# MSDI Vaccine Funding Aff



## What’s all this?

<https://youtube.com/clip/UgkxnImOvt9q0jkYfqiTYcRbb3P4IkLPQ_NC>

Much of the discussion about long term vaccine funding is focused on the CEPI project, which includes a lot of private funding streams, but the NFHS case list recommends it for the 2022-2023 case list. There are lots of cards on NATO cooperation to retain and expand from lessons learned via Covid, some of which at least mention a vaccine element.

As with many other cases, it is important to justify the plan in relation to TWO topic anchors – “Why use NATO?” and “Why biotech (or other area)?” – and this aff focused on each in ways that could work with a variety of other cases.

This aff is also designed to show how a case can be written to defend status quo mechanisms by saying additional action is needed to reach their potential (instead of setting up something entirely new based on a single proposal).

It is also designed to play “whack-a-mole” with the negative by having several layers of solvency concepts such that the 2AR can emphasize whatever concepts they did NOT attack. I recommend playing with different extension cards in practice rounds to achieve this effect. The current version of the plan text is word soup, and there are plenty of other words that could be considered.

## Case

### Inherency

#### NATO lack vaccine stockpiles, although its Covid cooperation in other areas could thump DA’s

NATO North Atlantic Treaty Organization, March 2021, https://www.nato.int/nato\_static\_fl2014/assets/pdf/2021/3/pdf/2103-factsheet-COVID-19-en.pdf, " NATO’s Response to the COVID-19 Pandemic" NATO Fact Sheet (ermo/sms, Acc:6-20-2022)

Vaccines

Although NATO does not have a supply of vaccines, the Alliance avails the clearing house mechanism to Allies and partners. Thus far, four nations requested vaccines : Montenegro, North Macedonia, Georgia and Tunisia.

Research and Innovation

NATO is supporting innovation through research and scientific collaboration on COVID-19. For example, the NATO Science & Technology Organization has tapped into its network of 6,000 defence scientists through the NATO Chief Scientist’s Challenge. Launched in April, the Challenge tasked Alliance researchers with identifying solutions to some of the most pressing challenges posed by COVID-19. More than 40 projects are now being taken forward, addressing topics such as understanding and countering pandemic disinformation, as well as improving military training for pandemic relief operations.

Furthermore, the NATO Science & Technology Organization’s Centre for Maritime Research and Experimentation directly supported the US state of Connecticut in developing a modelling capability to help forecast the spread of COVID-19.

Through the NATO Science for Peace and Security Programme, Italian and Swiss scientists are collaborating on a NATO supported project to develop rapid COVID-19 diagnostics.

### Plan

#### The United States federal government should substantially increase its security cooperation with the North Atlantic Treaty Organization in biotechnology through a vaccine research program emphasizing biosafety, resilience, foresight, and experimentalist governance.

### Solvency

#### The plan builds NATO resilience to contain all global threats – Article 3 and current agencies prove they say yes

Jaclyn Levy, 6-10-2021, Millennium Leadership Fellow at the Atlantic Council and the director of public policy at the Infectious Diseases Society of America https://www.atlanticcouncil.org/blogs/new-atlanticist/the-best-defense-why-nato-should-invest-in-resilience/, "The best defense: Why NATO should invest in resilience," Atlantic Council (ermo/sms, Acc:6-17-2022)

The COVID-19 pandemic has magnified not only the successes and failures of the world’s health systems but also the importance of multilateral partnerships in biosecurity. Preparing for the next pandemic will require adaptation, interconnectivity, and resilience—the capacity to resist and recover quickly from major infrastructure shocks. Intergovernmental alliances like NATO can play a critical role in the relationship- and capacity-building necessary for a healthy global biosecurity sphere, which ensures a more secure world.

There are many lessons from the last fifteen months, but among them is a time-honored proverb: an ounce of prevention is worth a pound of cure. Many public-health and security crises are a product of critical infrastructure vulnerabilities, but an expanded focus on resilience in developing a global security strategy can prevent the next crisis. Responding to emergencies such as pandemics is far more expensive than preventing them and creates additional costs such as strained political cohesion and waning support for public institutions. Policies emphasizing resilience should fundamentally aim to minimize damage, restore stability quickly, and generate improved strategies for similar issues. To this end, there are several steps NATO can take to build a preventive, resilience-based approach to emerging global challenges.

Article 3 of the North Atlantic Treaty includes resilience as a critical element of its mission to achieve collective defense, and the Alliance supports multiple programs to build resilience against non-traditional threats. At its 2016 Warsaw Summit, NATO committed to “continue to enhance our resilience against the full spectrum of threats, including hybrid threats, from any direction,” and added that “resilience is an essential basis for credible deterrence and defence and effective fulfilment of the Alliance’s core tasks.” In June, NATO Secretary General Jens Stoltenberg said during an appearance at the Atlantic Council that a critical part of the Alliance’s agenda over the coming decade is to support “resilience technologies.”

The COVID-19 pandemic has made clear NATO’s value in an unpredictable world. In 2020, NATO troops supported civilian efforts to combat the spread of COVID-19 by airlifting patients and medical equipment, building field hospitals, distributing supplies, repatriating civilians, establishing quarantine facilities and triage centers, assisting with decontamination, and sharing medical expertise. After this pandemic recedes, NATO’s proposals for responding to biothreats and other novel challenges should include investments in resilience to help combat “black swan” events, which may turn existing health or environmental emergencies into security crises. “Resilient societies are our first line of defense,” said NATO Deputy Secretary General Mircea Geoană in December, adding that “we have to put a much greater emphasis on resilience” across government, the private sector, and civil society.

NATO should start advancing resilience by leveraging and strengthening the following policies, programs, and partnerships:

The NATO Science & Technology Organization (STO) develops innovative solutions with global experts to ensure that the Alliance’s technological capacity meets its needs in a quickly changing world. Allied governments contributed approximately 500 million euros to STO last year, forming a pool of already-allocated funding that could support resilience-building efforts. To advance and sustain technological innovation that enhances global resilience, the STO’s Science and Technology Board should push for a sustained allocation of funding specifically for resilience research, biomedical research and development, and ambitious pilot programs focused on sharing pathogen surveillance data between countries and their health systems, developing biomedical research infrastructure, and conducting training simulations for biothreat and public-health emergencies.

The NATO Science for Peace and Security (SPS) Programme, as defined by the Alliance, promotes dialogue and cooperation “based on scientific research, technological innovation, and knowledge exchange. [It] offers funding, expert advice and support to… security-relevant activities that respond to NATO’s strategic objectives.” During the pandemic, SPS led efforts to advance the development of rapid COVID-19 tests. In the future, SPS should invest in ways to identify and combat swiftly rising global antimicrobial resistance, synthetic biology threats, and agricultural vulnerabilities; it should also invest in assessments and fortifications of medical and biosecurity stockpiles.

The Euro-Atlantic Disaster Response Coordination Centre (EADRCC) has experience supporting responses to infectious-disease outbreaks, which threaten to increase as a consequence of climate change, industrialization, and global migration. EADRCC activities leverage emerging technologies to enhance resilience and build capacities for crisis response. Previous joint exercises with the SPS Program have included testing innovative telemedicine and communications platforms. EADRCC’s successful logistical coordination during the COVID-19 pandemic underscores its unique value; in the future, the EADRCC should expand its role in international cooperation and information-sharing between military medical services and civilian health systems.

The Joint Chemical, Biological, Radiological, and Nuclear Defence (JCBRN) Centre of Excellence, a NATO military body focused on CBRN defense advice, education, training, and exercises, can convene member states and partners for training simulations and security activities related to novel threats in the context of regional and global issues. JCBRN should act on this capacity, in coordination with the Crisis Management and Disaster Response Centre of Excellence, to ensure that NATO member countries are prepared to combat future outbreaks and biological events. Strengthening bio-preparedness efforts through modeling and planning will help drive a resilient crisis response.

Established during the pandemic, the NATO Pandemic Response Trust Fund stockpiles medical equipment and supplies for members of the Alliance and partners in need. Beyond the current pandemic, it can help defend against future chemical, biological, radiological, nuclear, and public-health threats—only if NATO maintains and adapts these stockpiled resources for other critical public-health and infrastructure needs.

Looking ahead, the NATO 2030 initiative aims to elevate democratic leadership around the world, advance biomedical science and global technology, and position NATO and its partners to tackle novel global security challenges through a lens of flexibility and adaptation. Strategic investments in these efforts will establish resilient frameworks for addressing emerging threats, which is critical for successful collective defense.

Realizing the full potential of these and other programs will require additional support from NATO operations, planning, policy, and civilian divisions. Allies and international organizations should also continue working with NATO on the ground to support equipment procurement and regional needs. In today’s unpredictable security environment, successfully responding to threats requires resilience—and NATO is well-positioned to make resilience a reality.

#### NATO vaccine cooperation is vital to resilience – this approach avoids trade offs with other parts of the core mission

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So far, NATO has set up a Lessons Learned Steering Group (LLSG)66 on COVID-19, which collects inputs by agencies, divisions, and delegations to help the alliance design a strategy for both future waves of this coronavirus and for future pandemics. Stemming from the inputs of the LLSG and from the reflections of officials interviewed for this paper, the following recommendations to the alliance focus on resilience and readiness in crisis management.

● Resilience: NATO must remain vigilant against malign exploitation of crises. Under whatever circumstances may arise, the Atlantic alliance should not shift its focus away from its main objectives of pushing back against adversaries through deterrence and response-readiness.67

○ NATO should have a protocol to follow in case of crises like pandemics to ensure continuity of operations. So far, the alliance has shown impressive adaptability and was able to keep its missions running and continue with training and exercises, even if at a reduced level. However, military activities have been reduced by 33% with 80% fewer personnel participating,68 and the climate of uncertainty surrounding the impact of COVID-19 on NATO missions, training, and exercises could have left gaps for malign actors to exploit, especially in more fragile settings like in Iraq. To prevent future pandemics or similar events from eroding NATO’s readiness capabilities, it is paramount to develop structured plans and protocols that would allow timely adaptation, personnel protection, and resilience against external threats. To further protect core combat capabilities, it would be necessary for NATO personnel employed in quick-response units to receive early access to vaccines; the alliance should also be prepared with contact-tracing capabilities to identify outbreaks quickly.69

○ NATO should increase its counterdisinformation efforts and protect its member states against malign actors exploiting crises to promote their geopolitical and economic interests. Although disinformation has been included among the list of threats to NATO since the 2014 summit in Wales, the alliance has not established a special agency or team to focus on countering disinformation. During COVID-19, when NATO member states were targeted by Chinese “mask diplomacy” and Russia’s claims about the inability of Western countries to deal with COVID-19, the organization resorted to its Public Diplomacy Division — in cooperation with the European Union’s East Stratcom Task Force70 — to increase its public profile and debunk Chinese and Russian fake news. However, this is not yet enough to counter the volume and reach of such propaganda, which requires real-time investigation and fact-checking and outreach to the audience that has been targeted by disinformation, with the possibility of providing training for soldiers and commanders to react to information warfare.71 For this reason, the alliance should consider setting up a dedicated team and establish a framework of coordination with the East Stratcom Task Force to broaden the scope of counterdisinformation efforts and take more targeted actions to strengthen societal resilience across member states.

Readiness: NATO must further enhance its crisis management toolkit. The core lesson COVID-19 taught NATO concerned crisis management capabilities and culture. The alliance adjusted fairly quickly and made an incredibly efficient use of its logistical apparatus; yet, more can be done to enhance NATO readiness to face challenges of this nature.

○ Strengthen the Euro-Atlantic Disaster Relief Coordination Center. As mentioned, over the past few years, the EADRCC staff had been reduced to three people; as COVID-19 hit Europe, NATO was forced to rapidly reallocate military personnel from other departments to support the work of NATO’s clearinghouse for aid requests and delivery. At a time when the impact of global challenges can no longer be ignored, NATO should invest in and expand the EADRCC’s capacity and scope to increase preparedness in preparation for subsequent COVID-19 waves and other future catastrophic events. Along with the EADRCC, the alliance should enhance the flexibility in the NSPA procurement process in order to speed up access to cost-effective airlifting as well as to the procurement of medical equipment. Beyond overseeing the transportation supplies and medical assistance, the EADRCC could also play a role in coordinating NATO’s support to national armed forces in member states, in the event that such forces experience significant losses.

○ Increase knowledge, prediction capabilities, and awareness. Building on existing analytical platforms and programs72 and intelligence sharing between allied nations, NATO should increase its understanding and awareness of how global challenges and threats such as pandemics can affect NATO operations and personnel and increase preparation of tailored contingency plans for suitable responses. Some of these actions may include several aspects of the alliance’s activities, from decisionmaking to technological potential and research through its own laboratory (the Center for Maritime Research and Experimentation located in La Spezia, Italy) and its Science for Peace and Security (SPS) Program.73 Given NATO’s renewed sensitivity to biological risks, intelligence sharing could be crucial to elaborate plans for countering new threats such as bioterrorism.74

○ Coordination with the European Union. NATO’s logistical apparatus was crucial in delivering aid when the EU’s Civil Protection Mechanism was under stress, and after initial hesitation, in coordination with the EU mechanism. Moving forward, in the words of Malcom Chalmers, deputy director-general of Britain’s Royal United Services Institute (RUSI), the EU-NATO relationship will be crucial “if the West is to survive as a coherent entity.”75 Given that many NATO countries are also EU member states, all that applies to logistics, transportations, and purchases falls under the regulatory umbrella of the European Union. For this reason, a more established framework of cooperation between NATO and the EU will be crucial to ensure a smoother application of crisis protocols and ease the transportation of essential items within alliance territory, similarly to what was envisaged to ensure military mobility for the DEFENDER-Europe 20 drilling. In particular, the EU and NATO should also collaborate to establish permanent stockpiles76 and reduce the alliance’s dependence from global supply chain for crucial medical material, but also to develop cost-effective strategies for the production and distribution of a COVID-19 vaccine. Such coordination should also remain wary of duplicating efforts — as in the case of the NATO pandemic relief trust fund,77 which risks creating overlapping with the Civil Protection Mechanism for the accumulation of medical supplies.

### Advantage 1 NATO resilience

#### Multinational Medical Coordination Centre / European Medical Command (MMCC/EMC ) capacity is key to surge against future pandemics, but vaccine response needs to move from just-in-time focus to long term planning

Rico Maderthoner, 11-21-2021, Commander J.G. (OF-3) Germany Navy, https://military-medicine.com/article/4175-m3-eps-a-surge-capacity-concept-for-pandemics-crises.html, "M3-EPS: A Surge Capacity Concept for Pandemics and Crises," No Publication (ermo/sms, Acc:6-20-2022)

In late 2019, severe acute respiratory syndrome coronavirus 2 was first identified and has since led to the ongoing global COVID-19 pandemic. This pandemic has highlighted the lack of rapidly deployable reinforcement elements and systems as well as the benefits of stockpiles of medical equipment. A differentiation must be made between non-expendable medical supplies (i.e. medical devices1) and individually issued expendable medical supplies. The need for both expendable and non-expendable medical supplies could not be sufficiently satisfied in all areas as manufacturing nowadays is based on just-in-time practices without contingency stockpiling.

Production losses and market contractions as well as the concentration of production facilities in countries outside of Europe have in recent years frequently led to supply shortages across Europe for various drugs (including antibiotics, cytostatic agents, and vaccines). What is more, the pressure to reduce costs has in recent years led to a considerable reduction in civilian and military stockpiles of medical materials, including non-expendable medical supplies, in favour of just-in-time production.

The COVID-19 pandemic has led to an increased awareness among policymakers and the general public of pandemic and epidemic threat scenarios and their consequences.

In response to the rapid spread of COVID-19, the World Health Organization (WHO) and the Robert Koch Institute (RKI) made recommendations for improving preparations for further possible waves of COVID-19. In addition, the European Commission announced the creation of the rescEU strategic stockpile of medical equipment. (2)

The mission of the Multinational Medical Coordination Centre / European Medical Command is to support the medical services of NATO and the EU by coordinating medical capability development. One of the lessons learned in the management of major incidents, the Ebola crisis, and the current pandemic is that public health is becoming increasingly important for external and internal security.

As part of its programme of work, the MMCC/EMC was tasked in the spring of 2020 with improving cooperation between medical services and with enhancing their responsiveness so that they are better prepared for possible further COVID-19 waves, which may occur in combination with a seasonal flu epidemic.

In April 2020, the MMCC/EMC was asked by the Euro-Atlantic Disaster Response Coordination Centre (EADRCC) of NATO Headquarters in Brussels to quickly develop a concept for military medical stockpiling. This is the basis for the NATO Pandemic Response Trust Fund. Many nations have contributed financial resources and material to the trust fund on the basis of this concept. The NATO Support and Procurement Agency (NSPA) is responsible for managing the purchase and storage of trust fund items. The NATO Euro-Atlantic Disaster Response Coordination Centre helps coordinate requests for assistance from countries. In October and November 2020, the NATO member states Albania, Montenegro and North Macedonia received ventilators and medical supplies with a total value of €1.5 million.

The purpose of the M3-EPS concept developed by the MMCC/EMC is to maintain limited stockpiles to ensure surge capacity in the event of a critical development such as the COVID-19 pandemic.

The objective is to learn from the current COVID-19 pandemic so that medical services are more effectively and efficiently prepared for future epidemics and pandemics and are able to respond quickly. Rapidly deployable and modular standard packages with expendable and non-expendable medical materials are to be identified and defined for stockpiling. At the same time, the stockpiling efforts of the medical services must be supported.

Three Phases of Development

The concept was developed in three phases:

• Phase 1: The response capability of medical forces of the multinational EU Battlegroup 2020-2 (EU-BG-2020-2) will be improved for deployment with a modular initial COVID-19 capability (focusing on self-protection) to manage the COVID-19 pandemic or a local COVID-19 outbreak.

• Phase 2: The various modular, rapidly deployable standard packages will be harmonised with the nations participating in the MMCC/EMC and – wherever possible – will be aligned with comparable stockpiling preparations of the military and civilian bodies of NATO and the EU.

• Phase 3: A multinational concept will be developed which can be used not only for deployments to manage COVID-19 but also for other infectious diseases (those caused by other pathogens).

The modular standard packages can be used to support military medical facilities in international missions, to help hospitals in Germany and the EU, and to provide assistance, including administrative support, in theatres of operation. The concept includes a calculator that is used to compute costs, storage space, and personnel requirements for each module. The calculator uses defined parameters to generate a list of generic names for essential expendable and non-expendable medical material. This list helps users determine and procure what is actually needed.

#### Plan enables effective NATO resilience via publicity and battlefield readiness

Jamie Shea, 4-1-2020, Senior Fellow for Peace, Security and Defence at Friends of Europe and former DASG-ESC Deputy Assistant Secretary General for emerging security challenges at NATO, https://www.friendsofeurope.org/insights/never-waste-a-good-crisis-are-pandemics-natos-new-security-challenge/, "Never waste a good crisis: are pandemics NATO’s new security challenge?," Friends of Europe (ermo/sms, Acc:6-22-2022)

Rahm Emmanuel, the former chief of staff to President Obama and mayor of Chicago, was fond of telling his boss that he should “never let a good crisis go to waste”. The word “crisis” in Chinese also translates as opportunity. The international institutions that will emerge successfully from the current COVID-19 crisis will not only be those that act swiftly and usefully, but also which use the crisis to adapt their missions and their business models.

So far NATO is indeed having a good crisis, which may seem surprising as the alliance has never referred to pandemics in its list of emerging security challenges nor the various strategic concepts that it has developed since the end of the Cold War. New threats for NATO have been more in the realms of cyber-attacks, energy cut-offs, terrorism and state-driven hybrid campaigns. NATO’s forte has always been to focus on the man-made, human-driven threats to the future of humanity rather than those originating from natural causes.

Yet already in recent times the security implications of climate change were beginning to change this calculus, as evidenced by a spate of extreme weather events calling out the armed forces to fight floods and forest fires rather than Russians or jihadists. Indeed, on the eve of the outbreak of the COVID-19 pandemic, NATO ambassadors were planning their first away-day to brainstorm on climate change as a driver of security threats. Now coronavirus will force NATO’s leadership to review how the disruptive impact of natural disasters will complicate the alliance’s traditional missions as well as compel it to take on new ones.

In the first place, collective defence is being re-interpreted to mean solidarity in upholding domestic order and resilience rather than mainly protecting external borders. This change was already foreshadowed back in 2014 when NATO’s leaders proclaimed that a cyber-attack against an ally could be considered as an armed attack and trigger a collective response under Article 5 of the NATO treaty. In doing so, the alliance raised to the level of a treaty commitment for the first time a threat that was societal rather than military, which could impact the private sector as much as the state, and which was not based on physical violence or a kinetic effect.

Yet in taking this decision six years ago, NATO leaders were still thinking of potential retaliation against a state aggressor once its actions could be reliably identified. Coronavirus on the other hand is largely an invisible threat than can come from anywhere and which can be just as destructive as of a deliberate act of aggression, only without anyone being criminally or legally responsible. So, NATO’s defence responsibility in this new area is not founded on the promise of retaliation but on the promise of assistance and recovery. It is keeping its member states safe from within rather than without.

Moreover, any previous act of aggression was based on the notion that only a few NATO allies would be stricken by an attack and the other allies, less afflicted, would come to their help. Estonia, for instance, was the only ally to be crippled by a cyber-attack in 2007 and the United States the only ally to be targeted by Al Qaeda on 9/11 (when the alliance invoked its Article 5 defence clause for the first time in its 70 year history). Yet now, given the universality of the coronavirus, NATO has to defend all 30 of its equally-stricken member states all at once. This is totally new.

NATO’s foreign ministers – who met last week for the first time by video conference – can be satisfied with the organisation’s initial response. The Euro-Atlantic Disaster Response Coordination Centre has served as a clearinghouse to transport vital medical supplies from one ally to another. Turkey and the Czech Republic have flown equipment to Italy and Spain. NATO’s C17 heavy-lift aircraft based in Hungary have transported supplies to Romania. NATO civil response experts have coordinated logistics and communications. Yet rather than simply repeat these positive news stories, the foreign ministers should use this opportunity to see what more NATO can contribute.

For instance, the Supreme Allied Commander, Europe (SACEUR) could be tasked to establish an airlift capability to transport troops from one ally to another quickly if they are needed to help national armed forces to deal with the crisis, such as establishing field hospitals or transferring patients or transporting the dead for burial. The UK military has built the Nightingale hospital in an exhibition centre in East London with a capacity of up to 4,000 beds and is now building similar facilities in other UK cities.

This type of expertise could be useful in other allied countries, for instance in Eastern Europe and the Balkans where the national health and disaster response services are less developed. SACEUR could be tasked with drawing up an alliance-wide contingency and resilience plan to track the likely evolution of COVID-19 to the end of the year and identify the vulnerable points, and likely needs for assistance. On this basis, SACEUR can plan with the allies to generate the required force packages and ensure that they are trained, equipped and certified for disease control deployments.

NATO has highly professional military forces to buttress national resilience but they are useless if they cannot be used, and so another urgent task is to better protect NATO’s forces against disease and biological agents. The military have proven no more resilient to coronavirus than the civilian population. A US nuclear-powered aircraft carrier is out of action in Guam with a crew of 4,000 stricken with the virus. A Dutch submarine has had to return home and two German corvettes have stopped operation. Navies with their personnel working at close quarters seem to be particularly vulnerable to diseases. Meanwhile, allies have been withdrawing their contingents home early from important overseas missions in Afghanistan and Iraq. So, for the first time, allies have to choose between deploying their troops at home or abroad.

The future operating environment will therefore probably see armed forces being more evenly distributed between home and overseas duties. This implies more stress, a higher operational tempo and less training and recovery time. NATO consequently will need to overhaul its operational planning to be much more responsive to sudden crises and rapid force redeployments.

For instance, if a Dutch submarine has to suddenly go into quarantine, who will replace it, and how quickly? If a French training company is pulled out of Iraq, how can the gap be filled before the training activity suffers? If military medics or chemical, biological, radiological and nuclear (CBRN) decontamination units are sent home from the Baltic states without warning, how much reserve and deployable capability does NATO have in its inventory? Can all alliance deployed forces have a backup, rather like the understudy soprano in an opera, to fill the space if they become ill or are re-assigned?

Looking to the future, NATO will also need to re-think the concept of force protection. Up to now it has largely meant the protection of soldiers against improvised explosive devices or of bases against rocket attack. In the future, military planners will need to think of ways to improve soldiers’ hygiene, rapid access to protective clothing, separation techniques, vaccination and training and exercise schedules to learn to operate in disease-infested environments without rapid loss of operational effectiveness.

Finally, a challenge for the alliance will be to prevent adversaries from exploiting this newfound preoccupation with domestic resilience. In the age of hybrid warfare, adversaries do not need to carry out attacks to inflict damage. It is enough to exploit opportunities to increase their influence and undermine public trust in NATO solidarity. Russia has sent medical supplies to Northern Italy using military aircraft. These may not be especially useful but the gesture has given Russia the opportunity to set up a military cell in Bergamo, close to the NATO airbase in Vincenza. It could be used for intelligence gathering or to observe NATO operations at close quarters. China has also been opportunistically sending medical supplies to Italy and Spain to rebrand its image at a time when its own transparency in handling the coronavirus outbreak is open to scrutiny.

Cyber-attacks and disinformation campaigns are on the increase, while this battle of the PR narrative goes on in official government pronouncements. Consequently, NATO’s developing role in societal resilience also has to involve the virtual and societal domains as much as the physical domain of transport flights and field hospitals. Solidarity also means helping allies to counter false claims and unwelcome foreign influence. It needs to work closely with the European Union and national intelligence agencies to spot deliberate influence campaigns.

A line must also be drawn between genuine humanitarian gestures and outright attempts at political manipulation. If NATO does a lot but receives little visibility and recognition while Russia and China hype a few aid flights and donations to portray themselves as the saviours in our hour of need, then clearly this lesson will not have been learned. The NATO foreign ministers can ask the NATO Secretary-General and the EU High Representative to produce a monthly report on the political exploitation of the health crisis with geopolitical implications for the EU and NATO, and recommendations for joint or at least coordinated responses

The NATO Secretary-General, Jens Stoltenberg, is fond of saying that “we must not allow the health crisis to become a security crisis”. Yet it is already a security crisis as governments will be over-burdened for months managing the fallout from the virus. Defence budgets will be compressed and responses to foreign crises will be constrained. It will be an uphill struggle to resource existing missions and to keep the front-line forces fighting-fit.

The NATO of the future will have to find a new balance between defending a few of its member states at any one time against man-made threats, versus scenarios where potentially all member states are at risk from natural disasters. This is a heavy agenda, but the prospect of future pandemics as well as extreme weather events driven by global warming means it is one that cannot be avoided.

Last week, Jens Stoltenberg announced the names of his group of experts who will come up with ideas to improve NATO’s political consultations and machinery at the request of France and Germany. But the valuable time of these distinguished individuals and the money devoted to their review might be much more usefully spent in analysing the strategic implications of COVID-19 for the future of the alliance instead.

#### Resilience solves all impacts

Jim Townsend, 10-14-2020, former deputy assistant secretary of defense for European and NATO policy and an adjunct senior fellow in the CNAS Transatlantic Security Program and Anca Agachi assistant director with the Foresight, Strategy and Risks (FSR) Initiative in the Atlantic Council's Scowcroft Center for Strategy and Security https://www.atlanticcouncil.org/content-series/nato20-2020/build-resilience-for-an-era-of-shocks/, "Build resilience for an era of shocks," Atlantic Council (ermo/sms, Acc:6-17-2022)

This shift in the Alliance’s culture and architecture would yield several benefits. First, by adding an adequately resourced fourth core task focused on resilience, NATO could effectively conceptualize how to address non-traditional security threats, and do so in time to prevent and mitigate future COVID-like scenarios. Threats like climate change are a certainty; the only unknown is the level of damage they will cause. This variable depends on current efforts to adapt and bolster allies’ resilience, a capacity thus far underutilized at NATO headquarters.12 By starting now and using an improved and expanded resilience framework, NATO will be better prepared for and better able to bounce “forward” from future non-traditional threats.

Second, improving resilience is essential across the entire threat spectrum and reinforces traditional defense and deterrence.13 Proactive investments in community resilience are helpful not only in preventing non-traditional threats, but also in ensuring societal and state continuity and resistance in the case of an armed attack. Such measures can also serve to deter aggression by convincing adversaries their plans will not have the desired impact. In this new security environment, civilian and military components are intrinsically connected. As an ETH Zurich report notes, “solutions that mix military and non-military elements,” and cooperation across silos are necessary to achieve a “whole-of-society approach to security.”14

Finally, investing in resilience saves significant taxpayer money. Estimated savings resulting from the implementation of resilience frameworks vary between $4 to $6 in return for every $1 invested.15 The alternative, as COVID-19 has shown, is untenable. According to estimates, the pandemic will “end up costing between $8.1 and $15.8 trillion globally—roughly 500 times as costly as what it would take to invest in proposed preventive measures.”16 The conclusion is clear: responding to crises instead of preventing them is exceptionally more expensive. While this holds true in any economic environment, it is particularly relevant in the post-COVID-19 world defined by slumping economic growth, ballooning debt, and decreasing defense budgets.17 While nearly incalculable, these numbers do not consider intangible losses, such as strained NATO political cohesion or waning public support for the Alliance when it cannot adequately handle a crisis. When every dollar counts, the smart investment is resilience.

In a complex environment where it must grapple with multiple, interrelated strategic shocks and a combination of traditional and non-traditional threats, NATO has only one option: transform to meet the moment. As the Alliance considers how to adapt today for tomorrow’s challenges as part of the NATO 2030 process,18 one solution can help it “stay strong militarily, be more united politically, and take a broader approach globally”19: including resilience as a fourth core task.

#### NTT’s increase security dangers from Russia & China – will control all future wars – NATO key

Jim Townsend, 10-14-2020, former deputy assistant secretary of defense for European and NATO policy and an adjunct senior fellow in the CNAS Transatlantic Security Program and Anca Agachi assistant director with the Foresight, Strategy and Risks (FSR) Initiative in the Atlantic Council's Scowcroft Center for Strategy and Security https://www.atlanticcouncil.org/content-series/nato20-2020/build-resilience-for-an-era-of-shocks/, "Build resilience for an era of shocks," Atlantic Council (ermo/sms, Acc:6-17-2022)

The novel coronavirus is one of the most formative events of the twenty-first century. Despite warnings about pandemics from public health and intelligence officials, the world was caught off guard by COVID19. Though they had experience containing MERS and SARS, scientists and doctors had to learn about COVID-19 while trying to control it. Further, governments across the globe were forced to make impossible decisions between saving lives and saving economies.

Unfortunately, threats like COVID-19 might be a blueprint of the future. A rise in environmentally destabilizing human activity and extreme economic inequality, coupled with patchy investments in social safety nets and frail governance, have degraded human security conditions around the world. This combustible combination will likely result in a rise in non-traditional security threats. By definition, these threats are transnational, impacting entire regions or continents; systemic, resulting from an accumulation of widespread permissive and causal factors; and outside the realm of traditional military concepts and operations, in that they are normally associated with development issues. Non-traditional security threats include climate change, irregular migration, resource scarcity, criminality, and of course pandemics. Their pattern is similar: in the shortterm, they lead to loss of life in catastrophic events; however, more perniciously, they undermine societal functioning and therefore weaken deterrence capabilities in the long-term. In light of this trend, COVID-19 might be just the canary in the coal mine.

