 Importantly, ARV drugs, in developed countries, have ‘transformed AIDS from a death sentence to a chronic illness and saved thousands of lives’, but in sharp contrast, in sub-Saharan Africa, even at the reduced price of $300 per year the drugs remain out of reach for millions suffering from HIV and AIDS.95 Sub-Saharan Africa is the region most affected by the HIV/AIDS epidemic, and although it boasts only 10% of the world’s population, it nonetheless accounts for 66% of all HIV cases and more than 75% of AIDS-related deaths worldwide.96 It is well known that ARVs are the only proven means of staving off AIDS, and that so many in sub-Saharan Africa do not have access to ARVs is problematic – both morally and medically.97 Unfortunately, for the AIDS patients living in sub-Saharan Africa, the ARVs for frontline treatment are inaccessible due to its exorbitant price, which is fixed by transnational pharmaceutical corporations.98 Patients from sub-Saharan Africa suffer most from the impact of TRIPS, as the implementation of the Agreement has seen the price of patented drugs rise exponentially in a very short time, defying any logic.99 The only option available for countries in sub Saharan Africa is the use of generics, the procurement of which has now become highly problematic due to restriction placed on parallel imports and compulsory licensing under the Agreement. It will not be an exaggeration to state that the production and procurement of generics has almost been outlawed by the implementation of the TRIPS Agreement. One should bear in mind that the rules regulating the governance of multilateral trade are key to the future of HIV/AIDS treatment across the globe, particularly in poorer regions, subSaharan Africa being one, where price concerns can mean the difference between life and death.100 The extensive sufferings witnessed in sub-Saharan Africa due to HIV/ AIDS over the decades have prompted some to refer to the region as ‘ground zero’ of HIV/AIDS.101 Some writers opine that the TRIPS Agreement has only struck a discord, by making access to life-saving medicines an even more difficult task to achieve in subSaharan Africa and other disadvantaged parts of the world.

#### Lack of access to medicines and resources only leads to more suffering in the long term, the rise of infectious disease and an inability to deal with outbreaks leads to violence, social unrest, and economic turmoil

Celina Menzel, BA in public policy from hertie school of governance in berlin, in 2017 {“ THE IMPACT OF OUTBREAKS OF INFECTIOUS DISEASES ON POLITICAL STABILITY: EXAMINING THE EXAMPLES OF EBOLA, TUBERCULOSIS AND INFLUENZA,” KACIRISS, https://www.kas.de/documents/252038/253252/7\_dokument\_dok\_pdf\_52294\_1.pdf/95dc732e-2eda-2698-b01f-7ac77d060499?version=1.0&t=1539647543906}

Over the last two decades, outbreaks of severe acute respiratory syndrome (SARS), avian flu, swine flu, and ebola have reminded the world of the risks associated with outbreaks of infectious diseases. Since the 1960s, a growing number of such previously unknown disease agents have emerged. Simultaneously, well-known pathogens like cholera, malaria, and tuberculosis (TB) have **re-emerged** (Braun 2016: 1, Patrick 2011: 209, Fonkwo 2008: 13). Not only have factors like increased human mobility and migration, global trade and travel, population growth, urbanisation, changing agricultural practices, and ecological disruption have facilitated the emergence and re-emergence of infectious diseases (Patrick 2011: 233-234, WHO 2012: 24, Fonkwo 2008: 14, Gayer et al. 2007: 1625), but new global communication technologies facilitated the ***rapid spread*** of information, images, and stories about health crises to a wider audience (McInnes 2016: 384). Numerous health experts warn of growing risks of infectious disease outbreaks, especially with accelerated anti-microbial resistances and increasing non-compliance with vaccination policies (NIAID 2004: 71). This does not only pose a **severe risk** to human health and well-being, but also affects **societal, economic, and political prospects**. One aspect of the issue is the effect that infectious disease outbreaks can have on **political stability.** It is well-established that instability and conflict facilitate the (re-)emergence of infectious diseases, e.g. through destroyed health infrastructure, the disruption of disease control programs, limited access to health services, flight of trained health workers, and population displacements (Gayer et al. 2007: 1625, Patrick 2011: 230-231, McPake et al. 2015: 1-3). Yet, there is growing awareness that severe outbreaks of infectious diseases may also **negatively affect political stability** in afflicted countries. Although the link may not always be clear and there remains room for debate, many researchers, practitioners, and policymakers today assume that an indirect or direct link exists In 2012, the World Health Organisation (WHO) stated that “Infectious diseases have **shaped societies**, **driven conflict** and **spawned the marginalization of infected individuals and communities** throughout history” (WHO 2012: 10). Similarly, the Munich Security Conference (MSC) report from 2016 asserts that “In addition to the human toll, major outbreaks can also have significant impacts on economies and pose a **political risk** to governments, particularly those in **fragile states** that fail to control the disease” (MSC 2016: 42). In practice, the most recent 2014-2015 ebola outbreak in West Africa showed clear destabilising potential in the most-affected countries, particularly as unprepared health systems **broke down,** economies were **strongly affected**, human development and well-being **suffered severely**, and fear **spread widely.** The outbreak sparked unrest, as clinics and health facilities were violently attacked, patients and hospital items removed, and health staff threatened (Murrey 2014). In contrast, high TB rates in the region have not sparked any comparable reaction. For instance, Sierra Leone ranks near the top in TB death rates worldwide, with TB-induced deaths constituting a multiple of the deaths caused by ebola (World Life Expectancy 2016). The cursory observation of this empirical example indicates that some diseases may be more prone than others to affect political stability, although they objectively do not pose a greater risk to human well-being and development. This puzzle informs the following research question: Do outbreaks of different diseases - namely ebola, tuberculosis, and influenza - differ in their impact on the political stability of a country where an outbreak occurs? If that is the case, what can explain these differences? This research question is of interest for several reasons: Although political change is often necessary for positive development and inherent to democracy, frequent (and unconstitutional) political changeovers can pose challenges to effective governance (Steinberg 2012: 261). Therefore, political instability can impair the **social, economic, political, and human development** of a country and society, e.g. by hampering tax collection, high-quality education, adequate health systems, social programmes, economic productivity and investment, and law enforcement. If political instability is so rampant that it severely undermines the state’s capacity to fulfil its functions, the country may become a **breeding ground** for organised crime, terrorist groups, or militias, operating across borders and regions. Thus, gaining insights on the different factors that affect political stability is crucial. However, resources and political commitment are not inexhaustible, wherefore it is delusive to believe that all diseases can be effectively targeted. Therefore, a better understanding of which infectious diseases are particularly prone to political destabilisation may be helpful to inform policy decisions on targeted responses. This thesis makes a modest attempt to examine whether ebola, tuberculosis and influenza differ in their impact on political stability and provides possible explanations for such differences. In doing so, the thesis proceeds as follows: First, I present the state of research on the link between infectious diseases, security, and political stability, before providing a brief presentation of the three diseases in question. Subsequently, I give an overview of my quantitative analysis, including the chosen model and variables, descriptive statistics, and regression results for each of the three diseases. In order to go beyond statistical correlations and gain further information about the forces at play, I link the quantitative results to findings from interviews with public health and medical professionals as well as diplomats in West Africa. Finally, I discuss the results through a social-constructivist approach, focusing on the example of the 2014-2015 ebola outbreak in West Africa, before making concluding remarks. Although numbers are declining, infectious diseases are still the **leading cause** of death worldwide, killing more people than all wars and natural disasters combined (Braun 2016: 3, Patrick 2011: 210). In recent years, attention has increasingly shifted to non-communicable diseases (NCDs) as a major cause of morbidity, but many NCDs are linked to prior infection with pathogens (WHO 2012: 17-18). Since the 1960s, a growing number of previously unknown disease agents have emerged, while well-known pathogens like cholera, malaria, and tuberculosis have re-emerged (Braun 2016: 1, Patrick 2011: 209, Fonkwo 2008: 13). The (re-)emergence of infectious diseases has been facilitated by a range of factors, including increased human mobility and migration, global trade and travel, population growth and increased urban density, altered agricultural practices, close contact with livestock, deforestation and ecological disruption, conflict, weak institutions, misuse of anti-microbial drugs, decreased compliance with vaccination policies, and poverty (Patrick 2011: 233-234, WHO 2012: 24, Fonkwo 2008: 14, Gayer et al. 2007: 1625, NIAID 2004: 71). These factors allow pathogens to interact and mutate, spread to and amongst human populations, and to disseminate over large distances. Along with the growing risk of epidemics and pandemics, health issues have attracted attention from national security communities and the notion of ‘health security’ has become commonplace (Braun 2016: 1). For example, the U.S. National Science and Technology Council (NSTC) identified infectious diseases as a national security threat in 1995. In 2000, the U.S. National Intelligence Council (NIC) released a report stating that (re-)emerging infectious diseases threatened U.S. citizens and armed forces, and exacerbated social and political instability in countries and regions of U.S. interest (Patrick 2011: 209). More recently, outbreaks of SARS, avian flu, swine flu, and ebola have caught global attention, and in 2016 the MSC put infectious diseases on its agenda, stating: “Because of their threat to human health, to economies, and to the stability of states as a whole, lapses in health security can become issues of international security” (MSC 2016: 42). In the literature, Garrett (1994) pioneered in showing how the proliferation of diseases threatens the national security and global interests of the U.S.. Her work was pivotal for bringing issues of health security to the attention of policymakers (Garrett n.d., Price-Smith 2002: 9). Similarly, Pirages (1995) was among the first to link infectious diseases to state security and foreign policy, suggesting a range of further research avenues (Pirages 1995, Price-Smith 2002: 9). Today, issues of health security and infectious diseases are to an unprecedented extent on the agendas of policymakers and world leaders (NIAID 2004: 72). Nevertheless, the fields of health and security are still characterised by mutual scepticism. While health is regarded a rather ‘soft’ issue in the security community, health experts fear a ‘militarisation’ of health, undermining transparency and the political neutrality of humanitarian workers (Braun 2016: 1-2, Davies and Rushton 2016: 429). Both sides have their points. Since civilian capacities in outbreak emergencies are limited, the military or medical and logistical reserves can be rapidly mobilised to fill gaps (Hirschmugl 2015: 107, Braun 2016: 2). Davies and Rushton (2016) examine the role the UN Mission in Liberia (UNMIL) could have played during the 2014-2015 ebola outbreak. They discuss the provision of medical and humanitarian assistance by peacekeeping missions and examine advantages and downfalls, including the undermining of humanitarian neutrality and the dangers of ill-prepared interventions through insufficiently trained soldiers (Davies and Rushton 2016: 429-430). Other concerns over addressing health in security terms include the notion that health issues may become a priority only when the West feels threatened (Roemer-Mahler and Rushton 2016: 375, Abeysinghe 2016). Finally, Anderson and Beresford (2015) criticise that viewing health as a security issue entails security-driven, reactive responses, overlooking the underlying structural, socio-economic and political underpinnings of health crises. Clearly, the securitisation of health should not be promoted mindlessly. Nevertheless, health security includes a range of important issues to be considered. One is the link between infectious diseases, political stability, and state capacity. Relying on largely anecdotal evidence, historians have examined the effects of infectious diseases on societies and their role in the downfall of empires and civilisations (Price-Smith 2002: 10). Watts (1997) examines the destructive impact the bubonic plague had on Venice, its economic power and international role in the 14th century. Based on anthropological evidence, McNeill (1976) declares that debilitating pathogens may have played an important role in the expansion and collapse of various societies throughout history. For instance, the plague that struck Athens during the Peloponnesian War fatally affected Athenian war efforts and governance, and thus contributed to the fall of Athens. He also attributes decreases in power of the Byzantine Roman Empire in the 6th century to plague outbreaks. Finally, he shows that the collapse of feudalism may be linked to repeated waves of pneumonic and bubonic plague that struck Europe in the 14th and 15th century. These recurrent episodes of mass mortality likely undermined the legitimacy of authority structures like the Roman Catholic Church and resulted in labour shortages that allowed bondsmen to claim more rights. Initiated by these events, the Protestant rebellion ultimately resulted in the Thirty Year’s War (McNeill 1976, Price-Smith 2002: 11). Focusing on contemporary times, Patrick (2011) describes the **reciprocal spiral dynamic** between the spread of infectious diseases and weak state capacity. He argues that weak states are not only incapable of adequately preventing and addressing disease outbreaks, but that outbreaks can **further weaken fragile states**, **exacerbate poverty and instability, and undermine resilience to exogenous shocks** (Patrick 2011: 207-209). He argues that high disease prevalence can increase the **risk of violence** and **instability** by undermining traditional coping mechanisms of households, impairing economic productivity, increasing the risk of food shortages, and leading to population age structures with large youth cohorts, all of which reinforce a country’s propensity to turmoil. Moreover, rampant outbreaks could induce a loss of political legitimacy when national budgets, the provision of services, and state capacity erode. However, he also stresses that the empirical link between infectious diseases, state capacity, and violence is less clear than often claimed (Patrick 2011: 236). In contrast, Price-Smith (2002) provides **quantitative empirical** evidence for the existence of a **significant negative correlation** between infectious disease rates and state capacity. This association holds across regions and considerable time periods (Price-Smith 2002: 49-66). He argues that higher levels of infectious diseases act as stressors on state capacity by **generating political, social and economic instability**, and eroding governmental capacities (Price-Smith 2002: 22). The combination of increased demand on the government, mounting pathogen-induced deprivation, and declining government capacity can then lead to **political destabilisation and intra-state violence** (Price-Smith 2002: 15, 171-172). More specifically, high levels of infectious diseases can destabilise national economies, decrease per capita income and living standards, deplete work forces, affect productivity, reduce fiscal resources and government revenue, divert government expenditure, affect tourism and trade, and reinforce perceived and real income inequalities (Price-Smith 2002: 115-116, WHO 2012: 13-14, Fonkwo 2008: 15-16). According to the state weakness hypothesis in the security and conflict literature, the corresponding resource scarcity and poverty can act as **stressor variables** that create opportunities and incentives for citizens to participate in **collective violence against the status quo**. Moreover, in a situation of shrinking resource availability, political elites enter into competition for their share, political polarisation increases, and intra-elite violence (e.g. a coup d’état) becomes more likely (Price-Smith 2002: 124, Fonkwo 2008: 15). In addition, the disease poses a threat to the well-being of the population as guaranteed by the state. If the state is incapable of providing adequate protection of its citizens against the impact of pathogens, the citizen-state contract is shaken and **legitimacy is weakened**. Thus, debilitation and death do not only lead to psychological stress among the population, but also undermine the legitimacy of the ruling elites and authority structures, increase anti-governmental activities, aggravate institutional fragility, and impede effective governance (Price-Smith 2002: 124-130). Following a slightly different focus, Cervellati et al. (2011) examine whether a high and persistent exposure to infectious diseases increases a country’s risk of civil conflict. For their analysis, they use a new measure of disease prevalence to circumvent endogenous factors linked to economic development and socio-economic conditions (e.g. the quality of health infrastructure, education, and general health conditions). For this purpose, they use data on the geographic distribution of infectious disease pathogens that are endemic to a country to construct exogenous indices of extrinsic disease richness or disease environment for each country (Cervellati et al. 2011: 3). They find that large disease richness has a **statistically robust** and **quantitatively relevant** effect on the risk of civil conflict. Presumably, exposure to harsh disease environments, poor health, and high mortality rates reduce opportunity costs of engaging in violent activities (Cervellati et al. 2011: 2). In sum, the existing literature on health security provides detailed accounts of the link between infectious diseases and political stability or state capacity. However, little attention has been paid to whether certain infectious diseases are more likely to affect political stability than others. That is surprising because a better understanding of which diseases are prone to destabilisation would be useful to develop more targeted responses. In the following sections, I make an attempt to examine whether ebola, tuberculosis, and influenza differ in their impact on political stability.

