### 1NC - T

#### Interpretation: The aff must defend that member nations reduce all intellectual property protections for medicines

#### The upward entailment test and adverb test determine the genericity of a bare plural

Leslie and Lerner 16 [Sarah-Jane Leslie, Ph.D., Princeton, 2007. Dean of the Graduate School and Class of 1943 Professor of Philosophy. Served as the vice dean for faculty development in the Office of the Dean of the Faculty, director of the Program in Linguistics, and founding director of the Program in Cognitive Science at Princeton University. Adam Lerner, PhD Philosophy, Postgraduate Research Associate, Princeton 2018. From 2018, Assistant Professor/Faculty Fellow in the Center for Bioethics at New York University. Member of the [Princeton Social Neuroscience Lab](http://psnlab.princeton.edu/).] “Generic Generalizations.” Stanford Encyclopedia of Philosophy. April 24, 2016. <https://plato.stanford.edu/entries/generics/> TG

1. Generics and Logical Form

In English, generics can be expressed using a variety of syntactic forms: bare plurals (e.g., “tigers are striped”), indefinite singulars (e.g., “a tiger is striped”), and definite singulars (“the tiger is striped”). However, none of these syntactic forms is dedicated to expressing generic claims; each can also be used to express existential and/or specific claims. Further, some generics express what appear to be generalizations over individuals (e.g., “tigers are striped”), while others appear to predicate properties directly of the kind (e.g., “dodos are extinct”). These facts and others give rise to a number of questions concerning the logical forms of generic statements.

1.1 Isolating the Generic Interpretation

Consider the following pairs of sentences:

(1)a.Tigers are striped.

b.Tigers are on the front lawn.

(2)a.A tiger is striped.

b.A tiger is on the front lawn.

(3)a.The tiger is striped.

b.The tiger is on the front lawn.

The sentence pairs above are prima facie syntactically parallel—both are subject-predicate sentences whose subjects consist of the same common noun coupled with the same, or no, article. However, the interpretation of first sentence of each pair is intuitively quite different from the interpretation of the second sentence in the pair. In the second sentences, we are talking about some particular tigers: a group of tigers in ([1b](https://plato.stanford.edu/entries/generics/#ex1b)), some individual tiger in ([2b](https://plato.stanford.edu/entries/generics/#ex2b)), and some unique salient or familiar tiger in ([3b](https://plato.stanford.edu/entries/generics/#ex3b))—a beloved pet, perhaps. In the first sentences, however, we are saying something general. There is/are no particular tiger or tigers that we are talking about.

The second sentences of the pairs receive what is called an existential interpretation. The hallmark of the existential interpretation of a sentence containing a bare plural or an indefinite singular is that it may be paraphrased with “some” with little or no change in meaning; hence the terminology “existential reading”. The application of the term “existential interpretation” is perhaps less appropriate when applied to the definite singular, but it is intended there to cover interpretation of the definite singular as referring to a unique contextually salient/familiar particular individual, not to a kind.

There are some tests that are helpful in distinguishing these two readings. For example, the existential interpretation is upward entailing, meaning that the statement will always remain true if we replace the subject term with a more inclusive term. Consider our examples above. In ([1b](https://plato.stanford.edu/entries/generics/#ex1b)), we can replace “tiger” with “animal” salva veritate, but in ([1a](https://plato.stanford.edu/entries/generics/#ex1a)) we cannot. If “tigers are on the lawn” is true, then “animals are on the lawn” must be true. However, “tigers are striped” is true, yet “animals are striped” is false. ([1a](https://plato.stanford.edu/entries/generics/#ex1a)) does not entail that animals are striped, but ([1b](https://plato.stanford.edu/entries/generics/#ex1b)) entails that animals are on the front lawn (Lawler 1973; Laca 1990; Krifka et al. 1995).

Another test concerns whether we can insert an adverb of quantification with minimal change of meaning (Krifka et al. 1995). For example, inserting “usually” in the sentences in ([1a](https://plato.stanford.edu/entries/generics/#ex1a)) (e.g., “tigers are usually striped”) produces only a small change in meaning, while inserting “usually” in ([1b](https://plato.stanford.edu/entries/generics/#ex1b)) dramatically alters the meaning of the sentence (e.g., “tigers are usually on the front lawn”). (For generics such as “mosquitoes carry malaria”, the adverb “sometimes” is perhaps better used than “usually” to mark off the generic reading.)

#### It applies to “Medicines” – adding “generally” to the res doesn’t substantially change its meaning and the rez doesn’t entail reducing IP protections for all scientific technology

#### Violation: They spec

#### Net benefits -

#### [1] Limits – 580 recognized medicines plus combinations makes negating impossible especially with no unifying disads against medicines with different policies, implementation and IP procedures

#### [2] Precision outweighs – it determines which interps your ballot can endorse by providing the only salient focal point for debates—if their interp is not premised on the text of the resolution, its benefits are irrelevant to the question of topicality since it fails to interpret the topic

#### [3] Ground - The aff can claim any advantage to a virtual infinite combination of affs and the lack of predictability for negatives means virtually no DAs are applicable because Affirmatives can de-link out of them.

#### DTD on T-- indicts their ability to read the aff and the debate shouldn’t have happened to begin w if the aff was abusive

#### Competing Interps on T since its binary and a question of models—reasonability arbitrary

### 1NC – CP

#### The United States federal government should provide subsidies for the creation of a pipeline and storage system for carbon capture and sequestration.

Fiat solves

#### That commercializes the industry – ensures a transition to CCS.

Schrag ‘9 – Researcher at Harvard (Daniel, Steering Committee Member, “Making Carbon Capture and Storage Work; Acting in Time on Energy Policy”, Harvard Project on Climate Agreements, pp. 39-55. Book. Acc. 6/1/16)

Recommendation 1: Provide Federal Subsidies for Commercial-Scale CCS The U.S. government should provide federal subsidies for ten to twenty commercial- scale CCS projects. These should include different capture technologies (if appropriate) and different strategies for geological storage, and should be spread across different regions of the United States to have the biggest impact, both on knowledge gained and also on public perception. Although CCS should be profitable at some point given a sufficient price on carbon, government assistance is needed in the short term to demonstrate the technology at commercial scale. The price that would be imposed by any of the cap-and-trade legislation currently under discussion in Congress is still well below the level that would cover the cost of sequestration. This may not be a fatal obstacle as investors will anticipate higher prices in the future. But without an adequate price, it is likely that new plants would be built "capture ready" (that is, designed to capture CO2) but would not actually capture CO2 and store it in geological repositories. Another problem is that the price of CO2 could be volatile under a cap-and-trade regime, and this may discourage investment in large capital projects like CCS that depend on a high carbon price. It should be noted that in several parts of the country, including the Northeast, California, and even parts of the Midwest, it is extremely difficult, if not impossible, to obtain a permit to build a new coal-fired power plant, not because of a price on carbon but simply because local regulators are unlikely to allow any new power plant with high CO2 emissions. In these markets, a new coal-fired power plant with CCS may actually be profitable today, particularly in the regions dominated by natural gas-generated electricity that have very high prices. But even where CCS is commercially viable today, it is difficult to get investors to assume the technology risks, as well as the risks associated with legal and regulatory issues, including postinjection liability. A simple way around these concerns is to encourage ten to twenty CCS projects at commercial scales through a variety of government policies and programs. This would allow for demonstration of CCS at enough locations that we would learn whether leakage was a significant problem in certain places, determine which capture technologies were most efficient, and identify any unforeseen problems or challenges. To accomplish this, grants could be awarded on a competitive basis that would pay for some of the incremental capital costs of building a new power plant with CCS. A competitive bidding program might be an efficient way to distribute such subsidies as long as cost was only one of the factors considered when making awards. The Department of Energy, in its restructured FutureGen program, is essentially doing just that at a smaller scale, although sufficient funding has not yet been allocated to the program. It is essential that government support for commercial demonstration of CCS would also cover the costs of independent monitoring for these projects, at least during the first several years of operation, because knowledge of how the capture technologies operate and what happens to the CO2 after injection will be important in setting and revising CCS regulations in the future. Within these projects, it would be important to have a range of technologies and storage strategies included. Some of these grants should support retrofit of existing PC plants with postcombustion capture systems, which may require slightly greater funding. Because the intent of these government investments would be to launch true CCS projects and increase our understanding of how such systems would operate at commercial scales, projects that involve storing the CO2 through EOR should be ineligible for funding. The size of the grants would vary between regions because of differences in the local cost of electricity as well as the existence in some states of subsidy programs for low-carbon electricity that would apply to CCS. Grants would likely need to be higher in coal-intensive regions that currently have very low electricity prices. Awards would not necessarily have to cover the entire additional cost of CCS as these projects may have additional factors that make them more economical, such as accelerated permitting and state subsidies for low-carbon energy. Additional support could come in the form of tax credits that would depend on some minimum fraction of CO2 captured and stored (for example, 80 percent), or loan guarantees that would reduce the risk to investors in newer technologies including IGCC. All these forms of support could be tied to a carbon price so that the subsidies would diminish if a cap-and- trade bill were passed and these projects were able to benefit from a national carbon price.

#### Only CCS can solve warming.

Cohen ‘9 – Environment Director (Armond, Executive Director of the Clean Air Task Force, Mike Fowler, Kurt Waltzer, May 2009, “’NowGen’: Getting Real about Coal Carbon Capture and Sequestration”, The Electricity Journal, 22.4, pp. 25-42. <http://www.sciencedirect.com/science/article/pii/S1040619009000906>. Acc. 6/1/16)

II. CCS is Critical to a Zero-Carbon World¶ The title of a recent article by two leading climate researchers sums up the message emerging from the latest scientific evidence: “Stabilizing climate requires near-zero emissions.”1 Even the most dramatic, 50–80 percent CO2 reduction goals generally being discussed likely are not enough. We need a near-100-percent reduction by mid-century at the latest. Energy systems need to change faster.2¶ Part of the urgency stems from the reality that warming impacts from today's emissions may last as long as 1,000 years3; we cannot assume that reducing emissions “tomorrow” means we can reverse damage done to date. Worse, we risk passing irreversible “tipping points” that trigger abrupt and catastrophic changes, such as major ice melt in the polar regions, extensive rainforest loss, and radical alterations of critical weather and ocean circulation patterns. Such tipping points could be in sight if current emission trends continue for another decade or more.4¶ Unfortunately, we are moving in the wrong direction fast. In recent years, China has added coal capacity at a rate of one large new plant per week (70–100 GW per year)5 and India – potentially the world's most populous country by 2030 – could ramp up as well. The International Energy Agency (IEA) currently projects that world coal capacity will nearly double by 2030, an increase of 1,310 GW.6 If this build-out occurs without CCS, it will increase world CO2 emissions by about 12.6 billion metric tons annually7—roughly twice current U.S. emissions from all sources. Clearly, China, India, and other developing countries will “make or break” any global effort to cut CO2 emissions—in fact, changes in their emissions trajectory will overwhelm any plausible reductions by developed countries.¶ Numerous studies—including studies by the IEA, the Intergovernmental Panel on Climate Change, the U.S. Climate Change Science Program (CCSP), and several major environmental organizations—have assessed the relative roles that different technologies might play in meeting various climate stabilization targets. This body of work (and more) suggests that CCS has economic advantages relative to other options and is likely to be indispensable in achieving a zero-carbon energy mix. Specifically, these studies (which are reviewed and summarized at the CATF Web site, http://www.catf.us/projects/power\_sector/advanced\_coal/) find the following:¶ • Stabilizing atmospheric CO2 at 450 parts per million by volume (ppmv) could require more than 250 GW of fossil power with CCS globally by 2030 (U.S. CCSP, 2007)8;¶ • Fossil fuels with CCS might need to provide 26 percent of global energy supply under stabilization constraints (WWF, 2007)9;¶ • Combined power sector and industrial CCS could provide the largest single CO2 abatement option in the U.S. in 2030 (McKinsey & Co., 2007)10;¶ • Costs for stabilizing CO2 with widespread CCS deployment could be reduced 30 percent or more compared to the costs without CCS (IPCC, 2005)11;¶ • CCS [will] is likely to play a role roughly equivalent to that of energy efficiency and renewables in climate mitigation (IPCC, 2007).12¶ A. A demanding challenge¶ Figure 1 illustrates the magnitude of the global energy challenge. Each rectangle is drawn with height proportional to average per capita electricity consumption and width proportional to population.13 The area of each rectangle represents total consumption in 2004. Shades are used to indicate what fraction of electricity comes from coal (middle is between one-third and two-thirds, light is less than one-third, and dark is more than two-thirds). Clearly, if a reasonable target were set for per capita electricity consumption, even large reductions in the developed world—say 30 percent—would not offset enormous demand growth in the developing world. Massive capacity additions would still be needed. Continued population growth in developing countries, along with urbanization, industrialization, and income growth on a mass scale will only add to these pressures.¶ As already noted, rapid growth is well underway in developing countries, with China adding more coal-fired capacity in 2006 and 2007 than exists in Western Europe today and India planning 92 GW of new capacity (most of it thermal power) in the next five years.14 The current global economic downturn may moderate these trends, but only temporarily.¶ B. Other zero-carbon energy options: Not betting the farm¶ While it would be convenient if a combination of efficiency, truly “clean” renewable, and other zero-carbon sources15 could suffice to meet all the world's energy needs, common sense casts serious doubt on this proposition.16 First, there will be limits to how far we can reduce consumption with energy-efficiency policies. Policy efforts in the state of California have reduced per capita electricity demand by roughly 10 percent relative to the U.S. average,17 yet each Californian still uses about 7,000 kWh of electricity per year, more than almost anyplace in the world outside North America (and nearly five times the level of the average Chinese). Moreover, California's overall demand is still growing. Meanwhile, other low-carbon supply options confront their own formidable deployment challenges. For example, intermittency, lack of long-distance transmission capacity to remote sites, and land-use requirements remain hurdles to a massive scale-up of renewable sources like wind and solar power, despite continued technology improvements. The scale-up challenge is truly daunting: displacing just 1 Gt of annual CO2 emissions (out of the 7 Gt needed just to flatten global emissions by mid-century) would require 2,000 GW of wind energy—twice the current U.S. base of all installed electrical capacity. Alternatively, it would require a three-fold expansion of current world nuclear capacity.18¶ Meanwhile, movement toward an electrified vehicle fleet, in the U.S. and worldwide, may be desirable on climate and energy security grounds, but it will also contribute to growing electricity demand. Given remaining cost and technology challenges and ongoing concerns about indirect land-use impacts, we cannot count on biofuels to provide truly carbon-neutral solutions for the vehicle sector within the next few decades.19 If electricity therefore has to play a larger role, decarbonizing fossil-based power production becomes that much more urgent.¶ Obviously it is extremely difficult to forecast the deployment trajectory of different technologies decades into the future. But it would be unwise to “bet the farm” that fossil fuels in general, and coal in particular, do not have a significant role to play for some time to come.¶ C. History suggests that rapid scale-up to a gigatonne-scale CCS industry is well within our capabilities¶ For a typical 500 MW coal-fueled power plant, CCS involves separating, transporting, and storing about 4 million tonnes of CO2 each year.20 Compressed to a dense, supercritical state this mass of CO2 would occupy a space roughly 500 meters on each side and 33 meters thick.21 Applying the same technology at hundreds of plants represents the central challenge of CCS: the existing fleet of coal plants in the U.S.—at 320 GW combined capacity—produces more than 2 Gt of CO2 each year.¶ Fortunately, analogues from other industries suggest that this sort of scale-up is feasible over the next two decades. In a single 20-year period between 1950 and 1970, for example, installed electric-generating capacity in the U.S. more than quadrupled, from 69 GW to 316 GW. This matches the scale of the global CCS build-out that some studies suggest is necessary by 2030 to meet some climate targets. And it is significantly less capacity than China is expected to add over the same time period.22 Similarly, approximately 150,000 miles of natural gas pipeline were built in the U.S. between 1960 and 1980.23 The CO2 pipeline network needed to support several hundred GW of CCS-equipped power plants could be much smaller, perhaps less than 30,000 miles in some scenarios.24 Assuming 35 CO2 injection wells per GW implies roughly 10,000 wells would be needed for sequestration in this scenario—a large number, but well below the number of oilfield brine injection wells currently operating in the U.S. (150,00025) and equivalent to just six months of natural gas drilling activity in the Alberta Basin (20,000 wells per year26). Figure 2 compares the CCS infrastructure “lift” to comparable energy-system scale-ups in the past.27¶ In sum, experience suggests that large-scale CCS can be achieved over the next several decades. It also suggests that an entirely new, specialized industry with CO2 as its central, fungible commodity will need to emerge. Similar to the major energy industries that came before, this evolution may occur from the bottom up—as capture systems at individual plants combine to form regional systems with multiple CO2 sources, pipeline networks, and sequestration sites. Moreover, this new industry may need to be organized and governed as a regulated system in its own right.