Non-traditional threats are particularly complex because they can have a threat-multiplying effect, leading to cascading economic, political, and security shocks, as COVID-19 has shown. They can also decrease the efficacy of conventional deterrence measures by showing potential adversaries that an attack in the midst of such destabilizing circumstances would achieve more significant destruction. The rise of non-traditional security threats therefore can exacerbate existing conventional challenges, such as those posed by Russia and China. In this world, disruption will become the norm, not the exception.

The scope, scale, and impact of future non-traditional threats require NATO allies to think outside the framework of traditional security concepts and prepare the Alliance for missions that do not neatly fit an Article 5 scenario. To this end, the Alliance should approve a fourth core task focused on resilience, preparing the Alliance to protect the populations of member states against novel threats while reinforcing collective defense.

#### MMCC coop checks CBRN impacts

Stefan Kowitz,, 9-22-2021, Interviewer: Lt Gen (Rtd) Prof. Martin Bricknell, Editor-in-Chief, military-medicine.com Interviwee: Brigadier Stefan Kowitz, Director, NATO Multi-National Coordination Centre/European Union Medical Command https://military-medicine.com/article/4191-the-nato-response-to-the-covid-19-pandemic-interview-with-brigadier-stefan-kowitz.html, "The NATO response to the COVID-19 pandemic – Interview with Brigadier Stefan Kowitz," No Publication (ermo/sms, Acc:6-20-2022)

During the COVID pandemic, the current role of MMCC/EMC has been to use lessons identified for its future work to support military medical collaboration and coordination across our participating nations, NATO and the EU.

Our Telehealth Workshop in May 2021 is an excellent example. Telehealth has been a game-changer during the COVID pandemic, and the use of telehealth has increased in different areas of medical support. Telehealth provides significant means to measure the health of our soldiers and to improve the outcome of their medical treatment. COVID has been a trigger for transformation in telemedicine and telehealth. A follow-on Biosensor and Telehealth Workshop is planned in June 2022

We have just finalised an overview of COVID vaccination policies. The most notable finding is that most nations have not made COVID vaccination compulsory for members of the armed forces (as of Sep 2021). This may be hampering the success of vaccination programmes and reducing benefits for this population of risk. However, the vaccines’ success in preventing COVID infection and their limited side effects may change the situation, until a new variant of the virus appears.

MMCC/EMC is increasing its work in civil-military cooperation for the evacuation of patients in large-scale emergencies and in crises, including a higher number of infectious patients. We are working in close cooperation with the NATO Joint Healthcare Working Group and other participating nations on this issue. A workshop on this topic with participants of the responsible civilian and military stakeholders is planned in June 2022.

The MMCC/EMC was able to gain initial experience in stockpiling concepts in April 2020, when it was asked by the Euro-Atlantic Disaster Response Coordination Centre (EADRCC) of NATO to develop a medical stockpiling concept for the NATO COVID Trust Fund. An important part of the concept is a calculator that can be used to compute costs, storage space, and required personnel for each module. The NATO COVID Trust Fund has provided many donations based on this concept.

Based on these experiences, the MMCC/EMC has extended this medical stockpiling concept to the Military Modular Multipurpose Epidemic/Pandemic Stockpiling (M3-EPS) Concept, which can be used by EU and NATO nations and medical stakeholders. As a surge capacity, rapidly deployable and modular standard packages of medical materiel have been identified and defined for stockpiling. The seven modular standard packages, such as support for intensive care units, can be used to support both military and civilian medical facilities. For example, the bilateral support that the Bundeswehr Medical Service provided to Portugal was based on the principles of M3-EPS and included an ICU capability to enhance a civilian hospital. The French medical services use a similar approach. We hope to bring these results into NATO standardisation work and into national developments. We also aim to increase our preparedness with regard to the stockpiling of CBRN chemical and radiation antidotes.

If the MMCC/EMC has the time and resources, it will develop technical guidelines - based on existing NATO STANAGS - for deployed outbreak investigation team, which can be used for both infectious diseases and CBRN agents. We would like to combine deployable medical CBRN capabilities and public health capabilities. Civil-military collaboration regarding reachback laboratories with their sophisticated diagnostic capabilities has to be included in this concept.

#### NATO weakness fuels Russian influence in the region causing a dynamic shift in power balance—that goes nuclear

Hans Binnendijk, 06-09-2020, (Hans Binnendijk is a distinguished fellow at the Atlantic Council. He has served two tours on the National Security Council and as director of the Institute for National Strategic Studies. He has worked on NATO issues for four decades.), “The folly of a NATO troop withdrawal decision”, Defense News, https://www.defensenews.com/opinion/commentary/2020/06/09/the-folly-of-a-nato-troop-withdrawal-decision/ceng

A reported decision by President Trump to remove some 9,500 American troops from Germany could undercut a half decade long effort to prevent war by enhancing NATO’s deterrent posture in the Baltic area. The prospect of a withdrawal came without warning to American commanders in Europe and has no known strategic underpinning. NATO has been clear about the Russian threat and how to counter it. During the 2018 Brussels summit, NATO leaders concluded that “Russia’s aggressive actions, including the threat and use of force to attain political goals, challenge the Alliance and are undermining Euro-Atlantic security and the rules-based international order.” NATO’s response has been to construct a deterrent posture with several thousand NATO troops forward deployed in the Baltic states and Poland as a solid trip wire and with ready reserves further back poised for quick reinforcement should the trip wire fail. This deterrent posture is already fragile. There are doubts that the NATO Response Force and other national forces are adequately ready and that the logistics infrastructure is capable of enabling the rapid forward movement of troops. To deal with this fragility, NATO adopted two initiatives on readiness and mobility to assure that reserve forces would arrive in time. All of this has been constructed to deal with what U.S. commanders in Europe have called their nightmare scenario. They fear a quick Russian land grab in the Baltic states followed by Russian propaganda, a Russian call for a cease fire, and a nuclear threat are all designed to divide NATO in time of crisis and make it impotent. If this scenario is not adequately countered, NATO leaders fear Russia might take the gamble as they have gambled in Ukraine, Georgia, Syria, and now Libya. U.S. Russian experts note that President Vladimir Putin may take risky foreign policy steps to counter the growing COVID-19 crisis in Russia. Russia just announced the forward deployment of a motorized brigade to the Western Military District bordering the Baltic States. This is not the time to remove American troops. So how would a withdrawal decision undercut NATO’s strategy to deter the nightmare scenario? The U.S. forces most likely to be cut are F-16s and support troops in Germany. They are both crucial to NATO’s reinforcement strategy. Support forces are needed for training and as part of the mobility effort to move NATO troops forward in time of crisis. American air power is needed since it is able to launch strikes quickly in support of forward forces while other ground forces, both American and European, mobilize and move forward. Without these 9,500 troops, Poland and the Baltic states will be more vulnerable, along with the American personnel that remain. But the problem goes deeper. A withdrawal would be a clear signal that Trump is not serious about defending Europe. It would undercut the very deterrent strategy that both the Obama and Trump administrations have put in place to contain an aggressive Russia. It further undermines European confidence that America has Europe’s back. European powers may think twice before extending the deployment of their now more vulnerable forward deployed troops, further reducing deterrence. Plus the flawed decision could lead to the demise of the NATO Readiness Initiative and the Mobility Initiative, both of which the United States pressed hard for and Europe has supported. If the United States undercuts the reinforcement strategy that underpins these two initiatives, why would Europe have faith in them? This decision would compound the damage done to transatlantic security by earlier Trump decisions. For example, Trump’s withdrawal from the INF mid-range nuclear agreement — rather than fixing it — now gives Russia a significant and legal nuclear advantage over NATO’s nuclear deterrent on the continent. So if that nightmare scenario takes place, NATO will be less well prepared to deal with a nuclear threat, again tempting the Kremlin to take the risk. All is not lost. Both houses of Congress have shown strong support for the NATO alliance in face of continuous Trump assaults and should pass legislation aimed at overturning such an unwise decision.

#### CBRN weapons risk extinction

Marko M. **Krstic 17**. Ministry of Internal Affairs of the Republic of Serbia. Published in the Military Techinical Courier--Vol 65, Issue 2--a multidisciplinary scientific journal of the Ministry of Defence of the Republic of Serbia. TENDENCY OF USING CHEMICAL, BIOLOGICAL, RADIOLOGICAL AND NUCLEAR WEAPONS FOR TERRORIST PURPOSES. 2017. scindeks-clanci.ceon.rs/data/pdf/0042-8469/2017/0042-84691702481K.pdf

The studies of a few cases of earlier CBRN actions have led experts to identify the key characteristics of terrorist groups that could potentially have an interest to use these weapons. It is thought that conservatism is inherent in terrorist organizations, but it must not be forgotten that some terrorists are inclined to innovations in weapons and tactics, as well as to taking risks in actions or in the choice of weapons. Many experts agree that most terrorist organizations want to use proven methods to achieve desired effects. Innovations, especially in the field of CBRN weapons, often indicate terrorists are likely to be led by other factors rather than by pure curiosity and desire to experiment. For some individuals, repression and democratic and strong rule of law are positive determinants of the emergence of CBRN actions which points to a new and more complex global security environment with an increasing risk of terrorists trying to perform a CBRN attack. It is a frightening fact that a **single terrorist** or isolated terrorist group could improvise a **biological weapon** or use other ways to spread anthrax, smallpox or other biological agents and thereby cause mass casualties and destroy the health care system of a state. CBRN weapons are secretly shipped to terrorists or hostile governments and represent a significant and growing threat to many countries. Although the threat of CBRN attacks is widely recognized as the central issue of national security, most analysts assume that the primary danger is a threat of the military use of these weapons in conventional wars with tra-ditional military means while the **threat** of covert attacks, which include terrorism, is rashly and **unfairly neglected.** Covert attacks are difficult to deter or prevent and **CBRN weapons suitable for this type of attack are available to a growing number of enemy states and groups**. At the same time, restrictions on their use appear to be diminishing, and so-called new terrorists do not always escalate and become apparent only by using unconventional weapons. These weapons are easily spread or transmitted from person to person, have a high mortality rate and a potential impact on public health, causing mass casualties that can crush health systems and cause public panic and social disruption, thus requiring special efforts to suppress them. When assessing the threat of CBRN weapons, we should take into account the change in capacity to carry out terrorist attacks that are on the rise among countries and non-government elements. Analysts believe that the fear of chemical and biological terrorist attacks is excessive, they point out that, in the past, very few attacks involved these weapons, and even those few attempts that have occurred were mostly thwarted by the authorities. A relative ease with which biological weapons can be obtained, along with other current changes and turbulences in the world, sets the stage for another type of warfare in the 21st century. The potential for CBRN terrorism has widely grown since 11 September, when some of these materials were used. The danger of terrorist use of nuclear weapons and other weapons of mass destruction represents a very serious threat for many countries; if a terrorist group could gain access to this weapon, it is highly likely it would use it, or threaten to use it. Although there is very little information on terrorists and their ability to come into possession of nuclear weapons or on their intentions to get them, the risk of CBRN weapons has certainly increased since the terrorists started to become more familiar with these agents and their harmful consequences. Discovering the nature of the threat of biological weapons, as well as the appropriate response to them requires an emphasis on the biological characteristics of these instruments of war and terror. Preparing for a terrorist attack may seem daunting and there are a small number of people with practical experience and a good knowledge of CBRN weapons, because until recently there was no need to own them. In the past, most of the planning regarding emergency response to terrorism concentrated on the concerns of open attacks (bombing). However, the threats of CBRN weapons are taken seriously, especially in the USA, where media, fascinated by new weapons of mass destruction, encourage a growing fear for public safety. Terrorists who have significant human and material resources are much more likely to realize their intentions than lone perpetrators or small terrorist groups. A CBRN terrorism threat is certainly a matter of concern; however, terrorists will face many obstacles in the implementation of an attack of this kind. This includes the acquisition of materials and preparation for spreading them as well as a selection and a survey of a chosen objective and a correct dose required to achieve a desired effect. The growing threat of CBRN terrorism Terrorism can be defined as a deliberate act of violence intended to cause damage, but also to create an appropriate political and ideological situation, so that the use of these non-traditional weapons of terror outside the context is obvious, and the goals will not be military, but civilian ones (Bioterrorism, chemical weapons, and radiation terrorism, nd). Toxic substances, regardless of whether they are of animal, vegetable or mineral origin, were used throughout the history for political assassinations and sabotage; despite the risk of severe penalties, the prospects for success favoured the use of toxic substances. Such use has always been reduced, however, since only a small number of people had access to substances and possessed the ability of learn how to use them (Pascal, 1999). CBRN weapons are rightly viewed with a special sense of horror, their effects can be devastating and indiscriminating, and they take the most stringent toll among the most vulnerable population, non-combatants (e.g. a biological attack cannot be detected sufficiently fast after the disease spreads through the population). Moreover, chemical and biological weapons are a particularly attractive alternative for groups that do not have the ability to produce nuclear weapons, and this risk raises complex but important ethical issues (London, 2003). The common name for CBRN terrorism which causes the death of a large number of people, large scale damage and a strong echo worldwide is post-industrial or hyper-terrorism. This means that non-state elements possess and dispose of assets that were previously held only by states, but unlike them, which often fear reprisals after WMD attacks, terrorists, having no geographical location, are ready to use WMD with much less scrupulousness and fear (Kurmnik, Ribnikar, 2003). Some authors have described the factors that make chemical, biological, radiological and nuclear terrorist attacks in many ways unique and demanding, such as an element of surprise, invisible agents, ordnance, the risk of repetition and new types of risks (Ruggiero, Voss, 2015). In the past 30 years, the use of CBRN weapons has become a major concern for many nations around the world. The public has become insensitive to traditional terrorist attacks that seem to be a less efficient way for terrorist organizations to achieve their goals. What causes shock and fear is actually presenting the properties of weapons which can be used by terrorist organizations to enhance their efforts and the effectiveness of attacks. CBRN terrorism is often a synonym for weapons of mass destruction, although this form of terrorism and related incidents do not require attacks and inflicting harm to large numbers of people - they do not even require deadly attacks at all. The number of studies on this type of terrorism is limited due to the lack of available data on this terrorism type. There is a very small number of databases of CBRN incidents, and even the existing ones have relatively little to do with them and they are compared to conventional terrorism (Jesse, 2012). Some experts emphasize the factors that promote such attacks and these factors include the availability of information and expertise, increased frustration of terrorists, demonization of the target population, as well as a millennial, apocalyptic or messianic vision. Experts also differ in opinion when it comes to possible perpetrators of CBRN incidents, and include religious fundamentalists and cults1 as possible perpetrators of such attacks, especially when these groups address to ethereal audience, emphasizing the hatred of unbelievers (Ivanova, Sandler, 2007). Concerns about super terrorism which involves the use of CBRN weapons are mainly focused on what terrorists can do in the context of our social reality, with an emphasis on terrorist motivations, initiatives and limitations. When considering which terrorist groups may be inclined to commit CBRN terrorism, it is important to recognize the spectrum of these acts, as well as to analyze the following categorization: (a) massive casualty events produced by conventional weapons; (b) CBRN scams; (c) conventional attack on a nuclear facility; (d) limited-scale chemical or biological attack or a radiological dispersion; (e) large scale chemical or biological attack or a radiological dispersion; and (f) CBRN strikes (super terrorism) that can lead to thousands of victims. In addition to the motivation and willingness to inflict mass casualties in any way, terrorists must have technical and financial capabilities to come into possession of material and acquire skills for these types of weapons and materials and carry out a successful attack. Chemical and biological weapons can pose a risk to terrorists thus deterring them from using such weapons (Post, 2005, pp.148-151). The possibility that terrorists use chemical or biological substances may increase over the next decade, according to US intelligence agencies. According to CIA2 , an interest among non-state actors, including terrorists, for biological and chemical materials is real and growing, and the number of potential perpetrators is increasing. The agency also noted that many of these groups had developed an international network and did not need to rely on state sponsors for financial and technical support. However, it is believed that it is less likely that terrorists would choose chemical and biological weapons over conventional explosives, because these weapons are difficult to control and their results are unpredictable (Condesman, Burke, 2001). The risk of CBRN weapons is growing since terrorists are better acquainted with these agents and their potential for causing harm3 . These agents possess desirable characteristics as weapons of terror; they are biologically invisible to the naked eye, odorless and potentially lethal in the form of particles; natural organisms are so readily available, and can be "camouflaged" in natural disasters and used to spread fear and various diseases. Chemical agents quickly attack the critical physiological centers of the body, disabling or killing the victim. Biological and chemical weapons require the application of huge amounts of resources and result in different effects, causing fear and panic in the contaminated areas. Often referred to as "weapons of mass destruction", but, in medical terms, they are weapons of potential mass casualties because they can lead to massive death toll in the absence of preventive measures and timely response (Meyer, Spinella, 2014, pp.645-656). "Bioterrorism is the intentional use of microorganisms or toxins derived from living organisms used for hostile purposes intended to cause disease or death in man, animals and plants, on which they depend". The threat of bioterrorist attacks is real, and each individual is a potential terrorist, when terrorists are "invisible" prior to an attack which also can be "invisible" in the form of causing infectious disea-ses or epidemics. Citizens who are not aware they are infected are potential safety hazard and so-called dangerous bodies (Mijalković, 2011). In the last ten years, the issue of CBRN weapons has attracted the attention of experts, but a list of priorities by the heads of states has never been established. Biological weapons almost became forgotten after they had been banned by the 1972 Convention on Biological Weapons. A significant attention was paid to them during the 90s of the last century. The important thing is that biological weapons attract much less attention than other similar weapons, but probably represent the greatest danger, and in addition to their use in war, they are available as instruments of terror in peace. Some countries showed willingness to use such weapons against defenseless populations to achieve strategic objectives, and in this regard, some analysts believe that those who attacked the World Trade Center in 1993 applied cyanide on their bombs (this was not confirmed, but a large amount of cyanide was found in possession of the perpetrators). Such a group will prove to be less inefficient, because if terrorists decide to shock and surprise the government by inflicting enormous damage, CBRN weapons will become more attractive and more accessible (Bettis, 1998). Motives and forms of behavior of individuals and groups who acquired or used CBRN weapons have existed since long ago and there is no doubt that modern society is vulnerable to such attacks (Tucker, 2000). Fear of biological terrorism is certainly greater than the fear of the conventional forms of terrorism; some of these fears are justified and some are often exaggerated. Some agents are really very contagious and deadly, and if used properly, have a potential to result in casualties similar to those in a nuclear attack. Perhaps the scariest aspect of biological weapons is that the body is attacked without warning, people are afraid of the threat as it is invisible, and cannot be heard or felt. The history of warfare, terrorism and crime involving biological agents in the last century is considerably less dangerous and more deadly than the history of conventional warfare (Parachini, 2001). Today, some states and some terrorist groups can more **easily overcome** technological **barriers** due to the increased flow of **info**rmation and **access** to previously unavailable **tech**nologies. **Along with nuclear and chemical weapons, biological weapons are part of an unholy trinity of weapons of mass destruction** (Davis, Johnson-Winegar, 2000, pp.15-28). The **society is now faced with the threat of an apocalyptic and asymmetric war scenario** in which kamikaze attackers are able to arm themselves with WMD4 without even having to have a "physical" weapon to create fear; they probably still prefer simple, proven methods: a stampede in an enclosed place, or just an explosive device, which will kill many people5 (Palmer, 2004, pp.3-9). Early detection and response to biological or chemical terrorism are crucial to solving this problem (U.S. Congress House, 2003, p.117).

#### MMCC Stockpiling spurs NATO resilience – they will say yes, but more resources are vital

Rico Maderthoner, 11-21-2021, Commander J.G. (OF-3) Germany Navy, https://military-medicine.com/article/4175-m3-eps-a-surge-capacity-concept-for-pandemics-crises.html, "M3-EPS: A Surge Capacity Concept for Pandemics and Crises," No Publication (ermo/sms, Acc:6-20-2022)

Conclusion and Outlook

The ongoing pandemic has highlighted not just the lack of and need for emergency elements / systems that can be deployed easily and quickly but also the benefits of stockpiling medical supplies. The goal of the M3-EPS concept is to increase the medical resilience of the European nations and NATO member states. The project also serves to actively highlight the increasingly close connections and interdependences with the civilian health care system. This increasingly contributes to the positive perception of the solidarity between nations when it comes to this issue. The military medical services should not take on tasks of civilian agencies responsible for medical civil protection, however. Harmonising the stockpiling and resilience-building efforts of the civilian and military health care systems, however, is a positive and productive effort to put both systems in a position to better support each other in a crisis. As part of civil-military cooperation, the MMCC/EMC aims to make an important contribution to such efforts.

The common goal is to develop and maintain easily deployable medical surge capacities through innovative stockpiling in order to be better prepared for future epidemics and pandemics. In recent years, priority access to and stockpiling of medical supplies has been drastically reduced in order to cut costs. In the course of further concept development, options and opportunities for multinational, standardised pre-positioning can be analysed. Binational and multinational warehousing solutions may also be reviewed. Stockpiling as part of preparing for a pandemic as per the M3-EPS concept also requires considerably greater resources. The concept has already been shared with NATO and the EU as well as their member states, and modules have been planned based on those established by the MMCC/EMC. The M3-EPS project and its implementation can supplement these multinational modules. Any potential duplications are uncritical since all modules can be used independently and, if necessary, can become all the more effective when combined.

Initial procurements for NATO and the EU have already been implemented based on this concept.

#### Long term investment is vital to NATO’s security

Julie Gerberding, 6-29-2021, co-chair of the CSIS commission and executive vice president at Merck https://www.csis.org/analysis/cepi-20-critical-inflection-point, "CEPI 2.0: A Critical Inflection Point," No Publication (ermo/sms, Acc:6-20-2022)

Julie Gerberding, M.D.: I realize that, you know, it’s tempting to want to keep this in the mindset of public health, because it is a public health issue. But it’s far more than a public health issue. This has been an economic catastrophe for countries, for businesses, and for individual families. But it’s also a threat to our national security in a very direct way. When I saw the Navy ship with the outbreak of SARS-CoV-2, I realized a really important dimension of that threat, that you could take out a Navy with a respiratory pathogen. And that makes it something that is germane not just to the civilian population, but it’s germane to our force protection and our whole ability to defend our nation.

Now, that’s an extreme example. I wouldn’t use that as my leading argument. But I think we have to get ourselves into a mindset that this isn’t an outbreak. It is a threat to individuals, to businesses, to countries, and to the global order. And we need to approach it with the level of strategy, the level of investment, and the long-term sustained commitment that we do approach other threats to national security. I’m not saying put it in the Pentagon, but I’m saying that it’s a commensurate threat. And it’s significant enough that it merits the same level of intention and political support, alliances, and long-term strategic investments.

### Advantage 2 Biosafety

#### Next pandemic will exceed Covid-19, preparedness funding mitigates impact

Reuters, 12-6-2021, https://www.reuters.com/business/healthcare-pharmaceuticals/next-pandemic-could-be-more-lethal-than-covid-oxford-vaccine-creator-says-2021-12-06/, "Next pandemic could be more lethal than COVID, vaccine creator says," (ermo/sms, Acc:6-22-2022)

LONDON, Dec 6 (Reuters) - Future pandemics could be even more lethal than COVID-19 so the lessons learned from the outbreak must not be squandered and the world should ensure it is prepared for the next viral onslaught, one of the creators of the Oxford-AstraZeneca vaccine said.

The novel coronavirus has killed 5.26 million people across the world, according to Johns Hopkins University, wiped out trillions of dollars in economic output and turned life upside down for billions of people.

"The truth is, the next one could be worse. It could be more contagious, or more lethal, or both," Sarah Gilbert said in the Richard Dimbleby Lecture, the BBC reported. "This will not be the last time a virus threatens our lives and our livelihoods."

Gilbert, a professor of vaccinology at the University of Oxford, said the world should make sure it is better prepared for the next virus.

"The advances we have made, and the knowledge we have gained, must not be lost," she said.

Efforts to end the COVID-19 pandemic have been uneven and fragmented, marked by limited access to vaccines in low-income countries while the "healthy and wealthy" in rich countries get boosters, health experts say.

A panel of health experts set up by the World Health Organisation to review the handling of the SARS-CoV-2 pandemic has called for permanent funding and for greater ability to investigate pandemics through a new treaty.

One proposal was for new financing of at least $10 billion a year for pandemic preparedness.

#### Biotech NATO coop on biotech builds cascading resilience to address a wide range of risks

Mircea Geoană, 12-10-2020, Deputy Secretary General, NATO, https://www.nato.int/cps/en/natohq/opinions\_180067.htm, "Building transatlantic resilience: Why critical infrastructure is a matter of national security," NATO (ermo/sms, Acc:6-22-2022)

You know, as an Alliance we face and we’ve faced and we will face many challenges, and some of them we have been dealing with for many years. Look at Russia, they continue to seek to undermine our democracy, they're expanding their military they're attempting to dominate their neighbours like Ukraine, Georgia or the Republic of Moldova. These things are not new. There's also the scourge of terrorism that continues to haunt our societies. And our mission in Afghanistan to ensure it can deliver a place which should be, you know, not becoming again a safe haven for terrorists to launch attacks on our lands, or on their neighbours is also something which is very important.

There's also things that are relatively ‘new-er’, which is the rise of China, not an adversary to NATO per se but the global actor whom we must understand, and with its rise, it brings a lot of challenges, a lot of problems, a lot of opportunities and we have to act accordingly. And of course the use of emerging technologies as instruments of disruption and instruments of power. We are speaking of geo-technology. We are in the midst of the most, one of most, intense technological races in recent history. And for the political West and for democratic societies, this is also part of a very important conversation, because maintaining the security of our vital technologies is central in a way in which we can do, not only defending our people, but also protecting everything we do from airports, to power plants to infrastructures.

So, this persistent confrontation with novel and impactful issues is also becoming even more complicated because we start seeing more and more of the Black Swans, tsunami-kind risks, and the pandemic is just one example of things that might come, that eventually would come. And I think the issue of resilience that we are talking today about, is at the essence of the lessons learned from this pandemic and also from the other things. NATO is in the business of making sure that all these complicated issues will not come together in a sort of a perfect storm and making sure that health crisis or environmental crisis or financial crisis, will not become a security crisis, so that's where NATO is very, very, very, very important because resilience is the reflex, and the remedy, at the same time. Resilient societies, are our first line of defence.

Our security and prosperity depend on this. In the years ahead, we have to put a much greater emphasis on resilience, and this is not only about resilience of our governments, it's a whole of society resilience and engaging with the triple helix of government, of private sector, essentially importantly engaging the private sector, and also engaging our civil societies. This is what societal resilience is all about. So that's why I'm so happy to be today with you, and also I thank again the American Enterprise Institute for bringing this topic to a broader audience's attention. Of course, NATO has already worked closely with industry, but also the nature of this relationship is changing. I am chairing the Innovation Board in NATO, and we know that much of the innovation in technology, in biotechnology, in AI, in quantum computing, in human enhancement, in space, in everything, is done by the private sector.

So if we speak about resilience and security, we are you know, in a way, obliged to talk more to our private sector to the innovators, they're not only in governments, but also they are in the private sector, in academia. And this is also very important for our communications, for our equipments, and also for our armed forces as NATO and also as allies individually. So this effort is very important to us. Of course, there are other dimensions of resilience in a more sectoral way if you want. We speak in NATO for many years already - for five years - about the baseline requirements on resilience from infrastructure, from energy, from telecoms, now logistics and supply chain. And I think this kind of conversation is adding to the breadth and the depth of this conversation where NATO is already exceptionally, exceptionally well equipped.

We also, you know, in NATO resilience is part of our DNA. Because our founding fathers, in writing the brilliant piece of our Constitution, the Washington Treaty in Article Three they already spoke about the obligation for allies individually and collectively to improve their resilience to attack. Of course, the Washington treaty was conceived and imagined in a moment of Cold War with the Soviet Union, but the principle is relevant today and probably is more relevant today than ever before. In a complex and unpredictable world, to maintain our security, NATO allies need robust supply chains and civilian infrastructure. We need to protect civilian controlled undersea cables and satellite systems upon which our communications rely.

During large operations and military exercises. for example, around 90% - 9, 0, %, of military transport relies today on civilian ships, railways and aircrafts. There is no difference between civilian security and military strength, they’re one and the same. So NATO allies have already agreed high standards for resilience in areas including the continuity of government, transport, energy, food and water supply. We are now looking as we speak into the security of our infrastructure supply chains, as I mentioned, and also we are now contemplating screening; templates, methods, to screen foreign investments in our key infrastructures and also our key intellectual and technology companies.

Let's take telecoms for an example. In 2019, so before the pandemic, NATO updated our baseline resilience requirement for civil communications networks, including 5g, a topic which is much discussed. Allies must conduct thorough risk and vulnerability assessments, identify and mitigate cyber threats and assess the consequences of foreign ownership control, or direct investment of critical infrastructure. It is crucial that 5g infrastructure is safe, secure, and trusted. We have seen significant and welcome progress here. For example, through the US Clean Network Initiative, and also, a very good example of NATO US-EU cooperation: European Union's 5g toolbox, and together with NATO's baseline requirements on resilience.

This is why here at NATO we work closely with the EU, with the private sector, civil society, academia, because as I mentioned earlier, resilience is a national responsibility. It is also a collective effort. And also our Defence Ministers, the virtual meeting, only last month, they received a comprehensive report on the state of our critical infrastructure. While we have made progress there still vulnerabilities. For instance on foreign control of critical components on which our societies and our militaries rely, we have to further strengthen our resilience, we need to go further and agree stronger requirements for resilience.

At the meeting next year of NATO Heads of State and Government, we do hope that this will be, and this will be, on the agenda of our leaders, when our leaders will be meeting next year. So as we go through the current global crisis, we rediscover our reflex towards partnerships with like-minded organisations like the EU, the OECD, the World Bank or the UN. Cooperation among governments, cooperation among our civil and private sectors. And I think this kind of deep cooperation within the bodies of our societies, is key to our success. Because together we can tackle the novel elements and find solutions to otherwise very complex ,very long lasting, equations of risks and threats. Because together we are stronger and more efficient. And this is very, very important as the challenges we face in the political West, and we face a challenge, like we never had probably in centuries.

We are also, for the moment, not only a competition on geopolitical grounds, not only on geo-technological grounds, not only on financial and economic grounds, but also to the very resilience of our democratic societies, and the competition for the commanding heights of how human societies are organized is now raging. We are open, free societies. This is our strength. This is the value, foundation on which NATO is based. This is what we have been building for decades and decades. So when we speak about resilience. Please also think not only in terms of physical resilience in front of so many complicated issues, but also look at the deeper meaning of resilience, which is the very essence of defending our democratic way of life.

And also I have to say, speaking of our partners, look at NATO partners like, Finland, working together with the private sector to strengthen their resilience. Sweden another very important partner of ours is doing the same. We are learning from each other. We are working together, and we stand ready as NATO, to continue to engage even more ambitiously and more thoroughly with the private sector, with academia, with like-minded nations and partners around the world. And this is why we continue to put resilience at the very heart of what we do in NATO, because, as I mentioned, and as Stoltenberg mentioned just a few days ago, our first line of defence starts with resilient societies that we are coming from. That's where we are. And this will continue to go forward in the period ahead. So thank you so very much for having me. I look forward to our conversation down the road.

