Brand new aff for octas

Util – FW

# Util FW -

#### I affirm the resolution; The member nations of the World Trade Organization ought to reduce intellectual property protections for medicines.

#### My value is morality, as ought in the resolution implies a moral question.

#### The standard for this round is maximizing expected well being

#### Prefer ---

#### Binding- Pain and Pleasure are the only things with intrinsic disvalue and value, respectively. If I put my hand on a hot surface, I will pull my hand away – ethics have to be binding in order for obligations to be present.

(we have to know what is right and wrong for obligations to be present in the first place.)

#### Pleasure and pain are intrinsically valuable.

Moen 16 [Ole Martin Moen, Research Fellow in Philosophy at University of Oslo “An Argument for Hedonism” Journal of Value Inquiry (Springer), 50 (2) 2016: 267–281] SJDI

Let us start by observing, empirically, that a widely shared judgment about intrinsic value and disvalue is that pleasure is intrinsically valuable and pain is intrinsically disvaluable. On virtually any proposed list of intrinsic values and disvalues (we will look at some of them below), pleasure is included among the intrinsic values and pain among the intrinsic disvalues. This inclusion makes intuitive sense, moreover, for there is something undeniably good about the way pleasure feels and something undeniably bad about the way pain feels, and neither the goodness of pleasure nor the badness of pain seems to be exhausted by the further effects that these experiences might have. “Pleasure” and “pain” are here understood inclusively, as encompassing anything hedonically positive and anything hedonically negative.2 The special value statuses of pleasure and pain are manifested in how we treat these experiences in our everyday reasoning about values. If you tell me that you are heading for the convenience store, I might ask: “What for?” This is a reasonable question, for when you go to the convenience store you usually do so, not merely for the sake of going to the convenience store, but for the sake of achieving something further that you deem to be valuable. You might answer, for example: “To buy soda.” This answer makes sense, for soda is a nice thing and you can get it at the convenience store. I might further inquire, however: “What is buying the soda good for?” This further question can also be a reasonable one, for it need not be obvious why you want the soda. You might answer: “Well, I want it for the pleasure of drinking it.” If I then proceed by asking “But what is the pleasure of drinking the soda good for?” the discussion is likely to reach an awkward end. The reason is that the pleasure is not good for anything further; it is simply that for which going to the convenience store and buying the soda is good.3 As Aristotle observes: “We never ask [a man] what his end is in being pleased, because we assume that pleasure is choice worthy in itself.”4 Presumably, a similar story can be told in the case of pains, for if someone says “This is painful!” we never respond by asking: “And why is that a problem?” We take for granted that if something is painful, we have a sufficient explanation of why it is bad. If we are onto something in our everyday reasoning about values, it seems that pleasure and pain are both places where we reach the end of the line in matters of value.

#### In the face of Moral Uncertainty, extinction risks MUST come first. Extinction is where there is no pleasure and only pain, making it the worst possible situation.

#### Utilitarianism is needed if extinction risks are brought up

Bostrom 13 - Nick Bostrom, 2013, [*Global Policy*, Vol 4, Issue 1 (2013): 15-31], <https://www.existential-risk.org/concept.html>, Section 3.4

These reflections on moral uncertainty suggest an alternative, complementary way of looking at existential risk; they also suggest a new way of thinking about the ideal of sustainability. Let me elaborate. Our present understanding of axiology might well be confused. We may not now know — at least not in concrete detail — what outcomes would count as a big win for humanity; we might not even yet be able to imagine the best ends of our journey. If we are indeed profoundly uncertain about our ultimate aims, then we should recognize that there is a great option value in preserving — and ideally improving — our ability to recognize value and to steer the future accordingly. Ensuring that there will be a future version of humanity with great powers and a propensity to use them wisely is plausibly the best way available to us to increase the probability that the future will contain a lot of value. To do this, we must prevent any existential catastrophe

#### Extinction First –

#### Prefer --

#### Extinction Outweighs – irreversible impacts must always come first.

#### Objectivity – body count is the most objective way to calculate impacts because comparing suffering is unethical.

#### Moral Obligation – allowing people to die in unethical and should be prevented because it creates ethics towards other people.

#### We must act on Extinction–

Brian Kahn; 1/9/18; Quotes Jonathan Schell’s 1982 article in the New Yorker. Kahn 18:  **That’s why what journalist Jonathan Schell wrote about nuclear holocaust in The New Yorker in 1982 still rings as true today as ever:**

<https://earther.gizmodo.com/this-is-what-nuclear-war-would-mean-for-life-on-earth-1821910459>

Schell 82

**Schell 82:** “To employ a mathematical analogy, we can say thatalthough the risk of extinction may be fractional, the stake is, humanly speaking, infinite, and a fraction of infinity is still infinity. In other words, once we learn that a holocaust might lead to extinction we have no right to gamble, because if we lose, the game will be over, and neither we nor anyone else will ever get a another chance.”

# Contention 1 – Innovation

#### We are in an innovation crisis – new drugs are not being developed in favor of re-purposing old drugs to keep extending patent expiration.

Feldman 1 Robin Feldman 2-11-2019 "‘One-and-done’ for new drugs could cut patent thickets and boost generic competition" <https://www.statnews.com/2019/02/11/drug-patent-protection-one-done/> (Arthur J. Goldberg Distinguished Professor of Law, Albert Abramson ’54 Distinguished Professor of Law Chair, and Director of the Center for Innovation)

Drug companies **have brought great** innovations to market. Society rewards innovation with patents, or with non-patent exclusivities that can be obtained for activities such as testing drugs in children, undertaking new clinical studies, or developing orphan drugs. The rights provided by patents or non-patent exclusivities provide a defined time period of protection so companies can recoup their investments by charging monopoly prices. When patents end, lower-priced competitors should be able to jump into the market and drive down the price. **But that’s** not happening. Instead, drug companies build massive patent walls around their products, extending the protection **over and over again**. Some modern drugs have an avalanche of U.S. patents, with expiration dates **staggered across time**. For example, the rheumatoid arthritis drug Humira is **protected by more than 100 patents**. Walls like that **are insurmountable**. Rather than rewarding innovation, our patent system is now largely repurposing drugs. Between 2005 and 2015, **more than three-quarters** of the drugs associated with new patents **were not new ones** coming on the market but existing ones. In other words, we are mostly churning and recycling. Particularly troubling, new patents can be obtained on minor tweaks such as adjustments to dosage or delivery systems — a once-a-day pill instead of a twice-a-day one; a capsule rather than a tablet. Tinkering like this may have some value to some patients, but it nowhere near justifies the rewards we lavish on companies for doing it. From society’s standpoint, incentives should drive scientists back to the lab to look for new things, not to recycle existing drugs for minimal benefit.

#### We control Uniqueness – up to 80% of all new patents are not new drugs but old ones.

Feldman 2 Robin Feldman 18, May your drug price be evergreen, Journal of Law and the Biosciences, Volume 5, Issue 3, December 2018, Pages 590–647, <https://doi.org/10.1093/jlb/lsy022> Arthur J. Goldberg Distinguished Professor of Law, Albert Abramson ’54 Distinguished Professor of Law Chair, and Director of the Center for Innovation (Study Notes: Presenting the first comprehensive study of evergreening, this article examines the extent to which evergreening behavior—which can be defined as artificially extending the protection cliff—may contribute to the problem. The author analyses all drugs on the market between 2005 and 2015, combing through 60,000 data points to examine every instance in which a company added a new patent or exclusivity.)//

The study results demonstrate definitively that the pharmaceutical industry has strayed far from the patent system's intended design. The patent system is not functioning as a time-limited opportunity to garner a return, followed by open competition. Rather, companies throughout the industry seek and obtain repeated extensions of their competition-free zones. Moreover, the incidence of such behavior has steadily increased between 2005 and 2015, especially on the patent front and for certain highly valuable exclusivities. Most troubling, the data suggest that the current state of affairs **is harming innovation** in tangible ways. Rather than creating new medicines—sallying forth into new frontiers for the benefit of society—drug companies are focusing their time and effort extending the patent life of old products. This, of course, is not the innovation one would hope for. The greatest creativity at pharmaceutical **companies should be in the lab, not in the legal department**.115 The following sections describe the results obtained through our analysis in detail, but below are the key takeaways from the study: Rather than creating new medicines, pharmaceutical companies are recycling and repurposing old ones. In fact, 78% of the drugs associated with new patents in the FDA’s records were not new drugs coming on the market, but existing drugs. In some years, the percentage reached as high as 80%. Adding new patents and exclusivities to extend the protection cliff is particularly pronounced among blockbuster drugs. Of the roughly 100 best-selling drugs, more than 70% extended their protection at least once, with more than 50% extending the protection cliff more than once. Looking at the full group, almost 40% of all drugs available on the market created additional market barriers by having patents or exclusivities added to them.

