# 1

#### Interp – “medicines” prevent, diagnose, or treat harms

**MRS 20** [(MAINE REVENUE SERVICE SALES, FUEL & SPECIAL TAX DIVISION) “A REFERENCE GUIDE TO THE SALES AND USE TAX LAW” <https://www.maine.gov/revenue/sites/maine.gov.revenue/files/inline-files/Reference%20Guide%202020.pdf> December 2020] SS

[Medicines](https://www.lawinsider.com/dictionary/medicines) means antibiotics, analgesics, antipyretics, stimulants, sedatives, antitoxins, anesthetics, antipruritics, hormones, antihistamines, certain “dermal fillers” (such as BoTox®), injectable contrast agents, vitamins, oxygen, vaccines and other substances that are used in the prevention, diagnosis or treatment of disease or injury and that either (1) require a prescription in order to be purchased or administered to the retail consumer or patient; or (2) are sold in packaging.

#### Violation – CRISPR is a platform technology, not a medicine – being relevant for other medical research isn’t sufficient

Editas n/d [Editas Medicine, transnational medical organization focused on gene research and medical innovation. “CRISPR Gene Editing” https://www.editasmedicine.com/crispr-gene-editing/]

CRISPR (pronounced “crisper”) is an acronym for “Clustered, Regularly Interspaced, Short Palindromic Repeats,” and refers to a recently developed gene editing technology that can revise, remove, and replace DNA in a highly targeted manner. CRISPR is a dynamic, versatile tool that allows us to get to and edit nearly any location in the genome, and has the potential to help us develop medicines for people with a wide variety of diseases. We view CRISPR as a “platform” technology because of its ability to target DNA in any cell or tissue.

#### 1] Limits – their model explodes it to medical devices, home remedies, anything that remotely treats and more – only our definition creates a reasonable caselist for medicines while they make prep impossible and wreck engagement

#### 2] Precision – MRS is a legal definition of medicines from codified law and has intent to define which proves we’re right and consistent with topic lit – that determines research burdens and the scope of aff and neg ground

#### 3] use competing interps – reasonability is arbitrary and the brightline devolves to competing interps

# 2

#### Biopharma innovation is key to overall competitiveness – US still has a razor thin lead but protecting IP is uniquely key

Ezell 20 [Stephen Ezell, Director of Global Innovation Policy at the Information Technology and Innovation Foundation (ITIF). "Ensuring U.S. Biopharmaceutical Competitiveness." 7/16/20. https://itif.org/publications/2020/07/16/ensuring-us-biopharmaceutical-competitiveness]

Nations are competing for increased market share in a wide array of advanced-innovation industries, understanding that these industries are the key to competitiveness, national security, and good jobs. China’s “Made in China 2025” strategy is perhaps the most visible of these efforts, but by no means the only one.

Many nations, including China, have targeted the biopharmaceuticals industry—an industry which the United States has long led—especially in drug innovation. One result has been that over the last decade U.S. biopharmaceutical manufacturing value-added output has fallen by almost one-third, as the U.S. trade deficit in drugs and inputs has increased. Fortunately, America still leads in innovation and drug development, in large part due to effective life-science policies, including significant federal investment in life-sciences basic research, robust intellectual property (IP) protections, effective technology transfer policies, investment incentives, and, importantly, drug pricing policies that enable companies to invest in high-risk drug development.

But if the story of the past decline, and even loss, of other critical U.S. industries provides any guide, loss of U.S. production will ultimately lead to the loss of innovation capabilities as well. It is not enough for the United States to lead in drug development, it must also at least hold its own in drug production. This is especially true given the coming challenge from China, which intends to dominate the global drug industry, at all phases, from innovation to production to marketing.

Now is not the time for free-market complacency, hoping that America’s entrepreneurial spirit and rule of law will somehow suffice (the United States didn’t gain its biopharma lead from a laissez faire approach, and it certainly won’t keep its lead with it alone). Nor is it the time for drug populism, a political movement that both sides of the aisle, but especially progressives, have unfortunately embraced. Drug populism and its accompanying policies of weaker IP protections and draconian drug price controls would likely result in cheaper drugs. But there should be no confusion that it will lead to a hollowing out of U.S. capabilities, not just in production but also in innovation (and, not to mention, fewer new lifesaving drugs). If the United States is serious about competitiveness overall, and competitiveness in the biopharma sector specifically, an industry that the United States still has strong capabilities in—unlike the telecom equipment or flat-panel display industries, to name just two—then it’s time for Washington to articulate and embrace a robust national biopharmaceutical competitiveness strategy.

#### Chinese tech leadership causes nuke war

Kroenig & Gopalaswamy 18, \*Associate Professor of Government and Foreign Service at Georgetown University and Deputy Director for Strategy in the Scowcroft Center for Strategy and Security at the Atlantic Council. \*\*Director of the South Asia Center at the Atlantic Council. He holds a PhD in mechanical engineering with a specialization in numerical acoustics from Trinity College, Dublin. (Matthew & Bharath, 11-12-2018, "Will disruptive technology cause nuclear war?", *Bulletin of the Atomic Scientists*, https://thebulletin.org/2018/11/will-disruptive-technology-cause-nuclear-war/)

Rather, we should think more broadly about how new technology might affect global politics, and, for this, it is helpful to turn to scholarly international relations theory. The dominant theory of the causes of war in the academy is the “bargaining model of war.” This theory identifies rapid shifts in the balance of power as a primary cause of conflict.

International politics often presents states with conflicts that they can settle through peaceful bargaining, but when bargaining breaks down, war results. Shifts in the balance of power are problematic because they undermine effective bargaining. After all, why agree to a deal today if your bargaining position will be stronger tomorrow? And, a clear understanding of the military balance of power can contribute to peace. (Why start a war you are likely to lose?) But shifts in the balance of power muddy understandings of which states have the advantage.

You may see where this is going. New technologies threaten to create potentially destabilizing shifts in the balance of power.

For decades, stability in Europe and Asia has been supported by US military power. In recent years, however, the balance of power in Asia has begun to shift, as China has increased its military capabilities. Already, Beijing has become more assertive in the region, claiming contested territory in the South China Sea. And the results of Russia’s military modernization have been on full display in its ongoing intervention in Ukraine.

Moreover, China may have the lead over the United States in emerging technologies that could be decisive for the future of military acquisitions and warfare, including 3D printing, hypersonic missiles, quantum computing, 5G wireless connectivity, and artificial intelligence (AI). And Russian President Vladimir Putin is building new unmanned vehicles while ominously declaring, “Whoever leads in AI will rule the world.”

If China or Russia are able to incorporate new technologies into their militaries before the United States, then this could lead to the kind of rapid shift in the balance of power that often causes war.

If Beijing believes emerging technologies provide it with a newfound, local military advantage over the United States, for example, it may be more willing than previously to initiate conflict over Taiwan. And if Putin thinks new tech has strengthened his hand, he may be more tempted to launch a Ukraine-style invasion of a NATO member.

Either scenario could bring these nuclear powers into direct conflict with the United States, and once nuclear armed states are at war, there is an inherent risk of nuclear conflict through limited nuclear war strategies, nuclear brinkmanship, or simple accident or inadvertent escalation.

This framing of the problem leads to a different set of policy implications. The concern is not simply technologies that threaten to undermine nuclear second-strike capabilities directly, but, rather, any technologies that can result in a meaningful shift in the broader balance of power. And the solution is not to preserve second-strike capabilities, but to preserve prevailing power balances more broadly.

# Case

## Solvency

#### No effective gene editing governance, certainly not in the squo – tech evolves too fast, no institutional checks, no one cares

Monast 18 Monast, Jonas J. C. Boyden Gray Distinguished Fellow, Assistant Professor and Director of the Center on Climate, Energy, Environment & Economics at UNC. J.D., Georgetown University (2002) B.A., Appalachian State University (1995). "Governing Extinction in the Era of Gene Editing." NCL Rev. 97 (2018): 1329.

With CRISPR, the critical question is no longer whether humans can alter genes to eradicate some species and make others resilient to factors that may cause extinction. Instead, the questions are whether we should and, if so, under what circumstances. While the potential benefits are profound, CRISPR could also foment similarly profound, and potentially irreversible, negative impacts for the target species and the broader ecosystems in which they exist.10 Existing laws are not designed to grapple with these important value choices. Gene editing raises many of the hallmark challenges with emerging technology governance.11 These recent advances in biotechnology may fall outside the scope of existing regulatory schemes designed for earlier understandings of technologies. They may also require responses by multiple agencies operating under different bodies of law.12 The pace of scientific developments is occurring much faster than traditional regulation can typically respond.13 There are calls for flexibility and adaptability to allow the technologies to evolve.14 Continued research is necessary to develop new, potentially beneficial uses for the technology, but the research also creates unknown risks. The technology is widely accessible, allowing individual research labs to create and release edited organisms with potentially wide-ranging impacts.15 Nonbinding soft law measures, such as professional standards and codes of conduct, will play important roles in overseeing research and development of CRISPR-edited organisms. Gene editing implicates diverse and deep- seated values, but engaging a broad range of stakeholders is difficult. Developers seek rapid regulatory approval for releasing new genetically engineered (“GE”) organisms.

#### Gene editing decouples Ghana’s cocoa industry from climate change and enables it’s survival

Gakpo 19 Joseph Opoku Gakpo, June 13, 2019 "Gene editing could save Ghana’s cocoa from extinction, scientists say - Alliance for Science." Alliance for Science, allianceforscience.cornell.edu/blog/2019/06/gene-editing-save-ghanas-cocoa-extinction-scientists-say.