#### The foresight model is key to avert biosafety dangers

Cassidy Nelson, 9-8-2021 Future of Humanity Institute, University of Oxford ALSO Ilker Adiguzel, Marie-Valentine Florin, Filippa Lentzos, Rickard Knutsson, Catherine Rhodes, Paul Rutten & Annika Vergin, , https://link.springer.com/chapter/10.1007/978-94-024-2086-9\_12, "Foresight in Synthetic Biology and Biotechnology Threats," SpringerLink (ermo/sms, Acc:6-25-2022)

The study of the future dates back to antiquity. Understanding what could lie ahead was of strategic importance to rulers and military leaders and was of great general interest to ancient societies and religions. While cultures developed different ways of thinking about the future that evolved over time, a historically common point of view was that there was one single predetermined future (Cuhls et al. 2012). The systematic study of different possible futures, and how these could be shaped by present actions, emerged as a new field of inquiry in the mid-twentieth century, in part due to pioneering work conducted by the Research and Development (RAND) corporation in Santa Monica, California (Kaplan et al. 1950; Helmer 1967). Since its emergence, the field of futures studies has undergone rapid expansion with the refinement of its conceptual underpinnings and development of different methodologies.

Today, futures work is undertaken by governments, militaries and scientific institutions, and other interested groups, with the aim of gaining actionable insight into possible emerging futures. In fields like synthetic biology and biotechnology that are undergoing rapid and continuous change, the ability to gain strategic insight from possible futures is highly relevant to policy development, risk assessment and threat analysis. It is particularly important to be able to identify the underlying drivers, range of uncertainty, points of convergence, and potential opportunities and challenges in these developing fields, and how these might be affected by particular policy interventions. For all of these, foresight – a process of conducting futures work – can offer strategic insight.

Foresight has been defined in multiple ways. In this chapter, we use an understanding commonly found in the literature, which highlights that it is first and foremost a process that involves “systematically attempting to look into the longer-term future of science, technology, the economy and society” through which “one comes to a fuller understanding of the forces shaping the long-term future” (Martin 1995; Miles 2010). Foresight, therefore, differs from forecasting, in that it does not aim to predict the future. Although the two terms are sometimes used interchangeably, forecasting is concerned with making “a probabilistic statement, on a relatively high confidence level, about the future” (Martin 2010).

Foresight can also be contrasted with hindsight, which is a systematic examination of the past. While the past offers useful information that can inform a foresight process, hindsight has access to outcome information that foresight does not. Care should be taken when combining these processes in order to avoid “observation selection effects” or biasing thinking towards historical occurrences (Fischhoff 1975).

Many additional terms specific to futures studies have been introduced and refined in the literature, with some confusion arising given shared and contradictory wording used in colloquial contexts (Trump et al. 2019). In order to use clear terminology in describing futures research, with the aim of developing a consistent lexicon across NATO partners, a definitions list is provided below. This is followed by examples of foresight research conducted on the topics of emerging synthetic biology and biotechnology.

The two subsequent sections provide an overview of different foresight methodologies and present an approach to foresight question choice, highlighting some specific questions for synthetic biology and biotechnology. Finally, recommendations for the design of a foresight process are offered, with the intention of providing a useable resource for NATO partners investigating emerging synthetic biology and biotechnology threats.

#### DIY risks bioterror – regulations key to prevent

Ronit Langer & Shruti Sharma, 11-20-2020, Carnegie Endowment for International Peace (Technology and International Affairs Fellow & Technology and Society Sr. Research Analyst), https://carnegieendowment.org/2020/11/20/blessing-and-curse-of-biotechnology-primer-on-biosafety-and-biosecurity-pub-83252, "The Blessing and Curse of Biotechnology: A Primer on Biosafety and Biosecurity," (ermo/sms, Acc:6-8-2022)

SECURITY THREATS

Recent advances in synthetic biology, a technology that can be used to artificially create organisms in labs, carry the foreboding potential to develop biological weapons. Moreover, the emergence of the DIY community and the open-source nature of this movement have sparked concerns that terrorists could easily acquire the information needed to weaponize biotechnology, although none of these DIY groups have exhibited any nefarious intentions. Nefarious actors who previously acquired pathogens from a lab or from nature with the intention of developing a bioweapon can now either order DNA fragments online and assemble them to create dangerous pathogens or synthesize lethal pathogens from scratch using genomic information available online. Moreover, such actors can leverage vulnerabilities in the cyber defenses of labs and private companies to gain access to sensitive information that is not publicly available online.

To better understand the security threats emerging from recent developments in biotechnology, it is worthwhile to return to the aforementioned hypothetical Ebola scenario. Imagine for a moment that the researchers involved, in collaboration with an editor at an esteemed journal, decided that they would publish a redacted version of the methods and the results section of their research due to security concerns. A month after the paper was published, the lab noticed unusual activity on their servers. The lab immediately reported the incident to the university’s information technology department. The department contacted local law enforcement officials, and together they traced the hack to a suspected terrorist organization. The group was trying to gain access to the methodology that led to the accidental creation of a more virulent Ebola strain so as to launch a deliberate biological attack. Law enforcement put DNA synthesis companies on high alert for any orders that closely aligned with research on the Ebola virus or other high-risk pathogens. Thankfully, a company was able to flag an order and law enforcement was able to cooperate with local officials to shut down the unauthorized lab before it began creating and releasing harmful products.

In reality, individuals have at times tried to acquire deadly pathogens and other sensitive biological information. For example, two Canadians were arrested in the city of Buffalo, New York in 1984 after they were suspected of illegally acquiring and smuggling strains of botulism and tetanus to Canada. The Japanese cult Aum Shinrikyo made unsuccessful attempts in 1995 to acquire strains of Ebola from Central Africa to develop the group’s biological weapons program. More recently, two Chinese hackers were indicted in the United States for seeking to obtain intellectual property related to coronavirus treatments and vaccines. Similar incidents were reported in Spain; allegedly Chinese hackers were trying to steal data from Spanish labs conducting vaccine research.

In addition to strategically embedding members into research organizations to acquire these deadly pathogens, some terrorist organizations also have sought to rely on lab insiders to either develop biological weapons or grant access to organisms or sensitive information. For example, a Malaysian scientist tried to develop anthrax weapons for Osama bin Laden, the founder of al-Qaeda.

While most countries have national guidelines for handling safety and security threats, the examples described above highlight the global implications of such threats. It is therefore important to evaluate global best practices, treaties, and conventions that deal with such risks and devise strategies to update these safeguards to govern dual-use applications of emerging biotechnologies.

#### Biotech risks extinction without experimentalist governance to secure its benefits

Yang Xue 1,2, Hanzhi Yu 3,\* and Geng Qin 3, 12-20-2021, 1 Law School, Tianjin University, Tianjin 300072, China; 2 Center for Biosafety Research and Strategy, Tianjin University, Tianjin 300072, China 3 School of Public Affairs, Zhejiang University, Hangzhou 310058, China; https://www.mdpi.com/2071-1050/13/24/14056/htm, "Towards Good Governance on Dual-Use Biotechnology for Global Sustainable Development," Sustainability Volume 13 Issue 24 10.3390/su132414056 (ermo/sms, Acc:6-22-2022)

Abstract: Dual-use biotechnology faces the risks of availability, novel biological agents, knowledge, normative, and other dual-use risks. If left unchecked, these may destroy human living conditions and social order. Despite the benefits of dual-use technology, good governance is needed to mitigate its risks. The predicaments facing all governments in managing the dual-use risks of biotechnology deserve special attention. On the one hand, the information asymmetry risk of dual-use biotechnology prevents the traditional self-governance model in the field of biotechnology from playing its role. On the other hand, top-down public regulation often lags behind technological iteration due to the difficulty of predicting the human-made risks of dual-use biotechnology. Therefore, we argue that governance of the dual-use risks of biotechnology should avoid the traditional bottom-up or top-down modes. We suggest the governance for dual-use biotechnology could be improved if the four-stage experimentalist governance model is followed. The first stage is to achieve consensus on a broad governance framework with open-ended principles. The second stage is for countries to take action based on local conditions and the open-ended framework. The third stage is to establish a dynamic consultation mechanism for transnational information sharing and action review. The fourth and final stage is to evaluate and revise the global governance framework.

#### Biotech solves climate, disease, food & ecology

Ronit Langer & Shruti Sharma, 11-20-2020, Carnegie Endowment for International Peace (Technology and International Affairs Fellow & Technology and Society Sr. Research Analyst), https://carnegieendowment.org/2020/11/20/blessing-and-curse-of-biotechnology-primer-on-biosafety-and-biosecurity-pub-83252, "The Blessing and Curse of Biotechnology: A Primer on Biosafety and Biosecurity," (ermo/sms, Acc:6-8-2022)

Before turning to the safety and security of biotechnology research and the need to balance risk mitigation with innovations in the field, it is important to understand the scope and applications of such technologies. Biotechnology, as defined by the Organization of Economic Cooperation and Development, refers to “the application of scientific and engineering principles to the processing of materials by biological agents to provide goods and services.” Some applications of biotechnology include developing food products, biochemicals, beverages, and pharmaceuticals, as well as services like using genetically altered organisms for water purification, waste management, and sustainable resource procurement.

Scientific developments in biotechnology can offer solutions to address global challenges such as combating the spread of infectious diseases, reducing hunger, and remediating environmental degradation.

#### Climate change threatens human extinction

C. E. **Richards** et al, 2/19/20**21** (Department of Engineering, University of Cambridge), CLIMATIC CHANGE, Feb. 19, 2021. Retrieved Apr. 20, 2021 from https://link.springer.com/article/10.1007/s10584-021-02957-w

There is increasing concern that climate change poses **an existential risk to humanity**. Understanding these worst-case scenarios is essential for good risk management. However, our knowledge of the causal pathways through which climate change could cause societal collapse is underdeveloped. This paper aims to identify and structure an empirical evidence base of the climate change, food insecurity and societal collapse pathway. We first review the societal collapse and existential risk literature and define a set of determinants of societal collapse. We develop an original methodology, using these determinants as societal collapse proxies, to identify an empirical evidence base of climate change, food insecurity and societal collapse in contemporary society and then structure it using a novel-format causal loop diagram (CLD) defined at global scale and national granularity. The resulting evidence base varies in temporal and spatial distribution of study and in the type of data-driven methods used. The resulting CLD documents the spread of the evidence base, using line thickness and colour to depict density and type of data-driven method respectively. It enables exploration of how the effects of climate change may undermine agricultural systems and disrupt food supply, which can lead to economic shocks, socio-political instability as well as starvation, migration and conflict. Suggestions are made for future work that could build on this paper to further develop our qualitative understanding of, and quantitative complex systems modelling capabilities for analysing, the causal pathways between climate change and societal collapse. Introduction Despite recent social protests and climate emergency declarations, efforts to mitigate climate change to-date **are insufficient** (Ripple et al. 2019). Greenhouse gas (GHG) emissions continue to rise and global warming above 3 °C is increasingly likely this century (Raftery et al. 2017). There is emerging evidence of amplifying feedbacks accelerating (Natali 2019) and dampening feedbacks decelerating (Walker et al. 2019). These feedbacks exacerbate the possibility of runaway global warming (Steffen et al. 2018), estimated at 8 °C or greater by 2100 (Schneider et al. 2019). Such temperature increases translate to a range of real dangers (The Center for Climate and Security 2020), shifting the narrow climate niche within which humans have resided for millennia (Xu et al. 2020). Looking beyond the framing of ‘global warming’, there is concern that the effects of climate change may pose an **existential risk to humanity**, one that threatens ‘societal collapse’ or **even extinction** (Ord 2020). Understanding these worst-case scenarios is essential for good risk management (Kunreuther et al. 2013). Improving awareness of potential pathways through which climate change poses such a risk can help inform decision-making about interventions (Shepherd et al. 2018). Considering societal impacts that are more tangible for individuals, businesses and governments (Briggs et al. 2015), and better aligned with conventional risk priorities (Wagner and Weitzman 2015), may facilitate more effective action to mitigate climate change (Weber 2006). A number of pathways through which climate change could cause societal collapse have been identified, one being via **food insecurity** (Gowdy 2020). Climate change is predicted to **undermine agricultural systems** and disrupt food supply (FAO, IFAD, UNICEF 2020), which may **lead to economic shocks**, socio-**political instability** as well as **starvation**, **migration and conflict** at local through to **global scale** (Rivington et al. 2015). While the climate science underpinning global warming estimates is well established (IPCC 2014), albeit subject to sensitivities, the uncertainties increase significantly when we start to consider these tangible societal impacts given the complex relationships involved (Butzer 2012). Our understanding of worst-case scenarios, and particularly of empirical evidence addressing the causal pathways through which climate change may cause societal collapse, is underdeveloped (Kemp 2020).

#### Synth-bio engineered pandemics are the #1 existential risk

Bryan Walsh, 5-14-2020, Axios, "The coronavirus pandemic reawakens bioweapon fears," https://www.axios.com/coronavirus-pandemic-pathogen-bioweapon-45417c86-52aa-41b1-8a99-44a6e597d3a8.html (ermo/sms, Acc 9-26-2020)

The immense human and economic toll of the COVID-19 pandemic only underscores the threat posed by pathogens that could be deliberately engineered and released.

Why it matters: New technology like gene editing and DNA synthesis has made the creation of more virulent pathogens easier. Yet security and regulation efforts haven't kept pace with the science.

What's happening: Despite some claims by the White House, overwhelming scientific evidence indicates that the novel coronavirus was not accidentally released from a lab or deliberately engineered, but naturally spilled over from an animal source.

That doesn't mean the threat from bioweapons isn't dire. Along with AI, engineered pandemics are widely considered the biggest existential risk facing humanity.

That's in part because a pathogen could be engineered in a lab for maximum contagiousness and virulence, well beyond what would arise through natural selection.

Case in point: a 2018 pandemic simulation put on by the Johns Hopkins Center for Health Security featured a fictional engineered virus called Clade X that combined the contagiousness of the common cold with the virulence of the real-life Nipah virus, which has a mortality rate of 40-75%. The resulting simulated global outbreak killed 150 million people.

COVID-19 isn't anywhere near that fatal, but the pandemic has shown the vulnerability of the U.S. and the world to biological threats both natural and manmade.

"Potential adversaries are of course seeing the same things we’re seeing," says Richard Pilch of the Middlebury Institute of International Studies. "Anyone looking for a radical leveling approach — whether a state actor like North Korea or a motivated terrorist organization — may be influenced by COVID-19 to consider pursuing a biological weapons capability."

Background: Bioweapons were officially banned by the Biological Weapons Convention in 1975, though North Korea is suspected of maintaining an offensive bioweapons program.

A particular concern about biowarfare and bioterror, though, is that many of the tools and methods that could be used to create a weaponized virus are largely indistinguishable from those used in the course of legitimate scientific research. This makes biotechnology "dual-use" — and that much more difficult to safely regulate without cutting off research that could be vitally important.

While earlier bioweapons fears focused on the possibility that a state or terror group could try to weaponize a known dangerous agent like smallpox — which would require somehow obtaining restricted pathogens — new technology means that someone could obtain the genetic sequence of a germ online and synthesize it in the lab.

#### Food price spikes ends civilization

Ahmed, 15—citing models from Anglia Ruskin University’s Global Sustainability Institute Global Resource Organization Project (Nafeez, <https://medium.com/insurge-intelligence/uk-government-backed-scientific-model-flags-risk-of-civilisation-s-collapse-by-2040-4d121e455997#.6y0qsoexc>, dml)

The report explores the scenario of a near-term global food supply disruption, considered plausible on the basis of past events, especially in relation to future climate trends. The global food system, the authors find, is “under chronic pressure to meet an ever-rising demand, and its vulnerability to acute disruptions is compounded by factors such as climate change, water stress, ongoing globalisation and heightening political instability.” Three steps from crisis Lloyd’s scenario analysis shows that food production across the planet could be significantly undermined due to a combination of just three catastrophic weather events, leading to shortfalls in the production of staple crops, and ensuing price spikes. In the scenario, which is “set in the near future,” wheat, maize and soybean prices “increase to quadruple the levels seen around 2000,” while rice prices increase by 500%. This leads to rocketing stock prices for agricultural commodities, agricultural chemicals and agriculture engineering supply chains: “Food riots break out in urban areas across the Middle East, North Africa and Latin America. The euro weakens and the main European stock markets lose 10% of their value; US stock markets follow and lose 5% of their value.” The scenario analysis demonstrates that a key outcome of any such systemic shock to the global food supply — apart from “negative humanitarian consequences and major financial losses worldwide” — would be geopolitical mayhem as well as escalating terrorism and civil unrest.

## NATO Resilience Extensions

#### CBR shortcomings ensure large-scale bioweapon attacks – the far right has unique access to materials and know-how.

Daniel Koehler and Peter Popella 17. Fellow at George Washington University’s Program on Extremism, Editorial Board Member of the International Centre for Counter-Terrorism (ICCT) in The Hague and Founding Director of the German Institute on Radicalization and De-Radicalization Studies (GIRDS). Scholar of microbiology and specialist for infectious bacteria and antibiotic resistances, holds a B.Sc., M.Sc. and Ph.D. degree from the Eberhard Karls University Tuebingen, Germany. “BEWARE OF CBRN TERRORISM FROM THE FAR-RIGHT”. Small Wars Journal. Sept 19 2017. https://smallwarsjournal.com/jrnl/art/beware-of-cbrn-terrorism-from-the-far-right

As the threat from domestic terrorism is clearly increasing, one must ask if violent tactics used by these attackers might develop beyond the use of explosives and guns. The vehicle attack in Charlottesville was an indication of that tactics diversification, even though this was not the first incident of its kind in the United States. As the Oklahoma plot shows, far-right terrorists might see themselves in some kind of competition for public recognition with Jihadist groups like ISIS, which could lead to a further escalation of tactics used for example with the deployment of chemical, biological, radiological or nuclear (CBRN) weapons. In fact, right-wing terrorists have for decades been attempting to develop and use chemical and biological weapons. This article aims to give a short overview on the history of such efforts, the potential for right-wing terrorism to use chemical and biological agents in the future, and how authorities can counter this threat.

A Look at the Cases

Even though no significant cases of successful right-wing CBRN terror attacks in Western countries are known, a number of plots have been uncovered that indicate the motives and tactics of these extremists. In 2009 Ian Davidson, who was the leader of the right-wing terrorist Aryan Strike Force (ASF), became the first British citizen convicted of producing a chemical weapon of mass destruction. When Davidson and his son Nicky were arrested in the United Kingdom, the subsequent trial and conviction made history. His plot aimed to poison water supplies of Muslims in Serbia using the toxin ricin, which he already had produced in a significant amount. Estimations by investigators regarding the lethality of the material varied drastically but some thought the amount produced by Davison could have killed up to 1,000 people.

In the mid-1980s one of the few right-wing terrorist organizations in the United States, “The Covenant, the Sword, and the Arm of the Lord”, acquired large amounts of cyanide, intending to poison water supplies in major U.S. cities, but failed to overcome the technical difficulties of dissemination. In May 1996, a laboratory staff member and white supremacist in Ohio, Larry Wayne Harris, successfully acquired plague bacteria – not illegal at that time. Two years later, Harris and a co-conspirator were arrested for threatening to release anthrax in Las Vegas, even though his strain was a vaccine grade and harmless version. Material to extract ricin was also found at the home of white supremacist James Kenneth Gluck in Tampa, Fla., who was arrested by the FBI in November 1999 after he threatened judges with biological warfare. More serious seems to have been the plot led by neo-Nazi William Krar of Texas, arrested in April 2003. Investigators found more than 500,000 rounds of ammunition, 65 pipe bombs and remote-control briefcase bombs, and almost two pounds of deadly sodium cyanide. Along with white supremacist and anti-government material, components to convert the cyanide into a bomb capable of killing thousands were also secured. In November 2011, a plot to blow up government buildings and kill masses of people using ricin by a group of four men belonging to an anti-government militia in Georgia was uncovered. Especially concerning was the fact that one of the four was working for the federal Department of Agriculture, giving him access to chemicals, technical equipment and ways to disseminate the poison into food and water supplies. In February 2017, 27 year old William Christopher Gibbs, member of the white supremacist Creativity Movement, was arrested after hospitalizing himself for side effects of his experiments with ricin, triggering a large FBI operation.

When looking at these cases, far-right extremists attempting to acquire and use CBRN weapons have very mixed backgrounds, ranging from career criminals to senior biodefense researchers at United States Army institutions. However, the more serious plots came from well-educated individuals with necessary access to equipment and dissemination ways indicating that right-wing terrorists might be quite well embedded in Western societies. In his seminal study about far-right terrorists’ recruitment and radicalization from 2012 for example, Pete Simi found 56% of his sample belonged to middle or upper social class and 53% had some form of college or higher education (with and without degrees). The majority of far-right CBRN plotters were part of groups and networks associated with their ideological and criminal conduct but not all of them. However, every far-right CBRN incident appears to be a culmination of a radicalization escalation process, sometimes even over years, with long histories of openly expressed violent, right-wing extremist, racist or anti-government opinions. Many of the plotters repeatedly threatened to use CBRN weapons in public to bystanders, families or friends. Even the lone actors were known to have gradually distanced themselves from their social environments getting more and more agitated and aggressive.

Now, the key question is: what makes a threat of far-right CBRN terrorism more likely and dangerous than compared with other violent ideologies, such as left-wing or jihadi terrorism? Of course, far-right extremists have equal access to open market technical equipment and supplies for manufacturing such weaponry as all other extremists in the country and their ideology is not more or less dangerous than jihadi or left-wing extremism, for example. Nevertheless, in 2012 international terrorism expert Peter Bergen stated, that “11 right-wing and left-wing extremists have managed to acquire CBRN material that they planned to use against the public, government employees or both” while there was no evidence of jihadists in the United States managing to do that. From these 11 cases only one (Joseph Konopka) was motivated by left-wing extremist (more specifically anarchist) political ideals. This fact is striking, since other violent extremists, especially Jihadists, certainly do not lack the willingness to use weapons of mass destruction (WMDs), as it is currently experienced in Syria and Iraq. But how indicative is this retrospectively almost singular right-wing CBRN terror threat for the future?

To assess the possibility of an attack, one has to take three factors into account: 1) the feasibility of the used weapon (acquisition, available know-how, technology, materials or agents), 2) the “effectivity” or costs and benefits of the weapon and 3) the motivation to use the weapon regarding the pursued aims. The assassination of an individual person with a plain firearm is feasible (through the ease of acquiring a firearm), effective (since a single, well-placed bullet will “do the job”) and sends a clear message in terms of motivation, however not to an extent exceeding every-day criminality encountered on the streets of big cities. Using a deadly toxin, like ricin, presents bigger hurdles in terms of feasibility, but is also highly effective (in terms of toxicity and evasion of forensic investigation) and, more important, will provide added value in terms of public attention and media coverage about the attack and the very ideology of the originators. Considering the attack on a crowded public space, planting explosives will lead to severe damage as well potentially high lethality. However, by mixing the explosives with radioactive material – a so called dirty bomb – will not only cause more fatalities through radiation, but also evoke a higher level of fear and terror. Additionally, such an incident would represent a difficult challenge for first responders and might render the government incompetent of an appropriate response and preparation in the eyes of the public. All terrorists potentially share this goal to make their attacks more impactful and deadly, even though right-wing terrorists rarely have aimed to produce mass casualties, so far.

Factor 2, the effectivity of a weapon is, depending on the planned operation, similar for all kinds of terrorist as well. However, the feasibility to use CBRN weapons (factor 1) might be higher for far-right terrorists than for others, e.g. jihadists, since the extreme right can rely on established and much larger support networks, which can provide the required material, know-how and dissemination ways. Of course, it is not impossible for lone actors from all ideological strands to acquire the material as well as the know-how. Regarding factor 3, the motive, the violent far-right might be in an extraordinary position right now, making it more dangerous than ever.

The current Trump administration is openly courting the extreme right and – in the eyes of observers – fuelling a rising far-right terror threat, for example through the inadequate reaction to the Charlottesville attack. In addition, the general public is much less likely to perceive violent actions from far-right extremists as “terrorism” compared, for example, with those acts by Islamic extremists. This gives violent extremists from the far-right considerably more space to radicalize, escalate violent tactics and plot attacks without interference from the outside than from any other violent extremist group in Western countries. The most significant danger, however, will come to light after the demise of the Trump administration. A future US government trying to put the far-right jinni that Trump has released back into the bottle will face a much stronger, self-confident and aggressive opponent, already dreaming of a race war. The current government is favoured by anti-government militias and sovereign citizens and they are looking for a new enemy: those “counter-revolutionaries” attempting to return the United States to a pre-Trump state. Even open civil war was threatened in a case of impeachment. far-right extremists of all different strands might have heavily stockpiled firearms and explosives, but they know they cannot outgun and outman law enforcement, National Guard or the Military. A fight to retain their perceived newly gained freedom and powers therefore must include a tactical edge forcing the government to refrain from a too aggressive crackdown. CBRN agents or even the potential to quickly acquire them are the most effective and logical way to ensure the government’s passivity, especially giving the history of CBRN plots within the far-right.

What is Likely, What is Not? A Choice of Weapons

Some CBRN agents are more likely to be used in a terrorist attack than others, depending on factors such as ease of acquiring raw materials, difficulty of production, the required know-how, danger of storing the material for the terrorist, degradation of the material over time, deliverance, dispersion, and potential countermeasures. Nuclear and radiological weapons require radioactive elements that are generally stored under high-security and thus hard to obtain without a state sponsor. Low-level radioactive elements unsuitable for nuclear weapons, but sufficient for the construction of a ‘dirty bomb’ might be easier to obtain, since industry, agriculture and medical institutions are dependent on them. Americium, which is used in household smoke detectors, has indeed been found in the homes of far-right extremists, e.g. Tampa resident Brandon Russell. However, its actual effectiveness as a dirty-bomb ingredient is debated. Further, neo-Nazi James Cummings acquired four 1-gallon containers with a radioactive uranium and thorium mix in 2008, along with highly toxic beryllium powder and instructions to build a dirty bomb.

Chemicals and biological material, while for some part underlying governmental restrictions concerning proliferation and acquisition, are much easier to access. As noted by Edward You of the FBI’s Weapons of Mass Destruction Directorate, Biological Countermeasures Unit, “The materials are readily available (…), and the majority of equipment can be purchased outright and do not fall under any regulatory regime.” Precursors for chemical warfare agents, as sodium cyanide in the case of William Krar, can be simply bought online. Manuals explaining the synthesis of the active agents in small laboratory or kitchen setups have been found in many cases, illustrating that the required knowledge has already spread and advanced significantly. Explosives that have been found and used in terror associated cases include the so called ‘mother of Satan’, triacetone peroxide (TATP), and hexamethylene triperoxide diamine (HTMD). TATP can be synthesized from easily accessible household chemicals (acetone, hydrogen peroxide and sulfuric acid). Synthesis of chemical warfare agents like sarin, a nerve agent used by the Aum Shinrikyo attacks on the Tokyo subway, is highly demanding in terms of technology and know-how. Considering the difficulties of achieving sufficient quality of the material and the high risk for the producers during manufacturing and storage make and attack with nerve agents appear unlikely. However, structurally more simple chemicals, like cyanide compounds which can be commercially obtained, have been used in far-right terror plots.

Another potential dual-use chemical is chlorine. The highly reactive gas is nowadays widely used as disinfectant, bleaching agent and within different industry branches. Millions of tons are transported on roads and railways within the US every year, and may as such be targets for terrorist attacks. Upon contact with the human mucosa, the water soluble chlorine will at first cause local irritations and, during prolonged exposition of higher doses, evoke the deadly “dry-land drowning”. While no large scale attacks on hazardous material (HAZMAT) transports have been reported so far, guides to derail trains carrying such materials have been published by Jihadists and could easily be used by far-right terrorists as well. Additionally, application of commercially acquired chlorine as choking agent in local, small scale attacks pose a risk.

Alternatives to chemicals are agents of biological origin: toxins, bacteria (or spores – robust and dormant forms) and viruses. Toxins are harmful products of biological organisms, which interfere with vital body functions. Production and purification of these substances require in-depth knowledge and large amounts are thus hard to obtain. Ricin, which can be isolated from the castor oil plant, has been detected in multiple cases of far-right terror plots. While ricin is extremely deadly when taken up into the body, a wide spread application of ricin to target large groups of people is rather unlikely, just by the large amounts needed for such operation and the very proteinaceous nature. The isolation and cultivation of bacteria, although requiring some microbiological knowledge, can be done in improvised laboratory setups. Highly pathogenic strains are usually kept in isolated, high-security laboratories. However, Bacillus anthracis is an omnipresent, easy to isolate soil bacterium. Anthrax, as in the case of Larry Wayne Harris, is according to the CDC generally considered to be the most likely agent which might be used in large-scale bioterror. Viruses are dependent on cells as hosts for multiplication and thus require an even more complicated production process, which is highly unlikely to be established outside of academic or industrial laboratories. While the deadliest infectious diseases, like ebola or lassa, are caused by viral infections, application of viruses as terror agent by far-right extremist is unlikely. However, the growing industry and professionalization of DIY bio-laboratories across the United States was also noted by the FBI, which might also increase accessibility of the necessary technical equipment for potential biological and chemical terrorism.

Likely Goals of Right-Wing Terrorists

Existing research on right-wing CBRN terrorism is scarce and outdated. Few experts have even considered the potential threat, mostly in the late 1990s looking at Christian Millenarianism as a form of religious terrorism aiming for the apocalypse in a “sacrificial ritual of mass murder and suicide ”. Even though Christian millenarian groups have not attempted to develop CBRN weapons, they were scrutinized for such a potential threat after the Aum attack in Tokyo. Jessica Stern wrote in 1999 that “the costs of escalation to biological weapons seem to outweigh the benefits” for domestic extremists. Paul Blister and Nina Kollars confirmed this notion regarding the Christian Patriot Movement in 2011. Right-wing terrorism, however, goes beyond Christian fundamentalism and fanaticism circling around Armageddon. Especially given the dramatic increase in anti-government sentiment and militia groups in some western countries (e.g. the US and Germany) and their partial overlap with white supremacist and nationalist groups, there is potential for a future escalation of violent tactics if anyone might attempt to contain them again. Right-wing terrorists have usually not sought large public audiences for their attacks in order to communicate specific political programs but rather to annihilate their enemies by every means possible. In addition, to create chaos and panic, as well as erode a public’s trust in the government’s ability to provide safety by demonstrating its helplessness – a concept known as ‘strategy of tension’ among right-wing extremists – is thought to break the government’s monopoly of force and core political legitimacy.

Other research about right-wing extremism and terrorism has also shown, that an overlap between violent activists from the far-right and organized crime exists, which means that the acquisition of WMDs by these groups and actors could also be used as significant tool to shift the power base in extortion operations towards what could become right-wing extremist crime syndicates. In Austria for example a neo-Nazi group called ‘Object 21’ controlled large parts of the red light milieu along the Austrian-German border through the use of explosives, arson and attacks with butyric acid. In the United States, neo-Nazi oriented networks such as the Aryan Brotherhood for example, are deeply involved in drug trafficking. Highly militant and criminal hybrid networks could have severe impact within the organized crime world if they get their hands on CBRN weaponry, which is of course true not only of far-right but also for other terrorists.