### 1NC – DA

#### Biotech R&D is set for high growth and investment now

NASDAQ 8/9 [NASDAQ is a stock market index that includes almost all stocks listed on the Nasdaq stock exchange. Along with the Dow Jones Industrial Average and S&P 500, it is one of the three most-followed stock market indices in the United States. This article was written by NASDAQ contributors and published on CNBC. The editorial staff of CNBC did not contribute to the creation of this study.) “Why the Nasdaq Biotechnology Index is poised for a run of sustainable growth” CNBC, NASDAQ, 8/9/2021, <https://www.cnbc.com/advertorial/2021/08/09/why-the-nasdaq-biotechnology-index-is-poised-for-a-run-of-sustainable-growth-.html>] RM

Between the recent bio innovation success stories in the battle against Covid-19 and the technology-driven advances ushering in new efficiencies for research and development (R&D), **the biotech industry has never been more relevant**.

As home to more than 265 companies, the pioneering Nasdaq Biotechnology Index (NBI) has long been committed to providing healthcare’s innovators with access to the capital they need to keep moving forward. Now, investors have access to the Index’s companies through a new ETF, the Invesco Nasdaq Biotechnology ETF (IBBQ).

Launched in 1993, in the wake of the original “biotech revolution” led by the discovery of recombinant DNA, NBI® remains the most representative index in the space. In fact, 98% of all U.S. listed biotech companies are listed on Nasdaq. When considering the massive growth taking place in the sector, it’s no surprise that NBI has outperformed both the S&P 500 (SPX) and Health Care Select Sector Index (IXVTR) in certain market environments.

According to Mark Marex, Index R&D Senior Specialist for Nasdaq who recently compiled an in-depth report on the NBI, global events and digital acceleration have contributed to the Index’s recent strong performance; and Nasdaq’s dedication to maintaining a true benchmark for technology-driven healthcare innovation has provided a framework for growth.

Building the ideal benchmark

Given the existence of pureplay biotech firms, hybrid biopharmaceutical companies, and less R&D-intensive pharmaceutical manufacturers, creating a single benchmark that truly captures the biotech sector and the symbiotic relationships among its players is no easy task.

One of the unique aspects of NBI, versus biotech-focused indexes created by other index providers, is its subsector classifications split between Biotechnology and Pharmaceuticals. As of June 30, 2021, ICB (FTSE Russell’s Industry Classification Benchmark) classified 222 NBI companies as Biotechnology and 47 as Pharmaceuticals. The resulting split by index weight is approximately 65% and 35%, respectively, which illustrates the major difference between the two groups: Pharmaceutical companies tend to be much larger than Biotechnology firms.

This split within a single index provides advantages for investors: While offering some exposure to more established pharmaceutical companies, it also includes R&D-heavy biotech firms that over time may transition into biotech-driven pharma companies. That’s exactly what happened this year when NBI’s largest company, Amgen (AMGN / $144Bn), was reclassified by ICB from Biotechnology to Pharmaceuticals. By retaining firms as they straddle the two classifications over the course of their lifecycle, NBI presents potential growth advantages when compared with index providers that focus rigidly on one classification versus the other.

Home to world-changing breakthroughs

Nasdaq’s vision for the Index has served it well, **both in terms of its longevity and its current role as a champion of the companies paving the way for a post-pandemic world through their technological advances and life-saving treatments**. The broad reach of NBI constituents across multiple fronts in the fight against Covid-19, for example — from diagnosis to vaccines and treatment —demonstrates the strength of its core approach.

NBI companies including Gilead and Regeneron made headlines for their successes during the pandemic with antiviral therapeutics and antibody-based therapeutics for high-risk patients. But it’s the stunning success of m-RNA vaccine technology from Moderna and BioNTech, two NBI companies, that most clearly showcase the home run potential among the biotech entrepreneurs in the space.

And while NBI is currently up 8.2% YTD on a price-return basis (as of June 30) **versus a broader market gain of 14.4% by SPX**, the S&P Biotechnology Select Industry Index (SPSIBI) is down 3.7%.

It’s worth noting that in 2020, NBI outperformed SPX with a price gain of 25.7% versus 16.3%, respectively. This shows the resilience of the NBI and the inherent strength of its current mix of companies.

The possibilities of accelerated R&D

As a whole, the life-changing work being done by NBI constituents requires enormous amounts of R&D. In 2020, R&D expenses for the entire group totaled $68.5Bn, nearly 31% of these companies’ revenue totals. Two-thirds of NBI’s firms reported R&D expenses that exceeded their revenues

For several NBI companies, however, these massive investments provided tangible benefits in the fight against Covid-19. Undoubtedly, years of back-end work and minimal profits ultimately helped deliver the very products that are now driving historic returns. Psychologically, their breakthroughs demonstrated the enormous potential of science and technology to serve humankind.

Looking ahead, **revolutions in Mapping and Engineering processes, boosted by rapid advancements in Machine Learning and Artificial Intelligence, are fostering a true fusion of Biology and Technology that could transform the traditionally costly and labor-intensive R&D function**. Some research estimates these advances could reduce the failure rate of drugs by up to 45% and shorten drug trials by up to 50%. The result could be even more breakthroughs, performed much more efficiently, greatly increasing the returns on biopharmaceutical R&D.

Even a conservative interpretation of the above numbers would significantly reduce R&D costs and boost the market capitalization of therapeutics companies from the current $2Tn up to $9Tn as soon as 2024, according to estimates from ARK Financial.

Meanwhile, increasingly cost-effective human genomics could revolutionize several other industries, from agriculture to biofuels.

By any measure, there is much to be excited about across the spectrum of biotech — especially coming out of a global pandemic. And while no person, nor index, can truly predict what the future holds, chances are strong that companies sitting within NBI will have a hand in leading the way.

“**For investors**, the Index already serves as a fascinating lens through which to view human society’s scientific and technological advancements,” says Mark Marex. “To me, it’s very exciting to ponder what the researchers, scientists, and business leaders in this space will accomplish next.”

#### IPR protections are key to sustain healthcare investments and manufacturing. Independently, it’s key to broader vaccine production.

Roberts 6/25/21 [James M. Roberts is a Research Fellow for Economic Freedom and Growth at the Heritage Foundation. Roberts' primary responsibility as one of The Heritage Foundation's lead experts in economic freedom and growth is to edit the Rule of Law and Monetary Freedom sections of [Index of Economic Freedom](https://www.heritage.org/index/). An influential annual analysis of the economic climate of countries throughout the world, the Index is co-published by Heritage and The Wall Street Journal.) “Biden’s OK of Global Theft of America’s Intellectual Property is Wrong, Dangerous.” 6/25/2021, The Heritage Foundation, Commentary—Public Health] RM

Last month, President Biden advocated removing international intellectual property rights (IPR) protections for American-made COVID-19 vaccines.

**Foreign companies may take the president’s policy as a green light to produce reverse-engineered, counterfeit substitutes**.

The best way to prevent and treat new diseases is to ensure that private American pharmaceutical companies continue their innovative research and vaccine production.

Three U.S. companies—Pfizer, Moderna, and Johnson & Johnson—created and manufactured the world’s most effective mRNA COVID vaccines in record time. An increasing majority of Americans have now been inoculated, but much of the developing world remains in desperate need of vaccines. Americans naturally want to help. The question is how.

Last month, President Biden advocated removing international intellectual property rights (IPR) protections for American-made COVID-19 vaccines. This, he said, would help make the vaccines more plentiful and available in needy countries. **It’s a short-sighted approach and doomed to fail.**

Mr. Biden wants to waive the World Trade Organization’s “Trade-Related Aspects of Intellectual Property Rights” (TRIPS) agreement for U.S. vaccines and let foreign countries issue “compulsory licenses“ allowing their domestic pharmaceutical companies to manufacture the medicines without adequately compensating the companies that invented them.

Practically speaking, countries such as India and South Africa are unlikely to manufacture the vaccines. They lack an advanced infrastructure for cold supply-chain distribution and many other crucial resources required by these products’ capital-intensive, state-of-the-art manufacturing process.

But the Biden policy is bad for many other reasons.

Developing breakthrough medications takes tremendous ingenuity and immense financial investments. **It’s an extraordinarily high-risk endeavor, and the prospect of making a profit is what convinces private companies to undertake those risks.**

Signaling that the United States will not fight to defend their intellectual property rights **actively undermines innovation and manufacturing** in American health care and medicines.

It also erodes patient protections by undermining quality control. Foreign companies may take the president’s policy as a green light to produce reverse-engineered, counterfeit substitutes. Already there are reports of ineffective and even dangerous counterfeit COVID-19 vaccines being sold around the world.

Those pushing to break U.S. pharmaceutical patents say they want to do so for altruistic reasons. Consequently, they also insist that the prices for the medications be set far below their actual value.

But history shows us that forcing private companies to provide vaccines at an “affordable price,” regardless of the cost to the companies, actually impedes the manufacture of high-quality vaccines. Moreover, it inhibits the **future development of vaccines** needed to meet as-yet-unknown diseases.

Washington first imposed vaccine price controls as part of Hillary Clinton’s 1993 healthcare-for-all crusade. As the Wall Street Journal later noted, it was a body blow to the U.S. vaccine industry. Ironically, government-decreed prices left the companies unable to produce enough vaccines to meet Mrs. Clinton’s admittedly admirable goal of universal immunization of children. Since then, U.S. firms have largely eschewed the vaccine market because they could not recoup their R&D and manufacturing costs and earn enough profit to fund future innovation.

Ultimately, **compulsory licensing legalizes the theft of intellectual property**. Recognizing this, senators from both sides of the aisle have joined with other government officials and industry leaders to call on the administration to reverse this bad decision.

The U.S. patent protection system has served the nation well since its founding.  **It is and has been a bulwark of American prosperity**, but the strength of that protection has been weakening in the past few decades. **Compulsory licensing contributes to the erosion** of that protection.

As the U.S. and the rest of the world emerge from the pandemic, it is clear that more innovative medicines and vaccines will be needed for future protection from viruses and other emerging biological threats.

**The best way to prevent and treat those new diseases is to ensure that private American pharmaceutical companies continue their innovative research and vaccine production**.