#### Evergreening allows for companies to make very minor developments to already existing drugs, rather than developing brand new drugs – destroys innovation and competition.

**Dorairajan 18** [Govindarajan Dorairajan, GM-Learning & Organizational Development at Sun Pharmaceutical Industries Limited, 8-18-2018, “Is this "Evergreening" or Disruptive innovation?” Linked-in, <https://www.linkedin.com/pulse/evergreening-disruptive-innovation-govindarajan-dorairajan>

"Evergreening" refers to the strategies whereby pharmaceutical companies use patent laws and minor drug modifications to extend their monopoly privileges on the drug (Dwivedi & Hallihosur, 2010 & Rangan et al, 2009 & Wertheimer & Santella, 2009). Typically, these strategies are developed before expiry of the patent of an original drug, usually a high-revenue drug (Whitehead et al, 2008 & Hutchins, 2003). If obtained, it results in an extension of the patent protection period or a new patent for a minimally modified version of the drug and enables the innovators to retain monopoly over its product even after expiry of patent term. The innovators usually bring in small changes and then claim patent rights for 20 years.¶ Evergreening strategies commonly adopted by the pharmaceutical industry are:¶ 1) Redundant extensions and creation of ‘next generation drugs’ which result in superfluous variation to a product and then patenting it as a new application¶ 2) Prescription to over-the-counter (OTC) switch¶ 3) Exclusive partnerships with generic drug players in the market prior to drug patent expiry which thus significantly enhancing the brand value and interim earning royalties on the product.¶ 4) Defensive pricing strategies practice wherein the innovator companies decrease the price of the product in line with the generic players for healthy competition¶ 5) Establishment of subsidiary units by respective innovator companies in generic domain before the advent of rival generic players.¶ Consequences of Evergreening: A consequence of evergreening is the delayed entry of generic drugs into the market with extension of the original drug patent or competition between the patent-protected minimally modified version of the drug and generic drugs (Hemphil & Sampat, 2012). This situation might increase drug reimbursement costs by keeping the cheaper generic versions completely or partly out of the market (Faunce & Lexchin, 2007). Pharmaceutical companies defend evergreening practices and claim that revised formulas benefit patients and the drug industry (Hughes D, 2006 & Gaudry KS, 2011). Extending the patent period seizes generic drug manufacturing. Once generic drugs are under production, the price of the drug can drop by as much as 90%. Additional costs incurred through delay in generic entry can be very significant for the public health budgets and ultimately the consumer.¶ Ethical Issue: The net cost for society of evergreening patents is substantial. Evergreening patents interfere and hinder fair competition **in the pharmaceutical market, with the result that pharmaceutical** companies **can** charge highmonopoly prices for far longer period than is justified.

#### Innovation is uniquely key right now to solve AMR super-bugs -- timeframe’s key.

Sobti 19 [Dr. Navjot Kaur Sobti is an internal medicine resident physician at Dartmouth-Hitchcock-Medical Center/Dartmouth School of Medicine and a member of the ABC News Medical Unit. May 1, 2019. “Amid superbug crisis, scientists urge innovation”. <https://abcnews.go.com/Health/amidst-superbug-crisis-scientists-urge-innovation/story?id=62763415>]

[The United Nations](https://abcnews.go.com/Politics/amal-clooney-angelina-jolie-speak-us-weighed-vetoing/story?id=62574726) has called antimicrobial resistance a “global crisis.” With the [rise in superbugs](https://abcnews.go.com/Health/superbug-fungus-global-health-threat-600-us-infected/story?id=62297532) across the globe, common infections are becoming harder to treat, and lifesaving procedures riskier to perform. Drug-resistant infections result in about 700,000 deaths per year, with at least 230,000 of those deaths due to multidrug resistant tuberculosis, [according to a groundbreaking report from the World Health Organization (WHO).](https://www.who.int/antimicrobial-resistance/interagency-coordination-group/IACG_final_report_EN.pdf?ua=1) Given that antibiotic resistance is present in every country, antimicrobial resistance (AMR) now represents a global health crisis, according to the UN, which has urged immediate, coordinated and global action to prevent a potentially devastating health and financial crisis. With the rising rates of AMR -- including antivirals, antibiotics, and antifungals -- estimates from the WHO show that AMR may cause 10 million deaths every year by 2050, send 24 million people into extreme poverty by 2030, and lead to a financial crisis as severe as the on the U.S. experienced in 2008. Antimicrobial resistance develops when germs like bacteria and fungi are able to “defeat the drugs designed to kill them,” according to the Centers for Disease Control and Prevention. Through a biologic “survival of the fittest,” germs that are not killed by antimicrobials and continue to grow. WHO explains that “poor infection control, inadequate sanitary conditions and inappropriate food handling encourage the spread” of AMR, which can lead to “superbugs.” Those superbugs require powerful and oftentimes more expensive antimicrobials to treat. Examples of superbugs are far and wide, and can range from drug-resistant bacteria like Pseudomonas aeruginosa and Staphylococcus aureus to fungi like Candida. These bugs can cause illnesses that range from pneumonia to urinary tract and sexually transmitted infections. According to the WHO, AMR has caused complications for nearly 500,000 people with tuberculosis, and a number of people with HIV and malaria. The people at the [highest risk for AMR](https://www.who.int/news-room/detail/27-02-2017-who-publishes-list-of-bacteria-for-which-new-antibiotics-are-urgently-needed) are those with chronic diseases, people living in nursing homes, hospitalized in the ICU or undergoing life-saving treatments such as organ transplantation and cancer therapy. These people often develop infections, which can become antimicrobial-resistant, rendering them difficult, if not impossible, to treat. [(MORE: Melissa Rivers talks about her father's suicide with Dr. Jennifer Ashton)](https://abcnews.go.com/Health/melissa-rivers-talks-fathers-suicide-dr-jennifer-ashton/story?id=62733179&cid=clicksource_26_null_headlines_hed) The CDC notes that “antibiotic resistance has the potential to affect people at any stage of life,” including the “healthcare, veterinary, and agriculture industries, making it one of the world’s most urgent public health problems." AMR can cause prolonged hospital stays, billions of dollars in healthcare costs, disability, and potentially, death. “The most important thing is to understand and embrace the interconnectedness of all of this,” said Dr. Robert Redfield, director of the CDC, in a recent interview with ABC News’ Dr. Jennifer Ashton. It’s not just our countries that are connected.” Research has shown that superbugs like Candida auris “came from multiple places, at the same time. It wasn’t just one organism that [evolved]” in a single location, Redfield added. Given longstanding concerns about antimicrobial misuse leading to AMR, physicians have embraced a medical approach called antibiotic stewardship. This encourages physicians to carefully evaluate which antibiotic is most appropriate for their patient, and discontinue it once it is no longer medically needed. WHO has also highlighted that the inappropriate use of antimicrobials in agriculture -- such as on farms and in animals -- may be an underappreciated cause of AMR. Noting these trends, the WHO has urged for “coordinated action...to minimize the emergence and spread of antimicrobial resistance.” It urges all countries to make national action plans, with a focus on the development of new antimicrobial medications, vaccines, and careful antimicrobial use. Redfield emphasized the importance of vaccination during the global superbug crisis, stating that “the only way we have to eliminate an infection is vaccination.” He added that investing in innovation is key to solving the crisis. While WHO continues to advocate for superbug awareness, they warn that AMR has reversed “a century of progress in health.” The WHO added that “the challenges of antimicrobial resistance” are “not insurmountable,” and that coordinated action will “help to save millions of lives, preserve antimicrobials for generations to come and secure the future from drug-resistant diseases.”