A new study warns that climate change could drive Ghana’s cocoa (cacao) industry to extinction — a fate that scientists say could be reversed through gene editing. A study by the Climate Change Unit of Ghana’s Environmental Protection Agency (EPA) and the Cocoa Research Institute of Ghana is predicting the country’s environment will no longer be conducive to growing cocoa by 2080 if current climate change trends continue. The study supports a 2017 prediction by scientists that cocoa could go extinct across the world in 40 years. Ghana is the world’s second largest producer of cocoa, which is the main ingredient in the production of chocolate. Cocoa is the primary ingredient in chocolate. The Ghana study found that the reduced rainfall and increased temperatures resulting from climate change will make the country’s cocoa belt unsuitable for production of the crop by 2080, Angelina Mensah, public affairs director of Ghana’s Environmental Protection Agency, told a Ghana newspaper. “In the study, it was identified that due to warm temperature conditions being experienced currently in the country, the dry season, which spans from September to March, has exacerbated. This means cocoa, which is very sensitive to drought, in terms of growth and yields, would be affected,” she explained. “(Soil) moisture level in the years ahead will not be adequate for profitable cocoa production. Unless immediate interventions are rolled out to tackle climate change, cocoa would only be in the history books for the next generation to read.” If such interventions are not forthcoming, gene editing could be the solution to breeding new cocoa varieties that can survive the changing conditions. “Gene editing has the potential to accelerate the breeding of new cocoa varieties with resistance to climate stress and pests and diseases,” said Mark Guiltinan, professor of molecular biology at Pennsylvania State University, in an interview with the Alliance for Science. He noted that gene editing has already been used to develop other crops with improved resistance to some of the same climate-related stresses that cocoa is facing. “A key advantage of this approach is that it could be used to edit varieties with special characteristics and locally adapted to environmental conditions, which will avoid the very time-consuming process of moving traits from one access into another, which could take decades,” Guiltinan added. Ongoing work with CRISPR Guiltinan is leading a research project at Penn State that will help produce better cocoa plants using the CRISPR-Cas9 gene editing tool. CRISPR (clustered regularly interspaced short palindromic repeats) is a DNA sequence found in single-celled organisms. It can be used to introduce an enzyme called Cas9 in organisms to precisely edit their genomes and delete, silence or replace specific DNA regions. The researchers have used CRISPR-Cas9 to knock out a cocoa gene called TcNPR3 that suppresses the plant’s disease response. The researchers also created gene-edited cocoa embryos which they hope will grow into mature trees to test the effectiveness of this approach at a whole plant level. “We have regenerated some CRISPR-mediated gene-edited plants with mutations in a repressor of the pathogen defense system,” Guiltinan said. “These plants show strong resistance in lab tests. The plants are now about 2 feet tall and growing fast. Soon we will be able to perform further testing.” Low cocoa productivity in Africa In addition to climate change, cocoa growers in developing nations are facing other challenges, including lack of irrigation and the inability to purchase inputs like pesticides and fertilizers. In Ghana, cocoa orchards are also being displaced by more profitable rubber plantations. An estimated 30 percent of all cocoa produced in West Africa is destroyed by disease before it can get off the farm, which creates an enormous financial burden for farmers. In Ghana, the world’s second-largest cocoa producing country, state regulator COCOBOD revised the expected cocoa output for 2019 downward earlier this year because of an increase in pest attacks and disease. The increased pest and disease attacks have have been exacerbated partly by climate change, which encourages the rampant spread of disease-causing organisms that become more active in warmer weather. The Cocoa Swollen Shoot Virus (CSSV) disease, for example, has destroyed more than 200 million cocoa trees in West Africa and continues to spread on farms in the sub-region. Although it will take some time, Guiltinan is confident that gene editing technology will in due course be able to help farmers deal with diseases on cocoa farms. “The cocoa farmers around the world should know that it will be many years before these efforts find their way to their fields because on top of the technical challenges, there are also legal regulations and the public acceptance of these products that need to be addressed as well,” he said. “In the meantime, we are working to develop transgene-free gene editing in cacao and we are targeting several other genes for traits of interest, such as disease-resistance and quality traits. One trait of special interest for West Africa is CSSV resistance.” If all goes well, Guiltinan said, “I see a strong possibility of the first gene-edited cacao being ready for farmers in about five to 10 years.”

#### Destroys Ghana’s rainforest biodiversity

Omponsah and Tayki 20 Amponsah, Owusu [ Senior Lecturer, Department of planning, Kwame Nkrumah University of Science and Technology (KNUST) ] and Stephen Appiah Takyi [ Lecturer, Planning, Kwame Nkrumah University of Science and Technology (KNUST) ]. "Ghana's cocoa production relies on the environment, which needs better protection." Conversation, April 5, 2020, theconversation.com/ghanas-cocoa-production-relies-on-the-environment-which-needs-better-protection-134557.

Cocoa production has been the backbone of Ghana’s economy since the 1870s. It dominates the agricultural sector and contributes about 30% of the country’s export earnings. Cocoa employs about 800,000 farmers directly. It also supports the livelihoods of others in the commerce, service and industrial sectors of the Ghanaian economy. This makes it an important generator of revenue. Most studies of cocoa production have focused on its economic benefits. Less attention has been paid to its environmental impacts. But cocoa farming has enormous environmental consequences. This is because it can only take place in Ghana’s forest agro-ecological zone. In this zone, the rainfall is ideal for cocoa at 1500-2000mm, with a dry season of about four months. Also, cocoa trees thrive under shade. But with rising demand for cocoa on the world market, large areas of forest cover have been lost to its cultivation. The expansion and cultivation of new parcels of forest land, the replacement of old cocoa trees and the abandonment of old cocoa farmlands due to loss of soil fertility, have depleted the country’s forest cover. Between 2010 and 2015, 117,240 hectares of forest were cleared. Do experts have something to add to public debate? This loss is a threat to the very industry that is causing it. Over the years researchers, policy makers and practitioners in Ghana’s agricultural and environmental sectors have underestimated the environmental impacts of agricultural activities such as cocoa production. The link between low productivity in the cocoa sector and environmental impacts is contributing to uncertainty in the sector’s long-term sustainability. There is, therefore, an urgent need for more research, policies and strategies that will help minimise the environmental impacts of cocoa production. We undertook a study to assess these environmental impacts. We focused particularly on practices such as the clearing of cocoa farms and the use of insecticides and fertilisers.

**Key to prevent extinction**

**Owusu-Afriyie, 2 ---** Aburi Botanic Gardens staff

(George, "The Potential Role of African Botanic Gardens in Environmental Awareness Programmes and the Need to be Involved," 10-1-2, www.bgci.org/education/1703/, accessed 1-15-12)

Today some of the 60 botanic gardens and arboreta in Africa are among those botanic gardens that are leading the worldwide fight to save plant diversity, as well as creating an understanding and awareness for the promotion of methods of conservation and development of plant resources. Despite financial constraints, a number of African botanic gardens are implementing major reforms under the auspices of Botanic Gardens Conservation International, to enable them play a more purposeful role in conservation. The Creation of Environmental Awareness Among the Populace **African's biological diversity is** not only of continental economic importance but is also **of global significance**. Unfortunately, existing arrangements for the utilization of the continent's biodiversity cannot be considered sustainable and this is having serious repercussions on development programmes in Africa. The rich plant diversity in Africa is indiscriminately harvested for a number of purposes including: cultivation and production of food and cash crops for domestic and external interests herbal medicine construction. Luckily, in spite of their continued exploitation, botanic gardens and other habitats still contain some of the **richest assemblages of plant life known on this planet.** Thus African gardens are appropriate institutions with the necessary capacities and plant diversities for use in environmental awareness programmes. The success of environmental awareness programmes will largely depend upon the communities' understanding of the functioning of the environment, the problems it presents, and their expected contribution to its protection and improvement. The pursuit of conservation-oriented practices to halt the degradation and extinction of plant resources will depend not only on their acceptability, but also on the active support and involvement of the populace at large. In addition, people need to be well informed, sensitized and motivated towards adopting specific plant conservation practices and the sustainable use of plant resources. It is well known that plants are the **key to life on Earth** and the **prime element in biodiversity**. They dominate our landscape, providing the framework of natural ecosystems that provide the habitats for animal species and **make life on earth possible for humans** as well as other living beings. Yet in spite of this common knowledge of the importance of plants in human survival, plant life is being lost at an increasing rate not only in Africa, but also throughout the whole world. This is the result of economic pressure on the developing countries and careless human activities. Until unfair transactions, particularly in trading systems, are addressed and humans made the centre of attention, only a limited impact will be made in our effort to control the excessive utilization of resources and the regenerability of the various life-sustaining systems on the Earth.

**Prefer the specificity our evidence to African biodiversity- its key to prevent extinction- key region and species to global life-support systems**

**Richard, 10** -- science and technology editor

(Michael Graham, "The True Size and Importance of Africa," 10-13-10, www.treehugger.com/clean-technology/the-true-size-and-importance-of-africa-map.html, accessed 1-16-12)

Don't Overlook Africa! Because of the way flat maps distort the size of countries (the closer they are to the poles, the more distorted they are), most people don't really know just how big the African continent is. This leads many people - and the smart and powerful aren't immune to this - to underestimate Africa's importance. The map above shows just how wrong our perception can be (unless we've already seen a map like this before). It shows that you could fit the whole USA, China, India, Spain, France, Germany, the UK, Italy, Switzerland, Japan, and Eastern Europe, inside of Africa and still have some room left. We're All Inter-Connected Africa matters a lot because of the number of people who live there (about 1 billion as of 2005, with projections of 2 billion by 2050), but also because of the **number of indigenous animal and plant species**, because of the vast expanses of land that aren't being protected, because of the huge ecosystems that are uniquely found there, because of the impact that it can have on the global climate (especially deforestation and desertification), because of all the solar power potential and other natural resources, etc. It is one of the **key regions** that needs to improve on many levels for the welfare of its people and **to safeguard the integrity of our planet's life-support systems.** Africa is too often the forgotten continent, but it shouldn't be, and humanitarian problems should make us forget environmental issues because both go hand in hand. The degradation of the environment will affect the most vulnerable people there.