That way, U.S.-manufactured vaccines can be made available to all Americans quickly. And governments can subsidize their export and sale to other countries far more effectively and less expensively than through compulsory licensing schemes.

Meanwhile, let’s hope Mr. Biden listens to the more reasonable and less-agenda driven voices in this debate and reverses course on the TRIPS waiver.

#### COVID was a precursor to deadlier pandemics—vaccine production will determine everything.

Lander 8/4/21 [Eric Lander, President Biden’s Science Advisory and Director of the White House Office of Science and Technology Policy) “Opinion: As bad as Covid-19 has been, a future pandemic could be even worse—unless we act now” 8/4/21, The Washington Post] RM

[Coronavirus](https://www.washingtonpost.com/coronavirus/?itid=lk_inline_manual_3) vaccines can end the current pandemic if enough people choose to protect themselves and their loved ones by getting vaccinated. But in the years to come, we will still need to defend against a pandemic side effect: collective amnesia.

As public health emergencies recede, societies often quickly forget their experiences — and **fail to prepare for future challenges**. For pandemics, such a course would be disastrous.

**New infectious diseases have been emerging at an accelerating pace,** and they are spreading faster.

Our federal government is responsible for defending the United States against future threats. That’s why President Biden has asked Congress to fund his plan to build on current scientific progress to keep new infectious-disease threats from turning into pandemics like covid-19.

As the president’s science adviser, I know what’s becoming possible. For the first time in our history, we have an opportunity not just to refill our stockpiles but also to transform our capabilities. However, **if we don’t start preparing now for future pandemics, the window for action will close.**

Covid-19 has been a catastrophe: The toll in the United States alone is [more than 614,000 lives](https://www.washingtonpost.com/graphics/2020/national/coronavirus-us-cases-deaths/?itid=lk_inline_manual_11) and has been estimated to exceed [$16 trillion](https://jamanetwork.com/journals/jama/fullarticle/2771764), with disproportionate impact on vulnerable and marginalized communities.

But a future pandemic could be even worse — unless we take steps now.

It’s important to remember that the virus behind covid-19 is far less deadly than the 1918 influenza. The virus also belongs to a well-understood family, coronaviruses. It was possible to design vaccines within days of knowing the virus’s genetic code because 20 years of [basic scientific research](https://science.sciencemag.org/content/372/6538/109.full) had revealed which protein to target and how to stabilize it. And while the current virus spins off variants, its mutation rate is slower than that of most viruses.

**Unfortunately, most of the 26 families of viruses that infect humans are less well understood or harder to control**. We have a great deal of work still ahead.

The development of [mRNA vaccine technology](https://www.washingtonpost.com/health/2020/12/06/covid-vaccine-messenger-rna/?itid=lk_inline_manual_17) — thanks to more than a decade of foresighted basic research — was a game-changer. It shortened the time needed to design and test vaccines to less than a year — far faster than for any previous vaccine. And it’s been surprisingly effective against covid-19.

Still, there’s much more to do. We don’t yet know how mRNA vaccines will perform against other viruses down the road. And **when the next pandemic breaks out, we’ll want to be able to respond even faster.**

Fortunately, the scientific community has been developing a bold plan to keep future viruses from becoming pandemics.

Here are a few of the goals we should shoot for:

The capability to design, test and approve safe and effective vaccines within 100 days of detecting a pandemic threat (for covid-19, that would have meant May 2020); manufacture enough doses to supply the world within 200 days; and speed vaccination campaigns by replacing sterile injections with skin patches.

Diagnostics simple and cheap enough for daily home testing to limit spread and target medical care.

Early-warning systems to spot new biological threats anywhere in the world soon after they emerge and monitor them thereafter.

We desperately need to strengthen our public health system — from expanding the workforce to modernizing labs and data systems — including to ensure that vulnerable populations are protected.

And we need to coordinate actions with our international partners, because pandemics know no borders.

These goals are ambitious, but they’re feasible — provided the work is managed with the seriousness, focus and accountability of NASA’s Apollo Program, which sent humans to the moon.

Importantly, these capabilities won’t just prepare us for future pandemics; they’ll also improve public health and medical care for infectious diseases today.

Preparing for threats is a core national responsibility. That’s why our government invests heavily in missile defense and counterterrorism. We need to similarly protect the nation against biological threats, which range from the ongoing risk of pandemics to the possibility of deliberate use of bioweapons.

Pandemics cause massive death and disruption. From a financial standpoint, they’re also astronomically expensive. If, as might be expected from [history](https://www.cfr.org/timeline/major-epidemics-modern-era) and current trends, we suffered a pandemic of the current scale every two decades, the annualized cost would exceed $500 billion per year. Investing a much smaller amount to avert this toll is an economic and moral imperative.

The White House will put forward a detailed plan this month to ensure that the United States can fully prepare before the next outbreak. It’s hard to imagine a higher economic or human return on national investment.

#### Ecosystem sensitivity from climate change means future pandemics will cause extinction—assumes COVID

Supriya 4/19 [Lakshmi Supriya got her BSc in Industrial Chemistry from IIT Kharagpur (India) and a Ph.D. in Polymer Science and Engineering from Virginia Tech (USA). She has more than a decade of global industry experience working in the USA, Europe, and India. After her Ph.D., she worked as part of the R&D group in diverse industries starting with semiconductor packaging at Intel, Arizona, where she developed a new elastomeric thermal solution, which has now been commercialized and is used in the core i3 and i5 processors. From there she went on to work at two startups, one managing the microfluidics chip manufacturing lab at a biotechnology company and the other developing polymer formulations for oil extraction from oil sands. She also worked at Saint Gobain North America, developing various material solutions for photovoltaics and processing techniques and new applications for fluoropolymers. Most recently, she managed the Indian R&D team of Enthone (now part of MacDermid) developing electroplating technologies for precious metals.) “Humans versus viruses - Can we avoid extinction in near future?” News Medical Life Sciences, 4/19/21, https://www.news-medical.net/news/20210419/Humans-versus-viruses-Can-we-avoid-extinction-in-near-future.aspx] RM

Expert argues that human-caused changes to the environment can lead to the emergence of pathogens, not only from outside but also from our own microbiome, which can pave the way for large-scale destruction of humans and **even our extinction**.

Whenever there is a change in any system, it will cause other changes to reach a balance or equilibrium, generally at a point different from the original balance. Although this principle was originally posited by the French chemist Henry Le Chatelier for chemical reactions, this theory can be applied to almost anything else.

In an essay published on the online server Preprints\*, Eleftherios P. Diamandis of the University of Toronto and the Mount Sinai Hospital, Toronto, argues that changes caused by humans, to the climate, and everything around us will lead to changes that may have a dramatic impact on human life. Because our ecosystems are so complex, we don’t know how our actions will affect us in the long run, so humans generally disregard them.

Changing our environment

Everything around us is changing, from living organisms to the climate, water, and soil. Some estimates say about half the organisms that existed 50 years ago have already become extinct, and about 80% of the species may become extinct in the future.

As the debate on global warming continues, according to data, the last six years have been the warmest on record. Global warming is melting ice, and sea levels have been increasing. The changing climate is causing more and more wildfires, which are leading to other related damage. At the same time, increased flooding is causing large-scale devastation.

One question that arises is how much environmental damage have humans already done? A recent study compared the natural biomass on Earth to the mass produced by humans and found humans produce a mass equal to their weight every week. This human-made mass is mainly for buildings, roads, and plastic products.

In the early 1900s, human-made mass was about 3% of the global biomass. Today both are about equal. Projections say by 2040, the human-made mass will be triple that of Earth’s biomass. But, slowing down human activity that causes such production may be difficult, given it is considered part of our growth as a civilization.

Emerging pathogens

Although we are made up of human cells, we have almost ten times that of bacteria just in our guts and more on our skin. These microbes not only affect locally but also affect the entire body. There is a balance between the good and bad bacteria, and any change in the environment may cause this balance to shift, especially on the skin, the consequences of which are unknown.

Although most bacteria on and inside of us are harmless, gut bacteria can also have viruses. If viruses don’t kill the bacteria immediately, they can incorporate into the bacterial genome and stay latent for a long time until reactivation by environmental factors, when they can become pathogenic. They can also escape from the gut and enter other organs or the bloodstream. Bacteria can then use these viruses to kill other bacteria or help them evolve to more virulent strains.

An example of the evolution of pathogens is the cause of the current pandemic, the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). Several mutations are now known that make the virus more infectious and resistant to immune responses, and strengthening its to enter cells via surface receptors.

The brain

There is evidence that the SARS-CoV-2 can also affect the brain. The virus may enter the brain via the olfactory tract or through the angiotensin-converting enzyme 2 (ACE2) pathway. Viruses can also affect our senses, such as a loss of smell and taste, and there could be other so far unkown neurological effects. The loss of smell seen in COVID-19 could be a new viral syndrome specific to this disease.

Many books and movies have described pandemics caused by pathogens that wipe out large populations and cause severe diseases. In the essay, the author provides a hypothetical scenario where a gut bacteria suddenly starts producing viral proteins. Some virions spread through the body and get transmitted through the human population. After a few months, the virus started causing blindness, and within a year, large populations lost their vision.

Pandemics can cause other diseases that can threaten humanity’s entire existence. **The COVID-19 pandemic brought this possibility to the forefront**. If we continue disturbing the equilibrium between us and the environment, we don’t know what the consequences may be and **the next pandemic could lead us to extinction.**

### 1NC – DA

#### Biotech is the new frontier; America is ahead but China is dangerously close

Gupta 6/11 [Gaurav Gupta, Biotech Investor, Founder of Ascendant BioCapital, a life science investment firm based in New York. Previously, Gaurav worked at OrbiMed Advisors, and served as a resident in neurological surgery at Columbia University Medical Center. He has co-authored over a dozen articles in peer-reviewed journals, filed a patent on a device for use in spine surgery, and edited a book on the technical and ethical implications of using tissue engineered products in the operating room. Dr. Gupta obtained his M.D. from the Stanford University School of Medicine, where he was a Paul and Daisy Soros Fellow, and B.S. and M.S.E. in biomedical engineering from Johns Hopkins University, where he was a Charles R. Westgate Scholar.) “As Washington Ties Pharma’s Hands, China Is Leaping Ahead” Barron’s Magazine: Commentary, China., 6/11/2021] RM

There should be no doubt that we are living at the dawn of a golden age of biomedical innovation. The American scientific engine that produced Covid-19 vaccines in record time was fueled by a convergence of advances in genomics, biomarkers, data science, and manufacturing years in the making. The first Food and Drug Administration approvals of a host of new product formats—oligonucleotide, bispecific, oncolytic virus, CAR-T, and lentivirus/AAV—all took place within the last decade. These represent an unprecedented expansion of the armamentarium that physicians have at their disposal to treat and cure disease. In the last few years, [47% of all new medicines](https://www.efpia.eu/media/554521/efpia_pharmafigures_2020_web.pdf) were invented by U.S. biopharma companies, with [homegrown startups](https://www.cbo.gov/publication/57126) driving the majority of innovation. The bulk of the remainder were developed by foreign companies specifically for the U.S. market.

An indirect benefit of these trends is that most novel therapeutics undergo clinical development and early commercial launch here in the U.S. The rest of the world understands that the American patient has earlier and broader access to groundbreaking therapies via these mechanisms. Indeed, the past decade is filled with examples of medical “firsts” for American patients: the first cure for Hepatitis C, the first gene therapy for blindness, the first immunotherapy for cancer. Future rewards will be greater still if we preserve our current system of incentivizing and protecting innovation.

The remarkable innovation capacity of our biopharmaceutical industry ought to be a source of national pride. Yet while “Made in America” is the global standard for medicines in development today, misguided policy risks ceding our scientific prowess to other countries in the future. This is particularly true in the case of China, where biotechnology has become a strategic pillar for the health of its people and economy.

From 2016 to 2020, the market capitalization of all Chinese biopharma companies increased exponentially from [$1 billion to over $200 billion](https://www.bloomberg.com/news/articles/2021-03-01/xi-mobilizes-china-for-tech-revolution-to-cut-dependence-on-west). China saw over [$28 billion](https://www.bioworld.com/articles/506978-china-sees-five-year-highs-in-life-sciences-investments-and-partnering) invested in its life sciences sector in 2020, double the previous year’s amount. Returns on China’s investment are already arriving. The FDA approved a drug developed in China for the first time ever in 2019. While China’s innovation capacity currently remains behind America’s, my experiences as a biopharma professional make it clear they are doing everything they can to catch up and catch up fast.

In fact, when I speak to Chinese biotechnology executives, they boast that they can run clinical trials faster than their U.S. counterparts. The danger of misguided policies that disincentivize pharmaceutical innovation in the U.S. is effectively driving that same innovation to China. If we close off the market in the U.S. at the same time that China is opening its market to innovative new products, then we will see companies choose to first launch impactful novel medicines in China, based on clinical trials conducted in China. Because the FDA rarely accepts data generated entirely outside the U.S., this relocation of research capacity will negatively affect Americans’ access to cutting-edge therapies.

The biotechnology field is advancing rapidly. Promising technologies such as targeted protein degradation and gene editing are perhaps not far from being developed into impactful medicines, and the U.S. risks these technologies being mastered by Chinese companies.

It is widely held that allowing China to gain an asymmetric edge in critical technologies such as AI or quantum computing could destabilize the geopolitical balance of power. The same is true of biotechnology. Chinese scientists were the first to edit the genomes of human embryos, in [contravention](https://www.sciencemag.org/news/2019/12/chinese-scientist-who-produced-genetically-altered-babies-sentenced-3-years-jail) of international standards, and the U.S. national security community believes China is [pushing ahead](https://www.nbcnews.com/politics/national-security/china-has-done-human-testing-create-biologically-enhanced-super-soldiers-n1249914) with experimental concepts for biological and cognitive enhancement of soldiers and civilians. American policy should be focused on protecting, rather than undermining, the global dominance of our biotechnology industry.