#### AMR Superbugs lead to extinction- generic defense non applicable

Srivatsa 17 Kadiyali Srivatsa 1-12-2017 “Superbug Pandemics and How to Prevent Them” <https://www.the-american-interest.com/2017/01/12/superbug-pandemics-and-how-to-prevent-them/> (doctor, inventor, and publisher. He worked in acute and intensive pediatric care in British hospitals)//Elmer

It is by now no secret that the human species is locked in a race of its own making with “superbugs.” Indeed, if popular science fiction is a measure of awareness, the theme has pervaded English-language literature from Michael Crichton’s 1969 Andromeda Strain all the way to Emily St. John Mandel’s 2014 Station Eleven and beyond. By a combination of massive inadvertence and what can only be called stupidity, we must now invent new and effective antibiotics faster than deadly bacteria evolve—and regrettably, they are rapidly doing so with our help. I do not exclude the possibility that bad actors might deliberately engineer deadly superbugs.1 But even if that does not happen, humanity faces an existential threat largely of its own making in the absence of malign intentions. As threats go, this one is entirely predictable. The concept of a “black swan,” Nassim Nicholas Taleb’s term for low-probability but high-impact events, has become widely known in recent years. Taleb did not invent the concept; he only gave it a catchy name to help mainly business executives who know little of statistics or probability. Many have embraced the “black swan” label the way children embrace holiday gifts, which are often bobbles of little value, except to them. But the threat of inadvertent pandemics is not a “black swan” because its probability is not low. If one likes catchy labels, it better fits the term “gray rhino,” which, explains Michele Wucker, is a high-probability, high-impact event that people manage to ignore anyway for a raft of social-psychological reasons.2 A pandemic is a quintessential gray rhino, for it is no longer a matter of if but of when it will challenge us—and of how prepared we are to deal with it when it happens. We have certainly been warned. The curse we have created was understood as a possibility from the very outset, when seventy years ago Sir Alexander Fleming, the discoverer of penicillin, predicted antibiotic resistance. When interviewed for a 2015 article, “The Most Predictable Disaster in the History of the Human Race, ” Bill Gates pointed out that one of the costliest disasters of the 20th century, worse even than World War I, was the Spanish Flu pandemic of 1918-19. As the author of the article, Ezra Klein, put it: “No one can say we weren’t warned. And warned. And warned. A pandemic disease is the most predictable catastrophe in the history of the human race, if only because it has happened to the human race so many, many times before.”3 Even with effective new medicines, if we can devise them, we must contain outbreaks of bacterial disease fast, lest they get out of control. In other words, we have a social-organizational challenge before us as well as a strictly medical one. That means getting sufficient amounts of medicine into the right hands and in the right places, but it also means educating people and enabling them to communicate with each other to prevent any outbreak from spreading widely. Responsible governments and cooperative organizations have options in that regard, but even individuals can contribute something. To that end, as a medical doctor I have created a computer app that promises to be useful in that regard—of which more in a moment. But first let us review the situation, for while it has become well known to many people, there is a general resistance to acknowledging the severity and imminence of the danger. What Are the Problems? Bacteria are among the oldest living things on the planet. They are masters of survival and can be found everywhere. Billions of them live on and in every one of us, many of them helping our bodies to run smoothly and stay healthy. Most bacteria that are not helpful to us are at least harmless, but some are not. They invade our cells, spread quickly, and cause havoc that we refer to generically as disease. Millions of people used to die every year as a result of bacterial infections, until we developed antibiotics. These wonder drugs revolutionized medicine, but one can have too much of a good thing. Doctors have used antibiotics recklessly, prescribing them for just about everything, and in the process helped to create strains of bacteria that are resistant to the medicines we have. We even give antibiotics to cattle that are not sick and use them to fatten chickens. Companies large and small still mindlessly market antimicrobial products for hands and home, claiming that they kill bacteria and viruses. They do more harm than good because the low concentrations of antimicrobials that these products contain tend to kill friendly bacteria (not viruses at all), and so clear the way for the mass multiplication of surviving unfriendly bacteria. Perhaps even worse, hospitals have deployed antimicrobial products on an industrial scale for a long time now, the result being a sharp rise in iatrogenic bacterial illnesses. Overuse of antibiotics and commercial products containing them has helped superbugs to evolve. We now increasingly face microorganisms that cannot be killed by antibiotics, antifungals, antivirals, or any other chemical weapon we throw at them. Pandemics are the major risk we run as a result, but it is not the only one. Overuse of antibiotics by doctors, homemakers, and hospital managers could mean that, in the not-too-distant future, something as simple as a minor cut could again become life-threatening if it becomes infected. Few non-medical professionals are aware that antibiotics are the foundation on which nearly all of modern medicine rests. Cancer therapy, organ transplants, surgeries minor and major, and even childbirth all rely on antibiotics to prevent infections. If infections become untreatable we stand to lose most of the medical advances we have made over the past fifty years. And the problem is already here. In the summer of 2011, a 43-year-old woman with complications from a lung transplant was transferred from a New York City hospital to the Clinical Center at the National Institutes of Health (NIH), in Bethesda, Maryland. She had a highly resistant superbug known as Klebsiella pneumoniae carbapenemase (KPC). The patient was treated and eventually discharged after doctors concluded that they had contained the infection. A few weeks later, a 34-year-old man with a tumor and no known link to the woman contracted KPC while at the hospital. During the course of the next few months, several more NIH patients presented with KPC. Doctors attacked the outbreak with combinations of antibiotics, including a supposedly powerful experimental drug. A separate intensive care unit for KPC patients was set up and robots disinfected empty rooms, but the infection still spread beyond the intensive care area. Several patients died and then suddenly all was silent on the KPC front, with doctors convinced they had seen the last of the dangerous bacterium. They couldn’t have been more mistaken. A year later, a young man with complications from a bone marrow transplant arrived at NIH. He became infected with KPC and died. This superbug is now present in hospitals in most, if not all U.S. states. This is not good. This past year an outbreak of CRE (carbapenem-resistant enterobacteriaceae) linked to contaminated medical equipment infected 11 patients and killed two in Los Angeles area hospitals. This family of bacteria has evolved resistance to all antibiotics, including the powerful carbapenem antibiotics that are often used as a last resort against serious infections. They are now so resilient that it is virtually impossible to remove them from medical tools such as catheters and breathing tubes placed into the body, even after cleaning. Then we have gonorrhea, chlamydia, and other sexually transmitted diseases that we cannot treat and that are spreading all over the world. Anyone who has sex can catch these infections, and because most people may not exhibit any symptoms they spread infections without anyone knowing about it. Sexually transmitted diseases used to be treatable with antibiotics, but in recent years we have witnessed the rise of multi-drug resistant STDs. Untreated gonorrhea can lead to infertility in men and women and blindness and other congenital defect in babies. As is well known, too, we have witnessed many cases of drug-resistant pneumonia. These problems have arisen in part because of simple mistakes healthcare professionals repeatedly make. Let me explain. Neither superbugs nor common bacterial infections produce any special symptoms indicative of their cause. Rashes, fevers, sneezing, runny noses, ear pain, diarrhea, vomiting, coughing, fatigue, and weakness are signs of common and minor illnesses as well as uncommonly deadly ones. Therefore, the major problem for clinicians is to identify a common symptom that may potentially be an early sign of a major infection that could result in an epidemic. We know that dangerous infections in any given geographical area do not start at the same time. They start with one victim and gradually spread. But that victim is only one among hundreds of patients a doctor will typically see, so many doctors will miss patients presenting with infections that are serious. They will probably identify diseases that kill fast, but slow-spreading infections such as skin infections that can lead to septicemia are rarely diagnosed early. In addition, I have seen doctors treating eczema with antibiotic cream, even though they know that bacteria are resistant to the majority of these drugs. This sort of action encourages simple infections to spread locally, because patients are therefore not instructed to take other, more useful precautions. On top of that, some people are frivolous about infections and assume doctors are exaggerating the threat. And some people are selfish. Once I was called to see a passenger during a flight who had symptoms consistent with infection. He boarded the plane with these symptoms, but began to feel much worse during the flight. I was scared, knowing how infections such as Ebola can spread. This made me think about a way to screen passengers before they board a flight. Airlines could refund a traveler’s ticket, or issue a replacement, in case of sickness—which is not the policy now. We currently have no method to block infectious travelers from boarding flights, and there are no changes in the incentive system to enable conscientious passengers to avoid losing their money if they responsibly miss a flight because of illness. Speaking of selfishness, I once saw a mother drop her daughter off at school with a serious bout of impetigo on her face. When I asked her why she had brought her daughter to school with a contagious infection, she said she could not spare the time to keep her at home or take her to the doctor. By allowing this child to contact other children, a simple infection can become a major threat. Fortunately, I could see the rash on the girl’s face, but other kids in schools may have rashes we cannot see. Incorrect diagnosis of skin problems and mistaken use of antibiotics to treat them is common all over the world, and so we are continually creating superbugs in our communities. Similarly, chest infections, sore throats, and illnesses diagnosed as colds that unnecessarily treated with antibiotics are also a major threat. By prescribing antibiotics for viral infections, we are not only helping bacteria develop resistance, but we are also polluting the environment when these drugs are passed in urine and feces. All of this helps resistant bacteria to spread in the community and become an epidemic. Ebola is very difficult to transmit because people who are contagious have visible and unusual symptoms. However, the emerging infections and pandemics of the future may not have visible symptoms, and they could break out in highly populous countries