Disease and instability in Africa breeds multiple different threats to global secutity

Grant T Harris, Professional lecturer of International Affairs at George Washington University, in 2017 ["Why Africa matters to US national security," Atlantic Council, 5-25-2017, https://www.atlanticcouncil.org/in-depth-research-reports/report/why-africa-matters-to-us-national-security/]

  The United States cannot afford to underinvest in Africa, a continent of over a billion people with growing political and economic power. And yet, there is a **persistent misconception** prevalent among the American public—and even many foreign policy professionals—that Africa is largely irrelevant to US national security. This is dangerous, for three reasons. First, transnational threats from Africa are **persistent and real.** The continent’s uneven democratic and economic growth and pockets of conflict contribute to a disproportionate number of **weak and failed states**, which threaten US interests at home and abroad by opening the door to **terrorism, criminal activity, and pandemics**. For example, the Islamic State of Iraq and al-Sham (ISIS) and other groups are **expanding** their reach across Africa1 and, but for a swift global response, the Ebola crisis of 2014 to 2016 could have caused well over a million deaths and vast economic harm. Second, economic and political needs will inevitably draw the United States to Africa. Though the continent is currently underrepresented in the global economy, that will not last forever. Africa boasts a growing middle class and, by 2050, will constitute a quarter of the world’s population.2 While US businesses are underinvested in African markets, China and other global competitors are making deep economic inroads that are feeding jobs in their own countries and creating economic ties that translate into **greater political influence**. Though not always a zero-sum calculus, China’s deepening ties to the region will undoubtedly reduce US influence. Moreover, African states are forming an increasingly unified voice and salient voting bloc on global issues, particularly in multilateral fora; these developments could help either advance or block key aspects of the United States’ global agenda on issues ranging from counterterrorism to nuclear security. Third, incidences of conflict, humanitarian crisis, and mass atrocities in Africa put significant pressure on the United States to act, in fulfillment of the nation’s historic global leadership role. Though some question the value of maintaining the United States’ role as “global policeman,” military and counterterrorism strategists staunchly agree that, in today’s complex and dangerous global environment, it is insufficient to merely keep Americans safe on American soil. Indeed, the rationale for promoting stability and development goes much further; it gets to how the United States has traditionally seen itself in the world, by promoting leadership and values that advance human dignity.3 Serious engagement in Africa is needed, even if one’s view of US national security imperatives is limited to countering transnational threats. The logic is simple: instability **breeds threats**, and unilateralism **breeds failure**. More to the point, advancing the stability and partnerships needed to protect Americans ultimately requires promoting local economies, supporting good governance, and addressing conflict in African countries. Furthering stability—the only durable solution to transnational threats—depends on economic growth and good governance. Nothing illustrates the stakes more clearly than Africa’s demographic shifts. Given the region’s young population (with a median age of eighteen), African leaders must create eighteen million jobs per year.4 This is a tall order, requiring US trade and assistance. Success would propel strong economic growth, but failure would create a large pool of youth who lack opportunities and are potentially susceptible to radicalization, thereby directly increasing the **terrorist threat** facing the United States. Though the causes of radicalization vary and are complex, a recent study of Boko Haram recruits identified financial incentives, more than religion, as a key driver of group membership.5 In fact, West African youth have joined jihadist causes for financial inducements of less than $600.6 The fundamental importance of stability is further illustrated by the current migration crisis, with a significant proportion of migrants fleeing economic hardship, conflict, and governance problems in Africa.7 US allies in Europe view this mass migration as a grave national security threat, affecting their political focus, resource allocation, and relationships with specific African states in a manner that trades off against other US priorities. Similarly, the United States needs willing and capable African partners to protect itself from transnational threats, which also requires investment in Africa’s economic development. To be “willing,” African governments must believe that the United States treats them with respect, shares their interests, and invests in their futures. To be “capable,” African governments often need assistance to effectively combat threats, particularly to do so in a manner consistent with US values. Fostering genuine partnerships therefore means supporting development and economic growth in African countries; transactional relationships will not yield the strong and deep partnerships needed to protect US interests. Nor is the United States the only possible partner for African governments; other major powers—with different interests—are competing for influence and offering investment, military cooperation, and assistance. Beyond transnational threats, however, there is a broader set of issues at stake, including the United States’ interest in being optimally competitive in Africa’s growing markets; garnering political support for a global agenda that advances US interests and values; and maintaining the kind of leadership that comes from being generous and principled in working to protect innocent people from natural and man-made disasters. Engagement with Africa is frequently considered altruistic (i.e., of marginal benefit to the United States), or a national security imperative only with respect to counterterrorism. The former view is completely misguided, while the latter is myopic. In reality, African countries are linked to a wide and growing range of US national security and economic interests, and a broader recognition of these links is urgently needed to better inform policy and strengthen United States-Africa relations.8 The perception that US engagement with Africa is optional or irrelevant to core interests will, at best, diminish the tools available to policy makers (including financial resources and high-level attention), stunt US relationships on the continent, and cause missed opportunities. At worst, underinvestment in key partnerships and capacity in the region will increase the threat to Americans both at home and abroad, and diminish US influence in the international order. In an effort to dispel the harmful myth of Africa’s secondary importance to US national security and economic prosperity, this paper outlines the United States’ material interests in Africa through the following lenses: transnational threats, economic growth, access to natural resources, and promoting an international order that benefits the United States. Transitional threats Return to table of contents﻿ It has long been recognized that weak and failed states incubate **instability** that directly threatens US national **security**. Unfortunately, Africa is home to most of the world’s fragile states: in 2016, African countries took nineteen out of the top twenty-five slots in the Fund for Peace’s Fragile States Index.9 Whether the threat is terrorism or a deadly virus, the United States requires willing and capable African partners that can participate in broad, cooperative—and often regional—responses, particularly because many of these threats are overlapping and mutually reinforcing. Terrorism Terrorist groups based in Africa are inflicting terrible suffering and directly threaten the interests of the United States and its allies. In 2015, the number of people killed in terrorist attacks in Africa was the same or higher as the number of fatalities caused by the Islamic State of Iraq and al-Sham (ISIS) in the Middle East.10 While it cannot be emphasized enough that the vast majority of this misery has fallen on Africans, terrorist groups also endanger Americans and US interests. Multiple Africa-based groups maintain links with primary US adversaries like **ISIS and al-Qaeda,** which carried out the bombings of two US embassies in Kenya and Tanzania in 1998. More recently, there are growing concerns about terrorist organizations in the Sahel with links to al-Qaeda.11 ISIS has also been looking to Africa to expand its reach; the group is fully operational in eighteen countries, including eight in Africa (of which three are in North Africa),12 and it secured allegiance from Boko Haram in Nigeria in 2015.13 As described by a previous commander of the United States Africa Command (AFRICOM), “Terrorists with allegiances to multiple groups are expanding their collaboration in recruitment, financing, training, and operations, both within Africa and trans-regionally.”14 African-based groups such as Boko Haram—the second most lethal terrorist group in the world15—and al-Qaeda in the Islamic Maghreb (AQIM) espouse dangerous anti-American and/or anti-Western ideologies. Both have been responsible for targeting establishments frequented by Westerners, including attacks by Boko Haram against a United Nations (UN) building in Nigeria (2011), and by Africa-based al-Qaeda affiliates against hotels in Mali (2015), Burkina Faso (2016), and Côte d’Ivoire (2016). AQIM made more than $90 million kidnapping Europeans for ransom from 2008-2014.16 In addition, al-Shabaab, which is an affiliate of al-Qaeda, has conducted various attacks in East Africa, including at a restaurant and rugby club in Uganda (2010) and the Westgate Mall in Kenya (2013). Terrorist activities by these groups do not just pose localized threats: their anti-American messages reach potential audiences far and wide, including across Africa and in the United States. Al-Shabaab has solicited US residents and citizens (including among the approximately 150,000 strong Somali immigrant community in the United States17) for funding,18 new members,19 and to encourage attacks on US soil.20 In 2009, Nigerian Umar Farouk Abdulmutallab, the “Underwear Bomber,” was inspired by al-Qaeda to attempt to explode an airplane bound for the United States.21 Indeed, the characteristics of weak and failed states—including corruption, poor governance, and insecurity—breed terrorist threats by providing safe havens for perpetrators, avenues for profitable illegal activities, and opportunities to recruit disaffected individuals. In some cases, fragile states lack the capacity to act. In other cases, they may be unwilling to crack down on terrorism, as when Sudan provided refuge to Osama bin Laden in the early 1990s. In some circumstances, the threats are so pressing that the United States has sometimes been left with little choice but to take direct action, which is greatly facilitated by having a physical foothold in Africa and access to key infrastructure. As a case in point, Camp Lemonnier in Djibouti is critical to US counterterrorism efforts on the continent and in the Middle East, including operations against al-Shabaab in Somalia and al-Qaeda in the Arabian Peninsula (AQAP) in Yemen.22 Ultimately, however, successful counterterrorism endeavors require motivated and capable partners. The United States could not do it alone even if it wanted to—it would be an unwise investment and, more to the point, ineffective. In addition to direct military action, the United States must invest in strengthening partners’ ability to confront and prevent regional threats, including before they can escalate and affect US interests (abroad, and especially at home). This includes providing vital security cooperation and assistance to increase African partner capacity, which is neither a quick nor a small task. Mounting a meaningful security relationship depends on strong diplomacy and building partnerships across military, law enforcement, intelligence, and other channels. It may also require, as in the case of Nigeria or Kenya, confronting human rights issues to ensure compliance with US laws (e.g., Leahy human rights vetting of foreign security forces) that would otherwise prevent the US provision of certain types of assistance to specific units or individuals. In contrast, divorcing short-term counterterrorism operations from a deeper partnership that incorporates security and other assistance to African states could backfire if partner states lack the necessary will or ability to pursue comprehensive and effective strategies. To that end, the United States has increased its security partnerships in Africa. In 2015, AFRICOM conducted seventy-five joint operations, twelve major joint exercises, and four hundred security cooperation activities.23 In addition, supporting African-led interventions (such as in Somalia and the Lake Chad Basin region) can improve effectiveness and lend military operations a greater sense of legitimacy in countering threats that, in any case, demand regional solutions to be effective. Supporting African forces in addressing conflicts and conducting counterterror operations has minimized US boots on the ground, saving American lives in the process.24 Combating terrorism requires not just partners, but also a holistic approach to address development challenges and prevent extremism. Security tools are necessary but not sufficient to address and prevent terrorism; overreliance on tactics like military missions, intelligence gathering, and border policing will not adequately protect US interests. Instead, countering violent extremism requires tackling the underlying structural challenges that may expose individuals to radicalization and motivate violent acts. As is stated in President George W. Bush’s Freedom Agenda, “It is in the best interests of our Nation to alleviate the despair that can allow extremism to take hold by fighting hunger and disease, supporting basic education initiatives, and advancing global economic development.”25 Unfortunately, many African countries face just such development challenges, coupled with an exploding youth population that could either be an incredible economic boon or a substantial risk for national and regional stability. “During the next five years, growing African populations will become more youthful, urban, mobile, and networked, and better educated—and more demanding of a voice,” explains the National Intelligence Council.26 African governments must implement forward-thinking policies, including democratic and economic reforms to invest public resources wisely, tamp down corruption, and improve investment climates to attract private capital. Just to absorb the growing labor force, Africa will need to create approximately eighteen million jobs every year until 2035.27 Alternatively, misguided policy or denying opportunities to youth for short-term political gain will fuel discontent, extremism, and conflict. In dire situations, it can take very little to persuade disaffected youth to join extremist groups. In West Africa, young recruits receive less than $600 to join terrorist groups.28 A recent study of Boko Haram recruits identified financial incentives, more so than religion, as a key driver of group membership.29 This suggests that, among the many other complex factors that lead to radicalization, addressing poverty and governance issues remains central to tackling the root causes of terrorism. This further suggests that, without good alternatives, the number of terrorist recruits will continue to increase. According to General Thomas D. Waldhauser, the current commander of AFRICOM, African youth join extremist groups for jobs more than ideology; for that reason, he testified to Congress, “We have got to find a way to get at education, health care, hopelessness, livelihood, and the like…” because “we cannot kill our way to victory here.”30 Viewing Africa only through the soda straw of security tools and direct action would impede sustainable solutions, pervert Washington’s choice of partners, and prevent the United States from being effective in eliminating threats to its interests. Partnerships with African countries are therefore critical, not only to create jobs and opportunities for youth, but also to work with governments to address policies and corruption that create grievances and foster radicalization. Health threats In a globalized world, **communicable diseases can easily cross oceans and borders**. Combating such threats depends on capable partners with effective institutions to detect and prevent epidemics before they can spread. Developing these capacities requires substantial funding and coordination to strengthen early warning systems and healthcare services. But it is a far better option than risking American lives, resorting to expensive emergency measures, and enduring economic shocks that may have long-term negative implications. First, US leadership has been critical in reducing the direct and indirect impacts of devastating epidemics in Africa. The President’s Emergency Plan for AIDS Relief (PEPFAR) created under President George W. Bush saved some 740,000 lives over four years.31 With the 2014-2016 Ebola outbreak in West Africa, action by the United States and its allies—including military involvement—helped avoid a worst-case scenario of 1.4 million cases in four months.32 Early intervention decreased the chances of US citizens becoming infected, and minimized the possibility of a viral mutation; had that happened, the risks to the global population would have been enormous.33 Second, the United States cannot completely isolate itself in the face of such health crises. At the time of the Ebola outbreak, some 3,000—6,000 passengers a week were traveling between West Africa and the United States.34 The United States would have been much more directly impacted—and much sooner—had Ebola been more concentrated in a country like Nigeria, with greater travel and commercial links to the United States. Nor is simply closing the borders a practical response, as illustrated by ineffective travel restrictions to contain the spread of H1N1 influenza in 2009.35 There is also the risk of **weaponizing a highly infectious disease for bioterrorism purposes**. Though the likelihood of this happening with Ebola is low due to logistical and financial hurdles, that has not stopped state and non-state actors from trying in the past,36 and the possibility that such a threat could emanate from Africa should not be overlooked. Additionally, epidemics can have long-lasting destabilizing effects that undermine US security. PEPFAR was founded on the realization that “the devastation caused by HIV/AIDS would depress economic development, inhibit good governance, and decrease the size and productivity of the workforce—conditions that breed instability and conflict.”37 In the case of Ebola, even though Americans had a slim chance of contracting the disease, President Obama rightly determined that out-of-control infections could lead to panic and the economic collapse of affected African countries, with **global security** implications.38 Third, new and/or more frequent outbreaks are a distinct possibility in the future, partly as a result of growing and urbanizing populations in Africa and elsewhere, and the increased incidence of human-to-animal interactions. “Emerging diseases against which humans have no preexisting immunity or effective therapies pose significant risks of becoming pandemics,” warned former Director of National Intelligence James Clapper.39 Moreover, Africa’s generally weak national health systems heighten the likelihood that a localized disease will expand into a pandemic. For example, countries in Africa are the least likely of any region to have pandemic preparedness plans for avian influenza, which is especially worrying in light of recent outbreaks of “highly pathogenic” strains that have affected millions of birds across Europe, Asia, and Africa.40 If these strains succeeded in transferring to humans, the Center for Disease Control (CDC) cautions, “an influenza pandemic could result, with potentially high rates of illness and death worldwide.”41

#### Extinction – No burnout, harder to monitor.

**Piers Millett, Senior Research Fellow, and Andrew Snyder-Beattie, Director of Research, University of Oxford Future of Humanity Institute, Health Security Journal, 2017** ["Existential Risk and Cost-Effective Biosecurity", Volume 15, Number 4, DOI: 10.1089/hs.2017.0028, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5576214/, 1-31-2019] JRB