#### The plan recapitulates IP to China, destroying competitive advantages

WSJ 5/6 [Wall Street Journal Editorial Board, WSJ Opinion Philosophy: “We speak for free markets and free people, the principles, if you will, marked in the watershed year of 1776 by Thomas Jefferson's Declaration of Independence and Adam Smith's “Wealth of Nations.” So over the past century and into the next, the Journal stands for free trade and sound money; against confiscatory taxation and the ukases of kings and other collectivists; and for individual autonomy against dictators, bullies and even the tempers of momentary majorities.” Edited by Paul A. Gigot and Daniel Henninger, “Biden’s Vaccine IP Debacle: His patent heist is a blow to the Covid fight and U.S. biotech.” The WSJ Opinion: Review and Outlook, May 6, 2021] RM

We’ve already criticized President Biden’s bewildering decision Wednesday to endorse a patent waiver for Covid vaccines and therapies. But upon more reflection this may be the single worst presidential economic decision since Nixon’s wage-and-price controls.

In one fell swoop he has destroyed tens of billions of dollars in U.S. intellectual property, set a destructive precedent that will reduce pharmaceutical investment, and surrendered America’s advantage in biotech, a key growth industry of the future. Handed an American triumph of innovation and a great soft-power opportunity, Mr. Biden throws it all away.

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India and South Africa have been pushing to suspend patents at the World Trade Organization for months. They claim that waiving IP protections for Covid vaccines and therapies is necessary to expand global access, but their motivation is patently self-interested.

Both are large producers of generic drugs, though they have less expertise and capacity to make complex biologics like mRNA vaccines. They want to force Western pharmaceutical companies to hand over IP free of charge so they can produce and export vaccines and therapies for profit. Their strategy has been to shame Western leaders into surrendering with the help of Democrats in the U.S.

But suspending IP isn’t necessary to expand supply and will impede safe vaccine production. The global vaccine supply is already increasing rapidly thanks to licensing agreements the vaccine makers have made with manufacturers around the world.

Pfizer and BioNTech this week said they aimed to deliver three billion doses this year, up from last summer’s 1.2 billion estimate. Moderna increased its supply forecast for this year to between 800 million and a billion from 600 million. AstraZeneca says it has built a supply network with 25 manufacturing organizations in 15 countries to produce three billion doses this year.

AstraZeneca and Novavax have leaned heavily on manufacturers in India to produce billions of doses reserved for lower-income countries. But India has restricted vaccine exports to supply its own population. IP simply isn’t restraining vaccine production.

Busting patents also won’t speed up production, since it would take months for these countries to set up new facilities. Competition will increase for scarce ingredients, and less efficient manufacturers with little expertise would make it harder for licensed partners to produce vaccines.

There’s also the problem of safety. Johnson & Johnson has experienced quality problems at an Emergent plant making its vaccines, and that’s in Baltimore. Imagine the potential problems with unlicensed producers in, say, Malaysia or Brazil. If vaccines made there have complications, confidence in licensed vaccines could plummet too. And who would Pfizer and Moderna sue to get their reputations back?

The economic self-damage is also hard to fathom. The U.S. currently has a competitive advantage in biotech and biologics manufacturing, which could be a growing export industry. Waiving IP protections for Covid vaccines and medicines will give away America’s crown pharmaceutical jewels and make the U.S. and world more reliant on India and China for pharmaceuticals.

Moderna has been working on mRNA vaccines for a decade. Covid represents its first success. Ditto for Novavax, which has been at it for three decades. Small biotech companies in the U.S. have been studying how to create vaccines using nasal sprays, pills and patches.

Thanks to Mr. Biden, all this could become the property of foreign governments. Licensing agreements allow developers to share their IP while maintaining quality control. Breaking patents and forcing tech transfers will enable China and low-income countries to manufacture U.S. biotech products on their own.

China’s current crop of vaccines are far less effective than those in the West, but soon Beijing might be able to purvey Pfizer knock-offs. The U.S. has spent years deploring China’s theft of American IP, and now the Biden Administration may voluntarily let China could reap profits from decades of American innovation.

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Instead of handing over American IP to the world, Mr. Biden could negotiate bilateral vaccine agreements and export excess U.S. supply. If Mr. Biden wants to increase global supply safely, the U.S. could spend more to help the companies produce more for export. Then the jobs would go to Americans. We thought this was the point of the production deal Mr. Biden negotiated between J&J and Merck.

Alas, this President seems to be paying more attention these days to Elizabeth Warren, Bernie Sanders, Alexandria Ocasio-Cortez and Nancy Pelosi. They think vaccines and new drugs can be conjured by government as a public good with no incentive for risk-taking or profit. This really is destructive socialism.

Mr. Biden ought to listen to Angela Merkel. Pfizer’s partner BioNTech is a German firm, and the German Chancellor said Thursday that she opposes the WTO heist: “The protection of intellectual property is a source of innovation and it must remain so in the future.”

At least IP is safe in Germany. Mr. Biden has sent a signal around the world that nobody’s intellectual property is safe in America.

#### China will leapfrog the US through biotech primacy

Cumbers 20 [John Cumbers, “I am the founder and CEO of SynBioBeta, the leading community of innovators, investors, engineers, and thinkers who share a passion for using synthetic biology to build a better, more sustainable universe. I publish the weekly SynBioBeta Digest, host the SynBioBeta Podcast, and wrote “What’s Your Biostrategy?”, the first book to anticipate how synthetic biology is going to disrupt virtually every industry in the world. I also founded BetaSpace, a space settlement innovation network and community of visionaries, technologists, and investors accelerating the industries needed to sustain human life here and off-planet. I’ve been involved with multiple startups, I am an operating partner and investor at the hard tech investment fund Data Collective, and I'm a former bioengineer at NASA. I earned my PhD in Molecular Biology, Cell Biology, and Biochemistry from Brown University and am originally from the UK.”) “China’s Plan To Beat The U.S. In The Trillion-Dollar Global Bioeconomy” Forbes, 2/3/2020] RM

The report, entitled “Safeguarding the Bioeconomy,” looks at how research and innovation in the life sciences is driving rapid growth in agriculture, biomedical science, information science and computing, energy, and other sectors of the U.S. economy. This economic activity—collectively referred to as the bioeconomy—presents many opportunities to create jobs, improve the quality of life, and continue to drive the U.S. economy as a whole.

The report says that while the U.S. has been a leader in advancements in the biological sciences, other countries are actively investing in and expanding their capabilities in this area—and the U.S.’s lead is beginning to slip.

Four reasons everyone should care about the U.S. bioeconomy

It might be easy for some to dismiss the report out of hand as a bunch of alarmist professors lobbying for more research money. But when you consider all the ways that biotechnology powers the economy and impacts our daily lives, it becomes clear that this is about something more:

The economy: at $1 trillion in value, the U.S. bioeconomy represents hundreds of thousands of quality, high-paying jobs for Americans.

Health & medicine: innovators in the bioeconomy are making next-generation therapies for cancer and diabetes, tackling emerging diseases like Coronavirus, and even increasing human longevity.

Food & farming: biotechnology is not only making agriculture more sustainable, it’s also bringing to market new and improved crops that are more nutritious, more affordable, and more delicious.

The environment: humanity’s health and well-being depend on our ability to stop and reverse climate change, and we can’t do it without biological solutions that treat carbon not as a waste product, but as the starting point for chemicals and materials that today use petroleum.

Considering all this, it doesn’t seem like an overstatement when the report authors say that U.S. competitiveness in the bioeconomy is key to maintaining the economic health and security of the country.

The very real risks to the U.S. bioeconomy

There are many things that can go wrong, causing the U.S. to lose its current edge in the global bioeconomy. Some of these are economic risks, and others present serious national security risks. All of them are related to a failure of our government to act now. Here’s a sampling of the risks to U.S. leadership at the frontiers of tech and bio:

Insufficient government R&D investment. Money for basic research and development builds the foundations of the bioeconomy. We learn, achieve new results, and create new applications. Investments that help develop enabling tools, technologies, and standards have the potential to maintain the U.S. bioeconomy competitive in a global bioeconomy.

Ineffective or inefficient regulations. Regulatory uncertainty stifles creative new approaches that may have unknown paths, long delays, or that might be prohibited by later changes.

Inadequate workforce. The U.S.’s K-12 education system may not prepare students to study STEM subjects at the university and postgraduate level, hindering the quality of workers. A skilled workforce gives U.S. companies the best talent to choose from, and it also encourages international firms to establish research and production facilities here.

Ineffective or inefficient intellectual property protections. Uncertainty over what is patentable could discourage innovators who are considering whether and how to bring their innovations to market. Patent eligibility is also important to venture capitalists and private equity investors when considering whether to invest in biotechnology companies.

Cybersecurity. As biological engineering depends more and more on massive datasets, the emerging bioeconomy now exists at the intersection of information science and biotechnological science. The bioeconomy’s growing reliance on software, networking, and computer hardware tools yields the same cyber vulnerabilities present in any other sector, including hacking, sabotage, breached privacy, or theft of intellectual property.

Biosafety and biosecurity risks. The tools of today’s bioeconomy are enabling new capabilities that can generate concerns regarding traditional biothreats. These can include the accidental or intentional creation or release of dangerous or lethal pathogens. Such biothreats can harm humans, animals, plants, agriculture, the environment, and materials.

Risks from climate change. Food and feed crops, biofuels crops, and crops used with bio-based fermentation products are susceptible to temperature and water stresses, as well as insects and pathogens that migrate with changing weather patterns.

China: the biotech elephant in the room

I’ve written previously written how the Chinese government is already making substantial investments in its bioeconomy. Here are three scary statistics, courtesy of Greg B. Scott of the ChinaBio Group:

China is out-investing the U.S. China’s private investors poured $14.4 billion into its bioeconomy in 2019. That compares to the United States’ more meager investment of $10.4 billion.

China is building a bigger bioeconomy workforce. China graduates about 8-10 million students each year. In the U.S., that number is closer to 400,000. Many Chinese students graduating from U.S. institutions stay here, but they are increasingly returning home to start highly innovative companies.

China is investing in itself. Historically, China has invested heavily in foreign companies, tech, and debt. Now we’re seeing an uptick in China-to-China investments—the country no longer needs to look abroad to find plenty of good biotech opportunities.

Chinese investments have led to centers of excellence in the regional technology hub of Shenzhen, including the Institute of Synthetic Biology at the Shenzhen Institute of Advanced Sciences (SIAT) and BGI Genomics. Shenzhen will compete for technological and economic leadership with U.S. regional biotech powerhouses such as San Francisco/Silicon Valley and Boston/Cambridge in the years to come.

Many of China’s long-standing challenges—environment, food, water, waste management, and rapid innovation to retain its global manufacturing competitiveness—are areas where synthetic biology is seen as a key technology for the future. In other words, synthetic biology is not just an academic pursuit for China. Rather, its leaders are thinking proactively about how biological engineering can be used to address the country’s strategic national interests—while U.S. leadership stands idly by.

What do we do?

So what can U.S. policymakers do to protect the U.S. bioeconomy and ensure continued technological and economic leadership in biology for the next twenty years?

Straight from the top. China has made clear its ambition to become a global tech superpower, with President Xi Jinping calling science and technology one of the main battlefronts of the economy. The U.S. administration needs to step up its game, too. President Trump recently declared January 2020 to be National Biotechnology Month, citing “boundless possibilities for economic growth, national security, healthcare, manufacturing, and agriculture.” That’s the right sentiment—now we need real action.

New legislation. Late last year, the U.S. House of Representatives passed the Engineering Biology Research and Development Act of 2019, which would direct the Office of Science and Technology Policy (OSTP) to implement a national research strategy for engineering biology. The explicit goal: maintain U.S. science, technology, and economic leadership in synthetic biology. The bill now resides in the Senate and awaits committee action. Legislative leadership is now needed to give this bill the appropriations necessary to give it real teeth, and then put it squarely on the President’s desk.

Investing for returns. The Human Genome Project is said to have returned $141 for every dollar invested by taxpayers. While “Big Science” yields tremendous benefits for everyone, it doesn’t happen without federal funding. In 2019, politically courageous Republicans and Democrats came together to produce a 2020 final spending bill that is kind to science, in essence ignoring President Trump’s proposed cuts and instead giving increases to each of the NIH, NSF, NASA, and DOE’s Office of Science. But the U.S. isn’t even in the top ten for R&D spending as a percentage of GDP, while China continues to close in on the U.S., meaning that the U.S. is no longer the uncontested global leader in science.

Leading the global bioeconomy: Have some courage

There are many things the U.S. could do to protect the American bioeconomy. But above all else, policymakers need to come together and demonstrate the kind of courage and vision needed to be a world leader. Science and technology know no partisan lines. Everybody wants healthy lives, clean water, and good jobs. Federal initiative and assistance are needed to bring these benefits to everyone living in the U.S..

Today, the American synthetic biology industry may be unprepared for the global competition it will face, lacking initiative and leadership at the highest levels of government. But this could change quickly. If a country like the U.S. makes engineering biology a national priority, anything is possible in the new bioeconomy.