### Resilience is key

#### Resilience is key to ALL NATO objectives

CCOE 2019 Civil-Military Cooperation Centre of Excellence (The Hague), “Resilience through Civil Preparedness A CCOE Info Sheet” https://www.cimic-coe.org/resources/fact-sheets/resilience-through-civil-preparedness.pdf, (ermo/sms, Acc:6-17-2022)

What is Resilience?

Resilience has been defined as a society’s ability to resist and recover easily and quickly from a major shock, such as natural disaster or an armed attack.1 Resilience is a combination of Civil Preparedness and military capacity. Each NATO member state needs to be resilient to major shocks. A resilient country is less attractive as a target and therefore contributes to the alliance’s overall security. Robust resilience through civil preparedness in allied states is crucial to NATO’s collective security and defence. 2

What is Civil Preparedness?

Civil Preparedness is defined as all measures and means taken in peacetime, by national and Allied agencies, to enable a nation to survive an enemy attack and to contribute more effectively to the common war effort3. Civil preparedness refers to the ability to sustain the functions vital to society, ensuring basic supply for the population and the State's capacity to act in a crisis situation. This also means that the private sector in allied nations is ready to provide support to NATO military operation.4 Civil preparedness is a central pillar of allies’ resilience and a critical enabler for alliance collective defence. 5 While civil preparedness remains a national responsibility, NATO can support Allies in assessing and, upon request, enhancing their civil preparedness6.

### NATO says yes

#### Individual cooperation spurs MMC capacity – The FOC declaration proves they will say yes

Rico Maderthoner, 3-6-2022, Commander J.G. (OF-3) Germany Navy https://www.bundeswehr.de/en/organization/bundeswehr-medical-service-/multinational-medical-coordination-centre-is-operational-5441152, "Multinational Medical Coordination Centre/ European Medical Command is operational," No Publication (ermo/sms, Acc:6-20-2022) FOC = Full Operational Capability declaration

An intensive, demanding, but also common path

The Director of the MMC/EMC, Brigadier General Dr. Stefan Kowitz, also briefly described once again "the very busy and challenging path" that had been taken to get here. "In the light of the current security challenges, multinational cohesion is all the most important. The FOC Declaration is a symbol of the will to cooperate and integrate the medical services". This development process was not only very sporting in terms of time, but also extraordinary in its demands. Special challenges in the last two and a half years were the creation of conceptual, infrastructural and organisational foundations, the increase in personnel as well as the development of the Programme of Work combined with the implementation of many demanding projects. In addition, the necessary positioning of the MMCC/EMC in NATO and the EU as well as the development of important contacts and the establishment of a civil-military network under difficult COVID 19 conditions was of vital importance.

Projects for EU, NATO and partner nations

The FOC Declaration is important in two respects: on the one hand, to document what has been achieved and, on the other, to show what the MMCC/EMC stands for. The Mission Statement states that the MMCC/EMC focuses its activities on three main areas for the benefit of the nations, NATO and the EU: Preparation of operational engagements, Operational readiness of medical C3 and organisations and Support of operational engagements of the participating nations. This orientation sets a clear framework and grants the necessary flexibility to react to new developments.

Thus, the participating nations benefit directly from the projects and developments of the multinational coordination element. Projects are commissioned and accompanied directly by the participating nations or by NATO and the EU. As a multinational service provider, the innovative cooperation project of NATO and the EU is also responsible for supporting individual countries in medical issues and acts here at the same time as a civil-military link. Currently, representatives of seven nations work together on a permanent basis in the MMCC/EMC. The United States has established a liaison element.

Situation Centre and wargaming expertise are core competencies

In the field of wargaming, the MMCC/EMC has been able to establish itself with numerous references as a permanent planning and advisory element in the international network as a unique specialist. Likewise, the established Situation Centre is the hub and interface for the coordination services of the MMCC/EMC. By pooling all the capabilities of the MMCC/EMC and its network of experts, it is intended to respond quickly to the needs of individual member nations or NATO and EU institutions.

Lighthouse project as a bridge between NATO and the EU

As an agile and flexible project-driven service, the MMCC/EMC is always ready to fulfil missions for its partner nations and for the responsible institutions of NATO and the EU. Currently, the MMCC/EMC is acting as a link between civilian and military services of the EU and NATO in the area of support for the evacuation of Ukrainian wounded and sick. This lighthouse project is intended to improve cooperation between the capabilities of the NATO and EU medical services involved.

### Current MMCC isn’t enough

#### Lack of MMCC resourcing is limiting cooperation now

Stefan Kowitz,, 9-22-2021, Interviewer: Lt Gen (Rtd) Prof. Martin Bricknell, Editor-in-Chief, military-medicine.com Interviwee: Brigadier Stefan Kowitz, Director, NATO Multi-National Coordination Centre/European Union Medical Command https://military-medicine.com/article/4191-the-nato-response-to-the-covid-19-pandemic-interview-with-brigadier-stefan-kowitz.html, "The NATO response to the COVID-19 pandemic – Interview with Brigadier Stefan Kowitz," No Publication (ermo/sms, Acc:6-20-2022)

Bricknell, Martin:

What do you think are the lessons for international military alliances like NATO and the EU?

BG Kowitz:

As stated in the EU-NATO Joint Declaration (Warsaw, 8 July 2016), “our security is interconnected and together a broad range of tools can be mobilised to respond to the challenges we currently face, and make most efficient use of scarce resources. A stronger NATO and a stronger EU are mutually reinforcing. Together they can better provide security in Europe and beyond.” The leadership of NATO and the EU has requested the cooperation of both organisations. NATO-EU cooperation will prevent a duplication of efforts and offers a greater economy of scales in a resource-strained environment. The medical community can be with the MMCC/EMC at the forefront of NATO-EU cooperation. The medical challenges, now and in the future, are requesting coordination and the efficient use of our limited resources.

Bricknell, Martin:

Do you think there are any risks to military medical services arising from the pandemic?

BG Kowitz:

As a result of the possible COVID-19 global economic recession, the main risk is inadequate financial resources for the armed forces and their medical services. Within the armed forces, we have to emphasise how important the support of our military medical services has been during the response to this crisis.

#### New steps help MMCC capacity

Rico Maderthoner, 11-1-2021, Commander J.G. (OF-3) Germany Navy, https://www.coemed.org/news-and-events/the-main-planning-conference-of-the-vigorous-warrior-22-casualty-move-22-combined-tabletop-exercise-has-been-concluded-in-budapest-hungary, "The Main Planning Conference of the Vigorous Warrior 22," No Publication (ermo/sms, Acc:6-20-2022)

The NATO Centre of Excellence for Military Medicine (NATO MILMED COE) and the Multinational Medical Coordination Centre/ European Medical Command (MMCC/EMC – more info at: Multinational Medical Coordination Centre / European Medical Command (bundeswehr.de) ), are combining their expertise and know-how to create a unique training event for the benefit of NATO’s medical realm.

The Main Planning Conference is a key milestone in the planning process which was demonstrated by the attendance of 64 participants with representatives from NATO and partner nations. During the main planning conference in Budapest, planned by the NATO MILMED COE as host and taking place from Oct. 20-2021 to Oct. 21-2021, both entities set the framework and goals for next year's event. "I am glad that the conference, despite the large number of participants, 64 from NATO and partner nations, worked smoothly and in accordance with the specifications," said the Dutch planning officer of the NATO MILMED COE, Lieutenant Colonel Jos Schepers.

A partnership where 1+1 makes more than 2.: In his opening remarks, MILMED CoE Director Surgeon General Dr. Klagges reflected on the Vigorous Warrior Exercise Series: “The exercise series date back to 2011 in Hungary with 5 participating Nations, expanded to 11 Nations by 2013 in Germany, 14 by 2015 in the Czech Republic, 26 by 2017 in Germany again and in 2019 in Romania with 39 Nations and a considerable civilian component making it the largest NATO medical exercise ever.” Then he further stated that while the pandemic affected planning, it also proved to be an opportunity where a new format with new benefits could be tested. He also said he was pleased "that conducting a tabletop exercise led us to look for partners who were specifically knowledgeable about this format, and that we were able to partner with the Military Medical Coordination Centre / European Medical Command to host this event. There is no better example of synergy in the NATO medical field than our partnership, where 1+1 certainly makes more than 2."

Patient Tracking and Management in the NATO Alliance Case.

From March 28-April 09, 2022, exercise participants will coordinate and administratively manage patients and their transport from the time they are wounded to their respective home countries in an alliance case scenario under Article 5 of NATO's North Atlantic Treaty.

Core challenges, according to Col. Juergen Muntenaar, MMCC/EMC deputy director for NATO affairs, will be the systematic flow of patient tracking because "the systems and procedures were known 30 years ago. We as NATO are currently in the process of rediscovering them."

Caring for our wounded is paramount

Surgeon General Dr. Kowitz, the director of the MMCC/EMC was equally positive and focused: "I am pleased that we can bring our wargaming expertise to such a large exercise. But in the end, it's all about improving processes and getting the best care for our wounded."

The next step in planning will be to further refine the individual exercise sections that have been roughly outlined so far. In renewed joint conferences in Budapest and Koblenz, the results of the planning teams will be perfected by next April.

#### Supplies aren’t sufficient – coordination is critical to resilience

Rico Maderthoner, 8-16-2021, Commander J.G. (OF-3) Germany Navy, https://www.bundeswehr.de/en/organization/bundeswehr-medical-service-/new-initiative-to-develop-georgian-military-medical-capabilities-5209270, "Visit to start a new initiative to develop Georgian military medical capabilities," No Publication (ermo/sms, Acc:6-20-2022)

More than just a tent

“This is not just about procuring medical equipment such as respirators or surgical tables. The medical capabilities we are aiming for will be built on the interaction of qualified personnel and material. Developing a new medical capability takes patience and commitment and it requires the relevant Georgian agencies to assume responsibility for the various steps of development,” said Brigadier General (MC) Stefan Kowitz of the new, interesting challenge for the Koblenz agency. During the visit to Georgia, the delegation was able to visit the medical facilities and engage in conversation with military medical personnel in charge.

Common understanding as a solid foundation for missions

The purpose of this exchange was to gain a common understanding of NATO standards as a foundation for the joint development of a project plan with the Georgian delegation. To Sergeant Jan M., who works in the department of medical logistics and is an expert for medical material, “interoperability and joint medical standards are absolutely vital. They have proven their worth in the past.” He cites NATO missions as an example of this.

Intermediate objectives ensure progress

Individual stages and intermediate objectives of the initiative were jointly determined during the visit. This approach will ensure and the efficient buildup of capabilities and targeted support by the MMCC/EMC, which the Georgian side welcomes, and will drive the initiative forward.

The Military Medical Capacity Development Initiative is part of the extension of the existing Substantial NATO-Georgia Package (SNGP).

Its goal is to improve the defence and security capabilities of Georgia, strengthen resilience and improve interoperability with NATO.

#### Stockpiling vital to MMCC hybrid response

Bundeswehr Medical Service, 4-8-2020, https://www.bundeswehr.de/en/organization/bundeswehr-medical-service-/mmcc-emc-on-the-course-for-further-success--1204424, "MMCC/EMC on the course for further success," No Publication (ermo/sms, Acc:6-20-2022)

Stockpiling of medical materiel

The current COVID-19 pandemic has shown that stockpiling medical materiel and supplies increases the response capability and resilience of civilian and military health care systems. Under the 2020 German EU Council Presidency, the Bundeswehr Medical Service in cooperation with MMCC/EMC will develop modular medical materiel packages to be stockpiled for employment during outbreaks of infectious pathogens and epidemics. This concept is also known as "Military Modular Multipurpose Epidemic/Pandemic Stockpiling". Within the scope of resupply, hence, rapid materiel support of military medical facilities in theatre, in particular for EU Battle Group II/2020, can be ensured. In a subsequent step, the different modular, rapidly usable standard packages shall be further harmonised with the MMCC/EMC nations.

In line with Germany's role as Framework Nation for MMCC/EMC, the Bundeswehr Medical Service will demonstrate - in coordination with the 17 MMCC/EMC partner nations - that we have the capability to act jointly.

#### Plan’s stockpiling vital to MMCC effectiveness

Rico Maderthoner, 2-18-2021, Commander J.G. (OF-3) Germany Navy, https://www.bundeswehr.de/en/organization/bundeswehr-medical-service-/mmcc-emc-renders-visible-closer-cooperation-between-nato-and-eu-5033046, "MMCC/EMC renders visible closer cooperation between NATO and EU ," No Publication (ermo/sms, Acc:6-20-2022)

Quick response to epidemics and pandemics as the objective

During the first wave of COVID-19, the NATO's Euro-Atlantic Disaster Response Coordination Centre (EADRCC) requested MMCC/EMC to develop a concept on medical stockpiling, which in a further step was refined under the "European Medical Cooperation 2.0" during the German EU Council Presidency. The aim is to be prepared more quickly and effectively for epidemic or pandemic situations in the future.

A calculator is the basis of stockpiling

The Military Modular Multipurpose Epidemic/Pandemic Stockpiling (M3-EPS) concept consists of altogether seven modules some of which are employed independently of each other, while some others must be employed collectively. These rapidly usable standard packages are to reinforce existing medical treatment facilities or hospitals. Core of the concept is a calculator that quickly and simply determines personnel, materiel and storage area requirements as well as costs.

The projects have made visible many details, which will help to respond better to pandemics in the future. MMCC/EMC will make its contribution to this effect in order to support a coordinated, multinational approach, be it in the NATO or EU context.

### Vaccine focus key to solvency

#### Both USA and vaccine focus are critical to solvency

Richard Hatchett, 6-29-2021, CEO of the Coalition for Epidemic Preparedness Innovation, CEPI & former BARDA, acting director U.S. Biomedical Advanced Research and Development Authority, https://www.csis.org/analysis/cepi-20-critical-inflection-point, "CEPI 2.0: A Critical Inflection Point," No Publication (ermo/sms, Acc:6-20-2022)

Richard Hatchett, M.D.: Well, I think there’s basically three, you know, areas that there’s good alignment. I mean, there’s good alignment around the scientific agenda. I mean, our adoption of the—you know, focusing on the prototype pathogens, you know, we’ve drawn from the National Institute of Allergy and Infectious Diseases. Barney Graham and colleagues at the Vaccine Research Center have evolved that concept and, you know, have promulgated it. And we think they’re right. So the scientific approach, there’s already alignment. We’re ready to work hand-in-hand with the major science funding agencies within the U.S. to divide and conquer what is a very big R&D agenda.

There’s a political aspect, a political moment for the United States in terms of sort of its return to multilateral efforts. And I think, you know, this is a good opportunity for the U.S. to be forward-looking, to, you know, take a progressive and longer-term view, and to do that in a way that invites other global partners to participate. And CEPI, as a—you know, I mean, we aren’t a country. We don’t have a point of view. We’re just trying to solve one particular problem. And I think it’s a good way for the U.S. to join with the 25 or so other countries that are supporting CEPI in a global effort around countermeasures development for epidemic and pandemic threats.

And then finally, I think there’s an argument from self-interest, which is that if we see future epidemic or pandemic threats, the U.S. government has dual responsibilities. They have a responsibility to their own population, obviously, that will always be primary. But CEPI I think offers an opportunity for the U.S. to support international efforts and to support global equity simultaneously and in parallel, as—in future responses—as they’re addressing the needs of the U.S. population. So I think the value proposition that CEPI can bring in terms of, you know, a partnership with the U.S. are, you know, operating on multiple levels. And they’re all aligned with U.S. interests.

#### Vaccine funding includes delivery, requiring a global infrastructure

Julie Gerberding, 6-29-2021, co-chair of the CSIS commission and executive vice president at Merck https://www.csis.org/analysis/cepi-20-critical-inflection-point, "CEPI 2.0: A Critical Inflection Point," No Publication (ermo/sms, Acc:6-20-2022)

Julie Gerberding, M.D.: Well, we do have to finish the job in front of us. And I think everyone agrees that that has to happen. I think that there are some pieces to this plan that are upstream from where CEPI’s focus is with the G7, and then there’s some pieces that are downstream from there. The upstream pieces are really getting into a mindset, first of all, and then applying our science and technology to better be able to predict where spillovers will occur, and maybe preempt them. Which is very different from mitigation once you have an outbreak and it’s beginning to propagate.

So how do we move upstream? That means improving detection. It means using AI and geo-medicine tools to try to understand the human, animal ecological interface, the one health kind of space here. There’s a lot of science and a lot of collaboration. And it goes missing because the funding mechanisms don’t address the intersection of that space. The downstream piece that’s missing has to do with the deployment of vaccine. And we’re seeing now that even in some resource-limited environments where vaccines have been delivered they can’t be used because there is no infrastructure to get the vaccine into the arms of the people who need them. I mean, the world just doesn’t have adult immunization programs everywhere, like we do in the resource-rich countries.

So we’ve got to also deal with that, because even, in fact, in some ways, in some environments we’re already there, where the rate limiting step isn’t the number of doses. It’s the infrastructure, the people power, and the trust necessary to get them utilized. And we have to solve both of the extremes of the end-to-end. But the middle piece right now is job one, because that’s the here and now of this pandemic.

J. Stephen Morrison: Let’s talk about the relationship with the United States. There’s a proposal for multiyear funding over a five-year period, about a billion dollars in support over those five years. There’s a proposal for one of the emergency allocations, for a chunk of that to go towards supporting your efforts. There’s the hope that there will be strong political and technical partnership, that the United States will see CEPI as an integral asset in its future engagement internationally. And these are ideas that we’ve kicked around and been very supportive of.

### Solves Pandemics

#### Collective biosurveillance checks another pandemic

Richard Hatchett, 6-29-2021, CEO of the Coalition for Epidemic Preparedness Innovation, CEPI & former BARDA, acting director U.S. Biomedical Advanced Research and Development Authority, https://www.csis.org/analysis/cepi-20-critical-inflection-point, "CEPI 2.0: A Critical Inflection Point," No Publication (ermo/sms, Acc:6-20-2022)

Richard Hatchett, M.D.: Well, I think everyone in the world, frankly, has now had this common experience with the pandemic. And it doesn’t matter where you are on the political spectrum, it doesn’t matter, frankly, where you are on the spectrum in terms of the different interventions that we use. We’ve all been hugely impacted by the pandemic. None of us ever wants to see another pandemic again.

My colleague in the Bush White House, and actually now a CEPI board member, Rajeev Venkayya, has made the point that if we had in front of us an opportunity for $20 or $30 billion, which is probably what a global effort to accomplish the agenda that I talked about would cost over five or 10 years—if we had that opportunity to, you know, stop climate change, to—you know, to secure global temperatures below the 1.5 degree threshold, we would jump at that opportunity. And we would jump at it collectively as the world.

We are going to have the technologies coming out of this pandemic to respond rapidly in the future. We understand the bio-surveillance requirements. We understand the need now for empowered public health to respond rapidly when new diseases emerge. And there—and we know and see a pathway to making definitive countermeasures like vaccines and therapeutics much more rapidly than ever before. And it comes at a significant cost, but a, you know, microscopic cost compared to the risk of another pandemic.

And we can accomplish that goal much faster, much more effectively, if we work at it collectively. And I think an organization like CEPI, operating in the international space, filling gaps, focused on equity, has an important role to play in that collective solution. And I would hope that that opportunity would appeal to everyone, whatever their experience, whatever, you know, their potential political leanings or position.

#### NATO coordination enable dual use spillover

Rico Maderthoner, 11-19-2021, Commander J.G. (OF-3) Germany Navy, https://www.bundeswehr.de/en/organization/bundeswehr-medical-service-/next-step-towards-interoperability-5264984, "Next step towards interoperability," No Publication (ermo/sms, Acc:6-20-2022)

This milestone describes the starting point of the implementation phase," says the director of the multinational element, Dr. Stefan Kowitz, looking ahead to the steps ahead. The capabilities for the brigades' medical forces will be built up gradually and in modules. Two lines of development are in the foreground. Building up the personnel capabilities with the appropriate training to operate a highly mobile medical unit as well as the necessary material supplements to enable a treatment outcome in line with NATO and civilian requirements.

Civilian and military usability as a factor

"According to our analysis, the capabilities to be built up in the future enable use both for military tasks but also in crises or disasters to support the civilian health system, so-called dual-use capabilities," adds the MMCC/EMC director.

In her opening remarks, the Deputy Minister of Defence, Ms. Lela Chikovani, also honoured the "dedicated and hard work" and the joint team effort of the Georgian Medical Service and the MMCC/EMC delegation. She also mentioned additional cooperation opportunities with the EU. The possible harmonisation of NATO and EU activities, is not a difficulty for the MMCC/EMC, as it closely cooperates and collaborates with both institutions according to its mission.

Familiarisation with and practice in the NATO structure

Knowledge and understanding of NATO standards form the foundation for the development of the respective medical service capabilities of the Georgian armed forces. Following the kick-off of the implementation phase, a training team from the MMCC/EMC relocated to Georgia. "Working the new knowledge into existing structures in a guided environment and adjusting it for one's own system generally has a far greater effect than just imparting knowledge would have." This is how Colonel Jürgen Muntenaar, head of the training team and MMCC/EMC deputy director for NATO affairs, describes his training method.

Rescue chain: focus on communication and transport

During the training, the exercise participants not only learned about NATO structures, standardisation documents and terminology, but also applied their knowledge in a table-top exercise. In this exercise, the medical care of sick and wounded people was practised along the rescue chain. As a member of the MMCC/EMC team, Oberstabsbootsmann Stefanie Hippler also supported the Georgian comrades and saw "the special challenges in ensuring stable communication of the medical forces during the transport of the wounded, especially with the medical facilities to be taken in.

#### NATO cooperation enhances domestic response via solidarity

Giovanna De Maio 2020 visiting fellow at GWU George Washington University, former visiting fellow Center for the United States and Europe (CUSE) at Brookings, https://www.brookings.edu/wp-content/uploads/2020/10/FP\_20201028\_nato\_covid\_demaio-1.pdf, "," Brookings Institution (ermo/sms, Acc:6-17-2022)

A military alliance such as NATO is not a first responder in a health crisis, as most tasks must be implemented at the domestic level. However, given the impact and the spillover effects of COVID-19 on the very day-to-day operations of the alliance — military personnel are not immune from viruses — as well as on supply chains, and economies and societies around the world, it was paramount for NATO to take initiative both to protect its member states against malign actors and to offer crucial support in the spirit of solidarity.

In spite of these successful initiatives, the Operations Division of NATO headquarters in Brussels has admitted64 that the alliance was ill-prepared to handle such a crisis. As Rittimann noted, the alliance lacked its own means and political bandwidth to do more.65 For this reason, NATO and its member states should not miss the opportunity that the COVID-19 crisis offers to set up more structured plans to ensure readiness in crisis management. In particular, they should expand the concept of security to include the most pressing non-military global security threats: climate change, health risks, and social resilience against disinformation.

### Solves Deterrence/Assurance

#### Resilence key to NATO deterrence

NATO, 7-9-2016, North Atlantic Treaty Organization, https://www.nato.int/cps/en/natohq/official\_texts\_133180.htm, "Commitment to enhance resilience," Issued by the Heads of State and Government participating in the meeting of the North Atlantic Council in Warsaw, 8-9 July 2016 (ermo/sms, Acc:6-17-2022)

We, the Heads of State and Government of the North Atlantic Alliance, stand united in our resolve to maintain and further develop our individual and collective capacity to resist any form of armed attack. In this context, we are today making a commitment to continue to enhance our resilience against the full spectrum of threats, including hybrid threats, from any direction. Resilience is an essential basis for credible deterrence and defence and effective fulfilment of the Alliance’s core tasks.

Our commitment is rooted in the North Atlantic Treaty. It is based on the indivisibility of our security and underpins our solidarity and our commitment to defend one another.

#### NATO medical cooperation expands interoperability and builds capacity – NATO says yes

Bundeswehr Medical Service, 2022, https://www.bundeswehr.de/en/organization/bundeswehr-medical-service-/mmcc-emc-, "Multinational Medical Coordination Centre / European Medical Command," No Publication (ermo/sms, Acc:6-20-2022)

Task of the Multinational Medical Coordination Centre / European Medical Command (MMCC/EMC) is to provide coordinating support to the medical services of NATO and EU. The experience made in the management of large-scale medical emergencies or the Ebola crisis has shown that the interdependencies between public health protection and external and internal security are increasing. A future core task of MMCC/EMC will be civil-military cooperation, in particular with the organisations and institutions of the EU nations and establishments. MMCC/EMC supports in the provision and assessment of the medical situation picture for NATO and EU, which is jointly developed with the nations and NATO/EU organisations.

The task spectrum covered ranges from cross-border crisis management to collective and national defence. A particular focus is on CBRN [chemical, biological, radiological, nuclear] medical defence and on the coordination of strategic, supra-national medical evacuation.

On the Way to Multinationality

None of the nations is capable of ensuring the provision of all facets of medical support required for a NATO- or EU-led operation on its own. This is why in autumn 2018 the Surgeon Generals of the Medical Services of NATO and EU called for an additional coordinating medical organisation as an urgent necessity. On 4 September 2019, the 14 member states during a solemn ceremony signed initial operational capability (IOC) of MMCC/EMC. Most recently, during the COMEDS Plenary held in Brussels in late November 2019, the Slovak Republic signed the IOC declaration. By mid-2020, three more states, Poland, Lithuania and Spain, joined the MMCCMultinational Medical Coordination Centre/EMCEuropean Medical Command project.

One of the goals is to increase operational readiness and interoperability of our military medical services through common standards, combined planning and cooperative procurement.

### Solves quickly

#### NATO coordination solves fast – MMCC wargaming exercises prove

Rico Maderthoner, 5-10-2022, Commander J.G. (OF-3) Germany Navy, https://www.bundeswehr.de/en/organization/bundeswehr-medical-service-/largest-simulation-game-of-the-sanitaets-services-5406444, "Largest planning game of the medical services," No Publication (ermo/sms, Acc:6-20-2022)

The Multinational Medical Coordination Centre/European Medical Command (MMCC/EMC) in Koblenz and the NATO Centre of Excellence for Military Medicine (NATO MILMED COE) in Budapest shared the success of the wargaming exercise, which focused on medical care and wound transport in the context of national and alliance defence.

From 02 April to 08 April 2022, the international wargaming took place in Balatonakarattya, Hungary, with a total of 144 military and civilian participants from 23 nations.

In addition, the Koblenzers were linked in as support with their Situation Centre and ensured the connection to the national military patient evacuation centres in Rome (Italy), Zeist (Netherlands) and Koblenz.

Difficult conditions for planning

There were particular challenges in preparing for the exercise: a comparatively short preparation time of nine months, the challenges to EU and NATO medical services caused by the COVID pandemic and the Russian attack on Ukraine, and the reduced number of planning conferences to prepare for the exercise. "Despite this difficult situation, the exercise planning was successful; a lot was just done over the internet," said the head of the planning team, Lieutenant Colonel Andreas G.

The MMCC/EMC contributed its wargaming expertise to the exercise and was responsible for developing the exercise scenario and vignettes as well as the overall exercise control.

Exchange was in the foreground

During the wargaming, the participants had the opportunity for personal interaction in their respective planning sections and spaces - on a tactical and operational level. After two years of COVID pandemic restrictions, this was a great advantage for all participants. Lively discussions enriched with the experiences and skills of the experts from the different countries led to creative approaches and to overcoming the challenges.

Two successful exercises - one business game

By combining the exercises VIGOROUS WARRIOR and CASUALTY MOVE 22 (VW-CAMO 22) into one joint planning simulation, the management of multinational patient flows across different command levels of a large joint NATO operation was practised and analysed.

The VIGOROUS WARRIOR portion of the NATO MILMED COE focused on patient care at the tactical level in the brigade and division areas. The MMCC/EMC CASUALTY MOVE exercise focused on coordinating the flow of patients at the operational level above the divisions back to the home countries.

Initial findings and potential

"The VW22-CAMO22 wargaming was a success at all levels and the main objectives of the exercise were achieved. Considering the complexity of the exercise - the operational level was combined with the tactical level - all participants were challenged in this multinational exercise and were able to take important experiences back to their home locations." says the Director of the MMCC/EMC, Surgeon General Dr Stefan Kowitz, expressing his satisfaction with the initial results of the wargaming exercise.

The exercise and the extensive accompanying discussions provided extremely useful input for the further development of concepts (e.g. Medical Task Force Principle for Brigade), guidelines (e.g. SHAPE Patient Flow Guideline) and standardisation documents (e.g. MEDEVAC-STANAGStandardization Agreement).

Thus, the Koblenz-based company intends to incorporate the knowledge gained and the resulting work packages into its portfolio in order to improve and refine existing concepts.

### Expands coordination beyond NATO

#### NATO leadership is vital to civil preparedness and thus resilience

NATO, 7-9-2016, North Atlantic Treaty Organization, https://www.nato.int/cps/en/natohq/official\_texts\_133180.htm, "Commitment to enhance resilience," Issued by the Heads of State and Government participating in the meeting of the North Atlantic Council in Warsaw, 8-9 July 2016 (ermo/sms, Acc:6-17-2022)

We now face a broader and evolving range of military and non-military security challenges, which is the context for the Alliance’s long term adaptation. Being resilient against these challenges requires Allies to maintain and protect critical civilian capabilities, alongside and in support of military capabilities, and to work across the whole of government and with the private sector. It also requires the Alliance to continue to engage, as appropriate, with international bodies, particularly the European Union, and with partners.

To complement and enable our military capabilities, we will continue to improve civil preparedness. Noting that civil preparedness is above all a national responsibility, we will strive to achieve the agreed requirements for national resilience. We will protect our populations and territory by strengthening continuity of government, continuity of essential services and security of critical civilian infrastructure; and we will work to ensure that our national and NATO military forces can at all times be adequately supported with civilian resources, including energy, transportation, and communications. This will include NATO support to assess and, upon request, facilitate national progress.

#### NATO resilience supports the EU and the UN

CCOE 2019 Civil-Military Cooperation Centre of Excellence (The Hague), “Resilience through Civil Preparedness A CCOE Info Sheet” https://www.cimic-coe.org/resources/fact-sheets/resilience-through-civil-preparedness.pdf, (ermo/sms, Acc:6-17-2022)

In paragraph 83 of the 2016 NATO Warsaw Summit Communiqué, it is stated that “NATO will continue to pursue cooperative security through partnership with relevant countries and other international organizations”. NATO’s main strategic partners for Resilience through Civil Preparedness are the European Union and the United Nations.

#### MMCC spurs EU-NATO coordination

Rico Maderthoner, 11-17-2021, Commander J.G. (OF-3) Germany Navy, https://www.bundeswehr.de/en/organization/bundeswehr-medical-service-/preparations-for-evaluation-exercise-completed-5264046, "Preparations for evaluation exercise completed," No Publication (ermo/sms, Acc:6-20-2022)

Together with representatives of its member nations, final arrangements were made during the two-day online conference regarding the process and the coordination tasks to be performed by the MMCC/EMC. The MMCC/EMC will cooperate with military and civilian services of the EU and NATO.

In November, the MMCC/EMC will demonstrate that it can support and relieve its member nations as well as NATO and the EU by performing coordination tasks in the supranational environment.

Multinational evaluation team provides evidence

A multinational evaluation team from the member nations of the MMCC/EMC will assess the development of the MMCC/EMC over the past two years on the basis of evaluation criteria. This includes the core capability of the MMCC/EMC to act as a NATO and EU coordinating element. The REMI 2021 evaluation exercise is an important instrument for this. For this purpose, the Koblenz team will run through the various processes of medical crisis response with the participating nations and the responsible EU/NATO institutions in the hybrid exercise conducted in November 2021.