How worthwhile is it spending resources to study and mitigate the chance of human extinction from biological risks? The risks of such a catastrophe are presumably low, so a skeptic might argue that addressing such risks would be a waste of scarce resources. In this article, we investigate this position using a cost-effectiveness approach and ultimately conclude that the expected value of reducing these risks is large, especially since such risks jeopardize the existence of all future human lives. Historically, disease events have been responsible for the greatest death tolls on humanity. The 1918 flu was responsible for more than 50 million deaths,[1](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5576214/#B1) while smallpox killed perhaps 10 times that many in the 20th century alone.[2](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5576214/#B2) The Black Death was responsible for killing over 25% of the European population,[3](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5576214/#B3)while other pandemics, such as the plague of Justinian, are thought to have killed 25 million in the 6th century—constituting over 10% of the world's population at the time.[4](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5576214/#B4) It is an open question whether a future pandemic could result in outright human extinction or the irreversible collapse of civilization. A skeptic would have many good reasons to think that existential risk from disease is unlikely. Such a disease would need to spread worldwide to remote populations, overcome rare genetic resistances, and evade detection, cures, and countermeasures. Even evolution itself may work in humanity's favor: Virulence and transmission is often a trade-off, and so **evolutionary pressures could push against maximally lethal wild-type pathogens**.[5](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5576214/#B5),[6](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5576214/#B6) While these arguments point to a very small risk of human extinction, **they do not rule the possibility out** entirely. Although rare, there are recorded instances of species going extinct due to disease—primarily in amphibians, but also in 1 mammalian species of rat on Christmas Island.[7](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5576214/#B7),[8](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5576214/#B8) There are also historical examples of large human populations being almost entirely wiped out by disease, especially when multiple diseases were simultaneously introduced into a population without immunity. The most striking examples of total population collapse include native American tribes exposed to European diseases, such as the Massachusett (86% loss of population), Quiripi-Unquachog (95% loss of population), and the Western Abenaki (which suffered a staggering 98% loss of population).[9](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5576214/#B9) In the modern context, no single disease currently exists that combines the worst-case levels of transmissibility, lethality, resistance to countermeasures, and global reach. But many diseases are proof of principle that each worst-case attribute can be realized independently. For example, some diseases exhibit nearly a 100% case fatality ratio in the absence of treatment, such as rabies or septicemic plague. Other diseases have a track record of spreading to virtually every human community worldwide, such as the 1918 flu,[10](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5576214/#B10) and seroprevalence studies indicate that other pathogens, such as chickenpox and HSV-1, can successfully reach over 95% of a population.[11](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5576214/#B11),[12](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5576214/#B12) Under optimal virulence theory, natural evolution would be an unlikely source for pathogens with the highest possible levels of transmissibility, virulence, and global reach. But advances in biotechnology might allow the creation of diseases that combine such traits. Recent controversy has already emerged over a number of scientific experiments that resulted in viruses with enhanced transmissibility, lethality, and/or the ability to overcome therapeutics.[13-17](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5576214/#B13) Other experiments demonstrated that mousepox could be modified to have a 100% case fatality rate and render a vaccine ineffective.[18](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5576214/#B18) In addition to transmissibility and lethality, studies have shown that other disease traits, such as incubation time, environmental survival, and available vectors, could be modified as well.[19-21](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5576214/#B19) Although these experiments had scientific merit and were not conducted with malicious intent, their implications are still worrying. This is especially true given that there is also a long historical track record of state-run bioweapon research applying cutting-edge science and technology to design agents not previously seen in nature. The Soviet bioweapons program developed agents with traits such as enhanced virulence, resistance to therapies, greater environmental resilience, increased difficulty to diagnose or treat, and which caused unexpected disease presentations and outcomes.22 Delivery capabilities have also been subject to the cutting edge of technical development, with Canadian, US, and UK bioweapon efforts playing a critical role in developing the discipline of aerobiology.23,24 While there is no evidence of state-run bioweapons programs directly attempting to develop or deploy bioweapons that would pose an existential risk, the logic of deterrence **and mutually assured destruction** could **create** such **incentives** in more unstable political environments or following a breakdown of the Biological Weapons Convention.25 The possibility of a war between great powers could also increase the pressure to use such weapons—during the World Wars, bioweapons were used across multiple continents, with Germany targeting animals in WWI,26 and Japan using plague to cause an epidemic in China during WWII.27 Non-state actors may also pose a risk, especially those with explicitly omnicidal aims. While rare, there are examples. The Aum Shinrikyo cult in Japan sought biological weapons for the express purpose of causing extinction.28 Environmental groups, such as the Gaia Liberation Front, have argued that “we can ensure Gaia's survival only through the extinction of the Humans as a species … we now have the specific technology for doing the job … several different [genetically engineered] viruses could be released”(quoted in ref. 29). Groups such as R.I.S.E. also sought to protect nature by destroying most of humanity with bioweapons.30 Fortunately, to date, non-state actors have lacked the capabilities needed to pose a catastrophic bioweapons threat, but this could change in future decades as biotechnology becomes more accessible and the pool of experienced users grows.31,32 What is the appropriate response to these speculative extinction threats? A balanced biosecurity portfolio might include investments that reduce a mix of proven and speculative risks, but striking this balance is still difficult given the massive uncertainties around the low-probability, high-consequence risks. In this article, we examine the traditional spectrum of biosecurity risks (ie, biocrimes, bioterrorism, and biowarfare) to categorize biothreats by likelihood and impact, expanding the historical analysis to consider even lower-probability, higher-consequence events (catastrophic risks and existential risks). In order to produce reasoned estimates of the likelihood of different categories of biothreats, we bring together relevant data and theory and produce some first-guess estimates of the likelihood of different categories of biothreat, and we use these initial estimates to compare the cost-effectiveness of reducing existential risks with more traditional biosecurity measures. We emphasize that these models are highly uncertain, and their utility lies more in enabling order-of-magnitude comparisons rather than as a precise measure of the true risk. However, even with the most conservative models, we find that reduction of low-probability, high-consequence risks can be more cost-effective, as measured by quality-adjusted life year per dollar, especially when we account for the lives of future generations. This suggests that despite the low probability of such events, society still ought to invest more in preventing the most extreme possible biosecurity catastrophes. Go to: The Impact Spectrum of Various Biothreats Here, we use historical data to analyze the probability and severity of biothreats. We place biothreats in 6 loose categories: incidents, events, disasters, crises, global catastrophic risk, and existential risk. Together they form an overlapping spectrum of increasing impact and decreasing likelihood (Figure 1).\* Figure 1. A spectrum of differing impacts and likelihoods from biothreats. Below each category of risk is the number of human fatalities. We loosely define global catastrophic risk as being 100 million fatalities, and existential risk as being the total extinction of humanity. Alternative definitions can be found in previous reports,33 as well as within this journal issue.34 The historical use of bioweapons provides useful examples of some categories of biothreats. Biocrimes and bioterrorism provide examples of incidents.† Biological warfare provides examples of events and disasters. These historical examples provide indicative data on likelihood and impact that we can then feed into a cost-effectiveness analysis. We should note that these data are both sparse and sometimes controversial. Where possible, we use multiple datasets to corroborate our numbers, but ultimately the “true rate” of bioweapon attacks is highly uncertain. Biocrimes and Bioterrorism Historically, risks of biocrime‡ and bioterrorism§ have been limited. A 2015 Risk and Benefit Analysis for Gain of Function Research detailed 24 biocrimes between 1990 and 2015 (0.96 per year) and an additional 42 bioterrorism incidents between 1972 and 2014 (1 per year).36 This is consistent with other estimates of biocrimes and bioterrorism frequency, which range from 0.35 to 3.5 per year (see supplementary material, part 1, at http://online.liebertpub.com/doi/suppl/10.1089/hs.2017.0028). Most attacks typically result in no more than a handful of casualties (and many of these events include hoaxes, threats, and attacks that had no casualties at all). For example, the anthrax letter attacks in the United States in 2001, perhaps the most high-profile case in recent years, resulted in only 17 infections with 5 fatalities.37 The 2015 Risk and Benefit Analysis for Gain of Function Research detailed only a single death from the recorded biocrimes.\*\* Only 1 of the bioterrorism incidents in the report had associated deaths (the 2001 anthrax letter attacks).36 Based on this data, for the purposes of this article, we assume that we could expect 1 incident per year resulting in up to tens of deaths. Biological Warfare Academic overviews of biological warfare†† detail 7 programs prior to 1945.38 A further 9 programs are recorded between 1945 and 1994.39 For most of the last century, at least 1 program was active in any given year (Table 1). Table 1. The duration of state-run offensive biological weapons programs detailed in key historical reviews up to 1945 and from 1945 to 2000.5,6 State Duration (Review up to 1945) Duration (Review from 1945-2000) Canada 1925-1945 1945-1969 France 1921-1926 and 1935-1940 1947-1972 Germany 1915-1918 — Hungary — 1938-1944 Iraq — 1974-1990 Japan 1931-1945 — Poland — 1945-1960? South Africa — 1981-1994 Soviet Union 1920-1945 1945-1992 United Kingdom 1925-1945 1945-1957 United States 1942-1945 1945-1969 The actual use of bioweapons by states is less common: Over the 85 years covered by these histories (1915 to 2000), 18 cases of use (or possible use) were recorded, including outbreaks connected to biological warfare (see supplementary material, part 2, at http://online.liebertpub.com/doi/suppl/10.1089/hs.2017.0028). Extrapolating this out (dividing 18 by 85), we would have about a 20% chance per year of biowarfare. It is worth noting the limitations of these data. Most of these events occurred before the introduction of the Biological Weapons Convention and were conducted by countries that no longer have biological weapons programs. Since many of these incidents occurred during infrequent great power wars, we revise our best guess to around 10% chance per year of biowarfare. We use 2 sets of data to estimate the magnitude of such events. The first dataset was Japanese biological warfare in China,40 where records indicate a series of attacks on towns resulted in a mean of 330 casualties per event and 1 case in which an attack resulted in a regional outbreak causing an estimated 30,000 deaths (see supplementary material, part 3, at http://online.liebertpub.com/doi/suppl/10.1089/hs.2017.0028). The second data set came from disease events that were alleged to have an unnatural origin.41 In one case study, a point source release of anthrax resulted in at least 66 deaths. In a second case study, a regional epidemic of the same disease resulted in more than 17,000 human cases. While these events were not confirmed as having been caused by biological warfare, contemporary or subsequent analysis has suggested that such an origin was at least feasible. Combined, these figures provide an estimated impact of between 66 to 330 and 17,000 to 30,000. For the purposes of this analysis, we are assuming the lower boundary figures from biological warfare are indicative of events, with a likelihood of 10% per year and an impact ranging between tens and thousands of fatalities. The upper boundary figures from biological warfare are indicative of disasters, with a likelihood of 1% per year and an impact range of thousands to tens of thousands of fatalities.‡‡ Go to: Global Catastrophic and Existential Risk Unlike standard biothreats, there is no historical record on which to draw when considering global catastrophic or existential risks. Alternative approaches are required to estimate the likelihood of such an event. Given the high degree of uncertainty, we adopt 3 different approaches to approximate the risk of extinction from bioweapons: utilizing surveys of experts, previous major risk assessments, and simple toy models. These should be taken as initial guesses or rough order-of-magnitude approximations, and not a reliable or precise measure. Model 1: Survey of 2008 Global Catastrophic Risk Conference An informal survey at the 2008 Oxford Global Catastrophic Risk Conference asked participants to estimate the chance that disasters of different types would occur before 2100. Participants had a median risk estimate of 0.05% that a natural pandemic would lead to human extinction by 2100, and a median risk estimate of 2% that an “engineered” pandemic would lead to extinction by 2100.42 The advantage of the survey is that it directly measures the quantity that we are interested in: probability of extinction from bioweapons. The disadvantage is that the estimates were likely highly subjective and unreliable, especially as the survey did not account for response bias, and the respondents were not calibrated beforehand. We therefore also turn to other models that, while indirect, provide more objective measures of risk.§§ Model 2: Potentially Pandemic Pathogens Recent controversial experiments on H5N1 influenza prompted discussions as to the risks of deliberately creating potentially pandemic pathogens. These agents are those that are highly transmissible, capable of uncontrollable spread in human populations, highly virulent, and also possibly able to overcome medical countermeasures.44 Previous work in a comprehensive report done by Gryphon Scientific, Risk and Benefit Analysis of Gain of Function Research,36 has laid out very detailed risk assessments of potentially pandemic pathogen research, suggesting that the annual probability of a global pandemic resulting from an accident with this type of research in the United States is 0.002% to 0.1%. The report also concluded that risks of deliberate misuse were about as serious as the risks of an accidental outbreak, suggesting a 2-fold increase in risk. Assuming that 25% of relevant research is done in the United States as opposed to elsewhere in the world, this gives us a further 4-fold increase in risk. In total, this 8-fold increase in risk gives us a 0.016% to 0.8% chance of a pandemic in the future each year (see supplementary material, part 4, at http://online.liebertpub.com/doi/suppl/10.1089/hs.2017.0028). The analysis in Risk and Benefit Analysis of Gain of Function Research suggested that lab outbreaks from wild-type influenza viruses could result in between 4 million and 80 million deaths,36 but others have suggested that if some of the modified pathogens were to escape from a laboratory, they could cause up to 1 billion fatalities.45 For the purposes of this model, we assume that for any global pandemic arising from this kind of research, each has only a 1 in 10,000\*\*\* chance of causing an existential risk. This figure is somewhat arbitrary but serves as an excessively conservative guess that would include worst-case situations in which scientists intentionally cause harm, where civilization permanently collapses following a particularly bad outbreak, or other worst-case scenarios that would result in existential risk. Multiplying the probability of an outbreak with the probability of an existential risk gives us an annual risk probability between 1.6 × 10–8 and 8 × 10–7.††† Model 3: Naive Power Law Extrapolation Previous literature has found that casualty numbers from terrorism and warfare follow a power law distribution, including terrorism from WMDs.46 Power laws have the property of being scale invariant, meaning that the ratio in likelihood between events that cause the deaths of 10 people and 10,000 people will be the same as that between 10,000 people and 10,000,000 people.‡‡‡ This property results in a distribution with an exceptionally heavy tail, so that the vast majority of events will have very low casualty rates, with a couple of extreme outliers. Past studies have estimated this ratio for terrorism using biological and chemical weapons to be about 0.5 for 1 order of magnitude,47 meaning that an attack that kills 10x people is about 3 times less likely (100.5) than an attack that kills 10x–1 people (a concrete example is that attacks with more than 1,000 casualties, such as the Aum Shinrikyo attacks, will be about 30 times less probable than an attack that kills a single individual). Extrapolating the power law out, we find that the probability that an attack kills more than 5 billion will be (5 billion)–0.5 or 0.000014. Assuming 1 attack per year (extrapolated on the current rate of bio-attacks) and assuming that only 10% of such attacks that kill more than 5 billion eventually lead to extinction (due to the breakdown of society, or other knock-on effects), we get an annual existential risk of 0.0000014 (or 1.4 × 10–6). We can also use similar reasoning for warfare, where we have more reliable data (97 wars between 1820 and 1997, although the data are less specific to biological warfare). The parameter for warfare is 0.41,47 suggesting that wars that result in more than 5 billion casualties will comprise (5 billion)–0.41 = 0.0001 of all wars. Our estimate assumes that wars will occur with the same frequency as in 1820 to 1997, with 1 new war arising roughly every 2 years. It also assumes that in these extreme outlier scenarios, nuclear or contagious biological weapons would be the cause of such high casualty numbers, and that bioweapons specifically would be responsible for these enormous casualties about 10% of the time (historically bioweapons were deployed in WWI, WWII, and developed but not deployed in the Cold War—constituting a bioweapons threat in every great power war since 1900). Assuming that 10% of biowarfare escalations resulting in more than 5 billion deaths eventually lead to extinction, we get an annual existential risk from biowarfare of 0.0000005 (or 5 × 10–7). Perhaps the most interesting implication of the fatalities following a power law with a small exponent is that the majority of the expected casualties come from rare, catastrophic events. The data also bear this out for warfare and terrorism. The vast majority of US terrorism deaths occurred during 9/11, and the vast majority of terrorism injuries in Japan over the past decades came from a single Aum Shinrikyo attack. Warfare casualties are dominated by the great power wars. This suggests that a typical individual is far more likely to die from a rare, catastrophic attack as opposed to a smaller scale and more common one. If our goal is to reduce the greatest expected number of fatalities, we may be better off devoting resources to preventing the worst possible attacks. Why Uncertainty Is Not Cause for Reassurance Each of our estimates rely to some extent on guesswork and remain highly uncertain. Technological breakthroughs in areas such as diagnostics, vaccines, and therapeutics, as well as vastly improved surveillance, or even eventual space colonization, could reduce the chance of disease-related extinction by many orders of magnitude. Other breakthroughs such as highly distributed DNA synthesis or improved understanding of how to construct and modify diseases could increase or decrease the risks. Destabilizing political forces, the breakdown of the Biological Weapons Convention, or warfare between major world powers could vastly increase the amount of investment in bioweapons and create the incentives to actively use knowledge and biotechnology in destructive ways. Each of these factors suggests that our wide estimates could still be many orders of magnitude off from the true risk in this century. But uncertainty is not cause for reassurance. In instances where the probability of a catastrophe is thought to be extremely low (eg, human extinction from bioweapons), greater uncertainty around the estimates will typically imply greater risk of the catastrophe, as we have reduced confidence that the risk is actually at a low level.48 §§§ Given that our conservative models are based on historical data, they fail to account for the primary source of future risk: technological development that could radically democratize the ability to build advanced bioweapons. If the cost and required expertise of developing bioweapons falls far enough, the world might enter a phase where offensive capabilities dominate defensive ones. Some scholars, such as Martin Rees, think that humanity has about a 50% chance of going extinct due in large part to such technologies.49 However, incorporating these intuitions and technological conjectures would mean relying on qualitative arguments that would be far more contentious than our conservative estimates. We therefore proceed to assess the cost-effectiveness on the basis of our conservative models, until superior models of the risk emerge. How Bad Would Human Extinction Be? Human extinction would not only end the 7 billion lives in our current generation, but also cause the loss of all future generations to come. To calculate the humanitarian cost associated with such a catastrophe, one must therefore include the welfare of these future generations. While some have argued that future generations ought to be excluded or discounted when considering ethical actions,50 most of the in-depth philosophical work around the topic has concluded that future generations should not be given less inherent value.51-55 Therefore, for our calculations, we include future lives in our cost-effectiveness estimate.\*\*\*\* The large number of future generations at stake mean that reducing existential risk even by a small amount may have very large expected value. The Earth is thought to be habitable for roughly another billion years;56 our closest relative, homo erectus, lasted over 1.6 million years,57 and the typical mammalian species also lasts on the order of 1 to 2 million years.58 Following Matheny,29 if we were to assume that humanity would otherwise maintain a global population of 10 billion for the next 1.6 million years, human extinction would jeopardize on the order of 1.6 × 1016 life years. Go to: Cost-Effective Biosecurity How should we balance speculative risks of human extinction in a biosecurity portfolio? Here we turn to cost-effectiveness analysis, which is one method of prioritizing public projects.29 Cost-effectiveness analysis is helpful if our goal is to maximize the effect of our resources to achieve a measurable aim (such as life-years saved or cases of disease averted). Here we compare the cost-effectiveness of reducing risks in the categories of incidents, events, disasters, and existential risks. Calculating Costs The US federal government was projected to spend almost $13 billion on health security–related programs in 2017.59 To our knowledge, there has not been a quantitative assessment of how this spending has reduced the chances of bioterrorism, biowarfare, or even naturally occurring pandemics. However, the World Bank estimates that it would cost $1.9 billion to $3.4 billion per year over 5 years to bring all human and animal health systems up to minimal international standards, and it suggests that these measures would prevent at least 20% of pandemics.60†††† Many countries do not currently have healthcare systems that meet international standards—for example, in 2014 only 33% of countries reported their national arrangements met those required under the International Health Regulations.61 These mitigation measures would be adopted to be effective regardless of whether a disease outbreak originates naturally, accidentally, or deliberately.‡‡‡‡ The ability to rapidly detect and characterize the agent involved helps fast-track public health and R&D responses. Acting promptly enables basic public health measures that might decrease the likelihood of spread (such as social distancing) and track its emerging epidemiology (providing critical input for tailoring the responses). Even if we lack existing or candidate vaccines or therapeutics, having the capacity to treat symptoms can have a dramatic impact on case fatality rates.§§§§ We therefore assume that strengthening healthcare systems to meet international standards would have an impact on mitigating all types of disease risk, ranging from incidents and events to existential risks.\*\*\*\*\* We extend the World Bank's assumptions to include bioterrorism and biowarfare—that is, we assume that the healthcare infrastructure would reduce bioterrorism and biowarfare fatalities by 20%. We conservatively assume that existential risks will be reduced by only 1%, since any potential existential risk would likely be deliberately designed to overcome medical countermeasures. We calculate that purchasing 1 century's worth of global protection in this form would cost on the order of $250 billion, assuming that subsequent maintenance costs are lower but that the entire system needs intermittent upgrading.††††† To calculate the cost per life-year saved, we use the equation C/(N × L × R), where C is the cost of reducing risk, N is the number of biothreats we expect to occur in 1 century, L is the number of life-years lost in such an event, and R is the reduction in risk achieved by spending a given amount (specified by C). For nonextinction risks, we increase L 50 times over to denote 50 life-years saved per life. The denominator N × L × R denotes the total number of life-years saved.‡‡‡‡‡ In a subsequent model we also apply a discount rate to represent policymakers concerned only about lives in the short term. Go to: Results Including future generations into our cost-effectiveness calculations demonstrates that reducing existential risks, even if they are improbable, can be incredibly cost-effective in expectation (Table 2). Depending on the model used, we estimate that we can purchase 1 quality adjusted life-year in expectation for 10s of dollars (with outliers suggested around 12 cents to $1,600). Even with the most conservative estimates of existential risk, reducing the risk of human extinction is at least 100 times more cost-effective than standard biosecurity interventions, and possibly up to 1 million times more cost-effective. Table 2. Cost-effectiveness estimates of reducing risks of different magnitudes Point on Biothreat Spectrum N Expected number of events in 1 century L Expected number of lives lost per event R Reduction in risk by spending $250 billion Cost per life-year saved (assuming 50 years per life) Indicative Incident 100 1-10 20% $25m-$250m Indicative Event 10 100-1,000 20% $2.5m-$25m Indicative Disaster 1 10,000-100,000 20% $250k-$2.5m Existential Risk Model 1 0.0005 to 0.02 1016 life years 1% $0.125-$5.00 Model 2 1.6 × 10–6 to 8 × 10–5 1016 life years 1% $31.00-$1,600 Model 3 5 × 10–5 to 1.4 × 10–4 1016 life years 1% $18.00-$50.00 It is important to note that this result does not depend on the $250 billion figure—if we found a cheaper intervention that reduced all risks by a similar amount, cost-effectiveness of all the interventions would increase, but the relative merits of reducing existential risk would remain the same.§§§§§ There are certainly cheaper ways to reduce the low-level risks of biocrime and bioterrorism, and so our estimates of cost-effectiveness could be far too pessimistic. Examples of cheaper interventions might include dramatically increasing resources for specialized law enforcement prevention and interdiction, or increased surveillance on potential perpetrators. However, there are likely also far cheaper ways of reducing the more extreme risks that threaten extinction, and there is no reason to think similar efficiency gains could not be made in this area as well. Despite the vast resources spent on counterterrorism, governments may have neglected low-probability, high-impact risks.65,66 This therefore constitutes a critically underdeveloped area of research, for which there is likely low-hanging fruit. Even if the humanitarian case for reducing existential risk is clear, most policymakers will be responsible primarily for the interests of a more limited constituency comprising only the current generation and near future.\*\*\*\*\*\* It is therefore instructive to evaluate how well these cost-effectiveness results hold up when we largely ignore the benefits to future generations. We therefore repeat the cost-effectiveness estimates with a discount rate imposed on the benefits and costs borne in future years, and we find that the merits of reducing existential risk still hold. If we ignore distant future generations by discounting, the benefits of reducing existential risk fall by between 3 and 5 orders of magnitude (with a 1% to 5% discount rate), which is still far more cost-effective than measures to reduce small-scale casualty events. Under our survey model (Model 1), the cost per life-year varies between $1,300 and $52,000 for a 5% discount rate and between $770 and $30,000 for a 1% discount rate. These costs are even competitive with first-world healthcare spending, where typically anything less than $100,000 per quality adjusted life-year is considered a reasonable purchase.29 This suggests that even if we are concerned about welfare only in the near term, reducing existential risks from biotechnology is still a cost-effective means of saving expected life if the future chance of an existential risk is anything above 0.0001 per year. Our conservative models (with much lower risk) suggest that existential risk prevention is not cost-effective when compared to basic healthcare spending: Model 2 results in a cost per life-year between $330,000 and $16 million for a 5% discount rate and $190,000 and $9.7 million for a 1% discount rate, while Model 3 results in a cost per life-year of between $190,000 and $500,000 for a 5% discount rate and between $110,000 and $310,000 for a 1% discount rate. These conservative numbers would suggest that healthcare spending is a better purchase than marginal biosecurity funding, but even these numbers still support the notion that we are better off focusing on low-probability, high-impact risks rather than low-casualty biosecurity risks. For a biosecurity portfolio, even policy with limited time horizons is likely better off investing in measures that prevent the worst-case scenarios. Go to: Conclusions Although the probability of human extinction from bioweapons may be extremely low, the expected value of reducing the risk (even by a small amount) is still very large, since such risks jeopardize the existence of all future human lives. An initial attempt to estimate the cost-effectiveness of reducing these risks finds that it takes likely between 10 cents and 10s of dollars to save 1 life-year, assuming we value future human lives. Although this result is striking, it is not unprecedented. Similar analysis done by Matheny found that spending $1 billion on an asteroid deflection system would have a similar cost-effectiveness, at about $2.50 per life-year.29 Although preventing existential risks might be a far more cost-effective way to save lives than many existing biosecurity measures, this does not imply that we ought to devote all of our resources to protecting against existential risks. Many actions that fall under the rubric of standard health spending also likely reduce existential risk, and many of the resources spent reducing existential risk would in turn help address less extreme risks. Moreover, occasionally there are other opportunities that might be particularly cost-effective—for example, smallpox eradication cost less than $300 million (roughly $1.5 billion in 2017 dollars) and likely saved millions of lives.68 The conclusion is thus not that we should abandon all other health interventions for the sake of saving future lives, but rather that on balance we should increase investments that reduce these low-probability, high-stakes risks. We propose several steps forward. Given the high uncertainty around our estimates, we can expect a high value of information for additional research, implying that resources should be allocated to further assessment of these risks before large sums are directly allocated on the basis of unreliable evidence. Areas for basic research could include examining existential risk using the tools of technological horizon scanning, red-teaming, ecosystem and epidemic modeling, analyzing historical epidemic death tolls, and examining past species that have gone extinct due to disease, among others. And if existential risk could be as important as we claim, more work should be done to assess possible existential risks and countermeasures. Many actions that would reduce existential risk are already being pursued by those in biosecurity and public health. But there are also measures that would be particularly important in the context of existential risk—including measures that may be unduly neglected without a special focus on existential risk. One particularly inexpensive measure would be to invest in contingency plans for worst-case scenarios. Countering a pandemic does not typically require a large fraction of worldwide economic output, so there is not a clear path forward for rapidly pivoting to a total war footing in which a large percentage of worldwide GDP is spent on countermeasures. Running small experiments with easily scalable interventions could be a cheap way to explore avenues for rapidly turning resources into protection (examples of such experiments might include paying bounties to individuals or companies to avoid flu infection for a year while conducting essential services, such as power and sanitation).†††††† Countering existential risks could also result in reprioritizing current approaches—for example, favoring broad-spectrum diagnostics and countermeasures, as opposed to those tailored to a single pathogen. The worst possible attacks could come from built-up arsenals of multiple pathogens, possibly designed with long incubation periods and traits to overcome vaccination or medical treatment. Platform technologies that allow customizable countermeasures (eg, phages for bacteria, generalized vaccine templates) or pathogen-blind diagnostics (eg, distributed sequencing and improved software to interpret novel pathogens before symptoms occur) will stand a better chance against such threats.‡‡‡‡‡‡ An existential risk focus also would place extraordinary weight on avoiding arms races or the widespread weaponization of biotechnology. The near collapse of the 8th Review Conference of the Biological Weapons Convention in December 2016 demonstrates how fragile this regime is and how far current instruments are from the ideal. Strengthening the global norm against biological weapons might go a long way toward reducing the risks associated with state actors. The current 3-person Implementation Support Unit costs less than $1 million per year to support.71 In comparison, the 2017 budget for the work of the Organization for the Prohibition of Chemical Weapons is around $77 million (and provides for more than 450 fixed-term posts).72 Increasing the human capacity currently focusing on biological weapons risks by several orders of magnitude would be notably cheaper than the costs associated with building core capacities in public and animal health. More generally, any action that reduces the chance of arms races or great power conflict could substantially reduce the probability of existential risk from biotechnology in the century to come.