#### Gene editing perfects bioweaponry – and is perfect to eradicate massive populations

Rode et al 20 View ORCID ProfileNicolas O. Rode [INRAE researcher at the CBGP (Biological Center for Population Management, Montpellier, France).] , View ORCID ProfileVirginie Courtier-Orgogozo [research investigates the mutations responsible for natural evolutionary changes. At Université Paris Diderot] and View ORCID Profile Florence Débarre [evolutionary biologist, doing mostly theoretical work. My current research projects are on COVID-19, but I also keep working on models of gene drive. I am a CNRS researcher at the Institute of ecology and environmental sciences, in Paris, where I am a member of the EERI group.] G3: Genes, Genomes, Genetics September 1, 2020 vol. 10 no. 9 3403-3415; https://doi.org/10.1534/g3.120.401484

CRISPR-based homing gene drive is a genetic control technique aiming to modify or eradicate natural populations. This technique is based on the release of individuals carrying an engineered piece of DNA that can be preferentially inherited by the progeny. The development of countermeasures is important to control the spread of gene drives, should they result in unanticipated damages. One proposed countermeasure is the introduction of individuals carrying a brake construct that targets and inactivates the drive allele but leaves the wild-type allele unaffected. Here we develop models to investigate the efficiency of such brakes. We consider a variable population size and use a combination of analytical and numerical methods to determine the conditions where a brake can prevent the extinction of a population targeted by an eradication drive. We find that a brake is not guaranteed to prevent eradication and that characteristics of both the brake and the drive affect the likelihood of recovering the wild-type population. In particular, brakes that restore fitness are more efficient than brakes that do not. Our model also indicates that threshold-dependent drives (drives that can spread only when introduced above a threshold) are more amenable to control with a brake than drives that can spread from an arbitrary low introduction frequency (threshold-independent drives). Based on our results, we provide practical recommendations and discuss safety issues. Genetic controlgene drive braketheoretical model The use of engineered gene drives has been proposed as a technique for population control with potential applications in public health, agriculture and conservation (Burt 2003; Esvelt et al. 2014). This technique relies on the release of genetically engineered individuals that can rapidly propagate a transgene of interest into wild populations. Gene drives can be designed to modify, suppress or eradicate various target species (Scott et al. 2018; Rode et al. 2019). Potential target species include disease vectors (e.g., Anopheles gambiae, the main vector of malaria in Africa; Kyrou et al. 2018), agricultural pests (e.g., Drosophila suzukii, a major pest of soft fruits; Courtier-Orgogozo et al. 2017; Scott et al. 2018) or invasive rodents (e.g., invasive house mouse or black rats that threaten biodiversity on islands; Leitschuh et al. 2018). Due to the universality of CRISPR genome editing, CRISPR-based gene drives can potentially be applied to a wide variety of organisms (Esvelt et al. 2014; Raban et al. 2020). Diverse CRISPR-based gene drive systems have already been developed in the laboratory as proofs-of-principle in a few model organisms (homing, split homing, translocation, X-shredder, killer-rescue, cleave-and-rescue and TARE gene drives; Webster et al. 2020; Champer et al. 2020; see Raban et al. 2020 for a review) or as theoretical possibilities (daisy chain drives; Noble et al. 2019). Gene drives have so far only been tested in the laboratory and no field trial has been conducted yet. Among these systems, CRISPR-based homing gene drives are the most adaptable to new species and populations and the most advanced in terms of technological development (Raban et al. 2020). They involve a piece of DNA that includes a guide RNA (gRNA) gene and a cas9 gene (encoding the Cas9 endonuclease). The gRNA is designed to recognize a specific sequence in a wild-type chromosome, so that in heterozygotes carrying a drive allele and a wild-type allele, the Cas9-gRNA molecular complex will cut the wild-type chromosome at the target site. The resulting double-strand DNA break can then be repaired through homology-directed repair (also known as “gene conversion”), using the drive allele as a template, which is designed to harbor sequences identical to the ones flanking the target site. Consequently, the drive allele is transmitted to the next generation at rates beyond those of regular Mendelian inheritance and, if its features allow it, will rapidly spread within the target population. Homing gene drives are sometimes considered as “threshold-independent drives”, i.e., as being able to spread in a population from an arbitrary low introduction frequency (e.g., Marshall and Akbari 2018). Mathematical models of homing gene drives (e.g., Deredec et al. 2008; Alphey and Bonsall 2014; Unckless et al. 2015; Tanaka et al. 2017) have however shown that depending on various parameters (the efficacy of gene conversion, its timing, the fitness cost incurred by the drive allele and its dominance over the wild-type allele), some of the homing gene drives can be threshold-dependent, i.e., only spread if they are introduced above a threshold frequency. Mathematically, when there is an equilibrium at an intermediate frequency of the drive allele (Embedded Image) and when this equilibrium is unstable, then the drive is threshold-dependent; the value of the drive allele frequency at this equilibrium is the threshold above which the drive has to be introduced to spread (Deredec et al. 2008). Given that gene drives can potentially impact biodiversity, national sovereignty and food security (Oye et al. 2014; Akbari et al. 2015; DiCarlo et al. 2015; NASEM 2016; Montenegro de Wit 2019), there is a crucial need to develop strategies to minimize the risks of unintentional spread (e.g., following the escape of gene drive individuals from a laboratory) and to mitigate unanticipated or premeditated and malevolent harm to humans or the environment. For example, a CRISPR-based eradication drive may spread into a non-target population or species (Noble et al. 2018; Rode et al. 2019; Courtier-Orgogozo et al. 2020); a modification drive may alter the target population in an unexpected, detrimental manner; or a gene drive could be used as bioweapon (Gurwitz 2014). Decreasing the environmental risks associated with the development of this technology can be achieved by designing safer gene drives whose spread can be controlled spatially or temporally (Marshall and Akbari 2018; Raban et al. 2020) and by developing countermeasures to stop the spread of an ongoing gene drive (Esvelt et al. 2014; Gantz and Bier 2016; Vella et al. 2017).

#### Bioterror – possible now, likely, outweighs, extinction

De Bretton-Gordon 20 Hamish De Bretton-Gordon, CBRN Expert @ British Army, 20 [Director @ DBG Defense, Consultant on CBRN and Biosecurity], “Biosecurity in the Wake of COVID-19: The Urgent Action Needed,” Combatting Terrorism Center Sentinel, November/December 2020, Volume 13, Issue 11, <https://ctc.usma.edu/biosecurity-in-the-wake-of-covid-19-the-urgent-action-needed/> C.VC

Policymakers around the world did not grasp just how large the impact of a bio threat could be. Beyond the enormous human and economic impact, the current pandemic has exposed the weakness, lack of preparedness, and poor responsiveness of healthcare systems of even highly developed countries like the United States and the United Kingdom. And the virus has inflicted carnage, even though SARS-CoV-2 (the virus that causes COVID-19) is not especially virulent. The world may be confronted with other viruses in the future whose combination of virulence (the harm a pathogen does to its host), transmissibility, and other characteristics pose much greater danger.

While overwhelming evidence points to SARS-CoV-2 spontaneously spreading to humans, the advances in synthetic biology and the growth in the number of Level 3 and 4 biocontainment facilities around the world storing deadly viruses1 mean there is also the very real possibility that in the future, bad actors will try to engineer or steal/obtain a highly transmissible and highly virulent virus and unleash it onto the world. Another risk is accidental releases from such biocontainment facilities.

COVID-19, a highly transmissible but not very virulent pathogen, has had a devastating global impact, a fact that will not have gone unnoticed by rogue states and terror organizations. Advances in synthetic biology have created tools that could be put to malevolent use. In the last two decades, scientists synthesized the poliovirus from its genetic sequence,2 recreated the 1918 Spanish flu virus,3 and succeeded in modifying the H5N1 avian flu virus so that it resulted (in a research laboratory) in airborne transmission among mammals.4 In the future, we should think of weaponized biology as no less of an existential threat to the planet than weaponized atomic science. It should also be noted that the fear and panic that even a medium-scale bioterror attack could create could have dangerous implications that may rival or even surpass the immediate loss of life.

The Need to Rethink Likelihood

Given the fact that in late 2019 when, as far as is known, COVID-19 cases first started emerging in China, it had been more than a century since the previous catastrophic outbreak (the 1918-1919 “Spanish flu” pandemic),d it was unsurprising that many thought of such pandemics as a one-in-a-100-year event. Such assumptions should no longer hold. The encroachment of human settlements into areas that had previously been sanctuaries for wildlife5 and the popularity in some parts of the world of markets where people and wild animals are brought into proximity have made it more likely viruses will make the species leap to human beings.e And when they do, as the COVID-19 pandemic illustrated, the interconnectedness of a world in which millions of people fly each day6 means they can spread very rapidly.

There is also growing concern about engineered viruses. Not only have advances in synthetic biology (SynBio) created growing capacity for extremely dangerous viruses to be engineered in a laboratory, but the number of people with access to potentially dangerous ‘dual use’ technology has greatly expanded and continues to expand, making malevolent use of such technology ever more likely.

In the August 2020 issue of this publication, scientists at the U.S. Military Academy at West Point warned that:

The wide availability of the protocols, procedures, and techniques necessary to produce and modify living organisms combined with an exponential increase in the availability of genetic data is leading to a revolution in science affecting the threat landscape that can be rivaled only by the development of the atomic bomb. As the technology improves, the level of education and skills necessary to engineer biological agents decreases. Whereas only state actors historically had the resources to develop and employ biological weapons, SynBio is changing the threat paradigm.

The cost threshold of engineering viruses is also lowering, with the West Point scientists warning that synthetic biology has “placed the ability to recreate some of the deadliest infectious diseases known well within the grasp of the state-sponsored terrorist and the talented non-state actor.”7

As already noted, another source of vulnerability is that deadly viruses could be stolen from or escape from a research laboratory. There are now around 50 Biosafety Level 4f facilities around the world, where the deadliest pathogens are stored and worked on, and this figure is set to increase in the next few years.g This is a large increase over the last 30 years, creating bigger risk of a breach. Of equal, if not greater concern are the thousands of Biosafety Level 3 labs globally,8 which handle deadly pathogens like COVID-19.9

Given what has been outlined above, the risk of a future destructive biological attack or another devastating global pandemic should no longer be seen as low. From this point forward, there should no higher priority for the international community than biosecurity.

#### And outweighs the aff

Bakerlee 21 Chris Bakerlee is a Ph.D. candidate studying evolutionary genetics at Harvard University and a fellow in the Council on Strategic Risks’s Fellowship for Ending Bioweapons Programs. "Mother Nature is not 'the ultimate bioterrorist' - STAT." STAT, 8 Jan. 2021, www.statnews.com/2021/01/08/mother-nature-is-not-the-ultimate-bioterrorist. [Quality Control]

Taken together, these examples show that this meme no longer serves us well. It is undoubtedly a mistake to underestimate the threats from natural pathogens. At the same time, it is equally unwise to wield this 19-year-old expression like a magic wand, intending to briskly banish concerns about people causing harm with biology. We can’t afford to blind ourselves or others to the uncomfortable truth that, with each passing day, humans grow more capable of outdoing nature and harnessing biotechnology to cause harm on a staggering scale, by either cruelty or carelessness.