such as India and China that send thousands of travelers all over the world every day. When a person is infected with a contagious disease, he or she can expect to pass the illness on to an average of two people. This is called the “reproduction number.” Two is not that high a number as these things go; some diseases have far greater rates of infection. The SARS virus had a reproduction number of four. Measles has a reproduction number of 18. One person traveling as an airplane passenger and carrying an infection similar to Ebola can infect three to five people sitting nearby, ten if he or she walks to the toilet. The study that highlighted this was published in a medical journal a few years ago, but the airline industry has not implemented any changes or introduced screening to prevent the spread of infections by air travel passengers, a major vehicle for the rapid spread of disease. It is scary to think that nobody knows what will happen when the world faces a lethal disease we’re not used to, perhaps with a reproduction number of five or eight or even ten. What if it starts in a megacity? What if, unlike Ebola, it’s contagious before patients show obvious symptoms? Past experience isn’t comforting. In 2009, H1N1 flu spread around the world before we even knew it existed. The Questions Remains Why do seemingly intelligent people repeatedly do such collectively stupid things? How did we allow this to happen? The answer is disarmingly simple. It is because people are incentivized to prioritize short-term benefits over long-term considerations. It is what social scientists have called a “logic of collective action” problem. Everyone has his or her specialized niche interest: doctors their patients’ approval, business and airline executives their shareholders’ earnings, hospitals their reputations for best-practice hygienics, homemakers their obligation to keep their own families from illness. But no one owns the longer-term consequences for hundreds of millions of people who are irrelevant to satisfying these short-term concerns. Here is an example. At a recent Superbug Super Drug conference in London that I attended, scientists, health agencies, and pharmaceutical companies were vastly more concerned with investing millions of dollars in efforts to invent another antibiotic, claiming that this has to be the way forward. Money was the most pressing issue because, as everyone at the conference knew, for many years pharmaceutical companies have been pulling back from antibiotics research because they can’t see a profit in it. Development costs run into billions of dollars, yet there is no guarantee that any new drug will successfully fight infections. At the same conference Dr. Lloyd Czaplewski spoke about alternatives to antibiotics, in case we cannot come up with new ones fast enough to outrun superbug evolution. But he omitted mention of preventive strategies that use the internet or communication software to help reduce the spread of infections among families, communities, and countries. It is madness that we don’t have a concrete second-best alternative to new antibiotics, because we need them and we need them quickly. Of course, this is why we have governments, which have been known occasionally in the past as commonwealths. Governments are supposed to look out for the wider, common interests of society that niche-interested professionals take no responsibility for, and that includes public health. It is why nearly every nation’s government has an official who is analogous to the U.S. Surgeon General, and nearly every one has a public health service of some kind. Alas, national governments do not always function as they should. Several years ago physician and former Republican Senator Bill Frist submitted a proposal to the Senate for a U.S. Medical Expeditionary Corps. This would have been a specialized organization that could coordinate and execute rapid responses to global health emergencies such as Ebola. Nothing came of it, because Dr. Frist’s fellow politicians were either too shortsighted or too dimwitted to understand why it was a good idea. Or perhaps they simply realized that they could not benefit politically from supporting it. Plenty of mistakes continue to be made. In 2015, a particularly infectious form of bird flu ripped through 14 U.S. states, leading farmers to preventively slaughter nearly 40 million birds. The result of such callous and unnecessary acts is that, instead of exhausting themselves in the host population of birds, the viruses quickly find alternative hosts in which to survive, and could therefore easily mutate into a form that can infect humans. Earlier, during the 1980s, AIDS garnered more public attention because a handful of rich and famous people were infected, and because the campaign to eradicate it dovetailed with and boosted the political campaign on behalf of homosexual rights. Methicillin resistant Staphylococcus aureus (MRSA) in hospitals, by far the bigger threat at the time, was virtually ignored. Some doctors knew that MRSA would bring us to our knees and kill millions of people worldwide, but pharmaceutical companies and device and equipment manufacturers ignored these doctors and the thousands of patients dying in hospitals as a result of MRSA. They prioritized the wrong thing, and government did not correct the error. And that is partly how antibiotic-resistant infection went from an obscure hospital problem to an incipient global pandemic. Politics well outside the United States plays several other roles in the budding problem that we are confronting. Countries often will not admit they have a problem and request help because of the possible financial implications in terms of investment and travel. Guinea did not declare the Ebola epidemic early on and Chinese leaders, worried about trade and tourism, lied for months in 2002 about the presence of the SARS virus. In 2004, when avian influenza first surfaced in Thailand, officials there displayed a similar reluctance to release information. Hospitals in some countries, including India, are managed and often owned by doctors. They refuse to share information about existing infections and often categorically deny they have a problem. Reporting infections to public health authorities is not mandatory, and so hospitals that fail to say anything are not penalized. Even now, the WHO and the CDC do not have accurate and up-to-date information about the spread of E. coli or other infections, and part of the reason is that for-profit hospitals are reluctant to do anything to diminish their bottom line. Syria and Yemen are among those countries that are so weak and fragmented that they cannot effectively coordinate public healthcare. But their governments are also hostile to external organizations that offer relief. Part of the reason is xenophobia, but part is that this makes the government look bad. Relatedly, most poor-nation governments do not trust the efficacy of international institutions, and think that cooperating with them amounts to a re-importation of imperialism. They would rather their own people suffer and die than ask for needed help. That brings us to the level of international public health governance. Alas, sometimes poor-country governments estimate the efficacy of international institutions accurately. The WHO’s Ebola response in 2014-15 was a disaster. The organization was slow to declare a public health emergency even after public warnings from Médecins Sans Frontières, some of whose doctors had already died on the front line. The outbreak killed more than 28,000 people, far more than would have been the case had it been quickly identified. This isn’t just an issue of bureaucratic incompetence. The WHO is under-resourced for the problems it is meant to solve. Funding comes from voluntary donations, and there is no mechanism by which it can quickly scale up its efforts during an emergency. The result is that its response to the next major disease outbreak is likely to be as inadequate as were its responses to Ebola, H1N1, and SARS. Stakeholders admit that we need another mechanism, and most experts agree that the world needs some kind of emergency response team for dangerous diseases. But no one knows how to set one up amid the dysfunctional global governance structures that presently exist. Maybe they should turn to Bill Frist, whose basic concept was sound; if the U.S. government will not act, perhaps some other governments will, and use the UN system to do so. But as things stand, we lack a health equivalent of the military reserve. Neither government leaders nor doctors can mobilize a team of experts to contain infections. People who want to volunteer, whether for government or NGO efforts, are not paid and the rules, if any, are sketchy about what we do with them when they return from a mission. Are employers going to take them back? What are the quarantine rules? It is all completely ad hoc, meaning that humanity lacks the tools it needs to protect itself. And note, by the way, the contrast between how governments prepare for facing pandemics and how they prepare for making war. War is not more deadly to the human race than pandemics, but national defense against armed aggression is much better planned for than defense against threats to public health. There is a wealth of rules regarding it, too. Human beings study and plan for war, which kills people both deliberately and accidentally, but they do not invest comparable effort planning for pandemics, which are liable to kill orders of magnitude more people. To the mind of a medical doctor, this is strange. Creating Conditions for Infections to Spread Superbug infections spread for several interlocking reasons. Some are medical-epidemiological. Most of the infections of the past thirty years have started in one place and in one family. As already noted, they spread because many infectious diseases are highly contagious before the onset of symptoms, and because it is difficult to prevent patients who know they are sick from going to hospitals, work, and school, or from traveling further afield. But again, one reason for the problem is political, not medical. Many governments have no strategies in place to prevent pandemics because they are unwilling to tell their people how infections spread. They don’t want to worry people with such talk; it will make them, they fear, unpopular. So governments may have mountains of bureaucracy with great heaps of rules and regulations concerning public health, but they are generally unwilling to trust their own citizens to use common sense on their own behalf. This, too, seems very strange. Until now, no one has come forward to help us develop strategies to educate people how to identify and prevent the spread of infection to their families and communities. The majority of stakeholders have also been oblivious to the use of new technologies to help reduce the spread of these infections. There are some exceptions. In a fun blog post called Preparedness 101: Zombie Apocalypse, the CDC uses the threat of a zombie outbreak as a metaphor to encourage people to prepare for emergencies, including pandemics. It is well meaning and insightful, yet when my colleagues and I try to discuss ways of scaling up the CDC’s example with doctors and nurses, they shut down. Nobody plans for an actual crisis partly because it is too scary and hence paralyzing to think about. But it is also because it is not most health professionals’ job; it is not what they are trained and paid to do. It is always someone else’s job, except that it has turned out to be nobody’s job. Worse, the situation is not static. While we sit paralyzed, superbugs are evolving. Epidemiological models now predict how an algorithmic process of disease spread will move through the modern world. All urban centers around the entire globe can become infected within sixty days because we move around and cross borders much more than our ancestors did, thanks to air travel. A new pandemic could start crossing borders before we even know it exists. A flu-like disease could kill more than 33 million people in 250 days.3