#### Sub-point C is external natural pandemics

#### Future pandemics are incoming—COVID is just the beginning

Natalie Brown, graduated with a Bachelor of Journalism from Queensland's University of Technology NZ Herald, January 2021 ["Covid 19 coronavirus: US Army scientists warn that deadlier pandemics are coming", https://www.nzherald.co.nz/world/covid-19-coronavirus-us-army-scientists-warn-that-deadlier-pandemics-are-coming/5UQACBIWS3OPQRJZEBS6IPVAQI/, 9-2-2021] AWS

A group of American scientists have warned that the coronavirus pandemic "may not be the big one", with fears deadlier viruses are on the horizon and could occur within this generation's lifetime. The US Army scientists, based in the emerging infectious diseases branch at the Walter Reed Army Institute of Research, have spent the past year finding vaccines and therapeutics to stop not only the "original" strain of Covid-19 but also any new variants. The director of the branch, Dr Kayvon Modjarrad, told the Defence One 2021 Tech Summit on Monday that the likelihood this generation will see another pandemic during its lifetime is "high". "We have seen the acceleration of these pathogens and the epidemics that they precipitate." "And it may not be a coronavirus, this may not be the big one. There may be something that's more transmissible and more deadly ahead of us. "We have to think more broadly, not just about Covid-19, not just about coronavirus, but all emerging infectious threats coming into the future." Modjarrad joins a chorus of virologists and infectious diseases experts who, almost since coronavirus first emerged in Wuhan in late 2019, have said it's "inevitable" that other diseases are waiting in the wings, and that humans could play a role in how severe those outbreaks might be and where they'll come from. Speaking to the Guardian last week, Kirby Institute virologist Professor Stuart Turville said that how much responsibility we take for our impact on the environment could be a defining factor. "We are clever and unfortunately naive at the same time with respect to the planet. "Economics and big leaps and bounds in technology bring great standards of living across the globe, but can unearth many unwanted nasties." While about three-quarters of all novel emerging viral diseases over the past 20 years have been zoonotic (transmitted from an animal source) – most often birds, rodents or bats – missing from discussions of their origins is the role of humans, Turville added. "Unfortunately, things like climate change and habitat destruction will bring with them 'surprises' as animals struggle to deal with their changing environments courtesy of us." Medical virologist Professor Dominic Dwyer – a member of the World Health Organisation (WHO) team investigating the origins of the Covid-19 pandemic – agreed, adding that a key part of planning for future pandemics will be understanding animal, environment and human interaction. "All the viruses that have emerged in the last 50 years have come from either animals or the environment, and the connection, the network, between those factors and humans is so important," he told the Guardian. "Preparing and planning includes considering demographics, the crowded environments people live in, the healthcare environments that allow some things to spread but not others, climate change and the influence of the way we use the land and interact with wildlife, the way we do trade, farming and tourism. "All of those things have an impact on what lets a pandemic emerge and get going." Researcher in viral immunology at Murdoch University, Professor Cassandra Berry, said Australia needs to "start training and investing in its next generation of virus hunters now" in order to respond to future threats more rapidly. "There are viruses just waiting in the wings. The next pandemic will likely be an airborne virus that's highly transmissible, already out there, highly mutable and with an animal reservoir. "It will be particularly dangerous if it has no visible signs, if it spreads by stealth. "We are way overdue for another flu pandemic, and there are ones out there a few mutations away from moving from birds to humans. We need the funding invested now in our researchers to prepare." Next pandemic 'could be next year' In March, researchers [discovered a series of 24 new coronaviruses](https://www.nzherald.co.nz/world/covid-19-coronavirus-chinese-researchers-find-24-new-coronaviruses-in-bats/YMD42TGGOXLML4GJ3JKDWXS5IU/) in bats in a small region of the Yunnan province, in China's southwest. "In total, we assembled 24 novel coronavirus genomes from different bat species, including four SARS-CoV-2 like coronaviruses," the team wrote in a report, published in the journal Cell. One of the 24 – viral sample RpYNO6 – was the closest strain yet to Covid-19, though it had genetic differences on the spike protein, the knoblike structure that the virus uses when attaching to cells, the researchers said. "Together with the SARS-CoV-2 related virus collected from Thailand in June 2020, these results clearly demonstrate that viruses closely related to SARS-CoV-2 continue to circulate in bat populations, and in some regions might occur at a relatively high frequency," they wrote. Speaking to NPR, University of Sydney virologist Edward Holmes, who was part of the team, said "we're only just starting to scratch the surface" in terms of how many coronaviruses could be across the world. "The virusphere of coronaviruses is just immense." Peter Daszak, who helped lead a 2018 study of how these viruses jump from animals into people and how often they make people sick, said new coronaviruses are constantly jumping from bats and other animals into humans, though the vast majority of "spillover" events don't lead to a pandemic. "It's happening every day," he said. "I look at the spillover event a bit like rain or snow. These viruses are getting into and trickling across our populations." Both he and Holmes warned the next coronavirus outbreak could be right around the corner. "I think we need to face reality here," Holmes said. "Coronavirus pandemics are not a once in 100 year event. The next one could come at any time. It could come in 50 years or in 10 years. Or it could be next year."