The exercise will focus on civil-military cooperation in the context of cross-border crisis management, in particular with NATO and EU organisations and institutions, but mainly with the member nations of the MMCC/EMC. Fields of work and topics include: medical protection against biological threats and coordination of strategic, supranational wounded and sick transport.

"During the three days during exercise REMI 21, tasks will be performed individually, interlinked or building on each other, thus highlighting the various coordination and support services of the MMCC/EMC," says Surgeon General Dr Stefan Kowitz, Director of the MMCC/EMC, looking ahead to the upcoming event.

Situation Centre as a tool

The MMCC/EMC uses the Situation Centre as a tool for this. If the complexity of a task requires the involvement of several MMCC/EMC departments or if the fulfilment of the task is very time-critical, the Situation Centre is activated. By pooling all the capabilities of the MMCC/EMC and its network of experts, the aim is to react quickly to the needs of individual member nations or NATO and EU institutions.

During the REMI, possible medical crises or incidents, some of which may involve supranational hazards, are simulated at various locations on the European continent together with the respective nations. In doing so, the MMCC/EMC tries to provide the affected nations with appropriate stakeholders or service providers through its coordinative capabilities and expert network. Examples of such crises are accidents with increased numbers of casualties or outbreaks of transmissible pathogens.

In addition to the final work for the exercise, which is considered an important milestone for the full operational readiness of the MMCC/EMC, planning is already underway in the background for Exercise Vigorous Warrior/Casualty Move 22 (VW/CAMO 22). This exercise is being developed jointly with the Center of Excellence for Military Medicine (MilMedCOE), which supports the transformation of NATO's medical services. The MMCC/EMC is making its extensive wargaming expertise available for exercise VW/CAMO 22.

#### MMCC cooperation vital to EU/UN solvency layers

Michael Tomelzik, 5-9-2019, Bundeswehr Medical Service https://www.bundeswehr.de/en/organization/bundeswehr-medical-service-/closing-ranks-at-ehrenbreitstein-fortress--525906, "Closing Ranks at Ehrenbreitstein Fortress," No Publication (ermo/sms, Acc:6-20-2022)

Previously, there were two different approaches to the cooperation between the military medical services of NATO and EU. On 3 September 2019, the most senior representatives of the medical services from 14 nations signed a declaration aimed at combining both approaches.

The declaration of Initial Operational Capability (IOC), of the Multinational Medical Coordination Centre/European Medical Command (MMCC/EMC) marked the actual go-ahead of cooperation. "The event is so important because with their signature the most senior representatives of the medical services document their attachment and commitment to this important project of the medical services of NATO and EU", said Brigadier, Medical Corps, Dr Stefan Kowitz, Director MMCC/EMC.

MMCC/EMC

MMCC/EMC serves as connecting link between NATO and EU. Since its setup in December 2017, the multinational centre has been tasked with coordinating the medical capabilities of the different nations. Also, the different requirements on medical operational forces must be harmonised in accordance with NATO, EU and UNUnited Nations mandates so as to be able to be equally ready for all mandates. In the future, MMCC/EMC will also offer services in the fields of patient flow management and medical logistics.

Round table

Although the "round table" in the "Kuppelsaal" (domed hall) of Ehrenbreitstein Fortress was rectangular, it definitely had a signalling effect. The participating nations shall fill with life the MMCC/EMC located in Koblenz as equal partners. Beside the German elements, the multinational element of MMCC/EMC so far consists of a Dutch and a Norwegian liaison officer, a French liaison officer will join in the course of 2020. After achieving Initial Operational Capability, the build-up of MMCC/EMC will continue by the assignment of further liaison officers of the participating nations.

Formal confirmation

In a military ceremony performed at the Koblenz Rhine Barracks on 4 September, IOC was formally confirmed and declared in the presence of the representatives of the 14 participating nations and numerous guests. Witnessed by the representatives of the participating medical services, the Deputy Surgeon General of the Bundeswehr, Major General, Medical Corps, Dr Stephan Schoeps declared Initial Operational Capability of the MMCC/EMC. Subsequently, the Chief Mayor of the city of Koblenz also addressed the multinational representatives and visitors to the ceremony.

Together we are strong

The presence of the most senior representatives of the participating nations underlines the significance of this project. 90% of the EU citizens are living in a country that is member to NATO. Major General, Medical Corps, Dr Stephan Schoeps concluded by underlining the significance of the MMCC/EMC, saying that the resulting collective security needs require the promotion of interoperability between these states, for "together we are strong".

#### US military cooperation will coordinate via MMCC

Rico Maderthoner, 5-25-2021, Commander J.G. (OF-3) Germany Navy, https://www.bundeswehr.de/en/organization/bundeswehr-medical-service-/multinational-coordination-element-expands-network-5085080, "Multinational coordination element expands network," No Publication (ermo/sms, Acc:6-20-2022)

Through its recent agreement with the United States Army 30th Medical Brigade the Multinational Medical Coordination Center/ European Medical Command (MMCC/EMC) is tightening its network of international contacts once again.

On May 11, 30th Medical Brigade Commander Colonel Jason Wieman and MMCC/EMC Director Surgeon General Dr. Stefan Kowitz signed the protocol for the assignment of a United States Army Europe and Africa (USAREUR-AF) Liaison Officer to MMCC/EMC in Koblenz. Brigadier General Mark Thompson, USAREUR-AF Command Surgeon General and functional superior to Colonel Wieman, spoke of an important and future-oriented step. He considers the MMCC/EMC as an important partner for the future of the Theatre Medical Command Europe.

exchange and assistance

The agreement furthers closer cooperation between the two entities. Initially limited for one year, an officer of the US Army Medical Service is available once a week as a liaison person and direct link between both sides. The goal is to take advantage of multinational resource management opportunities by improving information sharing. Another focus is on developing standardized medical approaches to promote multilateral, civil-military cooperation with other medical actors.

"We are very happy about this strong connection that has grown for decades and the good camaraderie between our nations and the medical services on which we will continue to build our future cooperation" said the director of the MMCC/EMC, Surgeon General Dr. Stefan Kowitz. He has a long-standing personal connection with the respective USAREUR-AF Command Surgeons, who also hold the position of Commanding General of the Regional Health Command Europe.

The focus of the intensified form of cooperation is on information exchange and harmonization for the development of a detailed, shared medical situation assessment within Europe. In addition, the MMCC/EMC will be supported in the participation of multinational exercises and conferences, planning and coordination of projects. In return, the MMCC/EMC, with its network of experts provides the coordination expertise for multinational and civil-military solution approaches.

#### MMCC cooperation triggers medical situational awareness

Rico Maderthoner, 3-29-2021, Commander J.G. (OF-3) Germany Navy, https://www.bundeswehr.de/en/organization/bundeswehr-medical-service-/milestone-for-future-cooperation-with-nato-5046516, "Milestone for future cooperation with NATO," No Publication (ermo/sms, Acc:6-20-2022)

With their signatures, the Directors of the Multinational Medical Coordination Centre / European Medical Command (MMCC/EMC) and the NATO Centre of Excellence for Military Medicine (MILMED COE) on 18 March 2021 laid the foundation for the future cooperation of both organisations

The 5-page document outlines the major tasks of both organisations and their respective focus areas and responsibilities.

"Our common focus must be on facing the medical requirements of today efficiently and with all our expertise", emphasized the Director MMCC/EMC.

Practise complementary and coordinated cooperation here

The clear definition of the main tasks of both organisations enables to make effective use of resources. Core task of MMCC/EMC is the medical cooperation with SHAPE and its subordinate commands at operational level. These activities are supplemented by the improvement of civil-military cooperation and Medical Service resilience.

MMCC/EMC and NATO MILMED COE will continue to harmonise their work programme to avoid duplication of effort. Both organisations have agreed on regular coordination meetings on a quarterly basis.

Important step towards capability development

With this coordination document, MMCC/EMC has taken another fundamental step towards capability development of the future international medical hub for medical situational awareness.

For the last development phase, the team around the Director, Brigadier, Medical Corps, Dr Stefan Kowitz, is currently planning for exercise "Resilient Medical Interface 2021" in November. During this exercise, MMCC/EMC intends to demonstrate its capabilities. Owing to the pandemic, however, the ceremony on the occasion of the solemn commissioning of the new multinational coordination element of NATO and EU will only take place in March next year.

#### SGD aff mod

Katherine Aguirre,, 6-21-2021, researcher at the Igarapé Institute. Gordon LaForge is a senior researcher at Princeton University and a lecturer at Arizona State University’s Thunderbird School of Global Management. Robert Muggah is a principal at the SecDev Group, a co-founder of the Igarapé Institute, and the author, with Ian Goldin, of Terra Incognita: 100 Maps to Survive the Next 100 Years. Twitter: @robmuggah Anne-Marie Slaughter is the CEO of New America https://foreignpolicy.com/2021/06/21/global-vaccination-covax-gavi-covid-19-pandemic-impact-hubs-public-private-funding-united-nations/, "Three Years Is Too Long to Wait for a Global Vaccine Rollout," Foreign Policy (ermo/sms, Acc:6-20-2022)

Ending the pandemic is just the first step to recovery. COVID-19 has triggered setbacks in virtually every one of the United Nations’ Sustainable Development Goals, from reducing poverty and inequality to improving health and education. The pandemic has also accelerated urgent security challenges, from digital harms to military confrontation. If the current system of global cooperation fails to help the world recover, grievances and mistrust toward the United Nations and member states will intensify. If the world is to build back better—and develop the capability to address the looming crises of the future—then impact hubs are needed.

### Solves New Threats

#### MMCC key to address hybrid threats

Rico Maderthoner, 12-7-2020, Commander J.G. (OF-3) Germany Navy, https://www.bundeswehr.de/en/organization/bundeswehr-medical-service-/resilient-response-2020-successfully-completed--4882638, "Resilient Response 2020 Successfully Completed," No Publication (ermo/sms, Acc:6-20-2022)

From 23 to 27 November 2020, the Multinational Medical Coordination Centre / European Medical Command (MMCC/EMC) in Koblenz conducted the exercise Resilient Response 2020 (RERE 20). Fifteen nations had enrolled for the war game. Owed to the current Corona situation, this exercise was carried out only online.

All of the more than 70 participants in exercise RERE 20 agreed that communication is the key to success. During the three-day war game, representatives of international armed forces and authorities simulated their strategies and cooperation in the event of an epidemic/pandemic situation and exercised different responses to the outbreak of a highly contagious virus disease.

For more than seven months, the military personnel of MMCC/EMC in Koblenz had prepared the pandemic simulation exercise in cooperation with the European Centre of Excellence for Countering Hybrid Threats (Hybrid CoE) in Helsinki and the Federal Office of Civil Protection and Disaster Assistance. Coordinator on the part of the Federal Office of Civil Protection and Disaster Assistance was Dr Martin Weber who at the same time acted as Lead Facilitator of the exercise. In this function, he briefed the players on the scenario at the beginning of the respective round of the game. In one round for instance, this was the approach to phenomena of a second wave of infection.

Corona-Pandemic challlenges

The fact that owing to the current quarantine and travel restrictions most of the exercise had to be carried out online faced the organisers with additional challenges. In order to enable a smooth exchange between the players, a complex IT infrastructure was temporarily installed at MMCC/EMC, and more than 100 virtual chatrooms were established at short notice.

"After months of preparation and under the given, adverse conditions, it is great to see how our war game is filled with life by the players," said Lieutenant Colonel, Pharmacy Corps, Ronnie Michel. As Exercise Director and responsible developer of the exercise RERE 20, he was enthousiastic about the commitment and the creativity of the 15 nations enrolled for the exercise.

Complexes instructions

To make the simulation as realistic as possible for the participants, MMCC/EMC developed complex models simulating the course of a virus epidemic. During the war game, data were updated continuously based on the decisions made by the players. "The days of the exercise were a challenge for my team", said Lieutenant Colonel (Medical Corps) Dr Maren Kosak, Head of the Medical Situational Awareness / Civil-military Interface Branch at MMCC/EMC. In her function as head of the simulation cell she was responsible for the data base of the war game. "At the end of each action phase, within a very short time key figures on the development of the pandemic, the economic situation, and also on the mood among the population had to be calculated on the basis of the decisions made by the participants and re-transmitted to the countries."

Additional hybrid threats

In the course of the four rounds between the initial outbreak of the novel disease and availability and distribution of a vaccine, the participants had to deal not only with the occurrence and course of the infection and its impact on the economy and the mood of their respective nations. Various hybrid threats introduced by the members of the Hybrid CoE unexpectedly provided additional depth to the game.

While in one country prominent personalities doubted the dangerous nature of the virus and, thus, irritated the population, cyber attacks in other countries brought important clinics and research facilities to a standstill. Also these challenges were swiftly overcome by the close cooperation of the participants. "The war game offered a great opportunity to bring home to the participating nations the complexity of a coordinated response to the pandemic", said Shiho Rybski, Director for Training and Exercises at Hybrid CoE, with satisfaction.

#### MMCC capacity checks CBW impacts

Rico Maderthoner, 5-7-2021, Commander J.G. (OF-3) Germany Navy, https://www.bundeswehr.de/en/organization/bundeswehr-medical-service-/certification-exercise-remi-2021-takes-shape-5072222, "Certification exercise REMI 2021 takes shape," No Publication (ermo/sms, Acc:6-20-2022)

The Multinational Medical Coordination Centre/European Medical Command (MMCC/EMC) in Koblenz reaches the next milestone towards the main event in November.

The framework has been set since February. During a structured planning conference carried out per VTC from 26 to 28 April, the planning team around Lieutenant Colonel Andreas Godau and the participants filled with life the scenario already introduced in February. "One of the future core tasks of MMCC/EMC will be civil-military cooperation in cross-border crisis management, in particular with the organisations and institutions of NATO and the EU nations and establishments." With these words, the Director MMCC/EMC, Brigadier Dr Stefan Kowitz, at the same time describes the framework of the exercise.

Together with its member nations, MMCC/EMC as coordination element of NATO and EU will demonstrate its capabilities. In November 2021, the MMCC/EMC team in Koblenz to this end will play through and test the different processes of medical crisis response with the participating nations and the responsible EU/NATO establishments during the exercise that will be a hybrid one. During the three days of exercise REMI 21, the coordination and support services of MMCC/EMC will be examined by means of various individual tasks to be accomplished.

Certification for an emergency

Events of different levels of intensity will be simulated for the respective individual tasks, either individually, or in an interconnected or progressive fashion. The range will extend from responding to the dissemination of a biological agent to disaster assistance in the event of an earthquake. "For us, a particular focus lies on the issue of medical protection against nuclear, biological and chemical threats (CBRNchemical, biological, radiological, nuclear medical defence) and the coordination of strategic medical evacuation," the Director MMCC/EMC elaborates on the numerous tasks of his organisation.

The aim is multinational cooperation and the identification of potential

The main focus of the exercise will be on the cooperation with the numerous civilian and military points of contact from the meanwhile wide international network. The aim, however, will also be to identify potential that still exists to enhance and improve the portfolio of the multinational hub for medical civil-military cooperation and expertise.

#### MMCC biosensor leadership key to telehealth

Rico Maderthoner, 4-13-2021, Commander J.G. (OF-3) Germany Navy, https://www.bundeswehr.de/en/organization/bundeswehr-medical-service-/multinational-workshop-on-biosensor-technology-5054550, "Multinational Workshop on Biosensor Technology," No Publication (ermo/sms, Acc:6-20-2022)

Biosensors Supporting Healthcare in Missions will be the central theme of the virtual event, during which MMCC/EMC – together with the Committee of the Chiefs of Military Medical Services in NATO (COMEDS) and international stakeholders in the fields of telehealth and biosensor technology – will combine military and civilian expertise with the latest scientific developments.

More than 80 participants from 14 nations

The wide range of international participants from science and the armed forces enrolled for this event gives reason to expect an interesting and multifaceted programme around the core points "fitness for duty", "biosensor technology in support of health and medicine", and potential "guidelines and limits in the use of biosensors". MMCC/EMC has been able to win over leading military officers and scientists from the fields of biology, physics, medicine, cyber and IT, sports and health to identify common new fields of action and, thus, lay the foundation for future international projects and high-quality results. MMCC/EMC, thus, breaks new ground in this rapidly growing subject area. Synergy effects can be exploited and parallel developments reduced.

The aim is to support health care on operations

The advantages of using portable Biosensors Supporting Healthcare in Missions have continuously increased in recent years. Several solutions are on the brink of being implemented by the military medical services of several nations.

By bringing together leading experts from the bio-sensor technology field, MMCC/EMC as a hub for civil-military medical expertise will make a contribution to establishing a community of interest (COI) in the field of telehealth, and to identifying common fields of activity and future projects with participating nations.

### Solves via buzzwords

#### MMCC solves past NATO via Framework Nations Concept

Rico Maderthoner, 4-7-2021, Commander J.G. (OF-3) Germany Navy, https://www.bundeswehr.de/en/organization/bundeswehr-medical-service-/multinational-medical-care-nato-response-force-land-5050504, "Multinational medical care for NATO Response Force Land," No Publication (ermo/sms, Acc:6-20-2022)

The Multinational Medical Coordination Centre/European Medical Command (MMCC/EMC) has been tasked with the coordination of the multinational medical contributions of the NATO Response Force Land 2022-2024.

As one of the framework nations, Germany will provide the brigade of the NRF Land in 2023 again. Altogether eight nations will participate in this major unit. The threads for the various multinational medical portions come together in Koblenz. The lead nation has tasked MMCC/EMC to head the Multinational Medical Working Group (steering element to coordinate the multinational medical forces) for the NRF brigade. The brigade constitutes the spearhead of the NRF.

Concept for the development of medical capabilities

Initial focus of efforts is the conceptual buildup of the multinational medical forces. In this process, it is determined by consensus which nation can make which medical contribution to the NATO brigade. "These contributions range from the commitment of materiel through to individual posts," says Lieutenant Colonel Stephan Wüsthoff, head of the multinational planning body. He admits, "Planning is much easier when representatives of the participating nations are permanently on site, as is the case at MMCC/EMC".

Quick finalisation an early and lasting success

The buildup of forces was followed by the development of the multinational medical concept. This comprehensive concept, which describes the medical procedures, responsibilities and collaboration relationships, meanwhile is in the process of being staffed by the troop-contributing nations of the brigade. This quick development of the concept can be assessed as a success for the nations and MMCC/EMC. The head of the planning group is sure "that this concept will serve as a blueprint for other nations and medical lead units in the future". "Our goal, of course, is to simultaneously develop a data base for this kind of documents to preserve the expertise for future provisions of materiel and forces for NRF", he refers to the result of his efforts.

MMCC/EMC as multinational coordination element

According to the Framework Nations Concept, it is also possible for other NATO partner nations to have MMCC/EMC carry out these coordination tasks for the medical service parts of the provision of NATO forces. "This coordinating function can also be used for the medical forces of the EU Battle Group, the military crisis response forces of the European Union. Here, too, we have contributed our experience and skills," says the Director MMCC/EMC, Brigadier, Medical Corps, Dr Stefan Kowitz with a view to the tasks of his organisation.

Germany as Framework Nation for the spearhead of NATO

Together with the Netherlands and Norway, Germany - all three forming the Lead Nation Group - will provide the lead unit for NRF(L) 2022 -2024. The focus, here, will be the buildup of the Very High Readiness Joint Task Force Land 2023 (VJTFVery High Readiness Joint Task Force(L)) as part of the NATO Response Force. This rapidly deployable force was initiated at the Wales NATO Summit in 2014.

#### MMCC cooperation facilitates PESCO

Dr Stefan Kowitz, 3-8-2021, Director MMCC/EMC https://www.bundeswehr.de/en/organization/bundeswehr-medical-service-/a-lighthouse-project-bridging-nato-and-eu-5039060, "A lighthouse project bridging NATO and EU," No Publication (ermo/sms, Acc:6-20-2022)

Brigadier, Medical Corps, Dr Stefan Kowitz answers the questions of the European Parliament on the European Medical Command, one of the first PESCO (Permanent Structured Cooperation) Projects.

On 25 February 2021, the Director of the Multinational Medical Coordination Centre / European Medical Command (MMCC/EMC), Brigadier, Medical Corps, Dr Stefan Kowitz, briefed the Subcommittee on Security and Defence (SEDE) of the European Parliament on the setup of this new multinational organisation. He explained the roots of the organisation originating from NATO and EU initiatives, for both of which Germany is the framework nation. One of the projects is the so-called Permanent Structured Cooperation (PESCO) with the European Medical Command. PESCO is one of the most important defence initiatives of the EU. Therefore, the members of the European Parliament were interested in getting an overview on the development and progress of MMCC/EMC and on the integration of the PESCO project into MMCC/EMC. Task of MMCC/EMC is to support the medical services of NATO and the EU. The experiences made in the management of large-scale medical emergencies, the Ebola crisis and the COVID-19 pandemic have shown that the interdependencies between public health protection and external and internal security are increasing.

Multinational network as a hub for medical expertise

"In our unique position, we, the Multinational Medical Coordination Centre/European Medical Command, build bridges between civilian and military medical expertise and stakeholders of NATO and the EU as well as their nations and institutions. We are a coordinating body for military and civilian medical interoperability and the operational readiness of medical forces", the Director of MMCC/EMC outlined the core mission. As demonstrated in the current COVID-19 crisis, the military medical services make an important contribution to coping with the pandemic, but serve as so-called last reserve beside the civilian main force. An essential factor for cooperation and the development of a civil-military multinational medical network concept, procurement, stockpiling and disaster relief exercises must be harmonised and be mutually complementary between the civilian and military medical services and forces wherever possible and useful. This way, improvement of the common multinational medical resilience is achieved. In this context, Brigadier Dr Kowitz mentioned DG ECHO (Directorate-General European Civil Protection and Humanitarian Aid Operations) and DG SANTE (Directorate-General for Health and Food Safety) as EU institutions and important points of contact for the common development of future holistic concepts.

Tangible successes during the setup

In his briefing, Dr Kowitz could also report on initial successes. For instance, MMCC/EMC developed a stockpiling system for NATO and then extended it into a modular concept ("M3-EPS") for the reinforcement of medical treatment facilities with these modules. The aim is to be prepared more quickly and effectively for epidemic or pandemic situations, for instance by increasing intensive care capacities. The Bundeswehr applied the principle of such a medical augmentation element for intensive care units for its bilateral support in Portugal.

Another focus is the wargaming conducted at MMCC/EMC. In close cooperation with the European Centre of Excellence for Countering Hybrid Threats (Hybrid CoE) and the Federal Office of Civil Protection and Disaster Assistance, MMCC/EMC hosted a war game with a pandemic focus in Koblenz from 23 to 27 November 2020 ("Resilient Response 2020"). Exercise Resilient Response 2020 offered the opportunity to train necessary decision-making processes developing in the course of the different phases of a pandemic.

Functionality, interoperability, and efficiency

Central elements of the work done at MMCC/EMC are the development of a medical situation picture for Europe and increasing interoperability through the further harmonisation of national medical standards. This work is supported essentially by the medical standards already applicable in the EU.

This year, an important highlight of MMCC/EMC's efforts will be a virtual expert meeting in late May on the use of biosensors and telemedicine within the scope of medical support. MMCC/EMC offers itself for bringing together national and international experts and for contributing to pooling the wide range of activities. In addition, potential ethical questions and requirements of the regulation on medical equipment associated with the use of this technology shall be analysed within the scope of this workshop.

#### STO research leadership key to NATO cred

Nato, 5-16-2022, https://www.nato.int/cps/en/natohq/topics\_88745.htm, "NATO Science and Technology Organization," NATO (ermo/sms, Acc:6-23-2022) NATO Science and Technology Organization (STO)

Main tasks and responsibilities

The STO generates and exploits a leading-edge science and technology programme of work, delivering timely results and advice that advance the defence capabilities of Allies, partners and NATO in support of the core tasks of collective defence, crisis management and cooperative security.

It also supports decisions made at both national and NATO level by providing advice to the North Atlantic Council and national leadership.

The STO achieves its mission by nurturing a community of more than 6,000 actively engaged scientists. The STO network draws upon the expertise of more than 200,000 people in Allied and partner nations.

Structure

The STO is governed by the NATO Science and Technology Board (STB). The Board administers the STO’s scientific and technical committees and its three executive bodies: the Centre for Maritime Research and Experimentation (CMRE) in La Spezia, Italy; the Collaboration Support Office in Paris, France; and the Office of the Chief Scientist at NATO Headquarters in Brussels, Belgium.

The Chief Scientist is the chairman of the STB and the senior science advisor to the North Atlantic Council.

The scientific and technical committees, composed of members from national and NATO bodies, direct and execute NATO’s collaborative science and technology activities.

The CMRE organises and conducts scientific research and technology development, centred on the maritime domain, delivering innovative solutions to address the Alliance’s defence and security needs.

The CMRE conducts hands-on scientific and engineering research for the direct benefit of both NATO and such customers as research entities and industry. The Centre operates NATO’s two research vessels that enable science and technology solutions to be explored and developed at sea. This allows unique and specialised research to be conducted in core areas of interest for NATO. The CMRE’s engineering capability enables rapid exploitation of concept prototypes for use in trials and military experiments. The Centre also has a scientific and engineering knowledge base composed of a dedicated science platform and publications, for use across NATO.

Evolution

To safeguard Alliance freedom and shared values, it is of critical importance for NATO and its partner nations to maintain the edge in defence and security. Discovering, developing and utilising advanced knowledge and cutting‑edge science and technology is fundamental to maintaining the technological edge that has enabled Alliance forces to succeed across the full spectrum of operations over the past decades.

The STO was created through the amalgamation of the Research and Technology Organization and the NATO Undersea Research Centre. These bodies were brought together following a decision at the 2010 NATO Summit in Lisbon to reform the NATO agency structure.

The STO, along with its predecessor organisations, has been instrumental in enabling that success, both within the nations and for NATO itself.

By providing a critical venue for knowledge development and delivery, the STO remains committed to its foundational principle: bringing together subject matter experts from across the scientific spectrum with military end users in order to inform decision‑makers on emerging challenges and opportunities, and to ensure the technological advantage of the Alliance and its partners.

## Biosafety Extensions

### Experimentalist Governance solves

#### Collaboration accelerates virus identification & sequencing

Jocelyn Solis-Moreira 11-13-2021, New York-based health and science journalist with experience writing about medical research, mental health, and psychology. She has a degree in integrative neuroscience and a Master’s in psychology concentrating on behavioral neuroscience, Fact checked by Anna Guildford, Ph.D., https://www.medicalnewstoday.com/articles/how-did-we-develop-a-covid-19-vaccine-so-quickly, "COVID-19 vaccine: How was it developed so fast?," Medical News Today (ermo/sms, Acc:6-22-2022)

Worldwide collaboration

Under normal circumstances, making a vaccine can take up to 10–15 years. This is because of the complexity of vaccine development.

Dr. Michael Parry, the chair of infectious diseases at Stamford Health in Stamford, CT, told MNT that vaccines train our immune system to remember an infectious agent without us having to contract it.

“Traditionally, they have contained weakened or inactivated parts of a particular virus (antigen) to trigger an immune response within the body. These vaccines will prompt the immune system to respond, much as it would have on its first reaction to the actual pathogen.”

However, amid a global pandemic, time was a luxury the world could not afford. Researchers quickly mobilized to share their coronavirus data with other scientists.

Dr. Yager said that thanks to advances in genomic sequencing, researchers successfully uncovered the viral sequence of SARS-CoV-2 in January 2020 — roughly 10 days after the first reported pneumonia cases in Wuhan, China. The ability to fast-track research and clinical trials was a direct result of this worldwide cooperation.

#### Only experimentalist governance can solve

Yang Xue 1,2, Hanzhi Yu 3,\* and Geng Qin 3, 12-20-2021, 1 Law School, Tianjin University, Tianjin 300072, China; 2 Center for Biosafety Research and Strategy, Tianjin University, Tianjin 300072, China 3 School of Public Affairs, Zhejiang University, Hangzhou 310058, China; https://www.mdpi.com/2071-1050/13/24/14056/htm, "Towards Good Governance on Dual-Use Biotechnology for Global Sustainable Development," Sustainability Volume 13 Issue 24 10.3390/su132414056 (ermo/sms, Acc:6-22-2022)

3. Governing Dual-Use Biotechnology Based on Experimentalist Governance Model

3.1. Experimentalist Governance Framework

The risk of information asymmetry, the lack of knowledge of risks of abuse associated with research [36], and the unpredictability of human-made risks of dual-use biotechnology have caused a systematic dysfunction of “bottom-up” autonomy mode and “top-down” management-based regulation mode [37]. For these reasons, we cannot hope for a “one size fits all” solution.

To escape the predicament of dual-use biotechnology risk governance, it is necessary to re-examine current governance ideas and practices and propose targeted governance principles for existing problems, thus establishing a corresponding and specific governance mechanism. It is better to adopt the experimentalist governance mode, which includes “bottom up” and “top down” elements, to compensate for the limitations of different stakeholders (see Figure 1).

Experimentalist governance is a multi-layered mode of governance. It establishes an open-ended framework from the top and offers stakeholders in the field of dual-use biotechnology the freedom of discussion.

The goal of experimentalist governance is to reflect on and institutionalize policies in grassroots practice according to local conditions [38]. This approach could guide the country through policy uncertainties, assist in breaking the fetters of traditional authority and value norms, help practitioners remove the constraints of absolute interest and relative income distribution, optimize governance, and transform central organization departments from command-type to service-type [39,40].

In 2008, Sabel and Zeitlin first proposed experimentalist governance theory with the practice of EU governance under the recursive learning in decentralized compliance with international conventions [41,42]. Since then, experimentalist governance has been applied to global governance. Sandra and Tanya improved the dynamic structure in international society by relying on framework goals, reporting obligations, peer review and consultation processes [43]. This process included setting framework goals, letting the grassroots units implement those goals, regularly reporting and conducting peer evaluation, and periodically revising the framework.

In the view of the high uncertainty and potential implementation cost, Sabel and Victor institutionalized global experimentalist governance by setting of provisional goals under due process [44], which were then reviewed, revised, and promoted during implementation, and such experimentalist governance actions must rely on the robust support of governance mechanisms (for example, penalty defaults, which could promote joint action of public and private participants and increase the chances of success).

Global experimentalist governance has been extensively used in environmental issues. Among the most significant achievements of experimentalist governance are the Montreal Protocol [45,46], the Paris Agreement on Global Climate Change [44,47], the Climate and Clean Air Coalition to Reduce Short-Lived Climate Pollutants (CCAC) [48], the Forest Law Enforcement, Governance and Trade (FLEGT) [49], and the Global Food Safety Initiative [50].