Nature has no interests, motives, or political goals. To the extent it can be said to “want” anything, it is to perpetually enhance populations’ differential reproductive success, which only rarely aligns with causing greater harm to humans. Notably, the trillions of bacteria living in the average human’s colon appear to have adapted toward a peaceful and often mutually beneficial coexistence with their host. And even deadly pathogens may theoretically evolve toward making humans less sick if doing so opens up more opportunities for transmission between hosts.

The process of natural selection, for all its power, is highly constrained in its ability to generate “superbugs” possessing a diabolical suite of traits. Like human bioengineers, natural selection must work around stubborn physiological trade-offs between traits, such as genome replication rate and mutation rate. But natural selection is also handicapped by near-sightedness, driving improvements in traits that enhance a population’s fitness in its current environment with no attention to maintaining or improving traits that enhance fitness in other environments.

If creating an especially deadly pathogen were like winning a soccer match against a formidable opponent, natural selection would be competing with all the cunning of an especially persistent horde of 5-year-olds, glued to the ball and only ever capable of playing offense, defense, or goalie at any one time.

By contrast, modern biologists are gaining the ability to see the whole field, develop an intuition about where the ball will be next, and play multiple positions simultaneously. Through a combination of rational design, directed evolution, breeding, and brute force trial and error, they can increasingly engineer organisms that excel in multiple desired functions at once, such as the ability to grow quickly in a massive industrial fermenter while churning out commercially valuable biomolecules. This growing capability promises tremendous benefits for agriculture, industry, and human health, but its potential application to the creation of pathogens poses serious concerns.

It is worth emphasizing that trained biologists — let alone terrorists — still have difficulty one-upping natural selection’s creative output. Our understanding of biology is very much in its infancy. Yet our knowledge and capabilities are maturing rapidly, as evidenced by Twist’s prolific gene synthesis capabilities, along with recent feats in predicting protein structure, gene editing, and genome assembly. We are much closer to this exciting but frightening horizon today than we were in 2001, and this trend will likely persist.

It’s also worth noting that, when it comes to weapons-grade biotechnology, states likely pose a greater risk than non-state terrorists. States have vastly more resources to support the development of biological weapons, and about 23 are known or suspected to have maintained biological weapons programs in the 20th century. Some programs, like North Korea’s, likely persist to this day. As countries jockey for advantage, state biological weapons programs remain an ever-present danger, despite the treaties and export controls designed to rein them in. Covid-19, which has exposed countries’ vulnerability to biological threats, has done little to mitigate this danger.

Accidental releases pose an additional source of anthropogenic biorisk. Thanks to the U.S. government’s monitoring program, we know that dozens of agents and toxins with the potential to pose a severe threat to public health and agriculture are reported accidentally lost or released from U.S. labs every year. We also know that accidental releases around the world have already caused significant harm. Such risks increase as biotechnology expands across the world and gains in strength.

Biotechnology, with all its promise and peril, is moving fast. It’s irresponsible of us to shrug off current and emerging biotechnological threats by reciting “Nature is the ultimate bioterrorist” like some article of faith. As with global warming, the cost of willful ignorance and inaction is high — and increasing.

Our health security requires that we engage cautiously but honestly with the full spectrum of evolving biological risks, striving toward solutions with open eyes and moral courage.

## Innovation

#### No way CRISPR solves all disease - lifestyle factors, mistakes

Radcliffe 17 Radcliffe, Shawn. Shawn Radcliffe is a science writer and yoga teacher in Ontario, Canada. "Will Gene Editing Allow Us to Rid the World of Diseases?" Healthline, 26 Aug. 2017, www.healthline.com/health-news/will-gene-editing-allow-us-to-rid-world-of-diseases.

CRISPR-Cas9 is a powerful tool, but it also raises several concerns. “There’s a lot of discussion right now about how best to detect so-called ‘off-target effects,’” said Hochstrasser. “This is what happens when the [Cas9] protein cuts somewhere similar to where you want it to cut.” Off-target cuts could lead to unexpected genetic problems that cause an embryo to die. An edit in the wrong gene could also create an entirely new genetic disease that would be passed onto future generations. Even using CRISPR-Cas9 to modify mosquitoes and other insects raises safety concerns — like what happens when you make large-scale changes to an ecosystem or a trait in a population that gets out of control. There are also many ethical issues that come with modifying human embryos. So will CRISPR-Cas9 help rid the world of disease? There’s no doubt that it will make a sizeable dent in many diseases, but it’s unlikely to cure all of them any time soon. We already have tools for avoiding genetic diseases — like early genetic screening of fetuses and embryos — but these are not universally used. “We still don’t avoid tons of genetic diseases, because a lot of people don’t know that they harbor mutations that can be inherited,” said Hochstrasser. Some genetic mutations also happen spontaneously. This is the case with many cancers that result from environmental factorsTrusted Source such as UV rays, tobacco smoke, and certain chemicals. People also make choices that increase their risk of heart disease, stroke, obesity, and diabetes. So unless scientists can use CRISPR-Cas9 to find treatments for these lifestyle diseases — or genetically engineer people to stop smoking and start biking to work — these diseases will linger in human society. “Things like that are always going to need to be treated,” said Hochstrasser. “I don’t think it’s realistic to think we would ever prevent every disease from happening in a human.”

#### No extinction from regular pandemics

Ord 20 Ord, Toby. Toby David Godfrey Ord (born 18 July 1979) is an Australian philosopher. He founded Giving What We Can, an international society whose members pledge to donate at least 10% of their income to effective charities and is a key figure in the effective altruism movement, which promotes using reason and evidence to help the lives of others as much as possible.[3] He is a Senior Research Fellow at the University of Oxford's Future of Humanity Institute, where his work is focused on existential risk. BA in Phil and Comp Sci from Melbourne, BPhil in Phil from Oxford, PhD in Phil from Oxford. The precipice: existential risk and the future of humanity. Hachette Books, 2020.

Are we safe now from events like this? Or are we more vulnerable? Could a pandemic threaten humanity’s future?10 The Black Death was not the only biological disaster to scar human history. It was not even the only great bubonic plague. In 541 CE the Plague of Justinian struck the Byzantine Empire. Over three years it took the lives of roughly 3 percent of the world’s people.11 When Europeans reached the Americas in 1492, the two populations exposed each other to completely novel diseases. Over thousands of years each population had built up resistance to their own set of diseases, but were extremely susceptible to the others. The American peoples got by far the worse end of exchange, through diseases such as measles, influenza and especially smallpox. During the next hundred years a combination of invasion and disease took an immense toll—one whose scale may never be known, due to great uncertainty about the size of the pre-existing population. We can’t rule out the loss of more than 90 percent of the population of the Americas during that century, though the number could also be much lower.12 And it is very difficult to tease out how much of this should be attributed to war and occupation, rather than disease. As a rough upper bound, the Columbian exchange may have killed as many as 10 percent of the world’s people.13 Centuries later, the world had become so interconnected that a truly global pandemic was possible. Near the end of the First World War, a devastating strain of influenza (known as the 1918 flu or Spanish Flu) spread to six continents, and even remote Pacific islands. At least a third of the world’s population were infected and 3 to 6 percent were killed.14 This death toll outstripped that of the First World War, and possibly both World Wars combined. Yet even events like these fall short of being a threat to humanity’s longterm potential.15 In the great bubonic plagues we saw civilization in the affected areas falter, but recover. The regional 25 to 50 percent death rate was not enough to precipitate a continent-wide collapse of civilization. It changed the relative fortunes of empires, and may have altered the course of history substantially, but if anything, it gives us reason to believe that human civilization is likely to make it through future events with similar death rates, even if they were global in scale. The 1918 flu pandemic was remarkable in having very little apparent effect on the world’s development despite its global reach. It looks like it was lost in the wake of the First World War, which despite a smaller death toll, seems to have had a much larger effect on the course of history.16 It is less clear what lesson to draw from the Columbian exchange due to our lack of good records and its mix of causes. Pandemics were clearly a part of what led to a regional collapse of civilization, but we don’t know whether this would have occurred had it not been for the accompanying violence and imperial rule. The strongest case against existential risk from natural pandemics is the fossil record argument from Chapter 3. Extinction risk from natural causes above 0.1 percent per century is incompatible with the evidence of how long humanity and similar species have lasted. But this argument only works where the risk to humanity now is similar or lower than the longterm levels. For most risks this is clearly true, but not for pandemics. We have done many things to exacerbate the risk: some that could make pandemics more likely to occur, and some that could increase their damage. Thus even “natural” pandemics should be seen as a partly anthropogenic risk. Our population now is a thousand times greater than over most of human history, so there are vastly more opportunities for new human diseases to originate.17 And our farming practices have created vast numbers of animals living in unhealthy conditions within close proximity to humans. This increases the risk, as many major diseases originate in animals before crossing over to humans. Examples include HIV (chimpanzees), Ebola (bats), SARS (probably bats) and influenza (usually pigs or birds).18 Evidence suggests that diseases are crossing over into human populations from animals at an increasing rate.19 Modern civilization may also make it much easier for a pandemic to spread. The higher density of people living together in cities increases the number of people each of us may infect. Rapid long-distance transport greatly increases the distance pathogens can spread, reducing the degrees of separation between any two people. Moreover, we are no longer divided into isolated populations as we were for most of the last 10,000 years.20 Together these effects suggest that we might expect more new pandemics, for them to spread more quickly, and to reach a higher percentage of the world’s people. But we have also changed the world in ways that offer protection. We have a healthier population; improved sanitation and hygiene; preventative and curative medicine; and a scientific understanding of disease. Perhaps most importantly, we have public health bodies to facilitate global communication and coordination in the face of new outbreaks. We have seen the benefits of this protection through the dramatic decline of endemic infectious disease over the last century (though we can’t be sure pandemics will obey the same trend). Finally, we have spread to a range of locations and environments unprecedented for any mammalian species. This offers special protection from extinction events, because it requires the pathogen to be able to flourish in a vast range of environments and to reach exceptionally isolated populations such as uncontacted tribes, Antarctic researchers and nuclear submarine crews. 21 It is hard to know whether these combined effects have increased or decreased the existential risk from pandemics. This uncertainty is ultimately bad news: we were previously sitting on a powerful argument that the risk was tiny; now we are not. But note that we are not merely interested in the direction of the change, but also in the size of the change. If we take the fossil record as evidence that the risk was less than one in 2,000 per century, then to reach 1 percent per century the pandemic risk would need to be at least 20 times larger. This seems unlikely. In my view, the fossil record still provides a strong case against there being a high extinction risk from “natural” pandemics. So most of the remaining existential risk would come from the threat of permanent collapse: a pandemic severe enough to collapse civilization globally, combined with civilization turning out to be hard to re-establish or bad luck in our attempts to do so.