#### Heg solves arms races, land grabs, rogue states, and great power war

Brands 18 [Hal, Henry Kissinger Distinguished Professor at Johns Hopkins University's School of Advanced International Studies and a senior fellow at the Center for Strategic and Budgetary Assessments." American Grand Strategy in the Age of Trump." Page 129-133]

Since World War II, the United States has had a military second to none. Since the Cold War, America has committed to having overwhelming military primacy. The idea, as George W. Bush declared in 2002, that America must possess “strengths beyond challenge” has featured in every major U.S. strategy document for a quarter century; it has also been reflected in concrete terms.6

From the early 1990s, for example, the United States consistently accounted for around 35 to 45 percent of world defense spending and maintained peerless global power-projection capabilities.7 Perhaps more important, U.S. primacy was also unrivaled in key overseas strategic regions—Europe, East Asia, the Middle East. From thrashing Saddam Hussein’s million-man Iraqi military during Operation Desert Storm, to deploying—with impunity—two carrier strike groups off Taiwan during the China-Taiwan crisis of 1995– 96, Washington has been able to project military power superior to anything a regional rival could employ even on its own geopolitical doorstep.

This military dominance has constituted the hard-power backbone of an ambitious global strategy. After the Cold War, U.S. policymakers committed to averting a return to the unstable multipolarity of earlier eras, and to perpetuating the more favorable unipolar order. They committed to building on the successes of the postwar era by further advancing liberal political values and an open international economy, and to suppressing international scourges such as rogue states, nuclear proliferation, and catastrophic terrorism. And because they recognized that military force remained the ultima ratio regum, they understood the centrality of military preponderance.

Washington would need the military power necessary to underwrite worldwide alliance commitments. It would have to preserve substantial overmatch versus any potential great-power rival. It must be able to answer the sharpest challenges to the international system, such as Saddam’s invasion of Kuwait in 1990 or jihadist extremism after 9/11. Finally, because prevailing global norms generally reflect hard-power realities, America would need the superiority to assure that its own values remained ascendant. It was impolitic to say that U.S. strategy and the international order required “strengths beyond challenge,” but it was not at all inaccurate.

American primacy, moreover, was eminently affordable. At the height of the Cold War, the United States spent over 12 percent of GDP on defense. Since the mid-1990s, the number has usually been between 3 and 4 percent.8 In a historically favorable international environment, Washington could enjoy primacy—and its geopolitical fruits—on the cheap.

Yet U.S. strategy also heeded, at least until recently, the fact that there was a limit to how cheaply that primacy could be had. The American military did shrink significantly during the 1990s, but U.S. officials understood that if Washington cut back too far, its primacy would erode to a point where it ceased to deliver its geopolitical benefits. Alliances would lose credibility; the stability of key regions would be eroded; rivals would be emboldened; international crises would go unaddressed. American primacy was thus like a reasonably priced insurance policy. It required nontrivial expenditures, but protected against far costlier outcomes.9 Washington paid its insurance premiums for two decades after the Cold War. But more recently American primacy and strategic solvency have been imperiled.

THE DARKENING HORIZON For most of the post–Cold War era, the international system was— by historical standards—remarkably benign. Dangers existed, and as the terrorist attacks of September 11, 2001, demonstrated, they could manifest with horrific effect. But for two decades after the Soviet collapse, the world was characterized by remarkably low levels of great-power competition, high levels of security in key theaters such as Europe and East Asia, and the comparative weakness of those “rogue” actors—Iran, Iraq, North Korea, al-Qaeda—who most aggressively challenged American power. During the 1990s, some observers even spoke of a “strategic pause,” the idea being that the end of the Cold War had afforded the United States a respite from normal levels of geopolitical danger and competition. Now, however, the strategic horizon is darkening, due to four factors.

First, great-power military competition is back. The world’s two leading authoritarian powers—China and Russia—are seeking regional hegemony, contesting global norms such as nonaggression and freedom of navigation, and developing the military punch to underwrite these ambitions. Notwithstanding severe economic and demographic problems, Russia has conducted a major military modernization emphasizing nuclear weapons, high-end conventional capabilities, and rapid-deployment and special operations forces— and utilized many of these capabilities in conflicts in Ukraine and Syria.10 China, meanwhile, has carried out a buildup of historic proportions, with constant-dollar defense outlays rising from US$26 billion in 1995 to US$226 billion in 2016.11 Ominously, these expenditures have funded development of power-projection and antiaccess/area denial (A2/AD) tools necessary to threaten China’s neighbors and complicate U.S. intervention on their behalf. Washington has grown accustomed to having a generational military lead; Russian and Chinese modernization efforts are now creating a far more competitive environment.

#### Independently, China uses biotech offensively—uncertainty means you should err negative

Kania and Vonrndick 19 [Elsa Kania is an Adjunct Senior Fellow with the Technology and National Security Program at the Center for a New American Security. She is also a Ph.D. candidate in Harvard University’s Department of Government. Her views are her own. Wilson VornDick consults on national security, emerging technologies, and China for Duco and Rane.) “Weaponizing Biotech: How China's Military Is Preparing for a 'New Domain of Warfare'” Defense One, Commentary, China, Biowarfare, 8/14/2019] RM

We may be on the verge of a brave new world indeed. Today’s advances in biotechnology and genetic engineering have exciting applications in medicine — yet also alarming implications, including for military affairs. China’s national strategy of military-civil fusion (军民融合) has highlighted biology as a priority, and the People’s Liberation Army could be at the forefront of expanding and exploiting this knowledge.

The PLA’s keen interest is reflected in strategic writings and research that argue that advances in biology are contributing to changing the form or character (形态) of conflict. For example:

In 2010’s War for Biological Dominance (制生权战争), Guo Jiwei (郭继卫), a professor with the Third Military Medical University, emphasizes the impact of biology on future warfare.

In 2015, then-president of the Academy of Military Medical Sciences He Fuchu (贺福初) argued that biotechnology will become the new “strategic commanding heights” of national defense, from biomaterials to "brain control" weapons. Maj. Gen. He has since become the vice president of the Academy of Military Sciences, which leads China’s military science enterprise.

Biology is among seven "new domains of warfare" discussed in a 2017 book by Zhang Shibo (张仕波), a retired general and former president of the National Defense University, who concludes: “Modern biotechnology development is gradually showing strong signs characteristic of an offensive capability,” including the possibility that “specific ethnic genetic attacks” (特定种族基因攻击) could be employed.

The 2017 edition of Science of Military Strategy (战略学), a textbook published by the PLA’s National Defense University that is considered to be relatively authoritative, debuted a section about biology as a domain of military struggle, similarly mentioning the potential for new kinds of biological warfare to include “specific ethnic genetic attacks.”

These are just a few examples of an extensive and evolving literature by Chinese military scholars and scientists who are exploring new directions in military innovation.

Following these lines of thinking, the PLA is pursuing military applications for biology and looking into promising intersections with other disciplines, including brain science, supercomputing, and artificial intelligence. Since 2016, the Central Military Commission has funded projects on military brain science, advanced biomimetic systems, biological and biomimetic materials, human performance enhancement, and “new concept” biotechnology.

Gene Editing

Meanwhile, China has been leading the world in the number of trials of the CRISPR gene-editing technology in humans. Over a dozen clinical trials are known to have been undertaken, and some of these activities have provoked global controversy. It’s not clear whether Chinese scientist He Jiankui, may have received approval or even funding from the government for editing embryos that became the world’s first genetically modified humans. The news provoked serious concerns and backlash around the world and in China, where new legislation has been introduced to increase oversight over such research. However, there are reasons to be skeptical that China will overcome its history and track record of activities that are at best ethically questionable, or at worst cruel and unusual, in healthcare and medical sciences.

But it is striking how many of China’s CRISPR trials are taking place at the PLA General Hospital, including to fight cancer. Indeed, the PLA’s medical institutions have emerged as major centers for research in gene editing and other new frontiers of military medicine and biotechnology. The PLA’s Academy of Military Medical Sciences, or AMMS, which China touts as its “cradle of training for military medical talent,” was recently placed directly under the purview of the Academy of Military Science, which itself has been transformed to concentrate on scientific and technological innovation. This change could indicate a closer integration of medical science with military research.

In 2016, an AMMS doctoral researcher published a dissertation, “Research on the Evaluation of Human Performance Enhancement Technology,” which characterized CRISPR-Cas as one of three primary technologies that might boost troops’ combat effectiveness. The supporting research looked at the effectiveness of the drug Modafinil, which has applications in cognitive enhancement; and at transcranial magnetic stimulation, a type of brain stimulation, while also contending that the “great potential” of CRISPR-Cas as a “military deterrence technology in which China should “grasp the initiative” in development.

AI + Biotech

The intersection of biotechnology and artificial intelligence promises unique synergies. The vastness of the human genome — among the biggest of big data — all but requires AI and machine learning to point the way for CRISPR-related advances in therapeutics or enhancement.

In 2016, the potential strategic value of genetic information led the Chinese government to launch the National Genebank (国家基因库), which intends to become the world’s largest repository of such data. It aims to “develop and utilize China’s valuable genetic resources, safeguard national security in bioinformatics (生物信息学), and enhance China’s capability to seize the strategic commanding heights” in the domain of biotechnology.

The effort is administered by BGI, formerly known as Beijing Genomics Inc., which is Beijing’s de facto national champion in the field. BGI has established an edge in cheap gene sequencing, concentrating on amassing massive amounts of data from a diverse array of sources. The company has a global presence, including laboratories in California and Australia.

U.S. policymakers have been concerned, if not troubled, by the company’s access to the genetic information of Americans. BGI has been pursuing a range of partnerships, including with the University of California and with the Children’s Hospital of Philadelphia on human genome sequencing. BGI’s research and partnerships in Xinjiang also raise questions about its linkage to human rights abuses, including the forced collection of genetic information from Uighurs in Xinjiang.

There also appear to be links between BGI’s research and military research activities, particularly with the PLA’s National University of Defense Technology. BGI’s bioinformatics research has used Tianhe supercomputers to process genetic information for biomedical applications, while BGI and NUDT researchers have collaborated on several publications, including the design of tools for the use of CRISPR.

Biotech’s Expansive Frontier

It will be increasingly important to keep tabs on the Chinese military’s interest in biology as an emerging domain of warfare, guided by strategists who talk about potential “genetic weapons” and the possibility of a “bloodless victory.” Although the use of CRISPR to edit genes remains novel and nascent, these tools and techniques are rapidly advancing, and what is within the realm of the possible for military applications may continue to shift as well. In the process, the lack of transparency and uncertainty of ethical considerations in China’s research initiatives raise the risks of technological surprise.

## Case

### Uv

No 1AR Theory—

1] The 2NR must overcover theory since they get 3 minute 2ar collapse on one of the layers and persuasiveness advantage of a 3 minute 2ar

2] Responses to my counter interp will be new which means 1ar theory necessitates intervention---outweighs because it makes the decision arbitrary

3] I only have one chance to respond after it is introduced while they have two chances

At worst you should grant me an RVI on 1AR theory to rectify the skew

#### Severance and intrinsicness skews neg in 3 ways. First- steals all neg ground. Second- time skews the neg. It takes 2 seconds to sever out and completely waste the time of the 1NC. Third- skews all neg strats. Eliminates all possible DA's because the aff can simply sever out. Neg can't form effective strategy if aff can't just sever out every round. Kills fairness

#### Obviously neg fiat – its key to reciprocity because the aff can FIAT and they’d have to win that CPs and Ks are bad bc they’re impossible to win absent fiat

### at: warming

#### States wouldn’t implement the aff – endless filibustering in the squo by Europe, the UK, Russia, etc. should be enough proof, but they also have no incentive to listen since countries are split on the issue, and its not unanimous

#### Circumvention is a neg argument – core of the topic literature is whether countries would do it which is why there are huge debates on the EU, UK, China, etc agreeing to a waiver

#### Circumvention and they don’t solve – even if they say “durable fiat”, they have not defined the scope of the plan in the 1AC so you don’t know what the plan would materially look like

Mercurio 6/24 [Simon F.S. Li Professor of Law, The Chinese University of Hong Kong, Shatin, Hong Kong. June 24, 2021. “The IP Waiver for COVID-19: Bad Policy, Bad Precedent” <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8223179/> Accessed 8/25 //gord0]