#### IP nationalism ensures failed pandemic response – non-research, artificial scarcity, and prices

Cynthia M. Ho Loyola University Chicago School of Law, 8-23-2021 ["IP Nationalism: Addressing the COVID Crisis and Beyond", https://papers.ssrn.com/sol3/papers.cfm?abstract\_id=3910806, 9-2-2021] AWS

IP nationalism during a pandemic may ironically be contrary to economic assumptions. As explained earlier, IP nationalism generally assumes that strong IP rights will result in an increase in domestic GDP. However, as multiple studies have shown, a continued global pandemic causes economic losses to all countries, including wealthy ones.208 In other words, to the extent that IP nationalism contributes to medical nationalism, which is prolonging COVID, embracing strong IP rights during the COVID pandemic is contrary to global economic interests of all. Another important question is whether IP nationalism is valuable for promoting innovation. Some have attributed the plethora of effective COVID vaccines in record time to IP.209 However, these vaccines are of no help if IP rights result in artificial scarcity that deprives many individuals of access to them. Even setting aside the major problem of inequitable global access to effective vaccines, it is questionable whether IP is primarily responsible for these developments. After all, many of the vaccines were developed by companies that received direct funding and advance purchase orders.210 As many innovation scholars have previously recognized, sources of funding besides IP rights promote innovation, which the current pandemic now clearly shows is true. Even though IP may not be solely responsible for innovation, some countries seem resistant to foregoing that assumption. The prior discussion of objections to the proposed IP waiver highlights not only resistance, but incomplete statements that likely reflect a blind spot. Such countries insist no changes need to be made to IP norms. However, we obviously live in an interconnected and interdependent global world, such that until COVID is addressed everywhere, there will be a drag on the global economy. There have been repeated examples of supply chain disruptions during COVID; for example, electronic chips that are necessary for a wide range of products are currently in short supply since manufacturers in South-east Asia are presently hard hit by COVID. 211 The IMF has suggested that if forty percent of the world could be vaccinated by the first half of 2022, this would effectively inject $9 trillion into the global economy by 2025 due to faster resumption of economic activity and that wealthy countries would stand to capture forty percent of increased global GDP gains.212 2. Is IP Nationalism Worthwhile Outside a Global Pandemic? Whether IP nationalism is appropriate outside an infectious pandemic is less clear cut. As will be discussed, there are not only different economic impacts on countries, but also different impacts on innovation as well as access to treatments. Unlike the present situation, strong IP rights outside a pandemic would not necessarily result in economic losses to all countries. Rather, countries with strong IP exports would seem to obtain increased GDP from stronger global IP rights. Countries that are primarily IP importers, such as developing countries, on the other hand, arguably pay more in terms of more expensive imports of IP-proteccted goods. However, since IP rights are part of international trade agreements including, but not limited to the WTO that generally provide developing countries better access to other markets for export of non-IP products such as agriculture, there could be some economic benefit to strong global IP.213 However, even if strong global IP might have economic benefits for countries, there are countervailing considerations. First, there is a question of whether strong global IP rights are promoting socially desirable innovation. Second, even if desirable innovation occurs, there is another important question of whether it results in affordable treatments since IP legally permits its owners to charge high prices that many cannot afford. Neither of these questions are novel; in fact, the 2016 UN High Level Panel on Access to Medicine attempted to address how the existing international legal infrastructure can better promote socially desired and affordable innovation. Strong global IP rights do not necessarily lead to socially desirable innovation. Since IP rights such as patents provide the same exclusivity for all innovations (that meet the standards), companies are incentivized to pursue the most profitable, but not necessarily most socially needed discoveries. This means that conditions predominant in wealthy countries are the primary focus of companies. 214 Although 70% of global deaths are from neglected diseases, such diseases are generally ignored by the pharmaceutical industry due to lack of profitability.215 Even among the most well-funded neglected diseases such as tuberculosis and malaria, spending often is inadequate since these do not impact wealthy countries; the amount of money spend on COVID vaccines for which wealthy countries had an interest dwarfs the amount spent on a TB vaccine that is primarily of interest to poor countries.216 In contrast, companies may pursue “orphan diseases” that by definition only impact a small percent of wealthy populations because there are profitable and incentivized by extra IP exclusivity. 217 Companies may also overlook low-cost options to treat conditions for which IP rights are not possible since there is no ability to obtain IP-enhanced profits even in wealthier countries.218 Strong global IP rights associated with IP nationalism also leads to artificial scarcity of affordable drugs, which to someone that lacks resources is exactly the same as scarcity of vaccines during COVID. Although wealthy countries occasionally face trouble affording expensive new drugs,219 poor countries regularly face extreme difficulty accessing affordable drugs under patent protection. 220 Inadequate supply of affordable drugs can arguably be addressed by existing IP tools such as compulsory licenses. However, as previously discussed, countries face pressure using this legitimate tool, such that most avoid doing so despite repeated urging of public health advocates, as well as UN.221 In addition, while the poorest countries might obtain donor aid, many citizens in low income and lower middle income countries do not. The artificial scarcity of affordable drugs has an impact on global economics, albeit in a less different manner than during the present pandemic. Unlike an infectious disease that impacts all countries, inadequately treated diseases and conditions in one country do not automatically impact another. Nonetheless, inadequate access to medical treatment causes unnecessary global disparities that can create the same types of inequitable health outcomes discussed during COVID. 222 For example, poor health can result in lower GDP by fifteen percent due to premature death and lost productivity.223 Moreover, although some suggest that non-medical preventative measures such as better nutrition can improve health and economic outcomes, there are times where affordable, yet patented medical treatments are essential;224 for example, non-infectious, yet curable conditions such as Hepatitis C can result in unnecessary loss of workplace productivity and economic productivity due to premature deaths.225 3. Is IP Nationalism Consistent with Other Policies? Another relevant consideration is whether IP nationalism is consistent with historical IP policy, as well as policy underlying international human rights and global equity. As this section will explain, IP nationalism is inconsistent with these policies. Current IP nationalism is a far cry from historical use of IP even by countries that today embrace it. IP used to be a policy lever that each nation could decide on its own whether to use, and tailor to its domestic conditions. A country that prioritized access to medicine could legitimately decline to patent medical products to ensure more affordable drugs; even wealthier countries such as Portgual and Spain pursued this approach until the late 1980s. 226 In addition, since countries at an earlier stage of economic development often find it helpful to copy not just technology, but material generally, it was common in an earlier era for currently wealthy countries to have weak IP. 227 Notably, although the US in recent times has claimed that strong IP rights are essential, US history includes a period of copying from other countries when the US was still developing. 228 The most exclusive type of IP, patents, were historically granted not primarily to ensure profits to inventors, but, rather, to promote sharing of technology. Patents were originally granted only to inventors that would make the the patented invention in the patent-granting nation to ensure transfer of knowledge concerning the invention to benefit domestic citizens. 229 The importance of patents to transfer technology was considered so important that the patent would be revoked if the inventor failed to use the invention domestically and transfer these skills.230 In addition, in that earlier era, a nation that granted patents did not affirmatively harm other countries since no country was pressuring others to have certain IP rights. Rather, that only happened in the late 1980s after countries with strong IP-exporting industries lobbied for creation of global laws that would increase their global revenues. International human rights also do not align with IP nationalism. Creators as well as companies may assert that they have an international human right to benefit from their creations.231 However, the same international covenant that companies claim provides them rights to economic benefit also declares that all should benefit from scientific progress, including progress that is protected by IP rights.232 In other words, IP should benefit not just creators, but also users, as repeatedly recognized by UN committees. 233 Moreover, there are additional human rights that suggest that IP rights should be limited; in particular, the human right to enjoy to “highest attainable standard” of health is relevant since IP rights can negatively impact attainment of the right to health since IP can permit drugs to be priced beyond the reach of many to achieve health. 234 And, specifically, the UN has asserted that nations have a core obligation to make “essential medicines” available and accessible.235 The UN Commissioner has stated that in the event of conflict between IP and public health, IP rights should yield to the right to public health, which has been reaffirmed by other UN subcommittees.236 Of course, it is practically tricky to balance competing human rights obligations since there is no hierarchy among these rights since all human rights are inalienable, indivisible and interdependent.237 As other scholars have noted, it can be difficult to resolve conflicts among rights.238 Although human rights have generally not modified international IP agreements, they should nonetheless be considered as relevant policy for what norms should be. B. The Road (not) Yet Taken: The Global Public Good Approach This Section argues that since IP nationalism is fundamentally flawed during a pandemic, at minimum, IP for essential drugs and vaccines to treat a pandemic should be considered a global public good that should be freely available to all to ensure adequate access. However, there is also an argument that IP for essential drugs and vaccines outside a pandemic be considered global public goods as well. This would be true whether there were inadequate supplies as well as if supplies were unaffordable. 1. Pandemic Implications of IP of Essential Drugs as Global Public Goods In the midst of a pandemic, there is a strong case for IP related to treatments and especially vaccines to be considered global public goods to be shared by all as recommended by many including UN secretary General239 as well as individual countries.240 In May 2020, just months after global recognition of the pandemic, the WHO proposed a pool to facilitate sharing and transfer of all technology and IP concerning COVID241 as part of its call for global solidarity.242 The UN as well as UNESCO have also argued for companies to share IP related to COVID consistent with considering this to be a public good.243 Beyond the efforts of international groups, some world leaders have stated that COVID treatments should be a public good, although typically without any corollary action.244 The Open COVID Pledge started by a number of individuals to make it easy for companies to pledge to make IP freely available to manage the pandemic is also consistent with considering IP related to COVID as a global public good.245 Given that most of these calls for voluntary donations of IP have been unanswered by the pharmaceutical industry, a different method for considering IP related to vaccines to be a public good is the proposed TRIPS waiver. Although the waiver could be considered consistent with a public good approach, it would likely be less effective/efficient than the original WHO proposal that companies voluntarily not only share IP, but transfer related technology needed to make vaccines to ensure that trade secrets can also be obtained. As discussed earlier, the waiver includes waiver of enforcement of trade secrets, but these may still be difficult to legally force companies to disclose under some domestic laws. Theoretically, a country with the ability to force companies to disclose, such as the US, could consider COVID 19 vaccines a public good and mandate this disclosure.246 However, that does not seem to be something that is being actively discussed.

#### Natural pandemics risk extinction—mutations and response uncertainty makes it uniquely dangerous

Wolfgang Ehringer, Henrik Söderström, Master Students, Halmstad University, Digitala Vetenskapliga Arkivet, 2017 [“Framing Global Catastrophic Risk - Recent and Future Research”, <https://www.diva-portal.org/smash/record.jsf?pid=diva2%3A1077151&dswid=7618>, 9-2-2021] AWS

In this paper, we have touched several areas that are associated with the topic global catastrophic risk. Catastrophic climate change, nuclear war/winter, natural pandemics, exogenous risks, emerging risks and other/unknown risks. They all have in common that they are a threat to the earth and all living species on it. These global risks should be of concern, as Cotton-Barratt et al. (2016) states that all of them have the ability to affect at least 10 per cent of the human population. The global catastrophic risks have different chances to become reality, some have a higher risk than others. But when considering the risk it is important to keep in mind what Toby et al. (2010) suggest, namely that there are problems calculating the exact risk. To be able to calculate global catastrophic risks, some given conditions are required. We think that this should be highlighted, since even the smallest error can lead to major percentage deviations of the risk. This should be considered by politicians and other decision makers when planning and implementing strategies about countermeasures. The conditions need to be understood well to make the correct estimation of the risk. Furthermore, the main focus today, as we can see in politics and social contexts, is the catastrophic climate change. This is the case, because it is the risk which is most plausible for us to relate to and, as Baum (2015a) writes in his report, we humans have more motivation to act and reduce the risk of events that can happen in our lifetime. The climate change has still uncertain consequences on a global scale, but according to Tsur and Withagen (2011) it has already started to show a devastating effect on our planet and since it is affecting the earth in general, international efforts must be taken to reduce the negative trend. We have to act fast, as Schuur et al. (2015) mention, when the permafrost in the arctic starts to melt in huge scales, because then the point of no return for catastrophic global risk will be achieved. At this time, it will no longer be a risk, it will be reality. Global catastrophic climate change will not solely affect the planet, it will also be catastrophic for human health, since the access to fresh water will be reduced around the world (Papworth et al., 2015). Another GCR that is discussed and a relevant topic for our generation is nuclear war. Ever since the end of World War 2 the moral questions about nuclear technology have been a hot topic around the globe. If we just look at the history, we have already seen what catastrophic impact nuclear technology can have on our planet. Toon et al. (2008) write in their paper what consequences nuclear technology can have on the environment and humanity, but they additionally mention implications for political actions that could be done to prevent a catastrophe. The important point to highlight is that there are countermeasures which should be implemented by politicians. In many ways, nuclear technology is a political factor, to show strength in form of army power. As a consequence to the cold war between the U.S. and Russia, the number of nuclear weapons in the world increased, a way for the countries to emphasize strength (Figure 2). Even if this is only between two countries and no nuclear rockets were fired, it could have gone wrong for the entire world. According to Barrett et al. (2013) and Mosher et al. (2003), a nuclear war between the U.S. and Russia would be devastating for the entire planet. Several authors mention consequences about what nuclear technology can result in. One of the consequences of a nuclear war is nuclear winter, which is a side effect of a nuclear war. This should not be forgotten, although politicians often talk primarily about the direct impact of nuclear war and not about the other consequences that will follow many years after. We think, in the future it will be important to include education about nuclear technology in the regular school education for example. Hence, the next generation will grow up with a deeper understanding about the impacts and how a sustainable future without weapons of mass destruction can be built. Nuclear war/winter is a risk that humans have created themselves. Not as the natural pandemics, that is a part of nature, it is linked to human activity but not fully created by humans. Natural pandemics will always involve high uncertainty and can occur at any time. Since pandemics are complex and often hard for scientists to understand, we may not be able to have a proper vaccine ready for an outburst. The frequency of pandemics is high and since we are becoming a more global world, the spread of a huge pandemic could have devastating consequences. Possibly, we could observe a spread in a way that we have never seen before in history. According to Wraith and Stephenson (2009) and Cotton-Barratt et al. (2016), the next pandemic event could be the avian influenza which has the potential to spread across the globe in more rapid speed, compared to events in the past. If the reader wants to know more about the avian influenza, we recommend the article by Fouchier et al. (2012). Since it is that hard to exactly know how the next pandemic will rise, the best way to reduce the impact is progress in healthcare technology. Moving on to something that is completely independent from humans and often difficult to fully understand, the exogenous risks. This includes super-volcanic eruptions, large asteroid and comet impacts on earth. This risk is an existential risk with high level of uncertainty. It is nearly impossible to predict or know when the next event will occur. Additionally, if this happens, most of us will not survive probably. The impact from super-volcanic eruptions may have similar effects, compared to a nuclear war (Rampino, 2008). One of the most well-known potential super-volcanoes is in Yellowstone, North America. Christiansen et al. (2007) explains the hazards of Yellowstone in more detail and Lowenstern et al. (2006) focus on how to monitor super-volcanoes. This will give an overview of the potential risk that stem from super-volcanoes, and what impact an eruption in Yellowstone can have for the planet. It is not very likely that an eruption will happen during our generation. Additionally, it is hard to do anything to reduce the risk. Regarding large asteroid and comet impacts, there is a small chance that the earth will be affected during this century (Chapman and Morrison, 1994). So, it is a topic which may not be focused until asteroids or comets closely miss or even hit the earth. Napier (2008) and Morrison (2006) give a good overview on the risk from asteroids and comets and what could be done to prevent a potential disaster. By looking at our planet history, we already know what damage asteroids and comets can do. This is a GCR that is in many ways hard to understand, because the universe is extremely large and we do not know what space objects will be exposed and a threat for the earth in the future.