# Contention 2 – Food Insecurity

#### Current food consumption habits are unsustainable – warming, population growth, food requirements, loss of arable land, and demand for resource-intensive foods all mean a shortage is imminent

Goldstein and Oken 4/22 [(Gordon, an adjunct senior fellow at the Council on Foreign Relations (CFR). From 2010 to 2018, he was also a managing director at Silver Lake, the world’s largest investment firm in the global technology industry. Goldstein represented Silver Lake as a member of the U.S. delegation to the 2012 World Conference on International Telecommunications in the United Arab Emirates and also served on the American delegation to the 2014 UN International Telecommunication Union Plenipotentiary Conference in South Korea.) (Erik, Global Chairman, Investment Banking, J.P. Morgan Presider) “America’s New Challenge: Confronting the Crisis in Food Security” Council on Foreign Relations, 4/22/2021] TDI

The global dimensions of food instability are staggering. As the global population grows to a projected 10 billion in 2050, with a concurrent growth in income, overall food requirements are forecast to increase [PDF] by more than 50 percent. The demand for resource-intensive foods like meat and dairy is projected to grow by 70 percent.

The crisis in food sustainability displays a disturbing daily cadence. The world has lost 1,000 football fields worth of forest every hour, almost 30 million acres annually. According to a recent scientific study, climate change has diminished global food productivity by more than 20 percent over the past 60 years. If crop and pasture yields continue to grow as projected, by 2050 agricultural land will need to increase by an area nearly twice the size of India.

Not surprisingly, the world’s most populous and wealthy countries contribute the most to the crisis in food sustainability. Roughly 40 percent of greenhouse gas emissions from agriculture are clustered in four countries—the United States, China, India and Brazil. Since 1990, roughly 24 percent of global Greenhouse Gas Emissions can be attributed to the food system and our disproportionate reliance on livestock. Further exacerbating the problem is the methane produced in the agriculture industry, which is ~30 to ~80 times as deleterious to the environment as carbon dioxide.

#### Food insecurity causes state collapse, nuclear war, and terror – extinction

DeFeo 17 [(Michael, Regional Organizing Director at Arizona Democratic Party who graduated in 2019 with a bachelor’s degree in political science from Gettysburg College) “Food Insecurity and the Threat to Global Stability and Security in the 21st Century” Inquires Journal, 2017] TDI

Poor Institutional Capacity

Although the developed world experiences food insecurity, it is the lack of infrastructure and government institutions in developing countries that contribute to civil wars and state fragility. Foreign exchange shortages can provoke food and fuel scarcities that force governments to spend less on essential services and public goods. Accordingly, citizens see their medical and educational entitlements melt away. Such circumstances create breeding grounds for internal conflict.

All violent conflicts destroy land, water, and social resources for food production. Developing countries do not have massive industrial machines that can remedy such losses, therefore, the population will suffer. Food insecurity is a recruitment tool for violent extremist groups. Promising food and water to a starving population, especially in urban areas, makes recruiting young and disgruntled youth easier (Messer & Cohen, 2015). Syria had limited institutional capacity to deal with the mass displacement, and that lead to a civilian revolt and recruitment into the Islamic State.

Countries that fail to provide their people with basic services often experience gross economic inequality, and even human-rights violations, as was the case in both Syria and Sudan. Both countries are classified as Least Developed Countries (LDCs). LDCs are distinguished not just by their widespread poverty, but also by their structural weaknesses in economic, institutional, and human resources that make them unable to maintain stability during a drought. The combination of drought and political instability or violence led to famine in Somalia (another LDC) in 2011. Even with urgent humanitarian action, the country still plunged into chaos and violence (Messer & Cohen, 2015). Severe drought, like Somalia's, may result in crop failure in major food producing areas, which in turn is a significant threat to social stability and peace (Wischnath, 2014).

Sometimes droughts of exceptional severity (and the civil unrest that follows) are attributed to climate change, especially in particularly arid regions. Scholars are divided on whether climate change actually impacts civil conflict. That is why African countries like Somalia and Sudan are prime case studies. Africa has the lowest percentage of irrigated land in the world. Agriculture is the most important sector of most African countries. Very high percentages of civilians in African countries live in rural areas. Those characteristics combined with low economic and state capacity make African, particularly sub-Saharan African countries the most vulnerable to climate change and civil instability. Africa experiences more civil conflict than other parts of the world, therefore, it is possible to argue that a lack of climate variability effect on civil conflict in Africa would make it unlikely to cause civil conflict in other parts of the world (Koubi et al., 2012). Secretary-General of the United Nations, Ban Ki-moon attributed the conflict in Darfur to an ecological crisis arising “at least in part from climate change” (Ki-moon, 2007). The Fourth Report of the Intergovernmental Panel on Climate Change assessed that climate change will continue to worsen. As it does, it will increase food shortages, which may lead to conflict (AR4, 2007). The report also stated that forced displacement and rising social instability is the most likely result of food insecurity. This is almost exactly what happened in Syria. The first step towards conflict might be food riots, which often occur during a food shortage or when there is an unequal distribution of food. These are usually caused by food price increases, food speculation, transport problems, or extreme weather. In 1977, Egyptians became so desperate for food that they attacked shops, markets, and government buildings just to obtain bread and grain (Paveliuc-Olariu, 2013).