The role of intellectual property rights (IPRs) and access to medicines is contentious. On the one hand, IPRs encourage investment, innovation and the advancement of health science. On the other hand, the limited-term monopoly rights can result in artificially high prices and become a barrier to access to medicines. While the wisdom of the IPRs system has at times been tested, it has proven its value in the current COVID-19 pandemic as IPRs played a large role in the rapid (and unprecedented) development and availability of multiple vaccines. Despite the success, India and South Africa proposed that the World Trade Organization (WTO) waive IPRs under the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS Agreement) in order to increase access to vaccines and other COVID-19-related technologies.[1](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8223179/#Fn1) The proposal, tabled at a meeting of the TRIPS Council in October 2020, calls on Members to waive IPRs relating to and having an impact on the “prevention, containment or treatment of COVID-19”.[2](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8223179/#Fn2) The proposal attracted support from the majority of developing country Members,[3](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8223179/#Fn3) but was opposed by a handful of Members including the United States (US).[4](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8223179/#Fn4) Given that consensus could not be reached within the deadline of 90 days as set out in Art. IX:3 of the Agreement Establishing the WTO, Members agreed to keep the waiver proposal on the agenda of the TRIPS Council in 2021.[5](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8223179/#Fn5) On 5 May 2021, the US reversed its position and announced that it would support a waiver for COVID-19 vaccines.[6](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8223179/#Fn6) To be clear, this does not mean that the US supported the waiver as proposed by India and South Africa. Instead, the US has simply agreed to negotiate the perimeters of a waiver. Others, including the European Union (EU), Canada, Australia, Norway, Switzerland, the United Kingdom (UK) and even leading developing countries such as Brazil, Chile and Mexico remain opposed or lukewarm on the waiver.[7](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8223179/#Fn7) The US dropping opposition does not mean the concerns of other Members will simply disappear – one would hope that these nations opposed the waiver for valid reasons and did not simply blindly follow the US. Indeed, many of the above-listed Members remain unconvinced that even such a draconian step as a waiver of IPRs would accomplish the goal of increased vaccine production.[8](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8223179/#Fn8) For its part, the EU continues to favour an approach which makes better use of existing flexibilities available in the TRIPS Agreement.[9](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8223179/#Fn9) Thus, those expecting quick agreement on the waiver will be disappointed. Negotiations at the WTO are always difficult and lengthy, and US Trade Representative Katherine Tai acknowledged that the “negotiations will take time given the consensus-based nature of the institution and the complexity of the issues involved”.[10](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8223179/#Fn10) Issues of negotiation will include the scope of the waiver. Whereas the original proposal and its amended form extend the waiver beyond patents and vaccines to include nearly all forms of IP (i.e. copyright,[11](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8223179/#Fn11) industrial designs and trade secrets) as well as to all “health products and technologies including diagnostics, therapeutics, vaccines, medical devices, personal protective equipment, their materials or components, and their methods and means of manufacture for the prevention, treatment or containment of COVID-19”[12](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8223179/#Fn12) (with no requirement on how or the extent to which they are related to or useful in combatting COVID-19), the US and others seem to support a waiver limited to patents and vaccines.[13](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8223179/#Fn13) The length of the waiver will also be a contentious negotiating issue, with proponents seeking a virtual indefinite waiver lasting until the Membership agrees by consensus that it is no longer required – meaning even a single Member’s objection to ending the waiver would mean the waiver continues to remain in force[14](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8223179/#Fn14) – as will the request that any action claimed to be taken under the waiver is outside the scope of the WTO’s dispute settlement mechanism.[15](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8223179/#Fn15) These provisions will almost certainly be opposed by other Members, who would perhaps agree to a time-limited waiver which could be extended rather than an unchallengeable indefinite waiver which will be difficult to reverse. The proposal also fails to mention anything in relation to transparency and notification requirements and lacks safeguards against abuse or diversion. These points will likely also prove contentious in the negotiations. With so many initial divergences and as yet undiscussed issues, the negotiations at best could be completed by the time of the next WTO Ministerial Conference, scheduled to begin on 20 November 2021. There is precedent in this regard, as previous TRIPS negotiations involving IP and pharmaceuticals were not fully resolved until the days before the Ministerial Conferences (in 2003 and 2005).[16](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8223179/#Fn16) There is also a chance that the negotiations will continue past the calendar year 2021. The chance for a swift negotiation diminished with the release of a revised proposal by India and South Africa on 22 May 2021. As mentioned above, the proposal contains no limit as to product coverage, scope, notification requirements or safeguards and proposes that the waiver will remain in effect for what could be an indefinite period. This was not a proposal designed to engender quick negotiations and a solution. Instead, the proposal perhaps reveals India’s and South Africa’s true intent to use the COVID-19 pandemic as an excuse to roll-back IPRs rather than a good-faith effort to rapidly increase access to lifesaving vaccines and treatments around the world. It is not only the length of time which is an issue but also the ultimate impact of the waiver. A waiver simply means that a WTO Member would not be in violation of its WTO obligations if it does not protect and enforce the COVID-19-related IPRs for the duration of the waiver. The waiver would thus allow Members to deviate from their international obligations but not obligate Members to suspend protection and enforcement of the IPRs. Members like the US who support the waiver may not implement the necessary domestic legislation to waive IPRs within the jurisdiction. It is questionable whether the US could even legally implement the waiver given that IPRs are a matter of constitutional law.[17](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8223179/#Fn17) The US announcement remains meaningful, however, for two reasons. First, it signals a departure from the longstanding and bipartisan support for the pharmaceutical industry, which for decades has been instrumental in setting the IP and trade agenda.[18](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8223179/#Fn18) Second, it sends a strong signal that the US does not oppose others from waiving patent protection for vaccines. This shift may also be part of a broader and alternative strategy to increase vaccine production and distribution, whereby the US is not viewing or supporting waiver negotiations as a legal tool but more so as a threat to encourage vaccine innovators to increase production. In essence, the desired reaction would be that the IP holders increase efforts to license, transfer technology and expand manufacturing – exactly what the world needs at this time. Alan Beattie, writing in the Financial Times, believes that even the proponents of the waiver desire this outcome: “having talked to the proponents, [the original proposal] was always a tactical position designed to start a debate, identify possible support and flush out opponents rather than a likely outcome. To that end, it seems to have worked rather well.”[19](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8223179/#Fn19) India’s negotiator to the TRIPS Agreement and longtime WTO staffer, Jayashree Watal, agrees, stating the proposal is an “indirect attempt to put pressure on the original manufacturers to cooperate [and license production to companies in their countries]”.[20](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8223179/#Fn20) This view makes sense, as the proponents (and their supporters) have not even pointed to one credible instance where IPRs have blocked the production of a COVID-19 vaccine. Moreover, it is well known that the leading vaccines using mRNA are difficult to reproduce and having the “blueprints” does not guarantee safe and effective production. Simply stated, if a pastry chef provides instructions on how to bake a cake, the cake they bake is still going to be better than cakes baked by novices using the exact same recipe. The know-how and trade secrets are the key ingredient to the manufacture of quality, safe and effective pharmaceuticals or vaccines, and not only is it not transferred through compulsory licenses but it is hard to imagine how any government would force the transfer of such information even under a waiver. For this reason, instead of encouraging production everywhere – including in locations where safety and efficacy standards are virtually nonexistent – and accepting that there will be a flood of substandard vaccines coming onto the world market (with devastating effects) it is much more sensible to find out where potential manufacturing capabilities exist and find ways to exploit them and scale them up. When asked if a waiver would improve vaccine availability and equity, Watal responded: “No. It won’t. That’s clear.”[21](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8223179/#Fn21) I share Watal’s view and do not support a TRIPS waiver for IPRs or even a limited waiver for patents. With evidence mounting that “what the proposal … will definitely not achieve is speeding up the Covid-19 vaccination rate in India or other parts of the Global South”[22](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8223179/#Fn22) I refuse to sacrifice academic integrity by supporting a proposal simply because it is gaining traction in some circles.[23](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8223179/#Fn23) IPRs played a key role in delivering vaccines within a year of the discovery of a new pathogen; it seems inexplicable that the world would abandon the system without any evidence that IPRs are limiting during the current crisis.[24](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8223179/#Fn24) Moreover, innovators have been generous in licensing technology transfer and production and one would be hard-pressed to find credible reports of qualified generic producers being refused a license. This is not surprising, since multiple competing vaccines are on the market it simply does not make economic sense for innovators to refuse a license – the generic manufacturer would simply obtain a license (and market share) and pay royalties to a competitor. Instead, I support efforts to enable prompt and effective use of existing flexibilities in the TRIPS Agreement and concerted and coordinated efforts involving governments and the private sector to ensure all qualified generic producers willing and capable of manufacturing vaccines are doing so and to create supply by working to bring more facilities up to standard. Cooperation will not only lead us out of this pandemic but also put us in a better position to deal with the next one. Killing the goose that laid the golden egg may seem appealing to some in the short term but will only ensure that no eggs are delivered in the next pandemic.

#### Ecological tipping points are “scientific garbage” and lack data---effects are slow and localized

Brook et al. 18 [(Barry W. Brook, ARC Australian Laureate Professor and Chair of Environmental Sustainability at the University of Tasmania in the Faculty of Science, Engineering & Technology, Erle C. Ellis, Ph.D., Cornell University, 1990 Professor, Geography & Environmental Systems University of Maryland, and Jessie C. Buettel), “What Is the Evidence for Planetary Tipping Points?” In Effective Conservation Science: Data Not Dogma, Chapter 8, Oxford University Press (2018). <http://ecotope.org/people/ellis/papers/brook_2018.pdf>] TDI

\*The Nine Planetary Boundaries Brook Et Al. Refer Too Are, “Land-Use Change, Rate of Biodiversity Loss, Phosphorus Cycle, Global Freshwater Use, Ocean Acidification, Climate Change, Stratospheric Ozone Depletion, Atmospheric Aerosol Loading, Chemical Pollution, Terrestrial Net Primary Production, and Biodiversity Intactness”