### Solvency

#### Plan: Member nations of the World Trade Organization ought to reduce intellectual property protections for medicines related to global pandemics. To clarify, the aff only addresses patents and trade secrets. We spec pandemics as the parameters by the WHO

#### The plan creates a new goldilocks patent law that exempts pandemics

Lindsey, JD Harvard, 21

(Brink, <https://www.brookings.edu/blog/up-front/2021/06/03/why-intellectual-property-and-pandemics-dont-mix/>, 6-3)

Waiving patent protections is certainly no panacea. What is needed most urgently is a massive drive of technology transfer, capacity expansion, and supply line coordination to bring vaccine supply in line with global demand. Dispensing with patents in no way obviates the need for governments to fund and oversee this effort. Although focusing on these immediate constraints is vital, we cannot confine our attention to the short term. First of all, the COVID-19 pandemic is far from over. Although Americans can now see the light at the end of the tunnel thanks to the rapid rollout of vaccines, most of the world isn’t so lucky. The virus is currently raging in India and throughout South America, overwhelming health care systems and inflicting suffering and loss on a horrific scale. And consider the fact that Australia, which has been successful in suppressing the virus, recently announced it was sticking to plans to keep its borders closed until mid-2022. Criticisms of the TRIPS waiver that focus only on the next few months are therefore short-sighted: this pandemic could well drag on long enough for elimination of patent restrictions to enable new vaccine producers to make a positive difference. Furthermore, and probably even more important, this is almost certainly not the last pandemic we will face. Urbanization, the spread of factory-farming methods, and globalization all combine to increase the odds that a new virus will make the jump from animals to humans and then spread rapidly around the world. Prior to the current pandemic, the 21st century already saw outbreaks of SARS, H1N1, MERS, and Ebola. Everything we do and learn in the current crisis should be viewed from the perspective of getting ready for next time. THE NATURE OF THE PATENT BARGAIN When we take the longer view, we can see a fundamental mismatch between the policy design of intellectual property protection and the policy requirements of effective pandemic response. Although patent law, properly restrained, constitutes one important element of a well-designed national innovation system, the way it goes about encouraging technological progress is singularly ill-suited to the emergency conditions of a pandemic or other public health crisis. Securing a TRIPS waiver for COVID-19 vaccines and treatments would thus establish a salutary precedent that, in emergencies of this kind, governments should employ other, more direct means to incentivize the development of new drugs. Here is the basic bargain offered by patent law: encourage the creation of useful new ideas for the long run by slowing the diffusion of useful new ideas in the short run. The second half of the bargain, the half that imposes costs on society, comes from the temporary exclusive rights, or monopoly privileges, that a patent holder enjoys. Under U.S. patent law, for a period of 20 years nobody else can manufacture or sell the patented product without the permission of the patent holder. This allows the patent holder to block competitors from the market, or extract licensing fees before allowing them to enter, and consequently charge above-market prices to its customers. Patent rights thus slow the diffusion of a new invention by restricting output and raising prices. The imposition of these short-run costs, however, can bring net long-term benefits by sharpening the incentives to invent new products. In the absence of patent protection, the prospect of easy imitation by later market entrants can deter would-be innovators from incurring the up-front fixed costs of research and development. But with a guaranteed period of market exclusivity, inventors can proceed with greater confidence that they will be able to recoup their investment. For the tradeoff between costs and benefits to come out positive on net, patent law must strike the right balance. Exclusive rights should be valuable enough to encourage greater innovation, but not so easily granted or extensive in scope or term that this encouragement is outweighed by output restrictions on the patented product and discouragement of downstream innovations dependent on access to the patented technology. Unfortunately, the U.S. patent system at present is out of balance. Over the past few decades, the expansion of patentability to include software and business methods as well as a general relaxation of patenting requirements have led to wildly excessive growth in these temporary monopolies: the number of patents granted annually has skyrocketed roughly fivefold since the early 1980s. One unfortunate result has been the rise of “non-practicing entities,” better known as patent trolls: firms that make nothing themselves but buy up patent portfolios and monetize them through aggressive litigation. As a result, a law that is supposed to encourage innovation has turned into a legal minefield for many would-be innovators. In the pharmaceutical industry, firms have abused the law by piling up patents for trivial, therapeutically irrelevant “innovations” that allow them to extend their monopolies and keep raising prices long beyond the statutorily contemplated 20 years. Patent law is creating these unintended consequences because policymakers have been caught in an ideological fog that conflates “intellectual property” with actual property rights over physical objects. Enveloped in that fog, they regard any attempts to put limits on patent monopolies as attacks on private property and view ongoing expansions of patent privileges as necessary to keep innovation from grinding to a halt. In fact, patent law is a tool of regulatory policy with the usual tradeoffs between costs and benefits; like all tools, it can be misused, and as with all tools there are some jobs for which other tools are better suited. A well-designed patent system, in which benefits are maximized and costs kept to a minimum, is just one of various policy options that governments can employ to stimulate technological advance—including tax credits for R&D, prizes for targeted inventions, and direct government support. PUBLIC HEALTH EMERGENCIES AND DIRECT GOVERNMENT SUPPORT For pandemics and other public health emergencies, patents’ mix of costs and benefits is misaligned with what is needed for an effective policy response. The basic patent bargain, even when well struck, is to pay for more innovation down the road with slower diffusion of innovation today. In the context of a pandemic, that bargain is a bad one and should be rejected entirely. Here the imperative is to accelerate the diffusion of vaccines and other treatments, not slow it down. Giving drug companies the power to hold things up by blocking competitors and raising prices pushes in the completely wrong direction.

#### Waiving IPR is the vital internal link to equitable distribution- patents are a key deterrent to expanded manufacturing capabilities

Kang, PhD, et al., 7-14-21

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The temporary TRIPS waiver – as proposed by India and South Africa and supported by more than 100 countries – is a necessary and proportionate legal measure towards the clearing of existing intellectual property barriers to scaling up of production of COVID-19 health technologies in a direct, consistent and effective fashion. We call on the governments of the United Kingdom of Great Britain and Northern Ireland, Australia, Brazil, Japan, Norway, Switzerland and the European Union to drop their opposition to the TRIPS Waiver proposal at the World Trade Organisation and to support the waiver. Intellectual Property (IP) rights – including patents, copyrights, trade secrets and other undisclosed information – are not, and have never been, absolute rights and are granted and recognised under the condition that they serve the public interest. IP rights must not be allowed to stand in the way of measures designed to make accessible the health technologies needed to fight the COVID-19 pandemic, where universal global access is essential for the global public good. We acknowledge that legal factors beyond IP, such as trade and export restrictions, also shape the ability to produce and access COVID-19 vaccines and therapeutics. Nonetheless, it is the case that IP rights, and monopolies over tacit and informal information, are also implicated in the current lack of global capacity for vaccine production and other health technologies, as well as in enabling their inequitable distribution. Current strategies to address the vast inequity in the distribution of COVID-19 vaccines have focused on solutions which build on the existing IP system, such as the World Health Organisation (WHO) COVAX initiative or voluntary licensing provisions. Such proposals have had limited and insufficient success to date at providing vaccines to low- and middle-income countries. We note that as of June 2021 the voluntary COVAX donation scheme has delivered only 90m out of a promised 2bn doses. Pharmaceutical companies who hold relevant IP rights have also failed to engage with the WHO’s voluntary COVID-19 Technology Access Pool (C-TAP) of IP and know-how. Meanwhile, several solicitations of collaboration to produce vaccine by companies, such as from Teva in Israel, Biolyse in Canada, Bavarian Nordic in Denmark, and Incepta in Bangladesh, have not engendered a positive response from vaccine IP holding companies. Moreover, the shortcomings of vaccine production are not the only problem: distribution of existing vaccine supply has been profoundly unequal, with pre-purchasing and hoarding of doses by several high-income countries. This has underlined the need for globally distributed, local vaccine manufacturing hubs in low and middle-income countries in order to guarantee sustainable supply. Given the ongoing absence of sufficient voluntary engagement by the pharmaceutical industry with proposed global mechanisms to share IP rights, data and know-how to address the pandemic, the ability to suspend rules under the TRIPS Agreement is crucial to enable a radical increase in manufacturing capacity, and thus supply, of COVID-19 vaccines. This will facilitate a globally coordinated and transparent pathway to achieve global equitable access. The proposed TRIPS waiver would provide more companies with the freedom to operate in order to produce COVID-19 vaccines and other health technologies without the fear of infringing another party’s IP rights and the attendant threat of litigation. Furthermore, in light of the considerable public financing of COVID-19 vaccine research, development, production and purchase, claims of inviolability of private IP monopoly rights cannot be justified. The IP system has failed in the past to create market incentives for vaccine development – a finding that is acknowledged and analysed by scholars in the field. In the case of COVID-19 vaccines, such a market failure has been mitigated with unprecedented public funding and de-risking of R&D costs through advance market commitments by governments. These tailored public interventions addressed the pressing need for vaccine development, and in doing so compensated for the failure of IP incentives on their own to promote vaccine research and development. The TRIPS waiver is necessary at this time because the existing provisions within the TRIPS Agreement are not sufficient in a pandemic context, whereby global access to vaccines produced at speed and scale is in all our interests. For example, compulsory licence provisions under Art. 31 and Art. 31bis of TRIPS are insufficient to tackle already existing and emerging patent thickets and data exclusivity rules that impede production by manufacturers other than the IP rightsholders. Furthermore, compulsory licences do not address the need for technology transfer and the sharing of know-how needed to build local and regional manufacturing capacity. Building such capacity would enable sustainable solutions for this and future pandemics by increasing domestic/regional manufacturing capacity for vaccine production. Governments must work with IP holders to make available and incentivise the disclosure of information held as trade secrets (and other undisclosed information) on grounds of Art. 73 (b)(iii) TRIPS, as well as through the strengthening of domestic public interest provisions under Art. 39(3) TRIPS. There are precedents for this, including US production of penicillin in WWII in which the US government oversaw the necessary pooling of technology and knowledge by companies and universities to rapidly increase penicillin production. Last year, the US government used the Defense Production Act to prioritise the production of components for national supply as needed to combat COVID-19. The proposed TRIPS waiver will enable the temporary suspension of the relevant TRIPS rules for the duration of the COVID-19 pandemic, allowing freedom to operate. It is thus a necessary ingredient as part of a multi-pronged approach to combat the pandemic. This approach must also encompass other steps, including: global co-ordination of supply chains; streamlining regulatory approval processes and sharing exclusive data from regulatory dossiers; and investment in the WHO’s C-TAP and the mRNA technology transfer hub in South Africa. The TRIPS waiver will thus facilitate the technical resilience of lower- and middle-income countries in view of present and future pandemic action and preparedness. This is in line with the commitment in the TRIPS Agreement to balance the rights of IP holders in high-income countries with the promise of technology transfer to lower- and middle-income countries. It is time to fulfil this promise and, in so doing, to end the pandemic.

### FW

#### The standard is Maximizing respective well being

#### Prefer –

#### Actor specificity, policy impacts must be decided under a util lens since we must make tradeoffs with limited resource

Mack 4 [(Peter, MBBS, FRCS(Ed), FRCS (Glasg), PhD, MBA, MHlthEcon) “Utilitarian Ethics in Healthcare.” International Journal of the Computer, the Internet, and Management Vol. 12, No.3. 2004. Department of Surgery. Singapore General Hospital.] SJDI

Medicine is a costly science, but of greater concern to the health economist is that it is also a limitless art. Every medical advance created new needs that did not exist until the means of meeting them came into existence. Physicians are reputed to have an infinite capacity to do ever more things, and perform ever more expensive interventions for their patients so long as any of their patients’ health needs remain unfulfilled. The traditional stance of the physician is that each patient is an isolated universe. When confronted with a situation in which his duty involves a competition for scarce medications or treatments, he would plead the patient’s cause by all methods, short of deceit. However, when the physician’s decision involves more than just his own patient, or has some commitment to public health, other issues have to be considered. He then has to recognise that the unbridled advocacy of the patient may not square with what the economist perceives to be the most advantageous policy to society as a whole. Medical professionals characteristically deplore scarcities. Many of them are simply not prepared to modify their intransigent principle of unwavering duty to their patients’ individual interest. However, in decisions involving multiple patients, making available more medication, labour or expenses for one patient will mean leaving less for another. The physician is then compelled by his competing loyalties to enter into a decision mode of one versus many, where the underlying constraint is one of finiteness of the commodities. Although the medical treatment may be simple and inexpensive in many instances, there are situations such as in renal dialysis, where prioritisation of treatment poses a moral dilemma because some patients will be denied the treatment and perish. Ethics and economics share areas of overlap. They both deal with how people should behave, what policies the state should pursue and what obligations citizens owe to their governments. The centrality of the human person in both normative economics and normative ethics is pertinent to this discussion. Economics is the study of human action in the marketplace whereas ethics deals with the “rightness” or “wrongness” of human action in general. Both disciplines are rooted in human reason and human nature and the two disciplines intersect at the human person and the analysis of human action. From the economist’s perspective, ethics is identified with the investigation of rationally justifiable bases for resolving conflict among persons with divergent aims and who share a common world. Because of the scarcity of resources, one’s success is another person’s failure. Therefore ethics search for rationally justifiable standards for the resolution of interpersonal conflict. While the realities of human life have given rise to the concepts of property, justice and scarcity, the management of scarcity requires the exercise of choice, since having more of some goods means having less of others. Exercising choice in turn involves comparisons, and comparisons are based on principles. As ethicists, the meaning of these principles must be sought in the moral basis that implementing them would require. For instance, if the implementation of distributive justice in healthcare is founded on the basis of welfare-based principles, as opposed to say resource-based principles, it means that the health system is motivated by the idea that what is of primary moral importance is the level of welfare of the people. This means that all distributive questions should be settled according to which distribution maximises welfare. Utilitarianism is fundamentally welfarist in its philosophy. Application of the principle to healthcare requires a prior understanding of the welfarist theory as expounded by the economist. Conceptually, welfarist theory is built on four tenets: utility maximisation, consumer sovereignty, consequentialism and welfarism. Utility maximisation embodies the behavioural proposition that individuals choose rationally, but it does not address the morality of rational choice. Consumer sovereignty is the maxim that individuals are the best judge of their own welfare. Consequentialism holds that any action or choice must be judged exclusively in terms of outcomes. Welfarism is the proposition that the “goodness” of the resource allocation be judged solely on the welfare or utility levels in that situation. Taken together these four tenets require that a policy be judged solely in terms of the resulting utilities achieved by individuals as assessed by the individuals themselves. Issues of who receives the utility, the source of the utility and any non-utility aspects of the situation are ignored

#### 2nd - Revisionary intuitionism is reliable and proves it’s is the only coherent ethic

YUDKOWSKY 8 Researcher Eliezer Yudkowsky, Less Wrong, 1/28/2008, is an American AI researcher and writer best known for popularising the idea of friendly artificial intelligence.[2][3] He is a co-founder and research fellow at the Machine Intelligence Research Institute (MIRI), a private research nonprofit based in Berkeley, California. ["The "Intuitions" Behind "Utilitarianism"", <http://lesswrong.com/lw/n9/the_intuitions_behind_utilitarianism/>] bcr 2-21-2018