Moreover, civil war can create economic opportunities for certain groups, so they try to avoid resolving the conflict. Urban elites in Somalia profited tremendously off of internal conflict because of the absurd amount of foreign aid that was pumped into the country and then largely stolen (Shortland, Christopoulou, & Makatsoris, 2013). Once a country experiences a food shortage, it may lead to protests, riots, and violence. This all contributes to state instability, but it is not the state alone that suffers. If one country fails, it creates a crisis that could destabilize an entire region.

State Failure and the Threat to Regional Stability

Although fragile governments in developing countries are at a heightened risk for internal conflict that could topple them, that risk also threatens the country’s neighbors. After the Soviet Union collapsed in 1991, Afghanistan found itself alone in regional trade. Without a guaranteed source of cereal, the government had to turn to Iran and Pakistan for support in order to avoid its own collapse (Clarke, 2000). Unlike Afghanistan, many other developing countries have been unable to work together on food and water security. Thirteen of the twenty-two members of the Arab League rank among the most water-scarce nations on the planet. Food cannot be grown without water. The majority of the world is engaged in some sort of agreement with neighboring countries to share water supplies, but thirty-seven countries still do not share their water resources (El Hassan, 2014). Lack of cooperation can cause civil as well as interstate conflict. South Sudan legally has no share of the Nile River and the effects of that lack of water access have been mass starvation and violence.

The effects of climate change, water shortages, and mass migrations have resulted in acute food insecurity not just in Syria, but across the region (El Hassan, 2014). Food insecurity, plus an increase in the prices of staple foods have destabilized much of the area. The Arab Spring was the beginning of multiple conflicts that have affected countries like Syria, Egypt, and Libya. In Syria, food insecurity resulted in mass violence and has now created an international crisis involving multiple world powers.

Food insecurity is such a threat to entire regions because people cannot live without food and people want to live. When a region experiences food scarcity and that population feels threatened by hunger, it will relinquish dependency on any political authority and take up arms in order to ensure its well-being (Paveliuc-Olariu, 2013). This is human survivalism. It is important for developing countries in areas that are at risk for food insecurity to formulate policy that ensures aid goes to the food insecurity hotspots so as to maintain stability.

South Sudan experienced what happens when countries do not work together to feed their people. After gaining its independence from Sudan in 2011, 360,000 South Sudanese refugees returned to the country. This influx of human beings, coupled with drought conditions exacerbated economic strain and drove food prices up. The increases were the result of trade restrictions between Sudan and South Sudan. The overall reason for the food crisis, however, was the government's preoccupation with fighting a political and quasi-ethnic civil war rather than negotiating fair access to the Nile River (Tappis et al., 2013). Because of South Sudan’s weak institutions, it has done little to address the food shortage. That inability to solve the problem fuels insurgent recruitment that continues the bloodshed in South Sudan. The conflict is keeping regional rivalries alive with Uganda, Kenya, Ethiopia, and Sudan; all of whom have attempted to intervene in South Sudan militarily to bring about stability (Council on Foreign Affairs 2016). Aside from South Sudan, multiple conflicts across Africa are consuming massive amounts of diplomatic, political, and humanitarian resources in a region that faces a multitude of threats.

South Sudan, Somalia, and Syria are all failing states that are experiencing huge food shortages, humanitarian crises, and most importantly, extreme civil violence. South Sudan is mired in a civil war. Somalia is controlled by warlords and terror organizations. Syria has both of those problems. Conflict has turned these countries into “breeding grounds of instability, mass migration, and murder” rather than sovereign states with a monopoly on violence and control over their borders (Rotberg, 2002). To be sure, failing states are a concern because of their ability to destabilize entire regions, but states at risk for failure are also very important. Countries like Pakistan that are politically unstable and have food and water shortages could result in uncontrollable civil upheaval (The Fund for Peace, 2016).

Global Consequences of State Failure

Failing states and destabilized regions are not just a problem for the developing world. They are a very real concern for the United States and other developed countries as well. The Islamic State fed off of the Syrian Civil War and helped destabilize Iraq, Syria, Libya, and even Afghanistan and the Philippines. They have at also inspired terror attacks in Europe and the United States. They are a threat to both the developed and developing world. State instability allows them to recruit and train without government interference, which in turn allows them to plan attacks outside the region. An important source of income for the Islamic State has been agriculture from Iraq and Syria. While this revenue has received less media attention than oil extraction, it is still an important part of their economy (Jaafar & Woertz, 2016). It is also a key aspect of their political legitimacy because it allows them to feed their soldiers and those they control. Controlling some of the most fertile regions of the two countries has also helped the Islamic State starve off areas that have resisted them (Jaafar & Woertz, 2016). If Syria or Iraq are ever going to stabilize, those breadbaskets must be retaken and the food must reach the civilians in the cut off areas.

In the 20th century, state failure had few implications for international peace and security. Thanks to globalization, that is no longer the case. Failed states pose a threat to themselves, their neighbors, and the entire international community (Rotberg, 2002). Islamic State - inspired terror attacks in Belgium and France are a direct result of state collapse in Syria and Iraq. Preventing states from failing, rather than having to intervene militarily when they do, ought to be a top priority in the foreign policy of rich nations. Although the situations in Syria, Somalia, and South Sudan seem beyond repair, nation-building projects have had success in the past. Tajikistan, Lebanon, Cambodia, Kosovo and East Timor are all examples of relatively successful attempts to put failing states back on the right track (Rotberg, 2002). Developed countries must have the political will to ensure that people in developing countries are fed so that they remain pacified. It is often severe food insecurity that precedes ethnic or religious violence, as has been the case in South Sudan, therefore, adequate food is paramount to avoiding humanitarian crises that accompany ethnic and sectarian conflict (The Economist, 2016).

While it is true that many developed countries, especially the United States, are weary of providing so much financial aid and intervening militarily in war-torn, developing countries, it is imperative that the rich do not abandon the poor to a fate of internal destruction. Money must not be thrown blindly towards humanitarian crises and military intervention must be the last resort. Developed countries provided $1.4 billion for humanitarian aid in South Sudan in its first year of independence, but without specific conditions, that money went to kleptocrats rather than infrastructure projects or public services (The Economist, 2016).

Paying to help developing nations is expensive and will continue to be so. Afghanistan and Iraq are proof of that. But the war on terror, repeated military intervention, and humanitarian aid are expensive as well. In 2002, Robert Rotberg suggested that a new Marshall Plan was required for places like Afghanistan, the DRC, Sierra Leone, Somalia, and Sudan. If it is true that food and water security are the keys to keeping relative peace in new and developing countries and their collapse threatens the safety of the developed world, it seems logical that assisting those countries is wise.

In 1999, Susan L. Woodward argued that military leaders focus too much on force versus force combat rather than the issues of insurgency and terrorism in failed states. In 2017, military leaders have adjusted their strategies accordingly. Woodward believed that globalization made states less important, but their failure would still be felt around the world. Failed states cannot exercise their monopoly on violence and they cannot control their borders, thus threatening more than just the failed state (Woodward, 1999). Because state failure is so consequential, the United States military must continue to look into measures it can take to prevent it.