#### Consensus mechanisms key to experimental governance model

Yang Xue 1,2, Hanzhi Yu 3,\* and Geng Qin 3, 12-20-2021, 1 Law School, Tianjin University, Tianjin 300072, China; 2 Center for Biosafety Research and Strategy, Tianjin University, Tianjin 300072, China 3 School of Public Affairs, Zhejiang University, Hangzhou 310058, China; https://www.mdpi.com/2071-1050/13/24/14056/htm, "Towards Good Governance on Dual-Use Biotechnology for Global Sustainable Development," Sustainability Volume 13 Issue 24 10.3390/su132414056 (ermo/sms, Acc:6-22-2022)

3.2. Stage 1: Achieving Consensus on a General Global Governance Framework with

Open-Ended Principles

The first links of the experimental governance model is to invite as many stakeholders as possible to participate in the discussion, to construct an authoritative international platform for the discussion, to set an open-ended principle, and to form a legally binding agreement. The Biological Weapons Convention of the United Nations is an open-ended model platform. It can establish communication among countries, and create opportunities for other non-state actors to participate in discussions through the mechanism of experts’ meetings, side events and best practice sharing in order to systematically monitor and review developments in science and technology. We believe that for the risk of dual-use biotechnology, all stakeholders need to reach a consensus on three principles: (1) risk communication, (2) process transparency, and (3) subjectivity.

First, all States Parties should regard multi-party risk communication as the basic principle of governance. The National Research Council of the U.S. defines “risk communication” as an “interactive process in which individuals, groups, and institutions exchange information and ideas” [51]. Risk communication plays an important role in resolving conflicts caused by differing perceptions, as there is generally disagreement among the public, government officials, scientists and industries about the nature and severity of risks [52]. Under the media rendering of dual-use biotechnology in animal soldiers, genetic weapons, and super soldiers, the public become fearful of these artificial creatures as “unknown, frightening, uncontrollable, catastrophic and may affect future generations.” Due to this bias, politicians and the public tend to pay more attention to the risk of bioterrorism than to other kinds of risks [53]. Therefore, it is essential to strengthen and extend contact and communication among biotechnologist, policy makers, social scientists and the public.

Second, it is also vital to strengthen the principle of transparent supervision throughout the process of life science research. It is important to monitor all dual-use biological testing activities that may increase the toxicity of biological agents or toxins or change the host range. All participants in research involving class I and II pathogenic microorganisms, biosafety level III or above laboratories, and vaccines and biological drugs production units, should be required to submit test contents, experiment implementation, contingency plans and other documents for approval before they conduct their scientific research. Those process could complete the supervision chain of “project initiation–review–approval– implementation–verification”, thus ensuring rigorous supervision of scientific research.

Third, systematic and sustained awareness-raising and education in biorisk management are crucial to building a culture of safe, secure and responsible research of dual-use biotechnology. The culture of safe, secure and responsible research emphasizes that enable effective awareness-raising of the security dimensions of life science research; promote research integrity and the responsible use of science; enhance accountability practices among practitioners; and foster access to emerging capabilities.

#### Managed biotech can mitigate ecological impacts

Yang Xue 1,2, Hanzhi Yu 3,\* and Geng Qin 3, 12-20-2021, 1 Law School, Tianjin University, Tianjin 300072, China; 2 Center for Biosafety Research and Strategy, Tianjin University, Tianjin 300072, China 3 School of Public Affairs, Zhejiang University, Hangzhou 310058, China; https://www.mdpi.com/2071-1050/13/24/14056/htm, "Towards Good Governance on Dual-Use Biotechnology for Global Sustainable Development," Sustainability Volume 13 Issue 24 10.3390/su132414056 (ermo/sms, Acc:6-22-2022)

4. Conclusions

In the management of dual-use biotechnology risk, in addition to the predicament of technology iteration and governance rules caused by systematic internal attributes, the complex external environment has also exacerbated the contradiction between the demands of private subjects and social consensus. To this end, the experimental governance model could be a way of achieving good governance on dual-use biotechnology. The United Nations’ “Living with Risk” proposal states that the risks facing human beings are the result of multiple environmental factors [62]. Thus, we must continue to develop dual-use biotechnology. At the same time, we need to adjust global governance strategy periodically to adapt to and meet the new requirement of sustainable development.

### Panviral approaches solve

#### Panviral approaches solve all future diseases – funding & coordination key

Jennifer Kahn 4-21-2020 UC Berkeley Graduate School of Journalism “How Scientists Could Stop the Next Pandemic Before It Starts” New York Times Magazine <https://www.nytimes.com/2020/04/21/magazine/pandemic-vaccine.html> (ermo/sms, Acc:6-22-2022)

On a cold morning in February 2018, a group of 30 microbiologists, zoologists and public-health experts from around the world met at the headquarters of the World Health Organization in Geneva. The group was established by the W.H.O. in 2015 to create a priority list of dangerous viruses — specifically, those for which no vaccines or drugs were already in development. The consensus, at least among those in the room, was that as populations and global travel continued to grow and development increasingly pushed into wild areas, it was almost inevitable that once-containable local outbreaks, like SARS or Ebola, could become global disasters.

“The meeting was in a big room, with all the tables arranged around the edge, facing each other,” one of the group’s members, Peter Daszak, recalled recently. “It was a very formal process. Each person was asked to present the case for including a particular disease on the list of top threats. And everything you say is being taken down, and checked factually, and recorded.”

Daszak, who directs the pandemic-prevention group EcoHealth Alliance and is also chairman of the Forum on Microbial Threats at the National Academies of Sciences, Engineering and Medicine, had been given the task of presenting on SARS, a lethal coronavirus that killed roughly 800 people after it emerged in 2002. (SARS stands for Severe Acute Respiratory Syndrome and is officially known as SARS-CoV-1.) “We’d done a lot of research on coronaviruses, so we knew they were a clear and present danger,” he told me. “High mortality, no drugs or vaccines in the pipeline, with new variants that could still be emerging.”

The discussion, he said, was intense. “Everyone else in the room knows the facts already — they’ve read all the research,” Daszak said. But for each pathogen, the speaker had to convince the room that it presented a significant threat — “that this disease really could take off, and that we should concentrate on it rather than on Lassa fever or something else. So, you argue the case, and then people vote. And sometimes it gets quite heated. I remember that monkey pox was an issue, because there are outbreaks, but there’s really nothing we can do about them. It was a really rigorous, really excellent debate — and then afterward, we went and had fondue.”

The final list — which did contain SARS and MERS, along with seven other respiratory, hemorrhagic or otherwise-lethal viruses — also included something the W.H.O. dubbed “Disease X”: a stand-in for all the unknown pathogens, or devastating variations on existing pathogens, that had yet to emerge. Daszak describes Covid-19, the disease caused by the virus SARS-CoV-2, as exactly the kind of threat that Disease X was meant to represent: a novel, highly infectious coronavirus, with a high mortality rate, and no existing treatment or prevention. “The problem isn’t that prevention was impossible,” Daszak told me. “It was very possible. But we didn’t do it. Governments thought it was too expensive. Pharmaceutical companies operate for profit.” And the W.H.O., for the most part, had neither the funding nor the power to enforce the large-scale global collaboration necessary to combat it.

As Covid-19 has spread around the world, overwhelming hospitals and even mortuaries, there has been widespread consternation over how we could have been caught so flat-footed by a virus. Given all the shining advances of high-tech medicine — computer-controlled surgery, unprecedented immunotherapies, artificial-intelligence programs for assessing heart-disease risk — this failure feels utterly baffling. How could the entire world remain so powerless? More important, what could be different next time?

According to some infectious-disease experts, the scientific tools already exist to create a kind of viral-defense department — one that would allow us to pursue a broad range of vital global projects, from developing vaccines and drugs that work against a wide range of pathogens to monitoring disease hot spots and identifying potential high-risk viruses, both known and unknown. What’s lacking is resources. “We really did miss the wake-up call,” Daszak says. “The alarm went off with SARS, and we hit the snooze button. And then we hit it again with Ebola, with MERS, with Zika. Now that we’re awake, we should think about where to go from here.”

In late March, Vincent Racaniello, host of the podcast “This Week in Virology” and a professor at Columbia University, conducted an interview with the pediatric infectious-disease expert Mark Denison. Denison, who teaches at Vanderbilt University Medical Center, led a team that developed one of the most promising current treatments for Covid-19: the drug remdesivir, currently being tested by the pharmaceutical company Gilead Sciences.

On the show, Denison noted that because it is almost impossible to predict which virus might cause the next pandemic, researchers had long argued that it was essential to design panviral drugs and vaccines that would be effective against a wide range of strains: all types of influenza, for instance, or a substantial group of coronaviruses rather than just one. When his lab was first applying for a grant to study remdesivir, Denison recalled, that was already the goal. “We don’t want to work with a compound unless it inhibits every coronavirus we test,” Denison said. “Because we’re worried about MERS, we’re worried about SARS-1, but they’re not really our problem. The future is the problem.”

Panviral drugs — ones that work broadly within or across virus families — are harder to make than broad-spectrum antibiotics, largely because viruses work by hijacking the machinery of our cells, harnessing their key functions in order to replicate. A drug that blocks one of those functions (e.g., the production of a particular protein) is often also disrupting something that our own cells need to survive. Researchers have begun to find ways around that problem, in part by refining which process a drug targets. But they’ve also begun to test existing drugs against a wider array of viruses. It was in just such a follow-up screen that Gilead discovered that remdesivir, originally developed to treat hepatitis C and later tried against Ebola, might be effective against coronaviruses. (Favipiravir, an influenza drug developed in Japan, is another broad-spectrum candidate.) The reason drugs sometimes work in extremely different diseases — in, say, Ebola and coronaviruses and flu — is that they block some common mechanism. Remdesivir and favipiravir, for instance, each mimics a key building block in a virus’s RNA, which, when inserted, keeps the virus from replicating. “It’s definitely possible to make a drug that would work across a good range of coronaviruses,” Racaniello says. “We honestly should have had one long ago, since SARS in 2003. It would have taken care of this outbreak in China before it got out. And the only reason we didn’t is because there wasn’t enough financial backing.”

Panviral vaccines are also becoming a real possibility. In recent years, a number of prospective universal flu vaccines have been developed that work by targeting not the virus’s globular head, which mutates easily, but its stalk, which barely mutates at all. (As Daszak noted, if this outbreak had been a flu rather than a coronavirus, we’d be in much better shape.) Another new approach, mRNA vaccines, works by exploiting messenger RNA — a kind of courier that communicates the genetic instructions for making proteins — to drive an immune response. The advantages of mRNA vaccines are potentially enormous, in part because they can be made very quickly (one month instead of six for a known strain; two to three months for a novel virus) but also because they can be made on a vast scale (billions of doses, compared with the 100,000 doses that were needed for the Ebola epidemic). They’re extremely adaptable too: If a researcher can develop a platform that works with this coronavirus, it’s easy to redesign it for the next one. (One mRNA start-up, Moderna, set a drug-industry record by creating a prospective Covid-19 vaccine, mRNA-1273, in just 42 days, using the virus’s genetic sequence. The drug is currently in Phase 1 clinical trials to be safety-tested on healthy volunteers.) And while no mRNA vaccines have yet received F.D.A. approval, Covid-19 will almost certainly change that.

But for years, Racaniello notes, the real obstacle to making panviral drugs or vaccines has been that no one was willing to pay for their development. For pharmaceutical companies, he points out, panviral vaccines are simply a terrible business proposition: Companies have to spend hundreds of millions of dollars to develop a shot that people will get once a year at most — and not at all in years when no particular disease is ascendant.

Panviral drug treatments are unprofitable for similar reasons. For one, the course of treatment is short, usually just a few weeks; for chronic diseases (diabetes, high blood pressure), patients take regimens of pills daily, often for years. (One person noted that Gilead’s stock price actually dropped after the company produced a revolutionary hepatitis C drug. Because the treatment completely cured patients, the market for it started to shrink, undermining the company’s bottom line.)

The other problem is that there’s currently no way to quickly test for most viruses, which is essential if a doctor wants to establish a diagnosis and prescribe the right drug. As a result, Racaniello says, it’s “a chicken-and-egg situation: No one is developing drugs for these viruses because there’s no way to test for them. And no one is developing tests, because there aren’t any drugs to prescribe.”

### Biotech solves everything

#### BT solves disease

Ronit Langer & Shruti Sharma, 11-20-2020, Carnegie Endowment for International Peace (Technology and International Affairs Fellow & Technology and Society Sr. Research Analyst), https://carnegieendowment.org/2020/11/20/blessing-and-curse-of-biotechnology-primer-on-biosafety-and-biosecurity-pub-83252, "The Blessing and Curse of Biotechnology: A Primer on Biosafety and Biosecurity," (ermo/sms, Acc:6-8-2022)

Biotechnology has the potential to create novel diagnostics, vaccines, drugs, and other medical countermeasures needed to detect, prevent, and treat infectious diseases. For example, the coronavirus pandemic has highlighted the promising role that biotechnology can play in this way. Researchers around the globe are actively working to combat the pandemic. They have been using different technologies to develop cheap diagnostics, repurpose existing antivirals, discover new drugs, and create safe and effective vaccines. In addition, biotechnology can be used to create genetically engineered organisms that can be deliberately introduced into the environment for purposes such as mosquito control. As an example, advances in genome engineering technologies—such as clustered regularly interspaced short palindromic repeats (CRISPR) and CRISPR-associated protein 9 (Cas9)—have enabled the development of gene drives, a technology that allows desired genetic alterations to spread faster through a population over many generations. This technique can be used to cure vector-borne human diseases such as malaria and dengue fever by either making mosquitoes resistant to the parasites that cause these diseases or by completely wiping out disease-carrying mosquito populations.

#### BT solves food and ag pollution

Ronit Langer & Shruti Sharma, 11-20-2020, Carnegie Endowment for International Peace (Technology and International Affairs Fellow & Technology and Society Sr. Research Analyst), https://carnegieendowment.org/2020/11/20/blessing-and-curse-of-biotechnology-primer-on-biosafety-and-biosecurity-pub-83252, "The Blessing and Curse of Biotechnology: A Primer on Biosafety and Biosecurity," (ermo/sms, Acc:6-8-2022)

Agricultural biotechnology can be used to create genetically modified crops for combating hunger and malnutrition. Traditional biotechnology techniques such as selective breeding, hybridization, and fermentation have been modifying living plants for improved yield or enhanced nutritional value from time immemorial. However, with improvements in knowledge about the role of individual plant genes, modern biotechnology techniques can be used to add, delete, or edit specific genes to produce a desired variety, thereby reducing the possibility of off-target effects. For example, golden rice, an engineered variety of rice, contains two extra genes to make it produce beta-carotene, a precursor to Vitamin A, that can help address nutrient deficiencies that lead to blindness, anemia, and weakened immune systems among children. Scientific advances can also help develop genetically modified crops that withstand natural calamities, pests, and diseases. Such varieties can increase crop yields, lessen the need to use pesticides and insecticides, lift farmers out of poverty, and ensure food security. Beyond that, biotechnology can help produce healthier and faster-growing animals and improve the quality and quantity of milk, eggs, and meat for human consumption.

#### BT solves plastic ecological impacts

Ronit Langer & Shruti Sharma, 11-20-2020, Carnegie Endowment for International Peace (Technology and International Affairs Fellow & Technology and Society Sr. Research Analyst), https://carnegieendowment.org/2020/11/20/blessing-and-curse-of-biotechnology-primer-on-biosafety-and-biosecurity-pub-83252, "The Blessing and Curse of Biotechnology: A Primer on Biosafety and Biosecurity," (ermo/sms, Acc:6-8-2022)

Environmental biotechnology has the potential to help mitigate pollution by using microbes and their byproducts, instead of chemical methods, to treat solid, liquid, and gaseous wastes. Plastic pollution, one of the most pressing environmental concerns, can also be addressed through biotechnology. For example, some bacterial enzymes can digest the raw material used to produce single-use bottles for beverages. Moreover, bioplastics can be produced with renewable raw materials such as plants, vegetables, and other recycled forms of waste that can be environmentally friendly alternatives to oil-based plastics.

### Unregulated biotech risks extinction

#### Gene Drive mod – risks kinetic and population attacks

Yang Xue 1,2, Hanzhi Yu 3,\* and Geng Qin 3, 12-20-2021, 1 Law School, Tianjin University, Tianjin 300072, China; 2 Center for Biosafety Research and Strategy, Tianjin University, Tianjin 300072, China 3 School of Public Affairs, Zhejiang University, Hangzhou 310058, China; https://www.mdpi.com/2071-1050/13/24/14056/htm, "Towards Good Governance on Dual-Use Biotechnology for Global Sustainable Development," Sustainability Volume 13 Issue 24 10.3390/su132414056 (ermo/sms, Acc:6-22-2022)

1.2.3. Knowledge Risks

Knowledge risks reflect the fact that as human understanding of life science at the molecular and system levels deepens, research may be abused to attack knowledge loopholes. For example, the study of immune regulation is intended to improve human immunity to infectious diseases. However, a specific pathogen can be modified through engineering to bypass acquired or innate immune barriers, while importing immunosuppressants and biological weapons into specific populations to achieve the double purpose of reducing immunity and causing disease [11]. In addition, dual-use biotechnology can be used to subvert traditional weapons and equipment and attack the weaknesses in national defense military facilities. For example, at the Eighth Review Conference of the States Parties to the United Nations Biological Weapons Convention (BWC), the U.S. military revealed that it had been able to use gene synthesis technology to produce material damage factors aimed at non-living substances. Such non-traditional weapons can attack “rubber and metal parts, fuel, food and equipment”, accelerate the corrosion of rubber and metal parts of weapons, and destroy military fuel, supplies, instruments and equipment [5]. In theory, gene drive technology could be used to reduce human reproductive capacity and alter the size of specific human populations [12]. In recent years, biological scientists in the United States, Europe, and other developed countries have repeatedly called for appropriate biosafety precautions to minimize the uncertain risks of gene drive technologies to the environment, plants and animals, and human health [13].

#### Non-state bioterror is accessible – 3 reasons

Yang Xue 1,2, Hanzhi Yu 3,\* and Geng Qin 3, 12-20-2021, 1 Law School, Tianjin University, Tianjin 300072, China; 2 Center for Biosafety Research and Strategy, Tianjin University, Tianjin 300072, China 3 School of Public Affairs, Zhejiang University, Hangzhou 310058, China; https://www.mdpi.com/2071-1050/13/24/14056/htm, "Towards Good Governance on Dual-Use Biotechnology for Global Sustainable Development," Sustainability Volume 13 Issue 24 10.3390/su132414056 (ermo/sms, Acc:6-22-2022)

Accessibility is the difficulty in obtaining dual-use biotechnology. It is the first step of the intentional misuse of biotechnology, including obtaining hardware, software, and intangible information that can be applied to such technology for non-state actors to carry out bioterrorism activities. In the field of dual-use biotechnology, non-state actors can include ethnic separatists, transnational criminal organizations, terrorist organizations, cults, biohackers, and others who engage in covert behavior, have more freedom to conduct research, and are more difficult to supervise than state actors. At the Eighth Review Conference of the Convention on the Prohibition of Biological Weapons, the U.S. government announced that bioterrorism plots had been foiled by Kenya and Morocco. In addition, more than 15 criminal cases in the past ten years have involved the use of biological weapons in the U.S. There is therefore increasing concern over non-state actors using dual-use biotechnology to carry out bioterrorist attacks [5].

There are three accessibility risks of dual-use biotechnology. One is the disclosure of key technical information, such as key gene sequences of highly pathogenic pathogens that can be easily obtained from academic conferences, journals and public databases. In 2011, scientists from the United States and the Netherlands published academic papers on the transmission ability of highly pathogenic H5N1 influenza virus in mammalian cells, in which the methods of modifying the virus so as to enhance its transmission ability were made public [6]. This event that triggered global concern about the dual-use risk of biotechnology [7]. In addition, it is now easier than ever to obtain key experimental materials. In light of the industrialization of biotechnology, biotechnology enterprises can provide technical services and related reagents, including the detailed steps of entire experiments. Anyone can readily order laboratory equipment, consumables and substitutes online, and each year these become less expensive, so it is not difficult to set up a simple biology laboratory [8]. Finally, there are more ways than ever to obtain technology. More methods of communication have emerged outside of traditional channels in recent years, including the International Genetic Engineering Machine Competition (iGEM) and other international biology academic competitions, as well as online forums such as DIY biology.

#### Unregulated CRISPR risks superbug mutations

Ronit Langer & Shruti Sharma, 11-20-2020, Carnegie Endowment for International Peace (Technology and International Affairs Fellow & Technology and Society Sr. Research Analyst), https://carnegieendowment.org/2020/11/20/blessing-and-curse-of-biotechnology-primer-on-biosafety-and-biosecurity-pub-83252, "The Blessing and Curse of Biotechnology: A Primer on Biosafety and Biosecurity," (ermo/sms, Acc:6-8-2022)

Safety concerns extend beyond pathogens that may escape from research laboratories. Genetically engineered organisms that are introduced into a natural environment for beneficial purposes can also sometimes have unintended consequences. For example, although CRISPR/Cas9-enabled gene drives have the potential to eradicate vector-borne diseases, tackle invasive species, and control pests that target crops, the self-propagating nature of gene drives and the possibility that they could either spread indefinitely or accidently manipulate nontargeted species have raised concerns among regulators.

Similar experimental techniques, like sterilizing insects en masse, have been conducted in the past. One technique involves the mass sterilization of a targeted pest, such as fruit flies, using irradiation. Scientists advocating for gene drives argue that irradiation can cause random mutations, which might also have unintentional effects on the environment. Such off-target mutations can be avoided using gene drive technology that relies on genomic information obtained through reliable DNA sequencing tools. Although the technology has immense beneficial applications, it is important to update existing regulations and initiate public discourse on the benefits and the risks of this emerging technology.

#### DIY BT is the safety risk

Ronit Langer & Shruti Sharma, 11-20-2020, Carnegie Endowment for International Peace (Technology and International Affairs Fellow & Technology and Society Sr. Research Analyst), https://carnegieendowment.org/2020/11/20/blessing-and-curse-of-biotechnology-primer-on-biosafety-and-biosecurity-pub-83252, "The Blessing and Curse of Biotechnology: A Primer on Biosafety and Biosecurity," (ermo/sms, Acc:6-8-2022)

Biotechnology has the potential to revolutionize the societies that humans live in and the organisms that they live alongside. Recent advances include cheaper and more accessible DNA sequencing, faster DNA synthesis, the discovery of efficient and accurate gene-editing tools such as CRISPR/Cas9, and developments in synthetic biology. Meanwhile, there is a growing do-it-yourself (DIY) community of independent biotechnology practitioners and enthusiasts who are unaffiliated with any single lab. Despite their promise, developments in the field do raise certain safety and security concerns that policymakers and scientists must bear in mind.

SAFETY THREATS

To understand the safety threats emerging from biotechnology, let’s consider two hypothetical scenarios.

In the first scenario, researchers in a top-level biosafety lab rearrange DNA fragments to synthetically create a live Ebola virus. This pathogen was originally transmitted to people from wild animals, but it has the potential for human-to-human transmission, causing severe (and often fatal) symptoms in humans. These scientists are working on a weakened strain of the Ebola virus to understand its epidemiological characteristics, like the virus’s virulence and transmission factors. While the aim of the research is to develop vaccines or other treatment options that can help save human lives, the manipulation experiment accidently produces a strain of the virus with unexpected characteristics.

In the second scenario, scientists are working on a new symbiotic plant bacterium to improve the microbiome of the soil. An organic farm fifty miles away notices a slight increase in their crop yields, so they test the soil. The farmers find evidence of the synthetic bacteria, which they trace back to the lab, and they accuse the lab of trying to force GMOs on their consumers. The scientist conducting the research denies the allegations and hypothesizes that some live bacteria accidentally got out of the lab, either on people’s clothing or through the lab’s water system.

These two fictional scenarios illustrate the safety threats that can emerge from developments in biotechnology, both inside and outside the laboratory. While the first case represents accidents that can occur in a lab, the second case highlights the unintended consequences in cases when a genetically engineered organism accidently escapes a lab.

These fictional scenarios have become reality in numerous cases. For instance, in 2001, Australian scientists hoping to genetically engineer the mousepox virus to render lab mice infertile accidentally created a lethal mousepox virus. In another instance, researchers at the State University of New York developed a synthetic strain of the polio virus in 2002 from chemicals and publicly available genetic information. And the virus that caused the 1918 influenza pandemic—a pathogen that killed an estimated 50 million people globally in 1918 and 1919—was resurrected by a group of U.S. scientists in 2005. In another case, a team at the University of Alberta recreated an infectious horsepox virus, a close relative of the smallpox virus, by ordering DNA fragments online for about $100,000.

Although none of these experiments have led to an infection or an outbreak, there have been instances when the accidental release of pathogens either has led to infections among laboratory personnel or has resulted in disease outbreaks. For example, although smallpox was eradicated from the UK in the early 1970s, the virus escaped from a smallpox research lab in Birmingham and infected a researcher, who subsequently succumbed to the disease in 1978. In another incident, an experienced Russian scientist died of Ebola after accidentally injecting herself with the deadly virus while working on the Ebola vaccine. More recently, almost 3,000 people were infected in China with a bacterial infection called Brucellosis after a leak occurred at a biopharmaceutical company in 2019.

Since these accidents happened in regulated research labs, it was easier to minimize the societal impacts of such mishaps. However, the DIY community involves individuals, enthusiasts, and small organizations dabbling in genetics that are not linked to any formal institutions and hence are not regulated. Such unaffiliated communities have been in the news even during the coronavirus pandemic, when some of them joined the quest for an effective and safe vaccine. Since these groups sometimes have limited formal training on the safety and ethics of using such biotechnology, it might be difficult to contain and mitigate the impact of any accidents that might emerge from their experiments. Even though no unfortunate incident has happened so far, the absence of regulations to monitor this community has emerged as another safety threat.

### A2 Currrent frameworks solve

#### A2 CBD solves regulation now

Ronit Langer & Shruti Sharma, 11-20-2020, Carnegie Endowment for International Peace (Technology and International Affairs Fellow & Technology and Society Sr. Research Analyst), https://carnegieendowment.org/2020/11/20/blessing-and-curse-of-biotechnology-primer-on-biosafety-and-biosecurity-pub-83252, "The Blessing and Curse of Biotechnology: A Primer on Biosafety and Biosecurity," (ermo/sms, Acc:6-8-2022)

There are numerous international treaties and regimes in place to help mitigate the risks at play with biotechnology. Three of the most significant ones are the Convention on Biological Diversity, the Biological Weapons Convention (BWC), and the Australian Group. Each of these agreements or regimes tackles a different aspect of the risk profile—biosafety, bioweapons, and banned substances—but each of them comes with limitations, such as limited scope, sparse funding, and inadequate verification and monitoring mechanisms. None of the agreements create a binding framework to holistically address biosafety and biosecurity risks, making for an overall lack of accountability and rendering the development of international standards piecemeal and incomplete. In this regulatory environment, it is difficult to keep up with rapidly emerging advances in biotechnology or address pressing issues such as releasing biotechnology products, like gene drives, into nature.

THE CONVENTION ON BIOLOGICAL DIVERSITY

The Convention on Biological Diversity is an international legal instrument for ensuring that countries work together to promote a sustainable and equitable future that protects biological diversity. It has been ratified by 196 countries. The convention has two protocols, the Cartagena Protocol on Biosafety and the Nagoya Protocol, that promote the safe and equitable use of biotechnology with respect to biodiversity.

The Cartagena Protocol on Biosafety governs the use and transport of GMOs to protect biological diversity and human health. The Nagoya Protocol is a benefit-sharing agreement that mandates that—when researchers enter another country and use genetic sequences from indigenous plants, animals, or microorganisms and/or employ indigenous procedural knowledge—indigenous people are either compensated up-front or receive a fair share of the profits from commercialization.

The Cartagena Protocol, which entered into force in 2003, promotes a precautionary approach enshrined in the fifteenth principle of the Rio Declaration on Environment and Development, which states, “Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.” In essence, if the scientific community is uncertain about how a new organism will impact the environment, this principle states that scientists should proceed with extreme caution. In general, the Cartagena Protocol attempts to balance between the propensity of advances in biotechnology to help countries protect their biodiversity and develop economically alongside the threats that biotechnology poses to biodiversity and human health if something were to go wrong.

The Cartagena Protocol mainly covers the handling, transport, and use of GMOs across borders. The protocol established the Biosafety Clearing-House to facilitate the implementation of its guiding principles. The clearinghouse is designed to “facilitate the exchange of scientific, technical, environmental and legal information on, and experience with, living modified organisms [or GMOs].” All members of the protocol must inform the clearinghouse when countries make a new transfer agreement on GMOs, of any unintentional releases of GMOs that may cross borders, and any national laws that pertain to the effects GMOs may have on sustainability. While the protocol ensures safe use and transport of GMOs, it does not include any penalties for violations or have any accountability mechanisms for accidental releases of pathogens from labs or any other laboratory-acquired infections.

One key limitation is that the Cartagena Protocol only covers the transfer of physical material, whereas much of the information that tends to be transferred involves digital DNA sequences. The Nagoya Protocol, which was adopted in 2010, specifically focuses on benefit sharing from the genetic information of regional biological diversity or regional know-how. The Nagoya Protocol sets the standards for transfer agreements between a potential commercial actor and a local population to ensure that the local population is properly compensated for the use of its regional biodiversity. Similar to the Cartagena Protocol’s Biosafety Clearing-House, the Nagoya Protocol has an Access and Benefit-Sharing Clearing-House to help coordinate implementation and exchanges of information on benefit sharing. Although the protocol monitors fair utilization of genetic resources until indigenous communities are compensated, it does not monitor the safety and security of experiments that occur once fair compensation has taken place.

Both the Cartagena Protocol and the Nagoya Protocol are therefore limited in scope and do not protect against a wide range of biosafety threats. For example, neither protocol covers safety concerns from the transfer of DNA sequences and, therefore, would not prevent a nefarious actor from ordering sequences that might be used for the development of dangerous pathogens. In addition, the Cartagena Protocol only covers GMOs, not DNA sequences or other precursors to GMOs, while the Nagoya Protocol only covers indigenous benefit sharing, not transborder data on pathogens.

Fundamentally, the Cartagena Protocol and the Nagoya Protocol are trade mechanisms designed to protect local biodiversity from being overtaken by GMOs or exploited by biotech companies. They do not provide international guidelines for establishing biosafety protocols. Nor do they protect against the dangers of cheaper and faster DNA sequencing, easy DNA synthesis, online access to genomic information, and developments in synthetic biology, among other issues. Given these limitations, there is a need for the scientific community to expand on global biosafety standards to minimize risks from laboratories undertaking biotechnology-related research.

#### A2 BWC solves regulation now

Ronit Langer & Shruti Sharma, 11-20-2020, Carnegie Endowment for International Peace (Technology and International Affairs Fellow & Technology and Society Sr. Research Analyst), https://carnegieendowment.org/2020/11/20/blessing-and-curse-of-biotechnology-primer-on-biosafety-and-biosecurity-pub-83252, "The Blessing and Curse of Biotechnology: A Primer on Biosafety and Biosecurity," (ermo/sms, Acc:6-8-2022)

THE BIOLOGICAL WEAPONS CONVENTION

The BWC is a multilateral disarmament treaty banning the development, production, and stockpiling of biological weapons. The BWC, which entered into force in 1975, was the first treaty of its kind to ban an entire category of weapons. In consideration of the inherent dual use problems in biotechnology, the BWC does not outright ban any biological material. Rather, it bans the creation and stockpiling of biotoxins and other biological agents above the amount required for peaceful purposes, and it bans the use of any biological material as a weapon.