I haven't said much about metaethics - the nature of morality - because that has a forward dependency on a discussion of the Mind Projection Fallacy that I haven't gotten to yet. I used to be very confused about metaethics. After my confusion finally cleared up, I did a postmortem on my previous thoughts. I found that my object-level moral reasoninghad been valuable and my meta-level moral reasoning had beenworse than useless. And this appears to be a general syndrome - people do much better when discussing whether torture is good or bad than when they discuss the meaning of "good" and "bad". Thus, I deem it prudent to keep moral discussions on the object level wherever I possibly can. Occasionally people object to any discussion of morality on the grounds that morality doesn't exist, and in lieu of jumping over the forward dependency to explain that "exist" is not the right term to use here, I generally say, "But what do you do anyway?" and take the discussion back down to the object level. Paul Gowder, though, has pointed out that both the idea of choosing a googolplex dust specks in a googolplex eyes over 50 years of torture for one person, and the idea of "utilitarianism", depend on "intuition". He says I've argued that the two are not compatible, but charges me with failing to argue for the utilitarian intuitions that I appeal to. Now "intuition" is not how I would describe the computations that underlie human morality and distinguish us, as moralists, from an ideal philosopher of perfect emptiness and/or a rock. But I am okay with using the word "intuition" as a term of art, bearing in mind that "intuition" in this sense is not to be contrasted to reason, but is, rather, the cognitive building block out of which both long verbal arguments and fast perceptual arguments are constructed. Isee the project of morality as a project of renormalizing intuition**.** We have intuitions about things that seem desirable or undesirable, intuitions about actions that are right or wrong, intuitions about how to resolve conflicting intuitions, intuitions about how to systematize specific intuitions into general principles. Delete all the intuitions, and you aren't left with an ideal philosopher of perfect emptiness, you're left with a rock. Keep all your specific intuitions and refuse to build upon the reflective ones, and you aren't left with an ideal philosopher of perfect spontaneity and genuineness, you're left with a grunting caveperson running in circles, due to cyclical preferences and similar inconsistencies. "Intuition", as a term of art, is not a curse word when it comes to morality - there is nothing else to argue from. Evenmodus ponens is an "intuition" in this sense - it's just that modus ponens still seems like a good idea after being formalized, reflected on, extrapolated out to see if it has sensible consequences, etcetera. So that is "intuition". However, Gowder did not say what he meant by "utilitarianism". Does utilitarianism say... That right actions are strictly determined by good consequences? That praiseworthy actions depend on justifiable expectations of good consequences? That probabilities of consequences should normatively be discounted by their probability, so that a 50% probability of something bad should weigh exactly half as much in our tradeoffs? That virtuous actions always correspond to maximizing expected utility under some utility function? That two harmful events are worse than one? That two independent occurrences of a harm (not to the same person, not interacting with each other) are exactly twice as bad as one? That for any two harms A and B, with A much worse than B, there exists some tiny probability such that gambling on this probability of A is preferable to a certainty of B? If you say that I advocate something, or that my argument depends on something, and that it is wrong, do please specify what this thingy is... anyway, I accept 3, 5, 6, and 7, but not 4; I am not sure about the phrasing of 1; and 2 is true, I guess, but phrased in a rather solipsistic and selfish fashion: you should not worry about being praiseworthy. Now, what are the "intuitions" upon which my "utilitarianism" depends? This is a deepish sort of topic, but I'll take a quick stab at it. First of all, it's not just that someone presented me with a list of statements like those above, and I decided which ones sounded "intuitive". Among other things, if you try to violate "utilitarianism",you run into paradoxes, contradictions, circular preferences, and other things that aren't symptoms of moral wrongness so much as moral incoherence**.** After you think about moral problems for a while, and also find new truths about the world, and even discover disturbing facts about how you yourself work, you often end up with different moral opinions than when you started out. This does not quite define moral progress, but it is how we experience moral progress. As part of my experienced moral progress, I've drawn a conceptual separation between questions of type Where should we go? and questions of type How should we get there? (Could that be what Gowder means by saying I'm "utilitarian"?) The question of where a road goes - where it leads - you can answer by traveling the road and finding out. If you have a false belief about where the road leads, this falsity can be destroyed by the truth in a very direct and straightforward manner. When it comes to wanting to go to a particular place, this want is not entirely immune from the destructive powers of truth. You could go there and find that you regret it afterward (which does not define moral error, but is how we experience moral error). But, even so, wanting to be in a particular place seems worth distinguishing from wanting to take a particular road to a particular place. Our intuitions about where to go are arguable enough, but our intuitions about how to get there are frankly messed up. After the two hundred and eighty-seventh research study showing that people will chop their own feet off if you frame the problem the wrong way, you start to distrust first impressions. When you've read enough research on scope insensitivity - people will pay only 28% more to protect all 57 wilderness areas in Ontario than one area, people will pay the same amount to save 50,000 lives as 5,000 lives... that sort of thing... Well, the worst case of scope insensitivity I've ever heard of was described here by Slovic: Other recent research shows similar results. Two Israeli psychologists asked people to contribute to a costly life-saving treatment. They could offer that contribution to a group of eight sick children, or to an individual child selected from the group. The target amount needed to save the child (or children) was the same in both cases. Contributions to individual group members far outweighed the contributions to the entire group. There's other research along similar lines, but I'm just presenting one example, 'cause, y'know, eight examples would probably have less impact. If you know the general experimental paradigm, then the reason for the above behavior is pretty obvious - focusing your attention on a single child creates more emotional arousal than trying to distribute attention around eight children simultaneously. So people are willing to pay more to help one child than to help eight. Now, you could look at this intuition, and think it was revealing some kind of incredibly deep moral truthwhich shows that one child's good fortune is somehow devalued by the other children's good fortune. But what about the billions of other children in the world? Why isn't it a bad idea to help this one child, when that causes the value of all the other children to go down? How can it be significantly better to have 1,329,342,410 happy children than 1,329,342,409, but then somewhat worse to have seven more at 1,329,342,417? Or you could look at that and say: "The intuition is wrong: the brain can't successfully multiplyby eight and get a larger quantity than it started with. But it ought to, normatively speaking." And once you realize that the brain can't multiply by eight, then the other cases of scope neglect stop seeming to reveal some fundamental truth about 50,000 lives being worth just the same effort as 5,000 lives, or whatever. You don't get the impression you're looking at the revelation of a deep moral truth about nonagglomerative utilities. It's just that the brain doesn't goddamn multiply. Quantities get thrown out the window. If you have $100 to spend, and you spend $20 each on each of 5 efforts to save 5,000 lives, you will do worse than if you spend $100 on a single effort to save 50,000 lives. Likewise if such choices are made by 10 different people, rather than the same person. As soon as you start believing that it is better to save 50,000 lives than 25,000 lives, that simple preference of final destinations has implications for the choice of paths, when you consider five different events that save 5,000 lives. (It is a general principle that Bayesians see no difference between the long-run answer and the short-run answer; you never get two different answers from computing the same question two different ways. But the long run is a helpful intuition pump, so I am talking about it anyway.) The aggregative valuation strategy of "shut up and multiply" arises from the simple preference to have more of something - to save as many lives as possible - when you have to describe general principles for choosing more than once, acting more than once, planning at more than one time. Aggregation also arises from claiming that the local choice to save one life doesn't depend on how many lives already exist, far away on the other side of the planet, or far away on the other side of the universe. Three lives are one and one and one. No matter how many billions are doing better, or doing worse. 3 = 1 + 1 + 1, no matter what other quantities you add to both sides of the equation. And if you add another life you get 4 = 1 + 1 + 1 + 1. That's aggregation. When you've read enough heuristics and biases research, and enough coherence and uniqueness proofs for Bayesian probabilities and expected utility, and you've seen the "Dutch book" and "money pump" effects that penalize trying to handle uncertain outcomes any other way, then you don't see the preference reversals in the Allais Paradox as revealing some incredibly deep moral truth about the intrinsic value of certainty. It just goes to show that the brain doesn't goddamn multiply. The primitive, perceptual intuitions that make a choice "feel good" don't handle probabilistic pathways through time very skillfully, especially when the probabilities have been expressed symbolically rather than experienced as a frequency. So you reflect, devise more trustworthy logics, and think it through in words. When you see people insisting that no amount of money whatsoever is worth a single human life, and then driving an extra mile to save $10; or when you see people insisting that no amount of money is worth a decrement of health, and then choosing the cheapest health insurance available; then you don't think that their protestations reveal some deep truth about incommensurable utilities. Part of it, clearly, is that primitive intuitions don't successfully diminish the emotional impact of symbols standing for small quantities - anything you talk about seems like "an amount worth considering". And part of it has to do with preferring unconditional social rules to conditional social rules. Conditional rules seem weaker, seem more subject to manipulation. If there's any loophole that lets the government legally commit torture, then the government will drive a truck through that loophole. So it seems like there should be an unconditional social injunction against preferring money to life, and no "but" following it. Not even "but a thousand dollars isn't worth a 0.0000000001% probability of saving a life". Though the latter choice, of course, is revealed every time we sneeze without calling a doctor. The rhetoric of sacredness gets bonus points for seeming to express an unlimited commitment, an unconditional refusal that signals trustworthiness and refusal to compromise. So you conclude that moral rhetoric espouses qualitative distinctions, because espousing a quantitative tradeoff would sound like you were plotting to defect. On such occasions, people vigorously want to throw quantities out the window, and they get upset if you try to bring quantities back in, because quantities sound like conditions that would weaken the rule. But you don't conclude that there are actually two tiers of utility with lexical ordering. You don't conclude that there is actually an infinitely sharp moral gradient, some atom that moves a Planck distance (in our continuous physical universe) and sends a utility from 0 to infinity. You don't conclude that utilities must be expressed using hyper-real numbers. Because the lower tier would simply vanish in any equation. It would never be worth the tiniest effort to recalculate for it. All decisions would be determined by the upper tier, and all thought spent thinking about the upper tier only, if the upper tier genuinely had lexical priority. As Peter Norvig once pointed out, if Asimov's robots had strict priority for the First Law of Robotics ("A robot shall not harm a human being, nor through inaction allow a human being to come to harm") then no robot's behavior would ever show any sign of the other two Laws; there would always be some tiny First Law factor that would be sufficient to determine the decision. Whatever value is worth thinking about at all, must be worth trading off against all other values worth thinking about, because thought itself is a limited resource that must be traded off. When you reveal a value, you reveal a utility. I don't say that morality should always be simple. I've already said that the meaning of music is more than happiness alone, more than just a pleasure center lighting up. I would rather see music composed by people than by nonsentient machine learning algorithms, so that someone should have the joy of composition; I care about the journey, as well as the destination. And I am ready to hear if you tell me that the value of music is deeper, and involves more complications, than I realize - that the valuation of this one event is more complex than I know. But that's for one event. When it comes to multiplying by quantities and probabilities, complication is to be avoided - at least if you care more about the destination than the journey. When you've reflected on enough intuitions, and corrected enough absurdities, you start to see a common denominator, a meta-principle at work, which one might phrase as "Shut up and multiply."Where music is concerned, I care about the journey. When lives are at stake, I shut up and multiply. It is more important that lives be saved, than that we conform to any particular ritual in saving them. And the optimal path to that destination is governed by laws that are simple, because they are math. And that's why I'm a utilitarian - at least when I am doing something that is overwhelmingly more important than my own feelings about it - which is most of the time, because there are not many utilitarians, and many things left undone.

#### No calc indites

#### empirically denied, policymakers use predictions successfully multiple times- proves that any action is better than no action

#### No intent foresight distinction, we forsee an outcome and it becomes part of our deliberations, making it intrinsic to our actions

### UV

#### Aff gets 1ar theory and metatheory otherwise the negative can engage in near infinite abuse without any check. Its drop the debater, it’s the only way to deter abuse, aff time skew means that there isn’t enough time for the aff to do both substance and theory. Competing interpretations reasonability is arbritary. No rvis, a) illogical, you don’t get a cookie for being fair, B) six mins of neg dumping skews the debate. No 2nr paradigm issues insofar as they can engage 6 mins dumping on a shell which skews the debate and prevents the aff from checking neg abuse

#### Fairness is a voter, debate is a competitive activity, the judge has to vote for the better debater which necessitates a fair round – if they contest this, drop them insofar as it means that they don’t care about the activity and are clearly planning to engage in abusive activity

#### Education is a voter as it is the pedagogical intent of debate and why schools fund it

#### T is an RVI: multiple warrants:

a. AFF flex – negative has the ability to win on either layer so the aff needs the same ability in the 2ar. 2AR is too short to win a new shell and play defense against the 2NR theory arguments so the AFF needs reciprocal layers rather than adding more unreciprocal avenues. That’s not a problem in the long 2nr.

b. reciprocity- Only the neg can read T because only the aff has a burden to be topical. Thus the aff needs an RVI to compensate for the neg’s unique avenue to the ballot.

c. key to deterring frivolous T – otherwise T is a no risk issue that moots the entirety of the 1AC and becomes a NIB. T being an RVI encourages substantive engagement with the aff which is key to real world skills.

## 1ar

### Case

#### On the top – extend the first advantage – IP stifles innovation and harms access to vaccines, that’s bad because developing countries need those vaccines in order to start dealing with COVID, proliferation allows more mutations which causes extinction, as if covid keeps going we wont release enough aerosols to stop extinction

#### No incentives to go for counterfeits if price reductions and lower IP protection allows countries to go for the real deal

#### External regulation solves, adminstrations such as WHO and FDA have the ability to approve which drugs are safe which solves

#### Turn - High Drug Prices forces patients to go underground for drugs.

* AT Medicare CP – won’t cover Drugs – CP can’t fiat coverage

Bryant 11 Clifton Bryant 2011 “The Routledge Handbook of Deviant Behaviour” (former professor of sociology at VA Tech)//Elmer

Now, the field of medicine is able to achieve seemingly miraculous results, through organ transplantation, reviving patients who have been "clinically" dead, and curing supposedly "incurable diseases." Medical miracles are not cheap, however, and **the costs of** medical care and **drugs** have risen (and **continue to rise**) at a near-astronomical rate. Consequently, **neither** **private** medical insurance plans **nor Medicare** **will** now **cover certain** procedures, treatments, and **medicines**. In the future, with continuing reform of the US healthcare system, even fewer procedures, treatments, and medications might will be covered. Certainly, some medical treatment will be "rationed," and particular categories of people (such as the elderly) may be systematically denied the coverage they need. As a result of all this, **medical**- and health-related **crime** and deviance **will inevitably rise**. Medical insurance, Medicare, and Medicaid fraud, which is already prevalent today, will increase exponentially. Smugglers will "bootleg" ever more pharmaceuticals into the US, and a large, thriving, nationwide black market will develop **for those who cannot afford to buy uncovered medications**. More medicines and diagnostic equipment will be stolen, and back- street medical procedures using such stolen equipment may well be offered for cash with no questions asked. Armed robberies of valuable pharmaceuticals from drug stores and super- markets will increase, too. Bribery to obtain insurance-uncovered or rationed medical care (or, indeed, any kind of medical care where demand exceeds supply) will likely mushroom. This is actually common in some countries around the world. **Counterfeiting** expensive pharmaceuticals **will be prevalent**, and medical frauds of all kinds will be very widespread. Many of these frauds will be directed at the elderly population as it continues to increase in size. The elderly will be particularly vulnerable because they are most likely to be denied coverage for certain medical procedures or treatments. For instance, private health insurance and Medicare will both refuse to cover a woman in her mid-80s for potentially life-saving heart-bypass surgery. As a result, she will be a prime candidate for victimization by medical fraud that offers her affordable, but bogus, treatment. There is already a thriving international black market in human organs (Schepper-Hughes 2009). Kidneys are obtained from poor individuals in impoverished countries for relatively modest sums of money. This cash allows the donors to purchase luxuries, such as a small automobile, educate their children, or simply sustain their families for a few months. The organs are sometimes transferred quickly to a hospital in the donor's own country for transplant surgery. But on other occasions they are transported to the US or another Western country. In the US, obtaining an organ for transplantation in this fashion is illegal. Nevertheless, the practice will undoubtedly increase greatly in the future. Where medical care and medicines become exorbitantly expensive, cheaper ways to obtain them, even when these are illicit, will be sought. Where there are shortages of medical care or medicines, perhaps because of rationing, other means of obtaining them, even if deviant, will surely be employed. As the cost and the difficulty of obtaining medical care and medicines increase, the implications for increased crime and deviance become almost limitless.