As living standards, technological capacities,

and human welfare have continued to improve, concerns have mounted about possible natural limits to economic and population growth. Climate change, habitat loss, and recent extinctions are examples of impacts on natural systems that have been used as markers of global environmental degradation associated with the expanding influence of humans (Barnosky et al., 2012; McGill et al., 2015). Past civilizations have faced rapid declines and even collapsed in the face of regional environmental degradation, drought, and other environmental challenges (Scheffer, 2016; Butzer and Endfield, 2012). This begs the question of whether long-term societal relationships with the planet’s ecology may be approaching a global tipping point as the human population hurtles toward ten billion people. If this is indeed the case, the future of both biodiversity and humanity hangs in the balance. The hypothesis is that without urgent action to prevent reaching a global tipping point, the natural life support systems that sustain humanity may fail abruptly, with drastic consequences. 8.1 Regional tipping points yes— but what about global tipping points? There is strong evidence for rapid global shifts in the biosphere in the distant past, sometimes taking the form of mass extinction events, which have been linked to biophysical tipping points (Hughes et al., 2013). Tipping points occur when components of a system respond gradually to an external forcing to a point at which the response becomes nonlinear and abrupt. This response is often amplified through positive feedback interactions that induce an eventual state (or regime) shift (Lenton, 2013). Tipping points are well documented in studies of local ecosystems, such as lakes, that undergo regime shifts driven by alterations of energy or nutrient flows when thresholds are crossed and hysteresis prevails (Scheffer et al., 2015). Various tipping elements, some definite and others speculative, have also been noted in the Earth’s climate system (Lenton et al., 2008). Given this context, it would seem logical and indeed intuitive to conclude that the Earth system is susceptible and sensitive to planetary regime shifts caused by human alteration of Earth’s ecology. James Lovelock’s original Earth-system conception of “Gaia,” for instance, focused on interconnections and positive feedbacks between the geosphere and the biosphere, which act to promote stability and resilience (Lovelock and Margulis, 1974). But within this same framework, a temporary global forcing event, invoking disconnections and positive feedbacks, could lead to a rapid transition to an alternative stable state, as has been observed in many local systems (Kefi et al., 2016). This conceptual model invites the question of whether identifiable “boundaries” exist within the interacting components of the Earth system. If they do—and they are transgressed—then the planetary biosphere might be dramatically and permanently altered (Brook et al., 2013). 8.2 Planetary boundaries as a seductive policy framework The planetary boundaries concept, coined less than a decade ago (Rockström et al., 2009), represents the idea that contemporary societies have potentially transgressed the historical “natural” conditions— the “safe operating space”—under which human societies have historically thrived. However, to mark the boundaries of a planetary safe “reference state,” defined baselines are required. One possibility that has been suggested is the climatic conditions that marked the last 10 000 years of our current warm interglacial period, the Holocene, in which agricultural and urban societies first arose, should be used as a safe space (Steffen et al., 2015). Other safe spaces (or conversely boundaries) might be similarly recognized. In total, nine planetary boundaries have been hypothesized in association with Earth-system processes that, if sufficiently distorted, might potentially cause harmful changes in Earth’s functioning as a wholistic system (Table 8.1). This perspective has led some to postulate the potential breaching of critical thresholds, pushing the Earth out of the Holocene and consequently inducing a shift in the stability of the system (Barnosky et al., 2012). To quote: “Crossing these boundaries could generate abrupt or irreversible environmental changes.” (stockholmresilience.org/ research/planetary-boundaries.html). A hope often expressed is that flagging the crossing of these boundaries as a significant risk will provoke decision makers and the public into taking actions to mitigate harmful global changes (McAlpine et al., 2015). Such a framework, of global tipping points counterbalanced by secure safe spaces within planetary boundaries, is conceptually elegant and politically seductive. Notably, this implies two possible conditions—a state in which environmental change is without risk, and another in which risk is clear and action necessary. Such a framework is both constraining and liberating, and clearly defines a safe zone in which human societies may go about their activities without risk. As a consequence, if such clear knowledge on the risks of altering global environmental processes existed, a defined set of boundaries could be extremely useful to decision makers. But is there evidence of global tipping-point dynamics with safe space and global risk clearly demarcated? 8.3 The search for mechanisms and evidence in support of the nine planetary boundaries Since its original publication, the planetary boundaries framework, including the related concepts of a “safe operating space” and global regime shifts, have become increasingly prevalent in scientific and policy discussions concerned with global change (Corlett, 2015). This work has been heavily cited, updated, and actively promoted as a policy tool. But there has also been a counter-vailing critique that challenges the universality, utility, and even the underlying validity of the planetary boundaries framework (Brook and Blomqvist, 2016; Lenton and Williams, 2013). The underlying bases for this debate stem from disagreements over technical and scientific issues, including questions of scale, scientific underpinning, deterministic “boundary setting,” and the generality of mechanisms proposed. Most of the nine processes and systems listed in Table 8.1 lack theoretical mechanisms or evidence for a causal connection from local perturbations to global “boundary crossing” (Brook et al., 2013). The exceptions are the atmospheric and oceanic systems, which seem to most closely fit the characteristics required for a globally “scaled-up” version of the coupled, non-linear dynamics that have been shown to undergo phase shifts. But for others, like global land use or worldwide biodiversity, it is difficult to conceive how aggregated local-to-regional measures are representative of a coherent planetary system that is prone to tipping (Mace et al., 2014). Moreover, anthropogenic pressures vary geographically, and the system responses to stressors can be highly heterogeneous (Reyer et al., 2015). While global tipping points have been hypothesized, their exact “position” has not been determined. If the boundaries did exist at a global level, there is a good chance they could not be known until well after the regime shift or boundary crossing had occurred. This is because of our lack of our understanding of complex systems and the wild fluctuations in state variables that have occurred historically and continue to occur, without any evidence of an irreversible global collapse. Finally, implementing policies that avoid crossing planetary boundaries is a “global commons” problem, and everything we know from climate action indicates that it is difficult to generate agreements that address such risk when there is uncertainty about thresholds (Barrett and Dannenberg, 2012). 8.4 The problem with going from local process to a global tipping point For at least six of the nine proposed boundaries, the operational scales of these “Earth system processes” are local or regional (Table 8.1), yet the proposed boundaries represent global aggregations (the sum of many component sub-systems). The value assigned to any particular boundary is, in virtually all cases, speculative and represents an arbitrary point along a continuum of possible values, as opposed to a phase shift due to global non-linear dynamics. The most plausible threshold is for ocean acidification, because it is directly related to the calcite and aragonite compensation depth (i.e., something that is inherently quantifiable). The others are purely supported by a statement to the effect that “this stress or change from the baseline is deemed excessive.” This lack of scientific underpinning for these boundaries raises significant questions on the biological and physical relevance of such thresholds for the Earth system. What is currently needed are explicit efforts to link long-term monitoring to the choice of these boundary values (Robert et al., 2013). Unquestioning acceptance of these boundaries that in turn guide subsequent global assessment (as in Newbold et al., 2016) will only inhibit our understanding of human impacts. In addition to masking finer-grained detail, globally averaged or aggregated metrics are also often difficult to link to directed action. For instance, the recent Paris Agreement to limit average global temperature rise to less than 2 °C above pre-industrial levels was ultimately re-framed as a plethora of national goals or aspirations based on carbon-emissions intensity (Rogelj et al., 2016). This is partly because a “global temperature,” averaged across all the Earth system, is not a real physical phenomenon or quantity observed in any place. As such, it cannot be used to guide or monitor local system states. What can be monitored and altered are the trajectories of the underlying drivers of system changes (e.g., carbon emissions intensity, in the climate case), and these therefore ought to be the domain of targets. Even if one can identify and measure a global environmental attribute, it does not automatically follow that it is associated with a real-world threshold that, when crossed, leads to irreversible change. Asserting “safe” global limits on indicators like land-use change (the boundary of a maximum of 15% of land given over to cultivation, see Table 8.1) or decline in the local species abundance of originally present species (e.g., “10% loss relative to undisturbed habitat” as is the case in Newbold et al., 2016) is totally arbitrary. Such thinking ignores inherent complexity and promotes a “one size fits all” mode of thinking for conservation management that elides the very real need for locally appropriate solutions. Trying to avoid crossing a global land-use or biodiversity boundary might also lead to perverse outcomes locally, such as if restoring a “safe level” of biodiversity intactness in the world’s most fertile and productive regions (where most food originates) triggers undesirable trade-offs such as the displacement of farming to marginal regions that require more land, greater inputs, and hardship. In the context of food production, Running (2012) recently argued that at most an additional 10% of harvestable annual net global primary production (NPP) of terrestrial plants could be co-opted for future human use without crossing out of the planetary safe space. The implications of this assertion are draconian. Global NPP has been essentially steady, even with the massive agricultural expansion that has occurred over the last century. Thus, because the allocation of NPP is essentially a zerosum activity, asserting that humans can only get at most an additional 10% of that NPP implies future shortages of food, fiber, fodder, and fuel for people (Erb et al., 2012; Lewis, 2012). Policy based on this boundary would be fraught with human suffering, while the boundary itself has little mechanistic support or clear evidence of existence. In a similar vein, seeking to achieve uniform limits on practices such as nitrogen or phosphorus fertilizer use would inevitably lead to winners and losers at local scales (de Vries et al., 2013), because of differences in soil fertility and the legacies of historical farming practices (Erb et al., 2012; Carpenter and Bennett, 2011). For instance, while nitrogen fertilizer has been over-used in many developed countries, increases are urgently needed in sub-Saharan Africa to close the yield gap (Mueller et al., 2014). Given the consistent need for regionally appropriate limits, what practical use is a globally defined boundary? 8.5 Finding the research questions in an arena that is rife with competing visions of desirable futures Planetary boundaries are typically based on biogeochemical and ecological principles. Their frame is simple: if we pass threshold “X,” then the following ecological degradation or regime shift will occur. What this framing neglects is that there are inevitable trade-offs between human development goals and environmental protection/risk. Policy based on any assumed boundary will substantially impact development options. For the most part, truly natural areas are not the main “life support systems” for humanity; instead, people rely on those ecosystems that have been modified or engineered (Ellis et al., 2013). If it comes down to a choice between improved human development and the potential risk of transgressing an uncertain (and data poor) planetary boundary, it may be that society is willing to accept that risk. Science has a vital role in guiding environmental management. Ultimately, however, science must intersect with human decisions: physical laws are not negotiable, but our response to them is (Larsen et al., 2015). Global change is not a societal construct, so we must avoid the temptation to couch scientific models as policy directives. Value judgements do (and must) play a key role in determining how people respond to global environmental challenges and the possibility of inflexible planetary boundaries. What has become starkly apparent from the debate on planetary tipping points and possible global regime changes is the need for a concerted research agenda aimed at the potential links between biophysical and social systems to determine possible boundary “positions.” This research could come in the form of: (1) empirical examinations of regime shifts (or not) under gradual degradation; (2) models that explicitly link ecosystem changes and hypothesized boundaries to specific upheavals; and (3) explorations of how the framing of a boundary influences decision makers. For instance, our approach to Earth-system simulations is sophisticated for climatic components but lacks the resolution and mechanisms needed to test ideas on the planetary interconnectedness of nutrient and energy flows, or feedbacks across global biomes (Harfoot et al., 2014). The Madingley model of ecosystem dynamics (https://madingley.github. io/about) offers one promising example of an innovative attempt in this direction, because its design goals are to explicitly capture the scaling of processes that affect biodiversity from local to global scales (Purves et al., 2013). We can also seek a better understanding of the mechanistic underpinnings of the drivers of changes in global systems, such as land-use change and agricultural intensification. This could generate empirically based “bottomup” forecasts of trajectories, which, when linked to multi-ecosystem models, should improve our forecasts of the risks of planetary state shifts (Brook and Blomqvist, 2016). One of the appeals of planetary boundaries is the hypothesis that it resonates as a narrative for environmental action. The question is: how do decision-makers respond to these boundary arguments? Some research suggests that thresholds inhibit collective actions against tragedies of the commons (Barrett and Dannenberg, 2012). This is a field ripe for theoretical and empirical study. We also need to ask the hard questions about whether conceptual models like planetary boundaries the most effective strategy and engagement tool for conservation and mitigation are. The difficulty in getting international agreement on climate targets (e.g., the 2 °C “guardrail”) is an obvious case in point (Symons and Karlsson, 2015). Perhaps focusing on planetary opportunities: leverage points for guiding global change in better directions (e.g., carbon-neutral energy systems) is potentially a more effective focus of scientific attention (DeFries et al., 2012). By focusing on something to be averted as opposed to an outcome to be achieved, we risk breeding complacency on one side of a boundary, and hopelessness on the other. To summarize the above: the biosphere, and much of the geosphere, responds to external pressures in many and varied ways. The global human enterprise is driving large-scale changes in most components of the Earth system, but in a haphazard fashion, with responses often being weakly connected or transmitted slowly at a cross-continental scale. What we observe, for the global processes compiled in Table 8.1, is largely just the sum of all those changes. Acknowledging this reality should not be taken as diminishing the seriousness of these impacts or denying that major changes are occurring to the biosphere, atmosphere, and hydrosphere due to human activity. But it does make it implausible that the planet, or indeed most of its component systems, are primed to tip irreversibly to a radically different state that is inhospitable. Although the goal of sustainable stewardship of our planet is a laudable and an achievable one, the mechanisms and opportunities to conserve biodiversity and ecosystems lie mostly in targeted, localized actions (Jonas et al., 2014).

#### Extinction from warming requies 12 degrees, far greater than their internal link, and intervening actors will solve before then

Farquhar 17 [(Sebastian, leads the Global Priorities Project (GPP) at the Centre for Effective Altruism), et al., 2017, “Existential Risk: Diplomacy and Governance,” <https://www.fhi.ox.ac.uk/wp-content/uploads/Existential-Risks-2017-01-23.pdf>] TDI

The most likely levels of global warming are very unlikely to cause human extinction.15 The existential risks of climate change instead stem from tail risk climate change – the low probability of extreme levels of warming – and interaction with other sources of risk. It is impossible to say with confidence at what point global warming would become severe enough to pose an existential threat. Research has suggested that warming of 11-12°C would render most of the planet uninhabitable,16 and would completely devastate agriculture.17 This would pose an extreme threat to human civilisation as we know it.18 Warming of around 7°C or more could potentially produce conflict and instability on such a scale that the indirect effects could be an existential risk, although it is extremely uncertain how likely such scenarios are.19 Moreover, the timescales over which such changes might happen could mean that humanity is able to adapt enough to avoid extinction in even very extreme scenarios. The probability of these levels of warming depends on eventual greenhouse gas concentrations. According to some experts, unless strong action is taken soon by major emitters, it is likely that we will pursue a medium-high emissions pathway.20 If we do, the chance of extreme warming is highly uncertain but appears non-negligible. Current concentrations of greenhouse gases are higher than they have been for hundreds of thousands of years,21 which means that there are significant unknown unknowns about how the climate system will respond. Particularly concerning is the risk of positive feedback loops, such as the release of vast amounts of methane from melting of the arctic permafrost, which would cause rapid and disastrous warming.22 The economists Gernot Wagner and Martin Weitzman have used IPCC figures (which do not include modelling of feedback loops such as those from melting permafrost) to estimate that if we continue to pursue a medium-high emissions pathway, the probability of eventual warming of 6°C is around 10%,23 and of 10°C is around 3%.24 These estimates are of course highly uncertain. It is likely that the world will take action against climate change once it begins to impose large costs on human society, long before there is warming of 10°C. Unfortunately, there is significant inertia in the climate system: there is a 25 to 50 year lag between CO2 emissions and eventual warming,25 and it is expected that 40% of the peak concentration of CO2 will remain in the atmosphere 1,000 years after the peak is reached.26 Consequently, it is impossible to reduce temperatures quickly by reducing CO2 emissions. If the world does start to face costly warming, the international community will therefore face strong incentives to find other ways to reduce global temperatures.

### at: space col

#### Colonization fails and causes interworld war – turns the case.

Deudney ’20 [Daniel; Associate Professor of Political Science at Johns Hopkins University, PhD in political science from Princeton University, MPA in science, technology, and public policy from George Washington University; March 2020; “Chapter 6: Limitless Frontiers, Spaceship Earths, and Higher Humanities”; *Dark Skies: Space Expansionism, Planetary Geopolitics, and the Ends of Humanity*; Kindle; TV]

A dauntingly long list of factors predispose space colonies to unfreedom. First is the fact that such colonies, situated in the harshly inhospitable environments of space and other planets, will inevitably have central control over the necessities of life, most notably oxygen, water, and food, whose access has been largely taken for granted in all terrestrial human societies. 136 Second, space colonies will be spatially isolated, with a “natural Berlin Wall” preventing the flights to freedom that were available on Earth. 137 Third, there will be high barriers to the free flow of information between space colonies and societies elsewhere. 138 Fourth, free assembly, vital to permitting the mobilization and expression of popular grievances, will be difficult in the cramped and totally built spaces in extraterrestrial colonies. 139 Fifth, picking up on the point made by Cole and Cox, “unpredictable and criminal actions against the infrastructure represent a continuously present and potentially catastrophic” threat, thus justifying extreme constraints on individual activity and expression. 140 Sixth, space colonies will have “the need for a most intrusive and thorough-going surveillance regime” that will be easy to achieve and will extinguish privacy and erode individual autonomy. 141 Seventh, space colonies will be prone to cultures of intense conformity and will lack cultural diversity. 142 Eighth, the isolated and confined life of space colonies is likely to give rise to various forms of new religions with cultic tendencies inimical to individual freedom. 143 Ninth, turning to economics, collective efforts, not individual, will be necessary for converting raw resources into valuable goods, unlike on Earth, where sole proprietor and “homestead” ventures are both viable and widely viewed as a foundation for free societies. 144 Tenth, laissezfaire economic systems will be infeasible in space colonies, precluding a basic feature of free market economies on Earth. 145 Eleventh, space colonies are likely to require some type of welfare state to ensure that everyone has at least basic life-support services. Twelfth, the economies of space colonies are likely to be more autarkic than those on Earth, reducing the prospects for free trade, widely viewed as associated with free societies on Earth. Thirteenth, economic activity in space colonies is likely to require high levels of central planning. 146 Fourteenth and finally, population rates would need to be effectively regulated.