Any member of the BWC can initiate a bilateral or multilateral consultation to deal with any problems that come up during the implementation of the treaty. In the event of a suspected biological weapons attack, members of the BWC can report the perpetrating member to the UN Security Council for further action. However, the BWC currently has ­­­no mechanism for monitoring to ensure compliance or any means of verification. There is no set threshold for the amount of biological agents “required for peaceful purposes” and without monitoring and verification, there is no way to know if the biological agents a country has are being used peacefully.

Over the years, various review conferences have tried to implement self-reporting requirements and other confidence-building measures for members, such as declaring high containment research centers and vaccine production facilities, but these efforts have largely failed due to a lack of consensus among members. The difference in approach to biological weapons was most evident in 2001, when attempts to establish an international organization to monitor and verify compliance failed following a decade of efforts after the United States withdrew from the negotiations. The United States argued that the verification process would put the proprietary information of biotech and pharmaceutical companies at risk while not solving the problem because, it was argued, biological activities are inherently impossible to verify, a position the U.S. government has maintained to the present. On the other hand, the United States and India have recently supported a proposal that would strengthen export controls on biological material, but they received pushback from developing countries who want to keep biotechnology accessible and increase knowledge transfer. Russia, after backing off of verification in the last few years, has placed a special emphasis on bioweapons response protocols in the wake of a biological attack. In that vein, the Russian government has supported the development of mobile medical units for treating victims of bioweapons and natural epidemics and has recently gained support for this idea from the UK, but not from the United States.

Due to these ongoing tensions, instead of creating an international monitoring organization— similar to the Organization for the Prohibition of Chemical Weapons, which implements the Chemical Weapons Convention—the BWC instituted an implementation support unit (ISU) that is housed in the UN Department of Disarmament Affairs in Geneva. The Organization for the Prohibition of Chemical Weapons is an international organization in its own right and is managed by a large technical secretariat, which is composed of both political appointees from member states and permanent staff. The technical secretariat focuses on verification of compliance with and implementation of the Chemical Weapons Convention. By contrast, the ISU has a permanent staff of just three people. The ISU’s mandate is not verification and monitoring but rather to offer administrative support and help facilitate confidence-building measures among members.

In addition to a lack of verification, the BWC is often perceived by scholars as not readily addressing the impact of emerging technologies, such as synthetic biology and artificial intelligence, despite regular meetings of the member states (and expert meetings) to keep members up to date on pertinent issues. Another issue for the BWC is a lack of funding, as many member states have outstanding dues—in 2019, ninety-five members owed a collective total of over $140,000. The funding shortage for the BWC’s current activities, and the lack of consensus about how to expand its mandate, make it highly unlikely that the convention will be able to expand its role or the role of the ISU.

#### A2 Australia group solves regulation now

Ronit Langer & Shruti Sharma, 11-20-2020, Carnegie Endowment for International Peace (Technology and International Affairs Fellow & Technology and Society Sr. Research Analyst), https://carnegieendowment.org/2020/11/20/blessing-and-curse-of-biotechnology-primer-on-biosafety-and-biosecurity-pub-83252, "The Blessing and Curse of Biotechnology: A Primer on Biosafety and Biosecurity," (ermo/sms, Acc:6-8-2022)

THE AUSTRALIA GROUP

The Australia Group is a multilateral export control regime designed by an informal group of countries. The group’s goal is to help countries decide which substances need to be governed by export controls to minimize the risk that exporters may unwittingly assist in the creation of a biological or chemical weapon. The group, first convened in 1985 with fifteen countries and the European Commission, is not a legally binding agreement, but rather a coalition with a shared commitment to the nonproliferation of chemical and biological weapons. The group currently has forty-two members plus the European Commission. The Australia Group claims within its remit eighty-seven controlled compounds, some human and plant pathogens and toxins, and “dual-use biological equipment and related technology and software.”

While the Australia Group does fill in some gaps left by the Cartagena Protocol on Biosafety and the BWC, namely an expansive list of precursors to biological weapons that should be subject to tight export controls, it is not a legally binding agreement. Furthermore, many countries are not included in the group, limiting its reach. Overall, there is a need for more international cooperation to help mitigate the threats of emerging breakthroughs in biotechnology without curtailing technological progress.

#### Global standards secure the upside of BT and mitigate the downside

Ronit Langer & Shruti Sharma, 11-20-2020, Carnegie Endowment for International Peace (Technology and International Affairs Fellow & Technology and Society Sr. Research Analyst), https://carnegieendowment.org/2020/11/20/blessing-and-curse-of-biotechnology-primer-on-biosafety-and-biosecurity-pub-83252, "The Blessing and Curse of Biotechnology: A Primer on Biosafety and Biosecurity," (ermo/sms, Acc:6-8-2022)

Continuing advances in biotechnology provide a plethora of opportunities to address global challenges such as the spread of infectious diseases, food insecurity, and environmental degradation. However, the same technologies can be deployed by nefarious actors or hostile states to create deadly pathogens that can deliberately cause human infections, negatively target agricultural supply chains, or disrupt existing ecological balances. The world has already seen some troubling historical precedents of the deliberate misuse of biotechnology to develop bioweapons, instances of accidental releases of living organisms from labs, and cases of laboratory-acquired infections.

To tackle such challenges, most countries have adopted informal guidelines or laws to ensure the safety of biotechnology-related research, instituted mechanisms to prevent unauthorized access to biological material, and created export control regimes to govern the transfer of sensitive biological material.

At a global level, treaties, conventions, and guidelines have been drafted to ensure the fair and transparent promotion of biotechnology, but these mechanisms fall short of providing the oversight needed to promote the responsible conduct of biotechnology-related research. This is because these global mechanisms either have not been updated regularly and therefore fail to keep pace with recent technological developments or because they lack the expertise and financial resources needed to monitor global biotechnology developments.

Moreover, there are no mandatory global standards on biosafety and biosecurity that all research laboratories must abide by, and there is no mechanism that introduces accountability and proper procedures for judging claims of liability when experiments go awry. For example, when state actors deliberately misuse biotechnology, the signatory states of the BWC, in the absence of a verification and monitoring protocol, can only consult with each other or lodge a complaint with the UN Security Council.

The above examples highlight that these global mechanisms are ill-equipped to handle threats emerging from breakthroughs in biotechnology. To ensure that biotechnology-related research is conducted responsibly, the international community needs to collaborate to develop standards that govern the safety and security of experiments, formulate the long-debated verification and monitoring mechanism under the BWC, and incorporate clauses that institute liability and accountability mechanisms in cases of violations. These steps would go a long way toward increasing the odds that the world can make good on advances in biotechnology while mitigating the risks and downsides.

### CRISPR solves Heg

#### CRISPR has immense therapy upside, but research is outside the USA due to regulation

Marsha Greene & Zubin Master, 2018, Senior Policy Analyst, Peraton & Biomedical Ethics Research Program, Mayo Clinic, https://www.ndu.edu/Portals/59/Documents/Incoming/AY21%20Briefings/NDU%206070/CRISPR\_Military.pdf?ver=2020-08-11-170728-347, " Ethical Issues of Using CRISPR Technologies for Research on Military Enhancement" Journal of Bioethical Inquiry (ermo/sms, Acc:6-8-2022)

CRISPR/Cas9 is a major technological feat with tremendous potential to impact the agriculture and health industries. These tools are currently being used to expedite crop and livestock breeding, engineer new antimicrobials, and control populations of disease-carrying insects (Gao 2018; Nunez and Lu 2017; Hammond et al. 2016). For human health, CRISPR can be used to treat diseases for which gene editing has previously been considered a therapeutic strategy, including Parkinson’s disease, Alzheimer’s disease, muscular dystrophy, cystic fibrosis, sickle cell disease, hemophilia, autism, HIV, and various cancers among other applications (NASEM 2017). Two first-in-human safety trials have been initiated to study whether CRISPR edited immune cells are more efficient at killing tumour cells in people with terminal cancer (Cyranoski 2016; Reardon 2016). CRISPR technology has reportedly been used to correct gene defects in human embryos (Ma et al. 2017) and is considered important in improving assisted reproductive technologies (Simón 2013; Ishii 2017). Research involving human embryo manipulation, however, is largely being conducted outside the United States due to regulatory restrictions. Several of these applications have relevance to Department of Defense (DoD) initiatives.

#### CRISPR enables warfighter enhancement

Marsha Greene & Zubin Master, 2018, Senior Policy Analyst, Peraton & Biomedical Ethics Research Program, Mayo Clinic, https://www.ndu.edu/Portals/59/Documents/Incoming/AY21%20Briefings/NDU%206070/CRISPR\_Military.pdf?ver=2020-08-11-170728-347, " Ethical Issues of Using CRISPR Technologies for Research on Military Enhancement" Journal of Bioethical Inquiry (ermo/sms, Acc:6-8-2022)

The development of the CRISPR/Cas 9 system has revived the debate over gene editing applications in many areas including biological research, human health, and agriculture and food production among others. What is discussed less in the literature is the use of CRISPR/Cas and other gene editing technologies to enhance humans specifically for military purposes. The President’s Council on Bioethics under former President George W. Bush acknowledged that when performance is a matter of life and death, such as with soldiers on the battlefield, human enhancement may be more acceptable and indeed allowable (President’s Council for Bioethics 2003). Yet the Council cautioned that it may be unwise to allow the warfighter to become indistinguishable from his weapon. Nevertheless, as evidenced by the Defense Advanced Research Projects Agency (DARPA) Broad Agency Announcement (BAA) in 2014, human performance optimization continues to be a major area of research focus (DARPABAA-14-38). In this call, DARPA solicited proposals to improve warfighter performance, improve bioengineering safety, and create a biological based manufacturing platform. The announcement underscores the Department’s current focus on temporary optimization measures to include the development of short acting drugs and biologics designed to enhance everything from wound healing to improvement of a broad range of cognitive abilities. With the emergence of CRISPR/Cas technology and the possibility for permanent gene enhancements of service members, the debate over where the ethical line should be drawn in military human performance optimization requires further consideration.

In this paper, we focus on the ethics of research using CRISPR on adult military service members, specifically as it relates to potential exposure to biological agents. This focus is deliberate because warfare is increasingly becoming asymmetrical with the emergence of guerrilla and insurgent forces. Military operations have shifted to counterinsurgency with specific attention regarding how to combat the threat of non-lethal weapons (e.g., bioagents). We discuss the governance of research involving humans in the military and follow with a discussion of how CRISPR can be used to protect warfighters against biological agents. Finally, we perform an ethical analysis of research involving military personnel specifically on issues of risks–benefit analysis, informed consent, and equality of access and outline several considerations for institutional review boards (IRBs) and policymakers.

#### CRISPR enhancement improves low light and casualty aversion in soldiers

Marsha Greene & Zubin Master, 2018, Senior Policy Analyst, Peraton & Biomedical Ethics Research Program, Mayo Clinic, https://www.ndu.edu/Portals/59/Documents/Incoming/AY21%20Briefings/NDU%206070/CRISPR\_Military.pdf?ver=2020-08-11-170728-347, " Ethical Issues of Using CRISPR Technologies for Research on Military Enhancement" Journal of Bioethical Inquiry (ermo/sms, Acc:6-8-2022)

Other military applications of CRISPR could involve directly enhancing human soldiers. Humans remain the rate-limiting factor in the conduct of war. While weapons have become increasingly more sophisticated, provisions must be made in modern wargame exercises to allow the warfighter to sleep, receive nutrition, and heal after trauma or injury. Science fiction has conjured images of warfighters with super strength, enhanced vision, and limited psychosomatic reactions to the horrors of war. CRISPR research in the private sector is also trending towards enhancements that could be desirable for military applications. For example, a study with CRISPR-mediated gene editing of beagle embryos produced pups with twice the muscle mass having direct implications for human research (Zou et al. 2015). Scientists have also isolated genes from other species that could theoretically be genetically engineered to enhance humans such as a thermal imaging gene in reptiles which may confer the ability to see in low light conditions (Gracheva et al. 2010). Even a potential candidate gene for Post-Traumatic Stress Disorder has been described indicating that it may be possible to one day eliminate emotional detachment that warfighters sometimes encounter in the aftermath of war (Cornelis et al. 2010). Such experimental endeavours are likely to face major regulatory hurdles if they are ever seriously considered for development.

#### CRISPR tech may make gene editing unnecessary

Marsha Greene & Zubin Master, 2018, Senior Policy Analyst, Peraton & Biomedical Ethics Research Program, Mayo Clinic, https://www.ndu.edu/Portals/59/Documents/Incoming/AY21%20Briefings/NDU%206070/CRISPR\_Military.pdf?ver=2020-08-11-170728-347, " Ethical Issues of Using CRISPR Technologies for Research on Military Enhancement" Journal of Bioethical Inquiry (ermo/sms, Acc:6-8-2022)

More practically, the availability of CRISPR gene editing is likely to impact both policy and practice in warfighter health and performance research. CRISPR itself could be used to weaponize biological agents and the military will need to consider how the warfighter could be optimized for performance during a hypothetical attack (Hoehn et al. 2017). Historically, service members are often subject to mandatory vaccination programs to protect against biological agents while deployed. However, it may prove difficult to develop effective vaccines for some of these new and emerging biological threats. Initial work aimed at identifying candidate genes that confers sensitivity to anthrax could lay the ground work for these types of studies (Martchenko et al. 2012). Reduced expression of one such gene, capillary morphogenesis gene 2 (CMG 2), correlates strongly with lower susceptibility to anthrax. Interestingly, individuals who are closely related express CMG2 at similar levels which could indicate that sensitivity to these types of bioagents may be heritable traits. If genes such as CMG2 can be validated, the CRISPR system could be exploited in a variety of ways, some of which may not involve gene editing at all. In 2012, a team of researchers engineered a Cas9 enzyme that was unable to cut DNA (Qi et al. 2013). Essentially, the CRISPR/Cas9 machinery could be directed to a specific locus in the genome and used as either a gene promoter or suppressor, a sort of on/off switch for certain genes. More importantly, the effects could be reversible. One study did report targeted silencing of CMG receptors protected against anthrax toxin (Arévalo et al. 2014). Potential advantages are a shorter time frame between warfighter inoculation and deployment to a hostile zone and the ability to naturally reverse effects over time. More research is needed to determine the precise timing required for such inoculations and how long the expected response would be sustained.

#### Gene therapy checks the impact of chemical weapons

Peter H. Schwartz, April 2020, Indiana University Center for Bioethics, Indiana University School of Medicinehttps://www.cell.com/molecular-therapy-family/molecular-therapy/pdf/S1525-0016(20)30142-8.pdf, " Ethics of Gene Therapy in the Military: Promise and Potential Problems" Molecular Therapy Vol. 28 No 4 (ermo/sms, Acc:6-8-2022)

Recent research on mice has shown that gene therapy can neutralize the effect of certain types of chemical weapons.1,2 This approach may one day protect people, but it also raises worries. Some of these questions stem from it being gene therapy, but most stem from the fact that its key use would be on the battlefield. The most challenging questions involve assessing a therapy that is designed to protect soldiers but could also hurt them.

It’s important to begin the discussion by reviewing how dangerous chemical weapons are and why they have been banned by international treaty since the 1960s.3,4 The most commonly used nerve agents, such as sarin, tabun, and VX, are organophosphates that inhibit acetylcholinesterase and lead to nerve dysfunction, resulting in the inability to breathe, heart problems, seizures, and death. Chemoprotective clothing and gas masks provide some defense, but they are not perfect. Once a person is exposed, medical treatments have limited efficacy and may not be able to forestall death or brain damage.3,4

If an attack is expected, then some medications can be given to reduce or block the effect of nerve agents, though these treatments have limitations too. One approach being tested in animals is to inject an enzyme that quickly breaks down organophosphates.1,2 But these enzymes do not last in the bloodstream very long, so they may need to be given right before a possible attack, perhaps multiple times. The gene therapy approach may solve this problem: scientists injected a gene into mice that was taken up by their liver cells and made the protective enzyme. The study found that the enzyme remained active in the blood for the entire 5-month study and allowed the mice to survive multiple injections of the nerve agents.1,2

The experiment is just“proof of concept,” of course, since much more research would be needed to make the treatment for humans and identify its risks and benefits. But the potential advantages are clear. Despite the international treaty banning their use, chemical warfare is still being used, most recently in Syria.

The approach will attract the attention of ethicists in part because it is a possible gene therapy. Of note, though, the approach does not have two features that often raise the most concern about genetics. First, the treatment is somatic therapy, not heritable, so it doesn’t involve changes in the germline or affect the next generation.5 Second, it is an intervention countering a physical danger, and thus does not fall in the realm of “enhancement” of the sort that many worry gene therapy will eventually aim at, attempting to make people (or soldiers) smarter, taller, or stronger.6,7

#### EO medical research spills over to sub tracking

Patrick Tucker, 12-1-2018, Technology Editor, https://www.defenseone.com/technology/2018/12/us-military-genetically-engineering-new-life-forms-detect-enemy-subs/153200/, "The US Military Is Genetically Engineering New Life Forms To Detect Enemy Subs," Defense One (ermo/sms, Acc:6-8-2022)

How do you detect submarines in an expanse as large as the ocean? The U.S. military hopes that common marine microorganisms might be genetically engineered into living tripwires to signal the passage of enemy subs, underwater vessels, or even divers.

It’s one of many potential military applications for so-called engineered organisms, a field that promises living camouflage that reacts to its surroundings to better avoid detection, new drugs and medicines to help deployed forces survive in harsh conditions, and more. But the research is in its very early stages, military officials said.

### Plan is vaccine related

#### mRNA is 5x more effective than natural immunity

Jocelyn Solis-Moreira 11-13-2021, New York-based health and science journalist with experience writing about medical research, mental health, and psychology. She has a degree in integrative neuroscience and a Master’s in psychology concentrating on behavioral neuroscience, Fact checked by Anna Guildford, Ph.D., https://www.medicalnewstoday.com/articles/how-did-we-develop-a-covid-19-vaccine-so-quickly, "COVID-19 vaccine: How was it developed so fast?," Medical News Today (ermo/sms, Acc:6-22-2022)

mRNA technology

The Pfizer and Moderna COVID-19 vaccines were the first mRNA vaccines that humans received outside of clinical trials.

Dr. Thomas Kenyon, chief health officer at Project HOPE and former director of the CDC Center for Global Health, told MNT that mRNA technology is something the NIH had been working on for some time.

Dr. Kenyon explained that mRNA vaccines deliver the coronavirus S protein’s genetic material. Our own cells then use the information stored in the mRNA to make the S proteins. The immune system is then “trained” to recognize these spikes, preparing it for a future attack.

“When challenged with the real virus, your immune system attacks the real surface protein of the virus and inactivates it through the immune system capabilities,” Dr. Kenyon told MNT.

Concerns over mRNA vaccine

According to Dr. Kenyon, misinformation surrounding mRNA vaccines stems from a concern that the vaccine infects people with the virus.

“Nobody is getting infected with a COVID-19 vaccine. It is only the surface protein that would be replicated because we have given you the messenger RNA. It is not the entire virus,” he explained.

One misconception is that an mRNA vaccine would not be useful when the virus mutates.

A July 2020 study that appears in Frontiers in Microbiology confirms that the virus mutates. After analyzing 48,635 samples of SARS-CoV-2, the researchers identified an average of 7.23 mutations per sample.

While mutations are a certainty, Dr. Sun said that this should not be a cause for alarm.

“There has been an estimated 250,000 variants or strains of SARS-CoV-2 sequenced in the lab. For the most part, the virus has a low mutation rate compared to the mutation rate of the influenza virusTrusted Source,” Dr. Sun explained. “The spike protein is important for the ability of the virus to infect humans’ cells. I think it would not mutate enough for the vaccines to be ineffective.”

Another concern is whether natural immunity would be more effective than a vaccine. However, a CDC study from November 2021 found that COVID-19 mRNA vaccines are about five times more effective in preventing hospitalization than a previous infection.

“Natural immunity is not better than vaccine-acquired immunity. These vaccines have the potential to provide you with protective immunity without the risks associated with infection,” Dr. Yager told MNT.

#### RDNA is vaccine treatment

Muhammad Yasir Khan , 7-9-2021, King AbdulAziz U – BioScience Dept & King Fahad Medical Research Center (also Mohammed Alsaadi, Khalid Alghamdi and Ishtiaq Qadri) https://biomedres.us/fulltexts/BJSTR.MS.ID.005949.php, "Biotechnology and Its Applications in Vaccine Development," Biomedical Journal of Scientific & Technical Research July, 2021, Volume 37, 1 (ermo/sms, Acc:6-8-2022)

Vaccine is a biological substance which stimulates the immune system by introducing a killed, weakened disease causing organism, or its surface protein in healthy body. Vaccines provide acquired immunity against a particular disease. The mode of action of vaccine is either prophylactic (to prevent the future infection) or it could be threptic specifically many cancer vaccines are under experimental stages [1, 2]. The term vaccine or vaccination derived from Variolae vaccinae (smallpox of the cow) was coined for the first time by an English Physician Edward Jenner to describe cow pox. He used the term in 1798 for his long experiments to establish protective role of cow pox against smallpox [3]. According to World Health Organization so far twenty-five (25) licensed vaccines are available for different infectious diseases [4]. The traditional vaccines are either killed microorganism or attenuated one to generate immune response in body after their inoculation. After emergence of Recombinant DNA Technology is a sub-field of Biotechnology remarkable positive impacts were observed on human health. From production of safe proteins, antibodies and gene therapy RDT revolutionized different aspects of biological studies [5].

#### Reverse Genetics is vaccination

Muhammad Yasir Khan , 7-9-2021, King AbdulAziz U – BioScience Dept & King Fahad Medical Research Center (also Mohammed Alsaadi, Khalid Alghamdi and Ishtiaq Qadri) https://biomedres.us/fulltexts/BJSTR.MS.ID.005949.php, "Biotechnology and Its Applications in Vaccine Development," Biomedical Journal of Scientific & Technical Research July, 2021, Volume 37, 1 (ermo/sms, Acc:6-8-2022)

Reverse Genetics Platform

Reverse genetics literally means to understand the effect of gene by analyzing phenotypic effects of a specifically engineered gene sequences. Reverse genetics provide a low cost, effective and convenient method as compared to conventional approach for creating live attenuated vaccines. The common method to generate a live attenuated vaccine is to generate plasmids with sequences coding for structural and functional proteins. Influenza virus vaccine contains eight plasmids transfected tighter to produce vaccine [21]. The recent outbreaks of deadly Ebola virus accelerated the progress for its vaccine production. The vesicular stomatis virus-based vaccine is develop which is similar to reverse genetics. In this vaccine G protein of VSV replaced by Ebola Virus Glycoprotein (EBOV-GP) which is expressed on surface of VSV virus. The vaccine is now in phase three clinical trials [21].

## Front Lines

### 2AC Inherency

#### Vaccine leadership is possible

Morrison & Cole, 10-13-2020, J. Stephen Morrisonsenior vice president here at the Center for Strategic and International Studies, CSIS & Congressman Tom Cole, Republican of Oklahoma https://www.csis.org/analysis/online-event-conversation-congressman-tom-cole, "Online Event: A Conversation with Congressman Tom Cole," No Publication (ermo/sms, Acc:6-20-2022)

J. Stephen Morrison: Thank you. I want to ask you about the international domain and U.S. leadership in the international domain. There’s a couple of big issues there. You know, the global health security agenda has been an instrument in building capacity in low-income countries that are vulnerable. That was – that came about around the same time as Ebola. It got turbo charged with the supplemental. But there’s a question of sustaining that as a way of building defenses and preparedness in those countries that are very vulnerable.

There’s also the issue of the vaccine facility, to bring vaccines to low and middle-income countries that may really struggle to get that. And we have the COVAX facility led by CEPI and Gavi, Gavi playing the procurement and distribution role. U.S. has chosen not to be part of the COVAX facility. The door is still open. That can be changed. Congress can play a role there. And related to that is a question of WHO reform. Obviously, the president has chosen to terminate membership in WHO. That has been a controversial issue. We need to be thinking about what is the future of attempting to reconnect with WHO under what basis. We have the Independent Panel on Preparedness and Response that’s underway, an international group, which is charged with looking at these issues. And the U.S. has supported that panel.

Tell us your thoughts around what the U.S. leadership role should be in the international domain, particularly with reference to low and lower-middle income countries in this next phase.

Rep. Tom Cole: Well, I start with a belief that – you know, I’m a big believer in enlightened self-interest. I think some of the best things we’ve done in the country – you know, whether it’s PEPFAR or whether it’s NATO – they’re very different types of efforts, obviously. But the reality is, helping others to help yourself is pretty smart. And where disease is concerned, there is no border that will protect you. So, we need to be engaged globally on the health-care front. I actually toured yesterday – or, excuse me – Monday, I think, a biomedical facility in Maryland where they manufacture a whole variety of products. But two of the most interesting are things that, number one, are rapidly test – you can use them routinely, but they have surge capacity. So, we would never have this testing problem if we built these type of things and grouped them in appropriate places.

The other thing is that a smaller test, they argue, you could spread all over the world that could test unique things that we would – we would, you know, pick it up. Look, as I said, this is actually – you know, we had Ebola in Africa. We had one guy get to Dallas that was carrying the disease. You want to fight Ebola in West Africa or west Dallas? I know where I would pick. So, we need to be very aggressive. And a lot of the countries don’t have much health-care infrastructure. It’s not that they’re not fine, but strengthening their infrastructure strengthens our protection. It’s just that simple. I mean, we live in a world where disease can move with extraordinary speed.

#### Current COVAX efforts are too slow – will cost 28 trillion in lost output

Katherine Aguirre,, 6-21-2021, researcher at the Igarapé Institute. Gordon LaForge is a senior researcher at Princeton University and a lecturer at Arizona State University’s Thunderbird School of Global Management. Robert Muggah is a principal at the SecDev Group, a co-founder of the Igarapé Institute, and the author, with Ian Goldin, of Terra Incognita: 100 Maps to Survive the Next 100 Years. Twitter: @robmuggah Anne-Marie Slaughter is the CEO of New America https://foreignpolicy.com/2021/06/21/global-vaccination-covax-gavi-covid-19-pandemic-impact-hubs-public-private-funding-united-nations/, "Three Years Is Too Long to Wait for a Global Vaccine Rollout," Foreign Policy (ermo/sms, Acc:6-20-2022)

At first sight, the global vaccination rollout is mesmerizing. At least 2.4 billion people have already received at least one dose. But scrape a little deeper and the unevenness of vaccine distribution loses its luster. Just 480 million people have been fully vaccinated or 6.2 percent of the global population. What’s more, well over half of all administered doses have been injected into the arms of citizens from just two countries: the United States and China.

Following their summit in Cornwall, England, last week, the leaders of the G-7 nations committed to donating an additional 1 billion COVID-19 vaccines to poorer countries in 2021 and 2022. The Biden administration said 500 million of those doses would be provided by the United States, mostly through COVID-19 Vaccines Global Access (COVAX), a global vaccine facility managed by the Global Vaccine Alliance (Gavi) and the Coalition for Epidemic Preparedness Innovations. China is likewise distributing jabs to advance foreign-policy goals, having so far exported more than 250 million doses to other countries.

Notwithstanding the surge in vaccine diplomacy, far more investment is needed. Less than 1 percent of the billions of vaccine doses administered to date have gone to low-income countries. At the current rate of distribution, it will take until 2024 before all countries have sufficient supplies to vaccinate their populations. It is not just vaccine nationalism and supply chain disruptions that are slowing vaccination in poorer countries, but also financial constraints. To attain even the modest goal of vaccinating 20 percent of the people in 92 low-income countries by the end of the year, COVAX said it needs an additional $2.8 billion.

The delay is dangerous and costly for all nations. Recurrent outbreaks will prolong the global economic slowdown, which has already cost the world $28 trillion in lost output. If, by this summer, wealthier nations are fully vaccinated yet developing nations remain unvaccinated, global economic losses could add an additional $9 trillion to the bill. And the longer more contagious and lethal variants are allowed to incubate and spread, the greater the risk a vaccine-resistant strain emerges. As U.S. President Joe Biden has said, “We will ultimately not be safe until the world is safe.”

An urgent, all-hands-on-deck effort is needed to fund COVAX and Gavi in particular. So far, the focus has been on what governments can do. Mapping the funding network for Gavi and COVAX reveals two intriguing features of the current financing environment. First, governments have provided the lion’s share of financial support. Of the $9.5 billion pledged, $8.8 billion is from national governments. Second, although the remaining funding only makes up a small share, it comes from a surprisingly diverse array of organizations, including philanthropic foundations, corporations like Visa and Google, and even civil society groups like the charitable video game festival Gamers Without Borders.

### A2 Security K

#### Disease securitization good – checks political capture – link turns their impacts

Eric Swalwell, (CA Rep – D), 7-16-2021, https://www.justsecurity.org/77442/, "New Legislation Needed to Prepare for the Next Pandemic," Just Security (ermo/sms, Acc:6-8-2022)

COVID-19 has wreaked havoc upon the United States – a loss of more than 600,000 lives and a devastating blow to our economy – and it would be shameful if we didn’t use the lessons we have learned to help blunt the next pandemic’s impact.

The United States must change the perspective from which it prepares for and responds to a pandemic. Yes, they’re public health emergencies; however, the United States must also approach them as national security threats that need better public monitoring. Experts long have warned that infectious disease outbreaks could bring not only human suffering but also massive economic losses, and political instability – especially if outbreaks are serious enough to overwhelm health care systems, drain the workforce, and interrupt supply chains.

Think about what transpired over the past year and a half. Early on, hospitals ran out of personal protective equipment for healthcare workers and life-saving ventilators for patients. The aircraft carrier, the USS Theodore Roosevelt, had to be mostly evacuated in April 2020 as hundreds of sailors contracted the disease on board. Supply chains for everything from toilet paper to pork were disrupted. The president was hospitalized for three days, undergoing special experimental treatment to ensure his survival. And our highest-ranking military officers, the Joint Chiefs of Staff, were quarantined for two weeks in October after being exposed.

These are only a few examples of the many disruptions and scares the United States suffered, leaving the nation more vulnerable to other security risks while it struggled to mitigate the biological threat.

The future probably will bring worse. In addition to the climate-related crises that are expected, evidence suggests that emerging diseases will become more and more likely to reach pandemic proportions as the world becomes increasingly interconnected. The next global outbreak of a deadly disease could be right around the corner.

I’ve introduced the National Security Council Modernization Act to give the secretary of Health and Human Services (HHS) – whose department oversees the Centers for Disease Control and Prevention and other disease surveillance agencies – a seat on the National Security Council (NSC).

Adding the HHS secretary to the NSC would ensure that emerging public health threats are evaluated as potential national security threats, and would provide a readily available forum for the secretary to share information on such diseases with national security-oriented departments, such as the Department of Defense.

My bill also strengthens the NSC by permanently seating the chair of the Joint Chiefs of Staff and the director of National Intelligence, and by allowing only Senate-confirmed officers of the United States to serve as full members – thus limiting any president’s ability to politicize the council.

Also, as we have seen throughout the COVID-19 pandemic, public health misinformation – particularly on social media – can jeopardize America’s response to biological threats, unnecessarily putting people in harm’s way.

Consider the rampant, pernicious myths that accompanied COVID-19. Some claimed it was desirable to try to achieve herd immunity by letting the virus spread unchecked through the population; some claimed the number of COVID-19 deaths was much lower than what was being reported, and that the disease was being overblown; some claimed only the elderly or those with underlying health conditions could get seriously ill and require hospitalization for COVID-19. Some of these lies are still being propagated today, alongside dangerous conspiracy theories about the vaccines.