#### Extend Eby 18, actual analysis of Ip and different companies shows that there isn’t any causational access

#### Emprically denied, despite massive Ip protection in the squo, innovation is at an all time low – prefer empirics over theoretical evidence

#### 7] No Link - lower drug prices don’t impact research incentives. Prefer comprehensive studies to pharma propaganda.

Dranove et al. 20 [David Dranove, Walter J. McNerney Professor of Health Industry Management; Faculty Director of PhD Program; Professor of Strategy. September 2, 2020. “Pharma Companies Argue That Lower Drug Prices Would Mean Fewer Breakthrough Drugs. Is That True?” <https://insight.kellogg.northwestern.edu/article/pharma-companies-argue-lower-drug-prices-fewer-breakthrough-drugs>] Dhruv

Expected Profits and Innovation

The study used pharmaceutical research data from 1997 through 2018 on over 70,000 molecules developed globally by over 4,300 biopharma companies. This time period spanned the advent of Medicare Part D, which was created as part of the Medicare Modernization Act of 2003, and became effective in 2006. This made possible a “natural experiment” on the relationship between expected profits and innovation. Starting in 2006, pharmaceutical companies would have expected an increase in profits for drugs targeting older patients, due to the increased prescription-drug coverage for this population. The question, then, was whether that increased expected profit would yield greater innovation in drugs targeting seniors—or would companies play it safe by focusing on copycat versions of existing drugs? The Choice: Playing It Safe The study showed little change in research on scientifically novel drugs for seniors in response to Medicare Part D. “We saw an increase in drug research targeting seniors after the expansion of Medicare Part D,” Dranove says, “but it was largely for drugs with the same target-based actions as previous ones—addressing essentially the same condition in the body.” From 2012 to 2018, there was an increase of 106 percent in the number of clinical trials for less-novel drugs targeting seniors, but only a 14 percent increase in trials for the most novel pharmaceuticals. That means that in response to the new financial incentives, drug companies focused largely on copycat versions of drugs rather than truly novel products. “What the new Medicare Part D was affecting are drugs that are only valuable at the margin,” Garthwaite says. A Green Light for Pricing Regulation The main practical implication of the finding is that incremental changes to drug profits probably won’t affect innovation in a noticeable way. On one hand, this is discouraging news for healthcare professionals and policymakers who might otherwise champion incremental incentives in order to boost innovation. But on the other, it also suggests that policies that slightly lower drug prices won’t stifle pursuit of novel drugs. In short, the researchers argue that minor changes to drug-company profits will neither encourage nor discourage innovation. “Increasing competition or decreasing returns from developing products won’t kill the biopharma industry,” Garthwaite says. That means Americans could potentially enjoy lower drug prices—and the access that goes with these—without suffering a costly loss of biopharma innovation. “That social impact is ultimately what we care about,” Garthwaite says. The researchers also point out that copycat drugs developed in response to Medicare Part D did represent some value to patients—Lipitor was far from the first cholesterol-reducing drug to market, for example, but it improved upon existing ones and became a high-grossing product for Pfizer, a win–win. “The fifth [copycat] drug brought to market may have the fewest side effects,” Dranove says. “Or it may be the one that drives prices down.”

#### Extend my evidence in the subpoint A – vaccines are key to preventing global disease

#### Even if vaccines aren’t the only thing – they are still critical to stopping the disease

#### We aren’t forcing people to produce, we are stifling innovation with the status quo, we just allow production to be boosted – no impact here

#### They say that the issue is supply – they’ve conceded to the solvency evidence, Ips are the cause of the lack of supply – and removing those Ips boost IPS - reject their evidence – its 21 years old

#### They say we reach herd immunity by the end of the year, the aff needs that to be faster, new variants are proliferating, we need to stop covid now

### Disclosure

Idk what he was talking abt - I wasn’t aff r2 this is literally just a random aff

This case is literally not my case I don’t know what the hell he is showing me

Also – you cant delete docs in the file shae

I had tech issues – the judge can verify – I couldn’t upload

Graphical user interface, text, application, website

Description automatically generated

#### Counter interpretation: Debaters don’t have to disclose on the ndca wiki

Strat Skew – the neg has a ton of time to prep out the perfect strategy against the aff that the aff has no ability to encounter for – the aff time skews make it so that not disclosing leads to fair opportunities in the round

The aff doesn’t have infinite time to prep their case, they cant possibly predict every neg strat and they have other cases and limited time before tournaments

Just because there is a good norm for debate does not mean that me not doing that norm that has benefits is a form of actual abuse, meaning that I shouldn’t be punished for it

Does not do much for clash, since most of the time you would dump a bunch of generic blocks

The disclosure interp is bad, it out of round theory distracts us from the topic and actual in round abuse – prefer, we only have this topic for a short period of time, while we have many years to set disclosure norms

### K

#### Role of the ballot is to vote for the debater who advances the most desirable political position. This allows the aff to weigh impacts which is key:

#### Equity: allowing Ks to make one scholarship indict wipes 6 minutes of offense and creates a late-breaking debate. They don’t have to read compatible scholarship; they just have to let us compare worlds. If they can claim links of the aff we should be able to contest them based on impact analysis.

#### Testing: allowing the aff to weigh vs. the kritik is essential to truth testing the resolution and comparatively evaluating ethical desirability. Letting the K moot the aff crushes critical thinking skills and is antithetical to the educational purpose of debate which is to allow both sides effective counterword to prove/disprove the resolution.

#### C- anything else is arbitrary, self serving, and leads to questions about the function of debate

#### Don’t let them win on the link here – they say that death is inevitable, but that doesn’t mean that we should actively work towards it, preventing death is good for society and for people to thrive, their link justifies death good in this context

#### Even if you don’t buy that we are still causing massive suffering via covid which should be stopped

#### The Aff solves extinction—that’s [subpoint A]. The alt can’t solve extinction whatsoever

**Util proves the near-infinite value of small reductions in catastrophic risk.**

**Seth D. Baum Research Affiliate of the University of Cambridge and Anthony M. Barrett co founder of the global catastrophic risk institute, Global Catastrophic Risk Institute, 2018** ["Global Catastrophes: The Most Extreme Risks", https://sethbaum.com/ac/2018\_Extreme.pdf, 2-21-2019] AWS

Taken literally, a global catastrophe can be any event that is in some way catastrophic across the globe. This suggests a rather low threshold for what counts as a global catastrophe. An event causing just one death on each continent (say, from a jet-setting assassin) could rate as a global catastrophe, because surely these deaths would be catastrophic for the deceased and their loved ones. However, in common usage, a global catastrophe would be catastrophic for a significant portion of the globe. Minimum thresholds have variously been set around ten thousand to ten million deaths or $10 billion to $10 trillion in damages (Bostrom and Ćirković 2008), or death of one quarter of the human population (Atkinson 1999; Hempsell 2004). Others have emphasized catastrophes that cause long-term declines in the trajectory of human civilization (Beckstead 2013), that human civilization does not recover from (Maher and Baum 2013), that drastically reduce humanity’s potential for future achievements (Bostrom 2002, using the term “existential risk”), or that result in human extinction (Matheny 2007; Posner 2004). A common theme across all these treatments of GCR is that some catastrophes are vastly more important than others. Carl Sagan was perhaps the first to recognize this, in his commentary on nuclear winter (Sagan 1983). Without nuclear winter, a global nuclear war might kill several hundred million people. This is obviously a major catastrophe, but humanity would presumably carry on. However, with nuclear winter, per Sagan, humanity could go extinct. The loss would be not just an additional four billion or so deaths, but the loss of all future generations. To paraphrase Sagan, the loss would be billions and billions of lives, or even more. Sagan estimated 500 trillion lives, assuming humanity would continue for ten million more years, which he cited as typical for a successful species. Sagan’s 500 trillion number may even be an underestimate. The analysis here takes an adventurous turn, hinging on the evolution of the human species and the long-term fate of the universe. On these long time scales, the descendants of contemporary humans may no longer be recognizably “human”. The issue then is whether the descendants are still worth caring about, whatever they are. If they are, then it begs the question of how many of them there will be. Barring major global catastrophe, Earth will remain habitable for about one billion more years until the Sun gets too warm and large. The rest of the Solar System, Milky Way galaxy, universe, and (if it exists) the multiverse will remain habitable for a lot longer than that (Adams and Laughlin 1997), should our descendants gain the capacity to migrate there. An open question in astronomy is whether it is possible for the descendants of humanity to continue living for an infinite length of time or instead merely an astronomically large but finite length of time (see e.g. Ćirković 2002; Kaku 2005). Either way, the stakes with global catastrophes could be much larger than the loss of 500 trillion lives. Debates about the infinite vs. the merely astronomical are of theoretical interest (Ng 1991; Bossert et al. 2007), but they have limited practical significance. This can be seen when evaluating GCRs from a standard risk-equals-probability-times-magnitude framework. **Using Sagan’s 500 trillion lives estimate, it follows that reducing the probability of global catastrophe by a mere one-in-500-trillion chance is of the same significance as saving one human life**. Phrased differently, society should try 500 trillion times harder to prevent a global catastrophe than it should to save a person’s life. Or, preventing one million deaths is equivalent to a one-in500-million reduction in the probability of global catastrophe. This suggests society should make extremely large investment in GCR reduction, at the expense of virtually all other objectives. Judge and legal scholar Richard Posner made a similar point in monetary terms (Posner 2004). Posner used $50,000 as the value of a statistical human life (VSL) and 12 billion humans as the total loss of life (double the 2004 world population); he describes both figures as significant underestimates. Multiplying them gives $600 trillion as an underestimate of the value of preventing global catastrophe. For comparison, the United States government typically uses a VSL of around one to ten million dollars (Robinson 2007). Multiplying a $10 million VSL with 500 trillion lives gives $5x1021 as the value of preventing global catastrophe. But even using “just" $600 trillion, society should be willing to spend at least that much to prevent a global catastrophe, which converts to being willing to spend at least $1 million for a one-in-500-million reduction in the probability of global catastrophe. Thus while reasonable disagreement exists on how large of a VSL to use and how much to count future generations, even low-end positions suggest vast resource allocations should be redirected to reducing GCR. This conclusion is only strengthened when considering the astronomical size of the stakes, but the same point holds either way. The bottom line is that, as long as something along the lines of the standard riskequals-probability-times-magnitude framework is being used, then even tiny GCR reductions merit significant effort. This point holds especially strongly for risks of catastrophes that would cause permanent harm to global human civilization. The discussion thus far has assumed that all human lives are valued equally. This assumption is not universally held. People often value some people more than others, favoring themselves, their family and friends, their compatriots, their generation, or others whom they identify with. Great debates rage on across moral philosophy, economics, and other fields about how much people should value others who are distant in space, time, or social relation, as well as the unborn members of future generations. This debate is crucial for all valuations of risk, including GCR. Indeed, if each of us only cares about our immediate selves, then global catastrophes may not be especially important, and we probably have better things to do with our time than worry about them. While everyone has the right to their own views and feelings, we find that the strongest arguments are for the widely held position that all human lives should be valued equally. This position is succinctly stated in the United States Declaration of Independence, updated in the 1848 Declaration of Sentiments: “We hold these truths to be self-evident: that all men and women are created equal”. Philosophers speak of an agent-neutral, objective “view from nowhere” (Nagel 1986) or a “veil of ignorance” (Rawls 1971) in which each person considers what is best for society irrespective of which member of society they happen to be. Such a perspective suggests valuing everyone equally, regardless of who they are or where or when they live. **This in turn suggests a very high value for reducing GCR, or a high degree of priority for GCR reduction efforts.**

#### Extinction is a prerequisite to their thinking.

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8. Global ethics must respond to mass extinction. In late 2014, the Worldwide Fund for Nature reported a startling statistic: according to their global study, 52% of species had gone extinct between 1970 and 2010.60 This is not news: for three decades, conservation biologists have been warning of a ‘sixth mass extinction’, which, by definition, could eliminate more than three quarters of currently existing life forms in just a few centuries.61 In other words, it could threaten the practical possibility of the survival of earthly life. Mass extinction is not simply extinction (or death) writ large: it is a qualitatively different phenomena that demands its own ethical categories. It cannot be grasped by aggregating species extinctions, let alone the deaths of individual organisms. Not only does it erase diverse, irreplaceable life forms, their unique histories and open-ended possibilities, but it threatens the ontological conditions of Earthly life. IR is one of few disciplines that is explicitly devoted to the pursuit of survival, yet it has almost nothing to say in the face of a possible mass extinction event.62 It utterly lacks the conceptual and ethical frameworks necessary to foster diverse, meaningful responses to this phenomenon. As mentioned above, Cold-War era concepts such as ‘nuclear winter’ and ‘omnicide’ gesture towards harms massive in their scale and moral horror. However, they are asymptotic: they imagine nightmares of a severely denuded planet, yet they do not contemplate the comprehensive negation that a mass extinction event entails. In contemporary IR discourses, where it appears at all, extinction is treated as a problem of scientific management and biopolitical control aimed at securing existing human lifestyles.63 Once again, this approach fails to recognise the reality of extinction, which is a matter of being and nonbeing, not one of life and death processes. Confronting the enormity of a possible mass extinction event requires a total overhaul of human perceptions of what is at stake in the disruption of the conditions of Earthly life. The question of what is ‘lost’ in extinction has, since the inception of the concept of ‘conservation’, been addressed in terms of financial cost and economic liabilities.64 Beyond reducing life to forms to capital, currencies and financial instruments, the dominant neoliberal political economy of conservation imposes a homogenising, Western secular worldview on a planetary phenomenon. Yet the enormity, complexity, and scale of mass extinction is so huge that humans need to draw on every possible resource in order to find ways of responding. This means that they need to mobilise multiple worldviews and lifeways – including those emerging from indigenous and marginalised cosmologies. Above all, it is crucial and urgent to realise that extinction is a matter of global ethics. It is not simply an issue of management or security, or even of particular visions of the good life. Instead, it is about staking a claim as to the goodness of life itself. If it does not fit within the existing parameters of global ethics, then it is these boundaries that need to change.

#### \*Perm do both— including the plan is key to manage inevitable institutions.

Alex S. Vitale, Professor of Sociology and Coordinator of the Policing and Social Justice Project at Brooklyn College, Member of the New York State Advisory Committee of the US Commission on Civil Rights, holds a Ph.D. in Sociology from the City University of New York, interviewed by David Langstaff, Graduate Teaching Assistant in Rhetoric and Composition at Wayne State University, in Rustbelt Abolition, in 2017, [“Beyond Policing”, <https://rustbeltradio.org/2017/10/09/ep10/>, 9-21-20] IKK

David Langstaff: Expanding a little bit on the last point that you’re making about more radical political and economic empowerment, if efforts to reform the police have time and again failed to in any way reduce the violence that’s bound up with policing, to what extent is the framework of reform itself a problem? And to what extent do we need to think about what it means to struggle against police violence in fundamentally different ways? Alex Vitale: So as an activist on the ground, there’s a dilemma. Because the police are here, they’re a powerful force that people have to deal with on a daily basis often. So while we may have an analysis that says that the ultimate solutions to these problems are certain kinds of economic and political and social transformations, the empowerment of communities, the welfare of individuals, we also have to deal with the institution that already exists now. So the approach I take is to interrogate the forms that are being proposed, to see whether or not they empower police, or they move us in the direction of reducing police power and creating alternatives. Whether it’s affordable housing, or adequate mental healthcare, we need to make that the center of any police reform agenda. In groups like BYP 100, and the Youth Justice Coalition in Los Angeles, are doing just that. They are saying let’s redirect resources from policing, from courts, from prisons, into the kinds of social programs and economic transformations that will reduce the need for coercive state action.

#### Perm do the plan then the alt: they’re in a double bind—either the alt can overcome the single instance of the Aff or it will fail to overcome the status quo