#### Gene editing wrecks genetic diversity – extinction

Christian Wolfe 9, Associate Editor for American Association of Inside Sales Professionals, "Human Genetic Diversity and the Threat to the Survivability of Human Populations", https://www.ohio.edu/ethics/2003-conferences/human-genetic-diversity-and-the-threat-to-the-survivability-of-human-populations/

Through advances in reproductive technologies humans will eventually have the ability to utilize nearly fully artificial selection on human populations. These technologies raise many ethical and theological concerns. I will address one of the pragmatic ethical concerns, the potential loss of genetic diversity. Genetic diversity has a direct relation to the fitness and survivability of various species and populations; as genetic diversity decreases within a population, so does the fitness and survivability of that population. An examination of the genetic diversity argument (GDA) reveals that there is not strongly persuasive evidence regarding the effects on genetic diversity of the reproductive technologies on human populations. The only method available to produce the required evidence is through a very complex form of human experimentation. The type of human experiment that would produce the evidence is incompatible with present ethical codes of conduct. Therefore, any implementation of these technologies on human populations should be banned. There are many emerging technologies that could potentially affect genetic diversity. These include genetic testing and screening, selective breeding, population control, sterilization, selective abortion, embryo testing and selection, sperm donation, egg donation, embryo donation, surrogate pregnancy, fertility drugs, contraception, cloning embryos, and germ line or somatic cell manipulation (Resnik 2000, 454). Each of these reproductive technologies affects the composition of the human gene pool by increasing or decreasing the frequency of different genotypes or combinations of genotypes (Resnik 2000, 454). The germ-cell line, or just germ-line, constitutes a cell line through which genes are passed from generation to generation (World of Genetics 322). Germ-line therapy is often differentiated from somatic cell therapy, which is the alteration of non-reproductive cells. This distinction is not as clear as much of the literature supposes, but the problems with the germ-line/somatic cell distinction are beyond the scope of this paper. The focus of this paper includes the screening of embryos with the possibility of destruction of certain embryos, the modification of DNA (deoxyribonucleic acid) of early stage embryos through in-vitro fertilization (IVF), and the modification of parent gametes (Zimmerman 594-5). These technologies pose the clearest threat to genetic diversity of human populations. Genetic testing and screening examines the genetic information contained in a person’s cells to determine whether that person has or will develop a certain disease, is more susceptible to certain environmental risks, or could pass a disease on to his or her offspring (World 305). Parents could subject themselves to testing to determine whether or not to reproduce based on the likelihood of their potential children inheriting their genetic maladies. Also, embryos can be subjected to testing and screening to determine the likelihood that the future individual will develop a genetic disease. From that information, parents can decide to destroy the embryo, alter the embryo, or leave the embryo unmodified and risk that the child will develop a genetic disease. Germ-line gene therapy (GLGT) is germ-line manipulation on the genetic level in order to prevent genetic diseases in future persons (Richter and Bacchetta 304). The goal of GLGT is to treat human diseases by correcting the genetic defects that underlie the genetic disorders (Anderson and Friedmann 907). Therapy presents an alternative to destroying embryos likely to develop genetic disease by actually correcting genetic defects. Also available is the alteration of parent gametes in order to eliminate the possibility of passing on genetic disease to their offspring. GLGT allows for the alteration of either the early stage embryo or the parent gametes to prevent genetic disease. By either eliminating those genotypes that are likely to produce genetic disease or by altering the genome to actually prevent the genetic disease from developing, these technologies have great potential to affect the genetic diversity of a population. Genetic diversity is the variety and frequency of different genotypes or combinations of different genotypes within a population. A population is a geographically, socially, or culturally linked group whose reproductive decisions affect those within the group. Genetic diversity is measured by genetic variability, which diminishes in a population when the number of different phenotypes or the number of different combinations of genotypes decreases. Since populations are composed of individuals that carry genotypes, individual reproductive outcomes affect the genetic variability within specific populations (Resnik 2000, 452). Genetic diversity provides the resource for phenotypic variation that is integral in determining the rate of evolutionary change in an environment. A population that lacks genetic diversity will be poorly equipped to meet environmental changes and demands (Resnik 2000, 452). The importance of genetic diversity is undeniable; the survivability of a population is directly related to genetic diversity. While genetic diversity has no intrinsic value, genetic diversity has a clear instrumental value. Humans place positive value in genetic diversity as it promotes the extrinsic value of survivability. There is an ethical duty to prevent decreases in the genetic diversity of populations because of its importance in the survivability of those populations. Decreases in genetic diversity in populations are ethically undesirable because actions that reduce the survivability of the population are unethical. The genetic diversity argument (GDA) starts from the fact that scientific and technological developments in the realm of genetics and human reproduction will greatly affect the genetic diversity of human populations. There are both pessimistic and optimistic versions of the argument. I will briefly describe both versions of the GDA. The pessimistic version of the argument contends that the increased ability to control human reproduction will result in a loss of genetic diversity that will threaten the health and survivability of human populations (Resnik 2000, 451). This threat to health and survivability is due to a decrease in the populations’ ability to adapt to environmental changes and demands. In effect, these technologies have the potential to make the pool of available phenotypic traits limited enough so that human populations will not be able to respond to changes in environmental demand. This version of the GDA warns that germ-line altering reproductive technologies will reduce populations’ gene pools and eliminate potentially useful genes. Genetic diversity provides a resource of these useful genes. Evolutionary change is blind and has no way to know which genes are useful, therefore it is potentially damaging to population survivability to eliminate genes of any sort. As Glenn McGee notes, “The point of the GDA is that human beings also have no way of knowing which genes will be useful in the future or in different environments” (cited in Resnik 2000, 456). For instance, genetically homogenous populations of corn face problems with blight due to lack of genetic diversity. Although human populations have an ever-increasing level of control over the environment, the pessimistic response still turns on the inability to determine which genes will be useful in the future. The optimistic version of the genetic diversity argument contends that these reproductive technologies could lead to increases in human health and survivability resulting in an improvement of the well being of populations (Resnik 2000, 457). The basis for this response rests on the historical fact that advances in technology increase humans’ ability to control nature. The ability to control nature often leads to positive changes in the adaptability and survivability of human populations. The optimistic GDA relies on this historical fact and the seemingly obvious inference that the above technologies will increase the ability to affect the genetic diversity of human populations (Resnik 2000, 457). A commonly cited example of how genetic diversity can be increased with the implementation of such technologies is the incredible diversity of canines. Of course, there are important dissimilarities such as the explicit intention to increase phenotypic diversity. A major factor in whether these reproductive technologies will increase or decrease genetic diversity is what model they are implemented under, free market or state control. Each model addresses the concerns and motivations of those affected differently. The free market model is based upon the reproductive decisions of a diverse group of potential parents with separate interests, motivations, and means. The free market is the method by which many consumer decisions are made in the United States. This model is fundamentally based on the interaction between supply and demand. If a market demands diversity of a product, then the market will often supply the desired diversity. If the market demands the standardization of goods, such as building supplies, then that homogeneity is likely to be supplied. Also, markets create new preferences and demands by introducing new goods and services to the market. Most often, advancements in technology increase market variability, except of course if that development results in the formation of a monopoly. The diversity of goods in the free market system of America seemingly justifies the inference that a free market model for reproductive technologies would lead to increases, not decreases, in the genetic diversity of human populations. Both J. Glover and W. Gardner’s individual studies conclude, “Increases in our ability to control human reproduction will result in more genetic diversity in the human population because parents will have a variety of preferences and values that they can use in selecting offspring” (cited in Resnik 2000, 458). Just as technological advancements have increased the availability of diverse consumer products, germ-line altering technologies could increase the available options in reproduction and therefore increase the diversity of human populations. Nevertheless, confounding factors such homogeneity of desirable characteristics makes the above inference much more dubious than it first appears. The major problem with the free market model is the potential emergence of the homogeneity of desirable characteristics. Many characteristics such as intelligence, athleticism, and health, are almost universally accepted as desirable. Other characteristics such as height, eye color, and hair color, also have particular value attached to them. Genetic homogeneity could arise if the consumers of reproductive technologies have similar preferences for traits. As Resnik states, “If most people want tall, intelligent, healthy children with blonde hair and blue eyes, then parental choices could produce a phenotypically and genetically homogeneous population” (2000, 459). This problem is only exacerbated when one considers the phenomenon of fads. Societal pressures and obligations may also produce conformity. While these social effects may not take hold immediately, it seems possible, if not probable that these pressures would eventually affect reproductive decisions. Genetic homogeneity may be an unintended consequence of a population sharing common values (Resnik 2000, 459). If most people within a population have similar characteristic preferences and a desire to conform, genetic homogeneity is almost inevitable. Of course much of this line of reasoning depends on genetic determinism, which is incredibly naïve and misinformed. Environmental factors often play a decisive role in which phenotypes are displayed. If certain desirable traits, such as intelligence or health, were strongly linked to environmental factors regardless of genotype, then the inference from individual choices to phenotypic characteristics would be dramatically weakened (Resnik 2000, 465). On the other hand, if certain genes or series of genes are linked to a trait, and that genotype is most frequently selected, it would still poses the potential threat of a genetically homogeneous population, although not phenotypically homogeneous. There are good reasons to believe that the free market system will create greater genetic diversity within human populations. On the other hand, the influences of societal pressures and expectations should not be underestimated or ignored (Resnik 2000, 459). State control involves the local or federal government dictating the standards of practice in certain industries, such as the power industry, education, and mass transit. This model of control in implementing genetic technologies appears likely to lead to decreases in genetic diversity within a population. It is imaginable that the government would develop specific standards to which all human beings produced in that state would be subject. The effects of state control of reproductive technologies are not clearly predictable. A state controlled system could lead to a genetic caste system. For instance, if the state determined that all people should be a certain height, weight, IQ, color, sexual orientation, etc., then those who diverge from those state determined standards could be forced into different strata of the genetic caste system. Such scenarios are certainly plausible, if not likely under state controlled conditions. Under free market conditions, reproductive technologies could lead to increases or decreases genetic diversity. On the other hand, state control would almost inevitably lead to decreases in genetic diversity, but the extent of such effects is not clear. As David Resnik claims, “the consequences of not exerting social or governmental control over human genetics may be just as troubling, since parents will in all likelihood attempt to provide their children with genetic advantages, and the long-term results of parental control over human genetics may further exacerbate existing social and economic inequalities and create a genetic caste system” (1997, 428). The inability to produce definitive evidence of the effects of reproductive technologies under either control model points to urgency of the issue and the minimal knowledge of these technologies’ implications for the future of humanity. Each version of the GDA provides ground for arguments that could support or undermine the utilization of germ-line altering reproductive technologies. The most obvious conclusion from examining both versions is that there is no definitive evidence that implementing the above technologies will have positive or negative consequences for the survivability of human populations. Furthermore, an examination of the two most plausible options for methods of implementing the technologies within a population does not produce strong evidence that implementation will result in either increases or decreases in genetic diversity. This leaves medical science at an ethical crossroads between either continuing with the technologies and dealing with the results afterwards, or abstaining from research, or at least clinical trials, until such evidence arises. Neither of these paths seems to be positive, or even tenable. The only method for producing clear evidence about the potential threat to survivability that these reproductive technologies pose would be to continue research and perform a massive clinical trial. Animal experimentation is not a viable alternative to human experimentation because it completely eliminates many of the confounding factors such as social influences. Since the arguments on either side of the GDA cannot produce conclusive results, and given the potential harm done to populations if the reproductive technologies are implemented and genetic diversity does decrease, some form of human experimentation seems necessary before the technologies should be implemented. Of course, there are many questions that arise in response to such a claim, including the justification of the inference to the necessity of human experimentation. I will discuss these concerns below. To clarify the inference, one should be reminded of what is at stake with respect to genetic diversity. The cautionary tales of the GDA describe potentially analogous situations, such as the effects of artificial selection on the survivability of maize and the variety of canines that have been produced by artificial selection. It is not at all clear what effects the above reproductive technologies will have on a population’s genetic diversity. Their implementation could result in increases in disease susceptibility like the result of artificial selection on maize, or it could result in populations with incredible arrays of genetically distinct individuals, such as in the canine example. What is clear though is that genetic diversity has an inverse relationship with the adaptability and survivability of populations. Since human populations value their own survivability, it is clear that technologies that pose a great potential threat to genetic diversity should be closely examined before being implemented. Due to the great potential threat these technologies present to humans, it is necessary to produce very strong, if not definitive, evidence about the effects of these technologies on genetic diversity. The only way to produce such evidence is human experimentation. There are many factors that must be accounted for in a human experiment that would produce definitive evidence. The number and diversity of subjects would have to emulate a population that would be affected by the technologies. The experiment would have to be extensive enough to determine the effects on future generations. To account for potential homogeneity of desirable characteristics, the experiment should account for both diverse cultural and societal pressures. Furthermore, the experiment should be carried out under the two control models mentioned above, free market and state control. Also, there would have to be a method of curtailing influences from the non-experimental population. Finally, in the event that something goes awry with the experiment, there must be a method of destroying the test subjects. Given present ethical standards concerning human experimentation, the ethics of such an experiment are, at best, deeply problematic. While ethical norms can dramatically change with time through changes in societal norms and beliefs, the means necessary to employ such an experiment are almost incomprehensible. For instance, it is not at all clear how the experiment would quarantine the subjects or how to handle the necessity of multiple generations of researchers. The role of informed consent is unclear with such an experiment. In the proposed experiment, an unethical researcher could use informed consent in a manner to produce the results that the researcher desires and undermine the purpose of the experiment. Additionally, an integral part of informed consent is the ability to withdraw from the experiment at any time. This element could pose a serious problem for this type of research. Therefore informed consent must either be eliminated or be drastically altered. Under present ethical norms it is clear that the kind of experiment necessary to provide strongly persuasive evidence of the effects of germ-line altering reproductive technologies would be unethical. Ethical considerations aside, the pragmatics of such an experiment are daunting to say the least. The use of germ-line altering technologies should not be implemented until strongly persuasive evidence regarding the effects on genetic diversity is concretely established. Decreases in the genetic diversity of a population would put at risk the survivability of that population. Humans place a clear value in the survivability of populations. Therefore anything that threatens the survivability of populations is unethical. Germ-line altering reproductive technologies may potentially decrease genetic diversity within a population. Until there is concrete evidence demonstrating that such technologies will not lead to decreases in a population’s genetic diversity, those technologies should not be utilized. The only method of assessment to produce such evidence is through human experimentation. The nature of the necessary experimentation involves unacceptable ethical violations and unavoidable pragmatic difficulties. Without strong proof that such technologies do not pose a threat to genetic diversity, and therefore population survivability, those technologies should not be implemented. Due to the fact that such evidence is not possible, germ-line altering technologies should be banned.