The Threat of the Future

Finally, the threats from food shortages in South Sudan, Somalia, Afghanistan, Iraq, and Syria are important to the United States and the international community at large, but there is one country that, while it is not a failing state right now, could easily become one if the wealthy nations of the world do not ensure its stability. That country is Pakistan. The Fund for Peace ranked Pakistan as the 14th most fragile state in the world in 2016, giving it a “High Alert” designation for state failure (The Fund for Peace, 2016). Its Demographic Pressure Indicator was an 8.9 - 10.2 Although it improved by one-tenth of a point last year, its decade trend is worse by seven-tenths of a point and its five-year trend is worse by four-tenths of a point, suggesting that the food situation is actually worsening overall (The Fund for Peace, 2016). If internal conflict and potential state failure at its most basic level begins with food and water insecurity, then Pakistan could become a real problem very soon.

Considering the risk of state failure, Pakistan poses the greatest threat to the rest of the world because of the existence of nuclear weapons within the country. Pakistan is not a member of the Nuclear Non-Proliferation Treaty, yet it has about 120 nuclear weapons. It also has a Shaheen 1A ballistic missile that can reach targets 550 miles away (Pakistan Defence, 2015). Should a food crisis arise in Pakistan that results in civil war and governmental collapse, those weapons could end up in the hands of a group that intends to use them maliciously as an act of terror. That prospect should be incentive enough for the developed countries to realize that they cannot and must not leave food insecure countries to devour themselves.

While it is difficult to argue that food insecurity immediately and directly causes civil conflict, there is no denying that people need food and water and will fight to survive. In South Sudan, ethnic and political armies fight one another. In Syria, rebels and government forces fight each other while also fighting the Islamic State. And in Somalia, warlords and their armies fight. The Syrian Civil War began six years ago after a water shortage forced thousands of migrants into urban centers. Developing countries tend to be most affected by climate change, poor governance, and food price increases. Therefore, they are the most prone to instability that may lead to outright violence. Without the wherewithal to handle civil conflict, these countries may become fragile or even failing states. Once that happens, they represent a threat not just in their region of influence, but the whole world. That is why the developed Western nations must pay attention and provide aid to the developing world in order to maintain stability. There will be more food crises in developing countries in the future, but if the North has the strength to continue aiding the South, perhaps it will be able to curb mass starvation and avoid the horrendous violence that consumes starving countries

#### CRISPR solves for food insecurity –a Chinese lead in initiative can drive more efficient agriculture practices

Molteni 19 [(Megan, a science writer at STAT News. Previously, she was a staff writer at WIRED, covering biotechnology, public health, and genetic privacy.) “Crispr Can Help Solve Our Looming Food Crisis—Here's How” WIRED, 8/8/2019] TDI

In the US, six companies are currently developing Crispr-modified crops. But it’s not clear how many of them will actually help feed the world more sustainably. Corteva, DowDuPont’s agtech arm, will likely bring the first Crispr crop to market in the US—an even waxier waxy corn, which gets processed into food thickeners and adhesives. To see where Crispr might transform the food supply to one that can survive the ravages of climate change, you have to go to China.

According to a recent report in Science, China has been ramping up its Crispr crop work, with more than 20 labs dedicated to developing plants to feed the country’s swelling population. In 2013, the most recent year for which comparative figures exist, China outspent the US government on public funding of agricultural research more than twice over, pumping $10 billion into more than 1100 research institutions. And in 2017, the state-owned company ChemChina paid $43 billion for one of the world’s largest agribusinesses, Syngenta, which has a significant Crispr division. China still has yet to decide if it will follow the US’s lead with regards to regulation of Crispr crops, or if it will treat them the same as first-generation GMOs, as the European Union ruled last year.

In theory, Crispr and other genetic technologies could help reduce agriculture’s footprint in four big ways. One, it could keep already established croplands productive in the face of a changing climate, preventing the conversion of what remains of the planet’s wild areas to food production. Two, it could reduce farmers’ reliance on fertilizers, by helping companies develop designer microbes that produce nitrogen for crops instead. Three, it could make raising livestock both more efficient, more sustainable, and more humane. And lastly, but probably most realistically, it will help create crops with less spectacular traits that offer more incremental advances in efficiency—they sequester more carbon, pack in more nutrients, and produce more food per acre with fewer inputs.

# Contention 3 – Pandemics (if time)

#### CRISPR prices are extremely high right now, and are inaccessible – patents are to blame for this

Sherkow 17 Jacob S. Sherkow, [Yale J Biol Med.](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5733839/) 2017 Dec; 90(4): 667–672. Published online 2017 Dec 19. PMCID: PMC5733839 PMID: [29259531](https://www.ncbi.nlm.nih.gov/pubmed/29259531) Focus: Genome Editing

Patent issues surrounding CRISPR, the revolutionary genetic editing technology, may have important implications for the public health. Patents maintain high prices for novel therapies, limiting patient access. Relatedly, insurance coverage for expensive therapies is waning. Patents also misallocate research and development resources to profitable disease indications rather than those that necessarily impinge on the public health. And it is unclear how CRISPR therapies will figure into the current regulatory framework for biosimilars. Policy makers and physicians should consider these issues now, before CRISPR therapies become widely adopted—and entrenched—in the marketplace.

Similarly, patents would allow developers of CRISPR therapies to price their products in a way that makes up for low patient demand, either because the disease indication sought to be treated is rare or, like Glybera, the treatment is a one-time dose [[14](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5733839/#R14)]. Glybera, in fact, provides a sterling example of patents covering rare-indication, permanent gene therapies; the treatment is protected by at least eight patent families, covering the viral vector, protein expression systems, and manufacturing processes, with multiple patents and patent applications for each family [[21](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5733839/#R21)]. CRISPR developers are famously making use of extensive patent families like these, with enormous licensing fees paid to collaborators [[4](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5733839/#R4)]. The ultimate retail prices of these and related therapies can be astronomical. Novartis’s Kymriah (tisagenlecleucel)—the first approved CAR-T therapy, albeit without using CRISPR—costs $475,000 [[22](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5733839/#R22)]. It stands to reason that such patents will likely make any CRISPR therapies for rare diseases similarly expensive.

The potential price of patented CRISPR therapies also illuminates a larger point about drug pricing: it allows developers to set profit maximizing prices independent of the marginal costs of production [[23](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5733839/#R23)]. That is, patents allow drug developers to price their products as high as the market will bear regardless of how much therapies cost to make. This is important for CRISPR-based therapies sought to replace expensive-to-produce, multi-dose drugs. Monoclonocal antibody therapy, for example, is typically costly and difficult to manufacture, store, and provide to patients [[24](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5733839/#R24)]. CRISPR-based alternatives may ultimately be cheaper to produce. But patent coverage of the product allows the therapy’s developer to set prices far enough above this manufacturing cost as to make it irrelevant [[23](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5733839/#R23)]. The ease, cost, and permanency of CRISPR therapies do not necessarily mean they will be cheaper than companion therapies, especially where patents are involved.

#### The Prevalence of pandemics is set to steadily increase in the future.

UNESCO 20 ; UNESCO, **UNESCO is among IPBES’ main institutional United Nations partners, together with FAO, UNDP and UNEP. UNESCO's Local and Indigenous Knowledge Systems programme (LINKS) hosts the Technical Support Unit for the IPBES Task Force on Indigenous and Local Knowledge Systems, 10/29/20,** [**https://en.unesco.org/news/pandemics-increase-frequency-and-severity-unless-biodiversity-loss-addressed**](https://en.unesco.org/news/pandemics-increase-frequency-and-severity-unless-biodiversity-loss-addressed)**,**

**This report released 29 October is the result of a virtual workshop between 22 leading experts who agree that escaping the era of pandemics is possible, but that this will require a seismic shift in approach from reaction to prevention.**

There is a clear link between **global health** pandemicsand **the** biodiversity and climate crisis **we are experiencing. The** root causes of the pandemics are **also the driving force behind the erosion of biodiversity and climate change:** human activities**.** Changes in land use**, the expansion and intensification of agriculture and the trade and consumption of wildlife, disrupt ecosystems,** promote **proximity between humans and wildlife, livestock and humans and thus with** the pathogens they carry.