The future prospects for freedom in space, Cockell argues, are not just relevant to space but could also decisively shape the destiny of free societies on Earth. Space colonies could “exert a disproportionate effect on the Earth compared to their size and populations” because their position atop the gravity well would give them the ability to threaten the Earth with bombardment from space, hide weapons in the “unpoliceable vastness of the interplanetary void,” and better exploit the vast resources of the solar system. 147 With stakes this high, and with such daunting obstacles to preserving freedom in space, one might expect Cockell to reach the cautious conclusion that space colonization should be avoided in the interest of human freedom. But this is most definitely not his conclusion. He compiles these arguments not to undercut the appeal of space colonization but to identify potential problems that he believes can be avoided through careful anticipatory planning and engineering design in creating both built spaces and institutions. Continuing on the path of terrestrial urban designers and architects, he proposes that the preservation of freedom should be an important factor in the design of space colonies as well as in the founding charters for governing space colonies. 148

In the course of considering the prospects for freedom in space, two other members of the British Interplanetary Society group, the SF writer Stephen Baxter and the astronomer Ian Crawford, consider aspects of interplanetary warfare that might arise from attempts by space colonies to wage war to become independent from the Earth in ways analogous to how colonies on Earth, such as those in the Americas, became independent. After a careful quantitative assessment of violence potentials of asteroidal bombardment, they conclude that an interplanetary war “would be catastrophically lethal, even compared to our modern capability of all-out nuclear war,” and would jeopardize “the survival of the human species itself.” 149 Space colonial wars for independence “would likely wreck both civilizations if not exterminate the warring populations entirely.” 150 More generally, they observe that the “ease of inflicting enormous damage through an attack from space” means that “it is doubtful that the planet and its cargo of life, including the human, could be adequately protected in the event of an interplanetary war.” 151 But like Cockell’s treatment of the many barriers to freedom in colonies, Crawford and Baxter do not draw the cautious conclusion that colonization is an undesirable goal. Instead they conclude that it is “essential that an interplanetary political framework is established that guarantees colonial liberty without recourse to conflict.” 152

#### Supervolcanoes aren’t existential

* Super volcano expert consensus
* Toba was fake or a fluke
* Population spread solves
* Starts at once every 80,000 years
* Can’t prevent or delay eruptions
* But trying to causes one
* We survive even largest possible eruption

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.

Experts on supervolcanic eruptions do not typically suggest that there is a direct threat of human extinction. While there was some early evidence that the Toba eruption may have nearly destroyed humanity 74,000 years ago, newer evidence has made this look increasingly unlikely.32 Since Toba was the largest known eruption in the last 2 million years and we now have thousands of times the population spread over a much greater part of the Earth, we should assume extinction to be a very unlikely consequence.33 The effects may be roughly comparable to those of the one-to ten-kilometer asteroids, with major global crop failures lasting for years on end. Since the world only has about six months of food reserves, there is a possibility that billions of people could starve and that civilization could suffer a global collapse. I think that even if civilization did collapse, it would be very catastrophe. While geologists have identified the remnants of dozens of supereruptions, their frequency remains very uncertain likely to recover. But if it could not, that would constitute an existential. A recent review gave a central estimate of one per 20,000 years, with substantial uncertainty. For Toba-sized eruptions, the same analysis gives a central estimate of one in 80,000 years, but with even more uncertainty.34 What about for the next hundred years? When astronomers tracked more and more asteroids, they were able to determine that the next century would be safer than average. Unfortunately, volcanoes are much less predictable than asteroids. Despite knowing the locations of most of the volcanoes that have had supervolcanic eruptions in the past, it is extremely difficult to predict whether they are likely to erupt soon, and we should expect very little warning if they do. There is very little known about how to prevent or delay an impending supereruption. NASA recently conducted a very preliminary investigation of the possibility of slowly draining heat from the Yellowstone caldera, but investigations like these are in their earliest stages, and any sort of interference with an active volcano—especially one with a history of supereruptions—would obviously require enormous caution.35 For now, our best approach to the threat of supereruptions lies in preparing to mitigate the damage, through building up non-perishable food reserves or developing emergency food production techniques. Magnitude: 8–9 Average Century: ∼ 1 in 200 Next Century: ∼ 1 in 200 Magnitude: 9+ (e.g., Toba) Average Century: ∼ 1 in 800 Next Century: ∼ 1 in 800 T ABLE 3.2 The probability per century of a supervolcanic eruption. Note that there are good reasons to think that even the largest eruptions would be very unlikely to lead to extinction or unrecoverable collapse. The probability estimates are extremely rough, with the confidence interval for magnitude 8–9 eruptions ranging from 1 in 50 to 1 in 500 per century, and the confidence interval for magnitude 9+ ranging from 1 in 600 all the way to 1 in 60,000. Compared to asteroids and comets, we are at an earlier stage of understanding and managing the risk. This risk may also be fundamentally harder to manage, due to the greater difficulties of prediction and prevention. And most importantly, the probability of a civilization-threatening catastrophe in the next century is estimated to be about 100 times that of asteroids and comets combined. So supervolcanic eruptions appear to be the greater risk, and in greater need of additional attention.

### at: Food Wars

#### No food wars – no causal evidence, only maybe true for the poorest countries, and government responses solve the impact

Rosengrant 13 [Mark W. Rosegrant, Director of the Environment and Production Technology Division at the International Food Policy Research Institute, et al., 2013, “The Future of the Global Food Economy: Scenarios for Supply, Demand, and Prices,” in Food Security and Sociopolitical Stability, p. 39-40]

The food price spikes in the late 2000s caught the world’s attention, particularly when sharp increases in food and fuel prices in 2008 coincided with street demonstrations and riots in many countries. For 2008 and the two preceding years, researchers identified a significant number of countries (totaling 54) with protests during what was called the global food crisis (Benson et al. 2008). Violent protests occurred in 21 countries, and nonviolent protests occurred in 44 countries. Both types of protest took place in 11 countries. In a separate analysis, developing countries with low government effectiveness experienced more food price protests between 2007 and 2008 than countries with high government effectiveness (World Bank 201la). Although the incidence of violent protests was much higher in countries with less capable governance, many factors could be causing or contributing to these protests, such as government response tactics, rather than the initial food price spike. Data on food riots and food prices have tracked together in recent years. Agricultural commodity prices started strengthening in international markets in 2006. In the latter half of 2007, as prices continued to rise, two or fewer food price riots per month were recorded (based on World Food Programme data, as reported in Brinkman and Hendrix 2011). As prices peaked and remained high during mid-2008, the number of riots increased dramatically, with a cumulative total of 84 by August 2008. Subsequently, both prices and the monthly number of protests declined. Several researchers have studied the connection between food price shocks and conflict, finding at least some relationship between food prices and conflict. According to Dell et al. (2008), higher food prices lead to income declines and an increase in political instability, but only for poor countries. Researchers also found a positive and significant relationship between weather shocks (affecting food availability, prices, and real income) and the probability of suffering government repression or a civil war (Besley and Persson 2009). Arezki and Bruckner (2011) evaluated a constructed food price index and political variables, including data on riots and anti-government demonstrations and measures of civil unrest. Using data from 61 countries over the period 1970 to 2007, they found a direct connection between food price shocks and an increased likelihood of civil conflict, including riots and demonstrations. Other researchers have broadened the analysis by considering government responses or underlying policies that affect local prices, and consequently influence outcomes and the linkage between food price shocks and conflict. Carter and Bates (2012) evaluated data from 30 developing countries for the time period 1961 to 2001, concluding that when governments mitigate the impact of food price shocks on urban consumers, the apparent relationship between food price shocks and civil war disappears. Moreover, when the urban consumers can expect a favorable response, the protests only serve as a motivation for a policy response rather than as a prelude to something more serious, such as violent demonstrations or even civil war. Many in the international development community see war and conflict as a development issue, with a war or conflict severely damaging the local economy, which in turn leads to forced migration and dislocation, and ultimately acute food insecurity. Brinkman and Hendrix (2011) ask if it could be the other way around, with food insecurity causing conflict. Their answer, based on a review of the literature, is "a highly qualified yes," especially for intrastate conflict. The primary reason is that insecurity itself heightens the risk of democratic breakdown and civil conflict. The linkage connecting food insecurity to conflict is contingent on levels of economic development (a stronger linkage for poorer countries), existing political institutions, and other factors. The researchers say establishing causation directly is elusive, considering a lack of evidence for explaining individual behavior. The debate over cause and effect is ongoing. Policies can nevertheless be implemented to reduce price variability. Less costly forms of stabilization, at least in terms of government outlays, include reducing import tariffs (and quotas) to lower prices and restricting exports to increase food availability. However, these types of policy responses, while perhaps helping an individual country's consumers in the short run, can lead to increased international price volatility, with potential for disproportionate adverse impacts on other countries that also may be experiencing food insecurity.

#### No food wars – the countries that matter their impact are resilient and institutional responses prevent escalation

Cliffe 16 [Sarah Cliffe, Director of the Center on International Cooperation at New York University, 3/29/16, “Food Security, Nutrition, and Peace,” http://cic.nyu.edu/news\_commentary/food-security-nutrition-and-peace

However, current research does not yet indicate a clear link between climate change, food insecurity and conflict, except perhaps where rapidly deteriorating water availability cuts across existing tensions and weak institutions. But a series of interlinked problems – changing global patterns of consumption of energy and scarce resources, increasing demands for food imports (which draw on land, water, and energy inputs) can create pressure on fragile situations. Food security – and food prices – are a highly political issue, being a very immediate and visible source of popular welfare or popular uncertainty. But their link to conflict (and the wider links between climate change and conflict) is indirect rather than direct. What makes some countries more resilient than others? Many countries face food price or natural resource shocks without falling into conflict. Essentially, the two important factors in determining their resilience are: First, whether food insecurity is combined with other stresses – issues such as unemployment, but most fundamentally issues such as political exclusion or human rights abuses. We sometimes read nowadays that the 2006-2009 drought was a factor in the Syrian conflict, by driving rural-urban migration that caused societal stresses. It may of course have been one factor amongst many but it would be too simplistic to suggest that it was the primary driver of the Syrian conflict. Second, whether countries have strong enough institutions to fulfill a social compact with their citizens, providing help quickly to citizens affected by food insecurity, with or without international assistance. During the 2007-2008 food crisis, developing countries with low institutional strength experienced more food price protests than those with higher institutional strengths, and more than half these protests turned violent. This for example, is the difference in the events in Haiti versus those in Mexico or the Philippines where far greater institutional strength existed to deal with the food price shocks and protests did not spur deteriorating national security or widespread violence.

#### Their studies are bad

Demarest 15 [Leila Demarest, PhD Researcher at the Centre for Research on Peace and Development. Food price rises and political instability: Problematizing a complex relationship. The European Journal of Development Research, Vol. 27, No. 5, p. 650-671]

6. Conclusions and Way Forward While some progress has been made in improving our understanding of the linkages between rising food prices and conflict, several important gaps remain. Firstly, notions of conflict and political instability are often used interchangeably, while these concepts and the relationships between them remain to some extent vague. The ‘food riot’ concept in particular leads to confusion. Although it is popularly seen as a violent rise of the masses, in reality, many peaceful events are gathered under this term, while violence is often committed by the state rather than by hungry consumers. The term also presupposes that food is the central issue at hand, which does not necessarily have to be the case. Many misunderstanding arise from the second gap identified in this paper: the uncritical data gathering based on international news reports. Not only are these remarkably inconsistent, they also make use of classifications which are not scientifically investigated. Finally, causal mechanisms in the relationship between rising food prices and conflict often remain assumptions in the literature and lack empirical foundation.

Three crosscutting avenues for improvement therefore exist: better concept definitions, better data gathering, and more focus on contexts. Clearly defined concepts and categorizations of conflict and instability are a necessary foundation for research on the linkages between rising food prices and conflict. For (food) protests in particular, purposeful categorizations require an enhanced insight in the events that took place on the ground. Local news sources for data gathering can prove to be more reliable than Western (English) media to accomplish this. Event descriptions are also likely to be more detailed in local sources, which allows for a first-hand qualitative analysis of causes and context. As international food prices are likely to remain high, improving our understanding of the causal mechanisms which can lead to conflict remains crucial. We can draw important lessons from the literature on poverty and conflict, resource scarcity and conflict, and regime transition in Africa. The causal role of economic factors alone has continuously been questioned, and ‘context’ or prevailing political, economic, and social factors play a crucial role in the conflict outcome. The argument that adverse economic shocks seem more of a trigger to conflict rather than an important cause is not particularly remarkable in itself. Yet while many authors acknowledge this, the focus often remains on the trigger. Resource scarcity, climate change, population growth, or food insecurity often remain the starting point of analyses, with researchers consequently tracing the divergent (theoretical) possibilities for conflict. In the end, most admit that these factors do not automatically lead to conflict everywhere, and stress the importance of context. Because the theoretical possibilities for conflict are so large, however, the context factor remains rather understudied with as most agreed upon notions that elements of ‘grievance’ and ‘collective action’ are required. It is hence important to focus more on the ‘contexts’ that can lead to conflict and, in doing so, to make the distinction between different forms of conflict. This also implies a data collection exercise. Contextual data are currently collected at the aggregate, national level, and only on a yearly basis, which can lead to spurious relations. While the use of these variables is increasingly questioned in civil war studies, we can also doubt their strength in the study of highly localized, one-time events such as riots. I particularly make the case for ‘bringing politics back in’. The policies taken by the government are crucial in the violent escalation of social conflict (e.g. accommodation versus repression), but the only variable currently in use to explain state behaviour seems to be the country-level regime type variable (Polity IV or Freedom House), which is also used with regards to highly localized conflicts. Other ways in which politics matter, can be the strength of the political opposition. The Muslim Brotherhood in Egypt, for example, was probably better organized than other opposition groups to make use of economic unrest.