## WTO

#### WTO can’t solve – nations won’t come collaborate and regulate

Aaronson, George Washington University, 2014, Susan, June, “Can Trade Policy Set Information Free” http://www.gwu.edu/~iiep/assets/docs/papers/2014WP/AaronsonIIEPWP20149.pdf

In theory, the WTO should be an appropriate venue for such discussions. WTO members agreed not to place tariffs on data flows. However, the member states have not found common ground on how to reduce new trade barriers to information flows. In 2011, several nations nixed a US and EU proposal that members agree not to block Internet service providers or impede the free flow of information online. Moreover, the members of the WTO have made little progress on adding new regulatory issues such as privacy and cyber security that challenge Internet policymakers. However, many new online activities will require cooperative global regulation on issues that transcend market access -- the traditional turf of the WTO. These issues will require policymakers to think less about ensuring that their model of regulation is adopted globally but more about achieving interoperability among different governance approaches. Alas, policymakers are not consistently collaborating to achieve interoperability The US, the EU, and Canada use trade policies to govern the Internet at home and across borders. The three trade giants use bilateral and regional trade agreements to encourage e-commerce, reduce online barriers to trade, and to develop shared policies in a world where technology is rapidly changing and where governments compete to disseminate their regulatory approaches. Policymakers also use export controls, trade bans or targeted sanctions to protect Internet users in other countries or to prevent officials of other countries from using Internet related technologies in ways that undermine the rights of individuals abroad. Finally, policymakers may use trade agreements to challenge other governments’ online rules and policies as trade barriers.

#### Trade doesn’t solve war

Kat 15 — Mazhid Kat, Ph.D. Candidate in International Relations at King's College London, (“A Conceptual Analysis of Realism in International Political Economy,” *E-IR*, April 16th, Accessible Online at [http://www.e-ir.info...itical-economy/](http://www.e-ir.info/2015/04/16/a-conceptual-analysis-of-realism-in-international-political-economy/), Accessed On 02-08-2016)

The main critics of realism are liberals. They argue that growing integration of the world economy and interdependence among states will create a more peaceful and stable global order because aggressive actions will lead to huge economic losses. However, this concept misses several points. Firstly, even greatly economically interdependent states may start wars with one another, as was seen with the British Empire and Germany in the beginning of the 20th century.[xxix] Moreover, interdependence is usually not perfectly symmetrical. In many cases, weak states become more dependent on major powers.[xxx] Leading powers, in turn, use their economic power to promote global regimes more favourable to themselves. Also, interdependence can le[a]d to economic crises becoming more wide spread, which in turn leads to negative consequences in different parts of the world.[xxxi] For instance, the Great Depression in the United States during the 1930s was one of the reasons for huge economic problems in Germany, which were used by Hitler in his rise to power. Finally, some states have ideologies which prevail over economic interests. For example, North Korea conducts a Juche policy of self-sufficiency and Russia continues to experience significant economic losses because of its imperialistic turn.

#### WTO decline spurs regionalism – it better promotes trade and stops war

Brkic 13, Economics Prof at U of Sarajevo (Snježana, 3/25, Regional Trading Arrangements – Stumbling Blocks or Building Blocks in the Process of Global Trade Liberalization?, papers.ssrn.com/sol3/papers.cfm?abstract\_id=2239275)