**The report warns that** future pandemics will emerge more often, spread more rapidly, do more damage to the world economy and kill more people **than COVID-19** unless there is a transformative change in the global approach to dealingwith **infectious** disease**s, from reaction to prevention. The experts estimate that the cost of risk reduction to prevent pandemics is 100 times less than the cost of responding to such pandemics, "providing strong economic incentives for transformative change". This will require a deep reassessment and transformation of the relationship between humans and nature, and of the unsustainable consumption practices leading to biodiversity loss, climate change and the emergence of pandemics.**

**The experts recommend the establishment of a new intergovernmental partnership on health and trade, and the creation of a high-level intergovernmental council on pandemic prevention. They also stress the importance of valuing the commitment and knowledge of indigenous peoples and local communities.**

**Through its biodiversity strategy, UNESCO mobilizes its networks and partners to work on a set of values and principles that should guide actions to restore, conserve and transmit the value of biodiversity. We must transform the way we live on Earth together with other species of the living world, and establish a new pact.**

#### Disease is an existential risk--- encloses AND outweighs other threats

Pamlin & Armstrong 15, Dennis Pamlin, Executive Project Manager Global Risks, Global Challenges Foundation, and Stuart Armstrong, James Martin Research Fellow, Future of Humanity Institute, Oxford Martin School, University of Oxford, February 2015, “Global Challenges: 12 Risks that threaten human civilization: The case for a new risk category,” Global Challenges Foundation, p.30-93, https://api.globalchallenges.org/static/wp-content/uploads/12-Risks-with-infinite-impact.pdf

4 Global A pandemic (from Greek πᾶν, pan, “all”, and δῆμος demos, “people”) is an epidemic of infectious disease that has spread through human populations across a **large region**; for instance **several continents**, or even **worldwide**. Here only worldwide events are included. A widespread endemic disease that is stable in terms of how many people become sick from it is not a pandemic. 260 84 Global Challenges – Twelve risks that threaten human civilisation – The case for a new category of risks 3.1 Current risks 3.1.4.1 Expected impact disaggregation 3.1.4.2 Probability Influenza subtypes266 Infectious diseases have been one of the greatest causes of mortality in history. Unlike many other global challenges pandemics have happened recently, as we can see where reasonably good data exist. Plotting historic epidemic fatalities on a log scale reveals that these tend to follow a **power law with a small exponent**: many plagues have been found to follow a power law with exponent 0.26.261 These kinds of power laws are **heavy-tailed**262 to a significant degree.263 In consequence most of the fatalities are accounted for by the **top few events**.264 If this law holds for future pandemics as well,265 then the majority of people who will die from epidemics will likely die from the single largest pandemic. Most epidemic fatalities follow a power law, with some extreme events – such as the Black Death and Spanish Flu – being even more deadly.267 There are other grounds for suspecting that such a high impact epidemic will have a greater probability than usually assumed. All the features of an extremely devastating disease already exist in nature: essentially incurable (Ebola268), nearly always **fatal** (rabies269), **extremely infectious** (common cold270), and **long incubation periods** (HIV271). If a pathogen were to emerge that somehow combined these features (and influenza has demonstrated **antigenic shift**, the ability to combine features from different viruses272), its death toll would be extreme. Many relevant features of the world have changed considerably, making past comparisons problematic. The modern world has better sanitation and medical research, as well as national and supra-national institutions dedicated to combating diseases. Private insurers are also interested in modelling pandemic risks.273 Set against this is the fact that **modern transport** and dense human population allow infections to spread much more rapidly274, and there is the potential for urban slums to serve as breeding grounds for disease.275 Unlike events such as nuclear wars, pandemics would not damage the world’s infrastructure, and initial survivors would likely be resistant to the infection. And there would probably be survivors, if only in isolated locations. Hence the risk of a civilisation collapse would come from the rippleeffect of the fatalities and the policy responses. These would include political and agricultural disruption as well as economic dislocation and damage to the world’s trade network (including the food trade). Extinction risk is only possible if the aftermath of the epidemic **fragments and** diminishes human society to the extent that recovery becomes impossible before humanity succumbs to **other risks** (such as **climate change** or **further pandemics**). Five important factors in estimating the probabilities and impacts of the challenge: 1. What the true probability distribution for pandemics is, especially at the tail. 2. The capacity of modern international health systems to deal with an extreme pandemic. 3. How fast medical research can proceed in an emergency. 4. How mobility of goods and people, as well as population density, will affect pandemic tran

#### CRISPR will be able to solve for future pandemics; COVID proves, timeframe is key

Levy 20 Steven Levy, 3/10/20, https://www.wired.com/story/could-crispr-be-the-next-virus-killer/

In this particular experiment, he had introduced the lab’s Crispr-based system for finding and destroying SARS-Cov 2 (what scientists [call the new coronavirus](https://www.wired.com/story/coronavirus-has-a-name-the-deadly-disease-is-covid-19/)) into a solution containing an inert synthesized fragment of that virus. Like [all Crispr systems](https://www.wired.com/story/dna-editing-crispr-cas9-cas12e-cas12b-cas12a/), this one was composed of two parts: an enzyme and a strand of so-called "guide RNA." The RNA directs the enzyme, in this case, Cas-13d, to latch onto specific spots in the coronavirus's genome where it then makes a series of cuts. You can think of it like a pair of scissors programmed to scan a cookbook and chop up only the page containing the recipe for SARS-Cov-2.

After Abbott analyzed the data, he called over Marie La Russa, a research scientist managing the project, to verify what he’d seen. The coronavirus-targeted Crispr had reduced the amount of virus in the solution by [in a person] 90 percent. If effectively delivered, this kill rate, they theorized, might be enough to stop the disease in a human.

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The gene-editing power of Crispr technology has been increasingly directed at fighting diseases, originally against genetic ones. But more recently, it’s been harnessed [to fight infectious diseases](https://www.wired.com/story/chinese-scientists-try-to-cure-one-mans-hiv-with-crispr/), including, now, the new coronavirus. For instance, multiple teams inside and outside of academia are working on [using Crispr for more effective tests](https://www.wired.com/story/a-new-startup-wants-to-use-crispr-to-diagnose-disease/). Mammoth Biosciences, a private company, claims to have developed [a test for Covid-19](https://mammoth.bio/wp-content/uploads/2020/02/A-protocol-for-rapid-detection-of-the-2019-novel-coronavirus-SARS-CoV-2-using-CRISPR-diagnostics-SARS-CoV-2-DETECTR.pdf) that cuts the result time from several hours to under 30 minutes. Sherlock Biosciences has produced a protocol that could possibly enable something that would work [like a pregnancy test](https://www.broadinstitute.org/news/enabling-coronavirus-detection-using-crispr-cas13-open-access-sherlock-research-protocols-and), giving a positive signal on a test strip.

Efforts using Crispr to actually prevent or fight coronavirus are also emerging from existing projects designed to fight influenza and other infectious viruses. In 2018, Darpa began a four-year program called [Prepare.](https://www.darpa.mil/news-events/2018-05-25) According to its call for proposals, the idea was to use genetic approaches to “generate new medical countermeasures for future use in humans.” Qi’s lab at Stanford was one of several grant recipients. In April 2019, they began working on a Crispr-based means of fighting influenza. Naturally, as the coronavirus [spread earlier this year](https://www.wired.com/story/wuhan-china-coronavirus-global-health-emergency/), the team took notice, and in late January they switched their focus to the virus that’s now changed the way we live.

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For all of that, the Stanford paper may one day be seen as a milestone. The ultimate promise of a Crispr-based system is that once you identify the genetic targets of a new virus, altering a previous treatment is a simpler process, and can be quickly implemented. “So maybe down the line in the future, we would have the system that is completely agnostic to which virus that you're [fighting],” says Abbott. “All you would have to do is change one simple part, and then, boom, you’re actually protected against this new novel virus.” (He concedes that the FDA would still have to sign off on any new use for the therapy.)