Besides those advocating the optimistic or pessimistic view on regionalism effect on global trade liberalization, some economists, such as Frankel and Wei, hold a neutral position, in a way. Frankel and Wei believe that forms and achievements of international economic integrations can vary and that, for this reason, regionalism can be – depending on circumstances – linked to greater or smaller global trade liberalization. In the years-long period of regional integration development, four periods have been identified during which the integration processes were becoming particularly intensive and which have therefore been named "waves of regionalism". The first wave was taking place during the capitalism development in the second half of the 19th century, in the course of British sovereign domination over the world market. Economic integrations of the time primarily had the form of bilateral customs unions; however, owing to the comparative openness of international trading system based on the golden standard automatism, this period is called the "era of progressive bilateralism". The next two waves of regionalism occurred in the years following the world wars. Since the disintegration processes caused by the wars usually spawned economic nationalisms and autarchic tendencies, it is not surprising that post-war regionalisms were marked by discriminatory international economic integrations, primarily at the level of so-called negative integration, with expressedly “beggar-thy-neighbor” policies that resulted in considerable trade deviations. This particularly refers to the regionalism momentum after the First World War, which was additionally burdened by the consequences of Big Economic Crisis. The current wave of regionalism started in late 1980s and spread around the world to a far greater extent than any previous one did: it has covered almost all the continents and almost all the countries, even those which have mis to join all earlier regional initiatives, such as the USA, Canada, Japan and China. Integration processes, however, do not show any signs of flagging. Up till now, over 200 RTAs have been registered with GATT/WTO, more than 150 of them being still in force, and most of these valid arrangement have been made in the past ten years. Specific in many ways, this wave was dubbed "new regionalism". The most specific characteristics of new regionalism include: geographic spread of RTAs in terms of encompassing entire continents; greater speed; integration forms success; deepening of integration processes; and, the most important for this theoretical discussion, generally non-negative impact on outsiders, world economy as a whole, and the multilateral liberalization process. Some theorists (Gilpin) actually distinguish between the "benign" and "malign" regionalism. On the one hand, regionalism can advance the international economic stability, multilateral liberalization and world peace. On the other, it can have mercantilist features leading to economic well-being degradation and increasing international tensions and conflicts. Analyses of trends within the contemporary integration processes show that they mainly have features of "benign" regionalism. Reasons for this are numerous. Forces driving the contemporary regionalism development differ from those that used to drive earlier regionalism periods in the 20th century. The present regionalism emerged in the period characterized by the increasing economic inter-dependence between different world economy subjects, countries attempts to resolve trade disputes and multilateral framework of trade relations. As opposed to the 1930s episode, contemporary regional initiatives represent attempts to make the members' participation in the world economy easier, rather than make them more distant from it. As opposed to 1950s and 1960s episode, new initiatives are less frequently motivated exclusively by political interests, and are less frequently being used for mercantilist purposes. After the Second World War, more powerful countries kept using the economic integration as a means to strengthen their political influence on their weaker partners and outsiders. The examples include CMEA and European Community arrangements with its members' former colonies. As opposed to this practice, the new regionalism, mostly driven by common economic interests, yielded less trade diversion than previous one, and has also contributed to the prevention of military conflicts of greater proportions. Various analyses have shown that many regional integrations in earlier periods resulted in trade deviations, particularly those formed between less developed countries and between socialist countries. In recent years, however, the newly formed or revised regional integrations primarily seem to lead to trade creation. Contrary to the “beggar thy- neighbor” model of former international economic integrations, the integrations now offer certain advantages to outsiders as well, by stimulating growth and spurring the role of market forces. The analyses of contemporary trends in world economy also speak in favor of the "optimistic" proposition. The structural analysis shows that the world trade is growing and that this growth results both from the increase in intra-regional and from the increase in extra-regional trade value (Anderson i Snape 1994.)28. Actually, the intraregional trade has been growing faster, both by total value and by its share in world GDP. The extra-regional trade share in GDP was increasing in some regions – in North America, Asia-Pacific and Asian developing countries. However, the question arises as to whether the extra-regional trade would be greater without regional integrations or not? The answer would primarily depend both on the estimate of degree of some countries' trade policy restrictedness in such circumstances, and on factors such as geographic distance, transport communications, political relations among states. One should also take into account certain contemporary integration features – the primarily economic, rather than strategic motivation, and continuous expansion, which mostly includes countries that are significant economic partners. With respect to NAFTA, many believe that the negative effects on outsiders will be negligible, since the USA and Canada have actually been highly integrated economies for a long time already, while the Mexican economy is relatively small. The same view was pointed out by the EU, with respect to its expansion. It particularly refers to the inclusion of the remaining EFTA countries, because this will actually only complete, in institutional terms, the EU strong economic ties with these countries. Most EFTA countries have been part of the European economic area (EEA), i.e. the original EC-EFTA agreement, for a few years already, and conduct some 70% of their total international exchange with the Union countries. EU countries are also the most significant foreign-trade partners of Central and East Europe countries, and the recent joining the Union of several of them is not expected to cause a significant trade diversion. Besides, according to some earlier studies, during the previous wave of regionalism, in the 1967-70 period, the creation of trade in EEC was far greater than trade diversion: trade creation ranged from 13 to 23% of total imports, while trade diversion ranged from 1 to 6%. In Latin America, the new regionalism resulted in the faster growth of intra-regional trade, while the extra-regional exports and imports also continued to grow. Since early 1990s, the value of intra-regional imports registered the average annual growth of 18%. In the same time, the extra-regional exports were also growing, although at a lower rate of 9% average a year; its share in the total Latin America exports at the end of decade amounted to 18% as compared to 12% in 1990. In the 1990-1996 period, the intraregional imports grew by some 18% a year. The extra-regional imports were also growing very fast, reaching the 14% rate. These data reflect a great unbalance in the trade with extra-regional markets, since the imports from countries outside the region grew much faster the exports.30 Since the described trends point to the continued growth of extra-regional imports and exports, they also show that regional integration in Latin America has had the open regionalism character. Besides, the pending establishment of FTAA – Free Trade Area of Americas will gather, in the same group, the so-called "natural" trade partners – countries that have had an extremely extensive mutual exchange for years already, and the outsiders are therefore unlikely to be affected by strengthening of regionalism in this part of the world. Contemporary research shows that intra-regional trade is growing, however, same as interdependence between North America and East Asia and between the EU and East Asia. It can also be seen that the biggest and the most powerful countries, i.e. blocs, are extremely dependent on the rest of the world in terms of trade. For the EU, besides the intra-European trade, which is ranked first, foreign trade has the vital importance since it accounts for 10% of European GDP. In early 1990s, EU exchanged 40% of its foreign trade with non-members, 16% out of which with North America and East Asia together. EU therefore must keep in mind the rest of the world as well. The growing EU interest in outsiders is confirmed by establishing "The Euro-Med Partnership", which proclaimed a new form of cooperation between the EU and the countries at its South periphery32. Besides, the past few years witnessed a series of inter-regional agreements between the EU on the one hand, and certain groups from other regions on the other (MERCOSUR, CARICOM, ASEAN and GCC). In case of North America the ratio between intra-regional and inter-regional trade is 40:60, and in East Asia, it is 45:55. Any attempt to move towards significantly closed blocs ("fortresses") would require overcoming the significant inter-dependence between major trading blocs. Besides the analysis of contemporary trends in extra- and intra-regional trade, other research was conducted that was supposed to point to the reasons why the new regionalism has mainly a non-negative impact on outsiders and global liberalization. The distinctive features of new regionalism were also affected to characteristics of international economic and political environment it sprouted in. In the 1980s, economic nationalisms were not so expressed as in the interventionism years following the Second World War; however, the neo-liberalism represented by GATT activities did not find the "fertile ground” in all parts of the world. Regionalism growth in the circumstances of multilateral system existence is, among other things, the consequence of distrust in multilateralism. „The revival of the forces of regionalism stemmed from frustration with the slow pace of multilateral trade liberalization... If the world trade regime could not be moved ahead, then perhaps it was time for deeper liberalization within more limited groups of like-minded nations... Such efforts would at least liberalize some trade... and might even prod the other nations to go along with multilateral liberalization.“33 Kennedy's round and Tokyo round of trade negotiations under GATT auspices brought a certain progress in the global trade liberalization. However, the 1980s witnessed significant changes in the world economy that the GATT trade system was not up to. Besides. GATT had not yet managed to cover the entire trade in goods, since there were still exceptions in the trade in agricultural and textile products that particularly affected the USA and developing countries. GATT system of conflict resolutions, and its organizational and administrative mechanism in general also required revision. In this vacuum that was created in promoting trade and investment multilateralism from the point when GATT inadequacy became obvious until the start of the Uruguay round and the establishment of World Trade Organization, the wave of regionalism started spreading across the world again. Prodded by the Single European Act and the success of European integration, many countries turned to an alternative solution – establishment of new or expansion and deepening of the existing economic integrations. Even the USA, the multilateralism bastion until then, made a radical turn in their foreign-trade policy and started working on designing a North American integration.

#### WTO deters effective implementation of the Biosafety Protocol

Eckersley 04, Poli Sci Prof at Melbourne (Robyn, May, "The Big Chill: The WTO and Multilateral Environmental Agreements," Global Environmental Politics 4.2, Project Muse)

The growth of the modern biotechnology industry carries benefits as well as risks, and these risks have been a matter of increasing disquiet by ENGOs and broader publics (although much more in Europe than the US). In the absence of conclusive scientific evidence concerning the risks to humans, animals and plants associated with the transplantation of genes from one species to another, much of the heated political debate about biosafety regulation has turned on evidentiary questions: who should bear the burden of proof, and by what standard? The Cartagena Biosafety Protocol 2000, negotiated under the UN Convention on Biological Diversity 1992, represents the international community’s first major attempt to resolve these questions in relation to the transboundary movement of living modified organisms (LMOs) by adopting a risk averse approach in cases of scientific uncertainty. The Protocol has now received the requisite number of ratifications and it came into force on 11 September 2003. The Biosafety Protocol places restrictions on the transboundary movement, transit, storage and handling of certain LMOs that are intended to be released into the environment, in order to protect biodiversity and/or human health. The Protocol provides for risk assessment, risk management, transparency, import regulations and Advanced Informed Agreement (AIA) procedures before transboundary movements of the relevant LMOs can take place. In particular, it enables the party of import to conduct a risk assessment of such LMOs prior to granting import approval.63 LMOs destined for contained use, or intended for direct use as food, feed or processing, are exempt from the AIA procedure (Articles 6 and 7.3) and are subject to less onerous provisions, and pharmaceuticals are exempted from the Protocol altogether (see Article 5).64 In both cases, however, the Protocol requires the parties to apply the precautionary principle in the case of scientific uncertainty (Articles 1, 10(6) and 11(8)).65 This principle is included in the Rio Declaration on Environment and Development and has increasingly appeared in international and national legal instruments and strategies. The Protocol, which effectively serves to restrict the free flow of trade in certain LMOs, may be applied against both parties and non-parties. In effect, it enables all parties to the Protocol to scrutinize, and where necessary prevent, restrict or control, movements of certain LMOs into their respective territory. However, trade in the products and methods of the biotechnology industry is also governed by a number of WTO Agreements, the most significant of which is the Agreement on the Application of Sanitary and Phytosanitary Measures (known as the SPS Agreement). This Agreement enables parties to restrict or regulate trade in order to protect human, animal and plant safety, provided such measures can pass the usual tests concerning nonarbitrariness, nondiscrimination and least trade restrictiveness. The provisions of the SPS Agreement extend to LMOs. However, the SPS Agreement covers a smaller range of risks than the Protocol and includes a wider variety of products (e.g. it includes pharmaceuticals). The Cartagena Biosafety Protocol 2000 is illustrative of the increasingly problematic relationship between the trade rules and MEAs in three significant respects. First, the five year negotiations on the Protocol were somewhat fraught and, in February 1999 in Cartagena, Colombia they collapsed as a result of disagreement over the relationship between the proposed provisions of the Protocol and the WTO rules. As one UNEP officer put it, “ . . . a number of countries were re-using the arguments that WTO rules prevented this moving forward.” The Miami group, made up of major exporters of biotechnology and agricultural products (US, Canada, Australia, Argentina, Chile and Uruguay), was the main group opposing any tight restrictions on trade in LMOs. The Miami group sought to make the Protocol subservient to WTO disciplines in relation to trade in agricultural commodities containing LMOs and it succeeded in ensuring that less stringent requirements applied to such commodities. Opposing the Miami groups was the “Like-Minded-Group” made up of the European Union and a coalition of developing countries, which argued that the Protocol should not be compromised by WTO rules. The upshot of these tensions in the negotiations is that the trade restrictive provisions of the Protocol were less forceful and extensive than they might have been. As Hutchison puts it, “[t]he Cartagena Protocol is a treaty that may be too self-conscious of its relationship with international trade law,” preventing the adoption of a more radical or extensive precautionary approach. The tensions are also reflected in the contradictory preamble to the Protocol, which seeks to recognize the existing rights of WTO members while also not subordinating the Protocol to other international agreements.70 The Cartagena Biosafety Protocol provides strong evidence that the “long shadow of the WTO” is having a disciplinary effect on the negotiating phase of MEAs, irrespective of whether a legal dispute erupts in the future. Attempts to ensure that MEAs are “mutually supportive” with the WTO remain lopsided, in the sense that trade rules are increasingly invoked to restrict the scope and operation of MEAs, but the objectives and provisions of MEAs do not appear to have much influence in trade negotiations. Second, despite this self-censoring process, the Biosafety Protocol still sits uneasily alongside the WTO’s agreements, particularly the SPS Agreement, which was negotiated at the conclusion of the Uruguay round in 1994. The Biosafety Protocol overlaps with the SPS Agreement in significant ways and the trade measures in the Protocol have been described as “the leading candidate” for a WTO dispute. In particular, the risk assessment provisions of the Protocol operate on the basis of somewhat different evidentiary rules than the WTO’s SPS Agreement. The Protocol enables the importing party to apply the precautionary principle when carrying out its own risk assessment prior to the import of LMOs. The SPS Agreement also allows countries to set their own standards but provides that measures to ensure food safety and to protect the health of animals and plants should be based as far as possible on the analysis and assessment of objective and accurate scientific data. Moreover, such measures should be applied only to the extent necessary to protect human, animal or plant life or health, and they should not arbitrarily or unjustifiably discriminate between countries where identical or similar conditions prevail. The SPS Agreement also encourages states to base their national measures on the international standards, guidelines and recommendations developed by WTO member governments in other international organizations. It remains unclear whether the Protocol would be accepted as a “standard” for the purposes of the SPS Agreement. The SPS agreement only permits the precautionary principle to be applied on an interim basis while a risk assessment is being conducted (Article 5(7)) whereas the Biosafety Protocol contains no such restriction (nor any requirements for periodic review). The overlap between the Protocol and the SPS Agreement combined with different evidentiary rules and approaches to risk management, have sown the seeds for future controversy. As of February 2004, 87 countries have ratified the Protocol, including the European Union. 73 However, this leaves a large number of potential WTO challengers (particularly among the Miami group) who may seek to uphold the less restrictive provisions of the SPS Agreement against the relatively more cautious provisions of the Protocol. 74 Neither the US nor Australia are parties to the Protocol. The likelihood of a dispute is not idle conjecture given that the US is a major producer and exporter of GM products and anxious to remove restrictions to its export markets. Moreover, strong differences have already emerged between the US and the EU over questions of food safety, with the US displaying increasing frustration with what it sees as a complicated and time-consuming structure of product authorization by EU members (which effectively provided a de facto embargo on the development and testing of GM crops in Europe since 1998). 75 After a period of frustrated diplomacy, in May 2003 the US and Canada (with the support of Monsanto and later a number of other states) 76 officially initiated proceedings in the WTO against the European Union’s de facto moratorium on the grounds that it violates a number of WTO trade agreements, including the SPS Agreement. 77 The EU moratorium has since been lifted with the adoption of two new regulations in July 2003, which simplify and streamline the authorization procedures for GMOs released into the environment and for GM food and feed. However, the regulations remain stringent, particularly in the areas of traceability and labeling. Although the challenge by the US and its co-complainants continues, it is not clear whether it will run its full course. 78 This US challenge does not involve the Biosafety Protocol, and the decision in Shrimp Turtle suggests that the AB might uphold the Cartagena Protocol if a dispute was brought before it. Nonetheless, there is no guarantee, and growing US frustration is likely to have an extremely chastening effect on parties to the Protocol, who must now conduct their risk assessments of US products containing LMOs under the watchful eye of vigilant US trade representatives. The US has applied considerable pressure to other WTO members to support its WTO challenge. For example, the US responded to Egypt’s refusal to join the challenge by suspending proposed free-trade talks concerning a possible USEgypt Free Trade Agreement. 79 Moreover, US frustration in its failure to find markets for its GM products is likely to grow. Even impoverished African nations, such as Zambia, have been unwilling to accept unsold US GM food that has been recycled by the US as food aid under the World Food Program.

#### Biosafety protocol prevents bioweapons attack

Hammond 03, Director of the Sunshint Project (Edward, October, "Biosafety, Biosecuity, and Biological Weapons," Backgrounder #11, <http://www.sunshine-project.org/publications/bk/bk11.html>)

The agreements discussed in this paper address issues of biosecurity and biosafety, broadly conceived. They are critical elements of a global biosecurity framework. Other multilateral activities of relevance to the BWC, for example, the World Health Organization’s global health response to deliberate use of biological weapons, are also treated. They are, however, discussed in lesser detail because the BWC relevance of the OIE and, especially, the CBP and IPPC have been insufficiently discussed, despite the fact that the contribution of these agreements is routinely (but vaguely) mentioned in arms control debates and discussed by States Parties in meetings of the BWC.6 A closer look at these agreements is also merited because of the currently poor prospects for progress at the Biological Weapons Convention itself. Following the 2001 collapse of negotiations for the BWC Verification Protocol, States Parties agreed to a series of annual and experts’ meetings in the lead up to its Sixth Review Conference in 2006. However, a combination of sensitivities resulting from the failed Protocol, plus the narrow scope of meetings, and resignation before the highly uncooperative stance of the US currently limit the possibility that the meetings will result in binding multilateral measures to strengthen the BWC. The agreements discussed here also merit more profound consideration because of their critical role in the international regulation of biotechnology. Biological weapons risks posed by the development and dissemination of biotechnology are nearly universally recognized. Yet there is presently very little prospect of reigning in these risks through the BWC, whose parties generally recognize the dangers of biotechnology; but have been unable to adequately respond. In contrast, the Cartagena Biosafety Protocol is the first international agreement specifically developed to address biotechnology risks – to the environment, agriculture, animal and human health – and it possesses a vibrant process. It and the IPPC and OIE are presently developing and implementing enforceable international rules and standards to contain threats, limit harm, and impose liability for damages resulting from biotechnology. These provide opportunities and synergies to strengthen the global ban on biological weapons.

#### Bioweapons cause extinction – nuke war doesn’t

Singer 01, Director of the Program in Arms Control, Disarmament, and International Security at the University of Illinois at Urbana (Clifford, Spring,. "Will Mankind Survive the Millennium?" The Bulletin of the Program in Arms Control, Disarmament, and International Security, University of Illinois at Urbana-Champaign, 13.1, http://www.acdis.uiuc.edu/research/S&Ps/2001-Sp/S&P\_XIII/Singer.htm)

In recent years the fear of the apocalypse (or religious hope for it) has been in part a child of the Cold War, but its seeds in Western culture go back to the Black Death and earlier. Recent polls suggest that the majority in the United States that believe man would survive into the future for substantially less than a millennium was about 10 percent higher in the Cold War than afterward. However fear of annihilation of the human species through nuclear warfare was confused with the admittedly terrifying, but much different matter of destruction of a dominant civilization. The destruction of a third or more of much of the globe’s population through the disruption from the direct consequences of nuclear blast and fire damage was certainly possible. There was, and still is, what is now known to be a rather small chance that dust raised by an all-out nuclear war would cause a socalled nuclear winter, substantially reducing agricultural yields especially in temperate regions for a year or more. As noted above mankind as a whole has weathered a number of mind-boggling disasters in the past fifty thousand years even if older cultures or civilizations have sometimes eventually given way to new ones in the process. Moreover the fear that radioactive fallout would make the globe uninhabitable, publicized by widely seen works such as “On the Beach,” was a metaphor for the horror of nuclear war rather than reality. The epidemiological lethal results of well over a hundred atmospheric nuclear tests are barely statistically detectable except in immediate fallout plumes. The increase in radiation exposure far from the combatants in even a full scale nuclear exchange at the height of the Cold War would have been modest compared to the variations in natural background radiation doses that have readily been adapted to by a number of human populations. Nor is there any reason to believe that global warming or other insults to our physical environment resulting from currently used technologies will challenge the survival of mankind as a whole beyond what it has already handily survived through the past fifty thousand years. There are, however, two technologies currently under development that may pose a more serious threat to human survival. The first and most immediate is biological warfare combined with genetic engineering. Smallpox is the most fearsome of natural biological warfare agents in existence. By the end of the next decade, global immunity to smallpox will likely be at a low unprecedented since the emergence of this disease in the distant past, while the opportunity for it to spread rapidly across the globe will be at an all time high. In the absence of other complications such as nuclear war near the peak of an epidemic, developed countries may respond with quarantine and vaccination to limit the damage. Otherwise mortality there may match the rate of 30 percent or more expected in unprepared developing countries. With respect to genetic engineering using currently available knowledge and technology, the simple expedient of spreading an ample mixture of coat protein variants could render a vaccination response largely ineffective, but this would otherwise not be expected to substantially increase overall mortality rates. With development of new biological technology, however, there is a possibility that a variety of infectious agents may be engineered for combinations of greater than natural virulence and mortality, rather than just to overwhelm currently available antibiotics or vaccines. There is no a priori known upper limit to the power of this type of technology base, and thus the survival of a globally connected human family may be in question when and if this is achieved.