So, I’ve introduced the BIO Defense Act to strengthen the National Biodefense Strategy (NBS), a bipartisan plan enacted in 2016 as part of the National Defense Authorization Act. My bill would formalize a National Biodefense Directorate, and it would include the vice president and the department secretaries. This entity would be required to meet regularly, hire staff, and establish uniform data collection methods so it can continually update the NBS to address the national security risks posed by pandemics.

And, importantly, the Directorate would develop a National Strategy Combating Biodefense Misinformation to make sure the federal government is prepared to get the best-available public health information to the American people quickly and effectively in times of crisis. Knowledge is power during a pandemic, and government must actively promote fact-based information – while actively debunking and preventing the spread of lies, be they deliberate or panic-induced – to save lives.

COVID-19 must be seen as a wake-up call, alerting us to the national security threats posed by major pandemics. It’s even clearer now that former President Donald Trump handled the challenge poorly. He ignored data and intelligence, assembled but then contradicted expert advisers, sidestepped Congress, shunned already existing strategy, and lied to Americans about the scope of the public health threat.

This mismanagement exacerbated COVID-19’s danger to U.S. national security. The lack of a national strategy to mitigate COVID-19’s fallout led to a patchwork of state and local public health policies and contributed to the public’s mass anxiety, which made people more susceptible to violent ideology.

My bills are some initial, simple guardrails to ensure that the United States is always vigilant and prepared to respond to biological threats that impact national security, now and in the future.

#### A2 Security K NATO pandemic leadership is vital to cohesion

Aylin Unver Noi, Opinion Contributor, 4-4-2020, Istinye U Intl Relations Prof & senior fellow at the Transatlantic Leadership Network https://thehill.com/opinion/international/491164-its-time-to-consider-an-enhanced-role-for-nato-to-combat-pandemics/, "It’s time to consider an enhanced role for NATO to combat pandemics," Hill (ermo/sms, Acc:6-22-2022)

In 2019 when the U.S. remained the world’s largest defense spender, governments of the EU member states increased their defense spending to reach the 2 percent GDP NATO contribution target. The U.S. government built a wall across its southern border to improve American security; meanwhile, EU member states increased the number and budget of border patrols like FRONTEX to protect their borders from refugees and mass immigration flows, which seem a threat to their security. However, neither the U.S. nor the EU were well prepared to protect their citizens from one of the most dangerous and deadly security threats, one that does not recognize any border: pandemics.

The recent outbreak of COVID-19 reminds us that a pandemic can kill as many people as a war. Moreover, COVID-19 also demonstrates that it can severely harm the economy and has the potential to change the current international economic system. Furthermore, COVID-19 indicates that there is an urgent need for solidarity among NATO allies to battle against the outbreak.

COVID-19 is not the first pandemic — but pandemics were not accepted as a security threat and were not included in security strategy documents until the early 2000s, only viewed as a national security issue following the H5N1 and H1N1 outbreaks in 2005 and 2009. The 2006 U.S. National Security Strategy stated that pandemics like HIV (AIDS), H5N1 (avian influenza) do not recognize borders and should be dealt with through new strategies and responses. Like the U.S., the EU included pandemics as public health threats under the section entitled “Security and Development Nexus” in the 2008 Report on the Implementation of the European Security Strategy, stating that “pandemics further undermine development.”

Both the U.S. and the EU and its member states that define pandemics as a security threat aim to protect their citizens and try to take measures at national, federal and union levels. Contrary to these national security strategy documents, NATO’s 2010 strategic concept, an official policy document outlining purpose and fundamental NATO security tasks, does not mention pandemic.

NATO reconsidered its planning and operations to deal with new security threats. Accordingly, the head of states underlined “key environmental and resource constraints, including health risks, climate change, water scarcity and increasing energy needs will further shape the future security environment in areas of concern to NATO and have the potential to significantly affect NATO planning and operations” at the Wales Summit Declaration of NATO in 2014.

A couple of months ago at the NATO London Summit, leaders and heads of state stated that “we are stepping up NATO’s role in human security.” The concept of human security, which was first introduced in the United Nations Development Program’s 1994 Human Development Report, emphasizes the necessity of focusing on the protection of individuals from economic, environmental, social, and other forms of harm, including pandemics. Pandemics, which transcend national frontiers and are described as a global challenge, cannot be handled by state-centered traditional security understanding. Like other global challenges, a pandemic necessitates a global response.

Among other NATO allies, Italy has been hit worst by the outbreak and pleaded for help. China, Russia and Cuba responded very quickly to Italy’s request. China sent ventilators, face masks, doctors and nurses to Italy to help its battle against COVID-19. Russia sent military doctors, specialists on epidemics and equipment. Cuban doctors and nurses also travelled to Italy in order to help. This not only shows the necessity of international cooperation and enhanced partnerships with other actors and organizations when needed (as stated at the Strategic Concept of NATO) but also the need for an enhanced role for NATO to help its allies combat pandemics.

NATO is not unfamiliar with relief operations and humanitarian assistance. It took an active role in relief operations in the aftermath of Hurricane Katrina (2005) and an earthquake in Pakistan (2005). NATO’s Euro-Atlantic Disaster Response Coordination Center (EADRCC) providing medical, logistical and food supplies to the U.S. after Katrina. NATO also provided food, medical care, and deployed engineers, medical units to assist in relief operations after the earthquake in Pakistan.

In the London Declaration of 2019, leaders and heads of states reiterated that NATO guarantees the security of its member states’ territory, citizens and common values, emphasizing the cornerstone of alliance: solidarity, unity and cohesion.

It is time to show this solidarity with NATO allies struggling with the COVID-19 outbreak. It is time to enhance NATO’s role in the fight against pandemics.

#### A2 Security K NATO cooperation on pandemic emergence vital to resilience – prevents social collapse

Olli-Poika Parviainen, 12-10-2020, State Secretary, Finland Ministry of the Interior, https://www.nato.int/cps/en/natohq/opinions\_180067.htm, "Building transatlantic resilience: Why critical infrastructure is a matter of national security," NATO (ermo/sms, Acc:6-22-2022)

But I have prepared a little speech for you. It is the Minister’s speech which I have tuned a little bit, so, I think I will proceed to that. I think we've reached a stage in the coronavirus pandemic where we can already reflect on lessons for ongoing and future crisis and already at this point, it is clear that societal resilience is at the heart of responding efficiently to a long lasting crisis situation, like the one we are currently experiencing worldwide. During the past few years, resilience and critical infrastructure protection, have featured strongly in international discussions and discussions within EU and NATO.

Our societies are characterised by a web of complex interdependencies where private sector actors are principal operators in many fields of services and infrastructure. The resilience of modern societies is not restricted to state boundaries or a single actor. This is something that the previous speakers have also addressed. So in this intervention. I would like to highlight two areas relevant to the topic of this event.

Firstly, comprehensive security and societal resilience, as tools to maintain wellbeing and societal order, and secondly the importance of national security when assessing critical infrastructure, resilience against both old and new threats such as hybrid influencing and, for example, fake news even. So, first on comprehensive security and societal resilience. I want to highlight as national practices, we can be proud of Finland. And this is something that I think we have achieved quite well. And we have our own diamond shaped strategy of comprehensive security on use.

Finland has been using a so called comprehensive security model which I mentioned in its civil preparedness for decades. The model rests on the assumption that we should be prepared for all kinds of crisis, from everyday accident to all the way to military conflict or even to a war. I see internal security, the mandate of my Ministry in a wide sense, for example, reducing marginalisation and poverty. It promotes internal security and contributes to resilience tackling climate change, reduces frequency and magnitude of natural disasters. Fighting hate speech promotes social inclusion and prevents hate crimes, and so on.

The comprehensive security model relies on cooperation between authorities and other relevant actors, the private sector, public partners in education, society, social and healthcare sectors, and of course, NGOs. Another key element is building security of supply with national and international arrangements, and maintaining sufficient in-country reserve storage. The ongoing pandemic has really demonstrated in practice, how important security of supply and well functioning, or society preparedness, is for our everyday resilience.

In Finland, we have maintained reserve storages, but COVID-19 showed us too that keeping a good stock of essential equipment is not enough. You also have to build good supply production and acquisition chains to last weeks, and even months. And of course if you look at Finland, from a global map we are in a certain way stranded in an island. In Finland, a broad variety of private sector operators, it's about 1000 companies and relevant public authorities, form a cooperation network called the National Security of Supply Organisation. These pools, work together across sectors to ensure security of supply and critical functions of society, such as telecommunications, logistics, food supply, financial services, and energy.

When we think about resilience, the role of individual people cannot also be overlooked. Resilient people are in the foundation of our resilient society. They play a major role in the preparedness, alongside government institutions. Based on my experience so far, one of the strengths in my country has been people's trust in authorities, for example in following guidelines and restrictions. In addition, I want to emphasise the importance of a good social safety net, in promoting national resilience. This is a cornerstone of our Nordic Welfare Society.

For example, if you don't provide people with necessary health care during a pandemic, undiagnosed and untreated diseases will be a heavy burden for resilience, later on. As another example, I want to mention homelessness, of course, Finland has set a goal for no homelessness in Finland, in 2027, and to halve homelessness by 2023. This is an ambitious goal, but our efforts are paying off the number of homeless people is declining. Homeless people are extremely vulnerable to different crimes, and of course we are living in quite harsh climate. This is a matter of internal security and resilience in many ways, although often considered only a social security issue, but there is a strict connection between this phenomenon, and also to certain crime levels for example.

As an example of promoting resilience and awareness, I would also like to mention the Finnish National Defence Courses. I have also been on one, usually I have a pin here, but now it's in a different jacket. The goal of these courses, is to provide leaders in both civilian and military organisations, with an overview of Finland's foreign security and defence policy. The courses also promote collaboration between key people working in different areas of comprehensive security, it means that when we participate in the courses we meet other decision makers in key areas of our society.

And we practically practice on how to work together in unexpected circumstances and in crisis situations, for example we ran a simulation where I was a Minister, at the time, and now I get to use that lesson learned from there as a State Secretary in an actual Ministry. And then to critical infrastructure protection. Maybe I would start by saying that it is clear that European societies are characterised by a web of complex interdependencies where private sector actors have a growing role, the changed security environment has forced us to consider how disruptions in critical services and technologies can escalate the de-stabilisation of our societies.

#### Targeted bioeconomy investment spills over to ecology – our scenario planning is key

Ryan Morhard, 1-26-2022, director of policy and partnerships at Ginkgo Bioworks, Inc. in Boston, Massachusetts; an affiliate of the Georgetown University Center for Global Health Science and Security; and a term member of the Council on Foreign Relations. , https://www.thinkglobalhealth.org/article/bioeconomy-revolution-can-end-panic-and-neglect-cycle-health-security, "The Bioeconomy Revolution Can End the Panic-and-Neglect Cycle in Health Security," Council on Foreign Relations (ermo/sms, Acc:6-22-2022)

Before the COVID-19 pandemic, I spent a lot of time convening pandemic "war games."

These simulations asked leaders from around the world across different policy sectors to consider hypothetical pandemic scenarios. The ultimate purpose was to raise awareness and mobilize action to improve preparedness and response strategies and capabilities for dangerous outbreaks. Fundamentally, these events sought to help break the cycle of panic and neglect that has characterized investments in public health and biosecurity for so long.

The response to COVID-19 has shown that simulations and other efforts on pandemic preparedness and response may have underestimated the single most important factor enabling some of the most effective responses to the COVID-19 crisis: the revolutions in biotechnology and the bioeconomy.

Turn Back Time

Although pandemic simulations aren't much in demand these days, we can run two hypothetical scenarios that highlight the impact of new biotechnologies on pandemic preparedness and response.

In the first hypothetical, imagine if SARS-CoV-2 emerged not in 2019, but, rather, ten years earlier, in 2009. "COVID-09," if you will.

The response to a COVID-09 pandemic would have been radically different from the COVID-19 response. And much more difficult. To illustrate the point, consider the response to the H1N1 pandemic in 2009-10 and focus on two major pillars of the COVID-19 response—vaccines and detecting and tracking variants.

Vaccines have been our best tool to manage the risk and impact of COVID-19. By the end of the H1N1 pandemic, countries had administered over 350 million doses of influenza vaccines by leveraging the significant existing influenza vaccine manufacturing capacity. For comparison, nations have administered over 9.8 billion doses of COVID-19 vaccines that were developed and manufactured with unprecedented speed and scale in response to a novel virus. In particular, the leading COVID-19 vaccines, the mRNA vaccines, moved from the lab bench to billion-dose scale over the last decade.

How about variant detection and tracking? Identifying and tracking the emergence of COVID-19 variants—for example, delta and omicron—that might pose an increased public health risk has been essential to informing responses to the pandemic. The speed and scale at which these tasks have happened during COVID-19 would have been impossible a decade ago. During the H1N1 pandemic, the United States sequenced less than 10,000 influenza samples. Today, over 7 million SARS-CoV-2 sequences have been shared with the GISAID Initiative. And artificial intelligence is being used to analyze volumes of sequencing data to provide advance warning of high-risk variants and to inform the production of adapted vaccines—something that would have been science fiction in 2009.

The Biotechnology Revolution

What happened between 2009 and today? How did we get from 350 million doses of vaccine and 10,000 sequences during the H1N1 pandemic, to 9.8 billion doses and 7 million sequences—and counting—in the current pandemic?

Comparing the two pandemic responses creates challenges, but the difference in the ability to deploy vaccines and detect and track variants is remarkable. And lessons from the comparison hold promise for pandemic preparedness and response moving forward.

No matter how many simulations we convened, the world largely did not take the risk of pandemics seriously before COVID-19. Even after H1N1, we were unprepared.

In 2017, a World Bank working group recognized that investments in health security were generally neglected, outside of bursts of panicked activity, usually in response to the latest outbreak. In 2019, the high-level Global Preparedness Monitoring Board issued its first report just months before the world mobilized in response to COVID-19 and noted that countries remained unprepared, "For too long, we have allowed a cycle of panic and neglect when it comes to pandemics: we ramp up efforts when there is a serious threat, then quickly forget about them when the threat subsides."

So, if big investments in pandemic preparedness and response were not the primary driver of the new biotechnology capacities brought to bear against COVID-19, what was?

The answer is the bioeconomy.

The Bioeconomy Revolution

Today's bioeconomy is the major reason why our biotechnology tools for responding to COVID-19 are so much better than they were for H1N1 in 2009.

The Organization for Economic Cooperation and Development defines the bioeconomy as "the set of economic activities relating to the invention, development, production and use of biological products and processes." Traditionally, these activities have been concentrated in the pharmaceutical sector, and most people probably still associate biotechnology with medical applications. But that's changing quickly.

Since the H1N1 pandemic, DNA sequencing has become important to many economic activities. This need has increased incentives to improve sequencing technologies and has contributed to the substantial drop in cost of sequencing DNA. For example, the costs associated with DNA sequencing were 100 times cheaper in 2019 than in 2009. As a result, DNA sequencing has become a fundamental capability within the modern bioeconomy.

As the costs of biological engineering drop, and as production processes utilize automation, artificial intelligence, and data-analytics, the bioeconomy is moving beyond health care. In fact, many, if not most, of the cutting-edge applications of biotechnology that will shape the future bioeconomy are outside of human health. More and more, biotechnology contributes to products and processes we rely on for agriculture, food, consumer goods and services, materials, and energy.

Another reason the bioeconomy is expanding beyond health care is that new biotechnology tools increasingly offer solutions to other major environmental and social challenges we face today. Biotechnology offers new means to address not only pandemics but also climate change, food insecurity, and biodiversity loss. For example, biotechnology stands to play an essential role in removal and reduction of atmospheric carbon.

The response to the COVID-19 pandemic has shown that, when combined with public sector leadership and support, the bioeconomy offers ready capacity for biosurveillance, environmental monitoring, and continuous development and large-scale production of diagnostics, therapeutics, and vaccines.

Fast Forward

With that in mind, imagine that, in 2029, the world confronts a novel coronavirus as or more dangerous than SARS-CoV-2. What might the bioeconomy look like when COVID-29 strikes?

The McKinsey Global Institute has estimated that the bio-based economy could create approximately $2 trillion to $4 trillion of direct annual economic impact over the next ten to twenty years. In addition, up to 60 percent of the physical inputs to the global economy—such as wood, livestock, plastics, and fuels—could be made through biotechnologies, with up to 30 percent of private-sector research and development spending focused on biology-related industries.

With a bioeconomy that big and dynamic, the cutting-edge biotechnology that produced the fastest vaccine development and manufacturing in history in response to COVID-19 is only a preview of the contributions that biotechnology could make to pandemic preparedness and response in 2029.

Imagine what such a vibrant bioeconomy might make possible in responding to COVID-29 in areas where problems have emerged with COVID-19, such as inequitable vaccine access. For example, in a more advanced bioeconomy, envisioning a global network of "evergreen" vaccine manufacturing capabilities across both high- and low-income nations is plausible when, between pandemics, these biomanufacturing facilities are busy providing day-to-day solutions for, among other things, food insecurity and climate change.

The response to COVID-19—and the COVID-09 and COVID-29 hypothetical scenarios—suggests that policymakers around the world should take full advantage of the growing global bioeconomy in improving pandemic preparedness and response strategies and capabilities. The bioeconomy of the future offers our best shot at ending the panic-and-neglect cycle in pandemic policies, developing better tools for preventing, detecting, and responding to epidemics and pandemics, and supporting sustainable development around the world.

#### Perm – hard and soft biotech management strategies strength each other

Yang Xue 1,2, Hanzhi Yu 3,\* and Geng Qin 3, 12-20-2021, 1 Law School, Tianjin University, Tianjin 300072, China; 2 Center for Biosafety Research and Strategy, Tianjin University, Tianjin 300072, China 3 School of Public Affairs, Zhejiang University, Hangzhou 310058, China; https://www.mdpi.com/2071-1050/13/24/14056/htm, "Towards Good Governance on Dual-Use Biotechnology for Global Sustainable Development," Sustainability Volume 13 Issue 24 10.3390/su132414056 (ermo/sms, Acc:6-22-2022)

From the perspective of global practice and international experience, the rules of governance towards dual-use risks of biotechnology consist of hard and soft laws. “Hard laws” are conventions, laws and regulations that are enforced using national coercive power. “Soft laws” are democratic, open, universal and normative rules formulated and recognized through extensive participation and joint consultation of all social parties, including codes of conduct and professional self-discipline. Hard and soft rules are not mutually exclusive. For example, the effectiveness of voluntary standards and guidelines can be strengthened through the enforcement of criminal law or tort law so as to punish harm caused by accidental or intentional abuse [15].

### A2 Unilateral CP

#### NATO is a solvency deficit – the whole advantage is multilateral

#### NATO is vital to air logistics – CP does not achieve delivery

NATO North Atlantic Treaty Organization, March 2021, https://www.nato.int/nato\_static\_fl2014/assets/pdf/2021/3/pdf/2103-factsheet-COVID-19-en.pdf, " NATO’s Response to the COVID-19 Pandemic" NATO Fact Sheet (ermo/sms, Acc:6-20-2022)

Cooperating with International Organisations

As part of a coordinated approach, NATO is working closely with other international organisations, including the European Union, the United Nations Office for the Coordination of Humanitarian Affairs, the World Health Organization and the United Nations World Food Programme.

Throughout the COVID-19 crisis, we have strengthened our cooperation with the European Union. NATO and EU staffs have been exchanging information on steps taken by both organisations to support NATO Allies and partners during the crisis. This ensures that our efforts are coherent, complementary and transparent. Following a global request by the United Nations for airlift support in response to the COVID-19 pandemic, in July 2020 flights coordinated by NATO’s Euro-Atlantic Disaster Response Coordination Centre transported a field hospital from Europe to Accra, Ghana. The flights were operated by the United Kingdom Royal Air Force.

With commercial flights disrupted and the cost of cargo flights having escalated, this support came at a crucial time.

How NATO is helping to curb the pandemic

Since the start of the crisis, NATO’s Euro-Atlantic Disaster Response Coordination Centre has coordinated requests from the United Nations Office for the Coordination of Humanitarian Affairs and 18 NATO and partner countries, garnering more than 130 responses in return.

Logistics support provided by the NATO Support and Procurement Agency has helped Allies and partners achieve economies of scale in purchasing COVID-19 relief materialSeveral Allies and the NATO

Support and Procurement Agency have also helped Allies and partners in acquiring and transporting urgent relief items to countries in need through the Strategic Airlift Capability (SAC), and the Strategic Airlift International Solution (SALIS) programmes, as well as through commercial chartered flights and sealift. In total, around 1,500 tonnes of medical supplies and equipment were transported to Allied countries, including Hungary, Romania, Bulgaria and the Netherlands, as well as Czech Republic, Slovakia, Germany and Poland.

In the first half of 2020, almost half a million troops from NATO militaries have supported civilian efforts, building field hospitals, helping with testing, transporting patients, distributing medical equipment, conducting repatriation, helping with decontamination, making available laboratories, quarantine facilities, establishing triage centres and supporting border security across the Alliance.

Military forces from NATO Allies:

• flew more than 350 flights to transport medical personnel;

• transported more than 1,000 tonnes of equipment;

• helped build almost 100 field hospitals and over 25,000 treatment beds.

Since the start of the pandemic, the Euro-Atlantic Disaster Response Coordination Centre coordinated critical support for several Allies and partners in need. Deliveries of vital medical supplies from NATO Allies and partners in the first half of the year have eased the burden on the national healthcare systems and helped to save lives. Allies also helped each other through bilateral forms of assistance. Spain for example received support including from the Czech Republic, Estonia, Germany, Latvia, Lithuania, Luxembourg, Poland and Turkey. Italy received support including from Albania, the Czech Republic, Estonia, Luxembourg, Slovakia, Poland, Turkey and the United States.

#### Unilateralism guts experimental governance – can’t solve biotech

Yang Xue 1,2, Hanzhi Yu 3,\* and Geng Qin 3, 12-20-2021, 1 Law School, Tianjin University, Tianjin 300072, China; 2 Center for Biosafety Research and Strategy, Tianjin University, Tianjin 300072, China 3 School of Public Affairs, Zhejiang University, Hangzhou 310058, China; https://www.mdpi.com/2071-1050/13/24/14056/htm, "Towards Good Governance on Dual-Use Biotechnology for Global Sustainable Development," Sustainability Volume 13 Issue 24 10.3390/su132414056 (ermo/sms, Acc:6-22-2022)

3.4. Stage 3: Dynamic Consultation Mechanism for Transnational Information Sharing and

Action Review

Based on the governance practices of countries tailored to local conditions, experimentalist governance requires that the multilateral platforms of international organizations need to further review and supervise the actions of the country, so as to realize the integration of “bottom-up” and “top-down” governance. International organizations and other specialized associations need to review and supervise governments’ implementation of the governance of dual-use biotechnology. We believe that to achieve effective review and supervision functions, international organizations need to establish a dynamic consultant mechanism for transnational information sharing, and ensure that the governance of international organizations and specialized associations is self-regulated and connected by legislation and regulatory policies of governments of various countries.

Under the current framework of international biotechnology security governance, the Biological Weapons Convention still has the most powerful binding force. Therefore, under the framework of the BWC, a scientific advisory committee of scientists from developed and developing countries that takes into account the interests of developed and underdeveloped countries should be established as soon as possible to conduct regular information tracking, risk research and evaluation, and information sharing so as to strengthen risk management of dual-use biotechnology worldwide. Each contracting party may formulate its own laws and regulatory policies according to the risk evaluation of dual-use biotechnology carried out by the Scientific Advisory Committee of the Biological Weapons Convention, based on the self-regulation established by international professional associations and other international organizations. Biologists and enterprises, as important objects of dual-use biotechnology governance, while joining international professional associations and other international organizations to constantly improve their self-regulation, have also achieved a dynamic negotiation process for governance subjects (see Figure 2).

Regarding the governance of dual-use biotechnology risks, it is necessary for international organizations to re-examine and update set principles and objectives as well as to strengthen and specify the key content under the circumstance of the continuous improvement of technology application and R and D level.

We believed that the global cooperation on risk management of dual-use biotechnology may benefit from a window of policy opportunities. The COVID-19 pandemic has drawn global attention to global health governance and biosafety, both of which are essential in forging a consensus on global governance. Despite the volatile international climate, many governments have prioritized responding to and solving the challenges in global governance. The Ninth Review Conference of the States Parties to the Biological Weapons Convention will be held in 2022, and a breakthrough in cooperation is possible. We call on the world to take advantage of this opportunity and allow biotechnology to benefit global development.

#### US-Europe BT disharmony chills products to market

Ronit Langer & Shruti Sharma, 11-20-2020, Carnegie Endowment for International Peace (Technology and International Affairs Fellow & Technology and Society Sr. Research Analyst), https://carnegieendowment.org/2020/11/20/blessing-and-curse-of-biotechnology-primer-on-biosafety-and-biosecurity-pub-83252, "The Blessing and Curse of Biotechnology: A Primer on Biosafety and Biosecurity," (ermo/sms, Acc:6-8-2022)

Real-world applications are integral to the successful development and use of biotechnology. In the pharmaceutical industry, for instance, streamlining the process of getting new treatments to market is called translational medicine. Standard procedures for proving that a new treatment is safe and effective include animal models and clinical trials.

For agricultural biotechnology, this process is less defined. Many countries, particularly members of the European Union, ban the growing of genetically modified organisms (GMOs) or crops. In countries where GMOs are allowed, regulations are often shifting due to public pressure from anti-GMO organizations and differing definitions of the term genetically modified. Once a GMO product enters the market, companies must navigate the complicated information landscape surrounding GMOs and provide evidence to consumers that their product is safe.

For environmental biotechnology, the processes of getting products to market has not been established yet. The applications of environmental biotechnology often fall outside of existing regulatory frameworks. Applications often span many national borders, such as gene drives being considered to help eradicate malaria-causing mosquitoes in sub-Saharan Africa. In some cases, these applications fall outside of national borders altogether, such as in the case of bacteria designed to break down oil from oil spills.

#### US counterplan fails – Common rule checks innovation

Marsha Greene & Zubin Master, 2018, Senior Policy Analyst, Peraton & Biomedical Ethics Research Program, Mayo Clinic, https://www.ndu.edu/Portals/59/Documents/Incoming/AY21%20Briefings/NDU%206070/CRISPR\_Military.pdf?ver=2020-08-11-170728-347, " Ethical Issues of Using CRISPR Technologies for Research on Military Enhancement" Journal of Bioethical Inquiry (ermo/sms, Acc:6-8-2022)

The public exposure to several unethical experiments conducted in the United States and abroad led to the development of the Belmont Report (Smith and Master 2014). The Belmont Report underscores three fundamental tenets of research ethics: respect for persons, beneficence, and justice. Heavily influenced by the Belmont Report, the Common Rule (45 CFR 46) is an overarching set of regulations that aims to protect human subjects participating in research. Fifteen Federal agencies, including the DoD, have signed on to the Common Rule in 1991 with the purpose of promoting uniformity in how research involving humans is governed. The Common Rule has several subparts providing additional protections for vulnerable populations such as pregnant women, human fetuses and neonates, prisoners, and children (Smith and Master 2014). Provisions within the Common Rule include the composition and processes of institutional review boards and informed consent among others. The Common Rule was revised in January 2017 with an effective date for July 19, 2018.

Prior to the Common Rule era, military research involving human subjects was largely accelerated due to the use of poison gas during World War I and the subsequent development of a chemical warfare defence programme. During the time between the two world wars, it is estimated that approximately 60,000 U.S. service members were experimentally exposed to Mustard gas and Lewistite (Brown 2009). Although the programme ramped down significantly following the end of World War II, military scientists continued research and development to seek out more effective compounds that could act as nerve agents, incapacitating compounds, and psychoactive agents. An additional 6,720 service members are estimated to have participated in experiments to test these agents from 1955 to 1979 (Brown 2009). Experiments were conducted under a shroud of secrecy but were still based on Nuremberg and Helsinki guidance and emphasized that participation was voluntary (Brown 2009). Since that time, military research involving service members has involved everything from human performance, feeding and nutrition, military medicine, and social behavioural interactions. Department of Defense human protections oversight has evolved to ensure more transparency, accountability, and greater protection for service members and civilians participating in DoD sponsored research.

Each Federal agency has also adopted protections in their instance of the rule to protect specific populations known to participate in research they sponsor. The DoD makes additional provisions for research involving service members. Due to the superior-subordinate relationship that exists in the military, DoD research policy provides additional protections to minimize command influence, to ensure that each individual gives informed consent in advance, and to limit waivers of informed consent (Amoroso and Wenger 2003). Furthermore, 10 United States Code 980 (10 USC 980) requires that all human participants of DoD sponsored research be able to give consent in advance of the research unless such research is intended to directly benefit the participant, in which case consent may be obtained from a legal representative (Sec 980 2005). The DoD has developed instructions that delineate the implementation of the Common Rule and considerations regarding special protections for service members (DoDI 3216.02, 2002). The DoD has also agreed to comply with all civilian Food and Drug Administration (FDA) regulations regarding the development and use of new pharmaceuticals, including the requirement to obtain informed consent from human subjects participating in experimental drug and biologics trials.

### A2 Non-Government CP

#### Reliance on private initiative hampers all NATO operations

CCOE 2019 Civil-Military Cooperation Centre of Excellence (The Hague), “Resilience through Civil Preparedness A CCOE Info Sheet” https://www.cimic-coe.org/resources/fact-sheets/resilience-through-civil-preparedness.pdf, (ermo/sms, Acc:6-17-2022)

Why NATO deals with Resilience through Civil Preparedness?

Recognizing that the modern, global environment is characterized by uncertainty, complexity and ambiguity9. New efforts are urgently needed that extend traditional activities at territorial defence and deterrence. Therefore it is crucial to develop modern approaches to build a society’s capacity to anticipate and resolve disruptive challenges to its critical functions, and to prevail against direct attacks if necessary.10

The need for Resilience through Civil Preparedness is re-appearing not just because the landscape of conflict has changed, but also because the modern conflicts now, target all aspects of states and societies.11 NATO forces rely on civilian assets to enable rapid deployment and support operations across alliance territory. Decades of over-reliance on private sector capabilities have left gaps in the alliance's ability to support military operations.

#### Lab to field is key to non-scale military use

Patrick Tucker, 12-1-2018, Technology Editor, https://www.defenseone.com/technology/2018/12/us-military-genetically-engineering-new-life-forms-detect-enemy-subs/153200/, "The US Military Is Genetically Engineering New Life Forms To Detect Enemy Subs," Defense One (ermo/sms, Acc:6-8-2022)

U.S. Army researchers are focused on getting synthetic organisms out of the lab and into the field, that also means getting useful, new reactions out of abundant organisms and finding new nanoscale (one billionth of a meter in size) techniques to engineer those molecular reactions.

“We want to move synthetic biology from the laboratory to the field. That's a big thrust of ours and so there's a lot of tool development in order to do that,” said Dimitra Stratis-Cullum, who leads the biomaterials team at the U.S. Army Research Laboratory. “If you want to move a biological bio-based sensor to the field you try to ruggedize those organisms. You try to protect them. You try to encapsulate them. You try to basically increase their longevity in these harsh environments. So if you had, for example, embedded in a uniform a sensor that detects a hazard that's a bio-based sensor. And perhaps it also causes more than one color change depending on the complex input. So there's more than one function. Or it would sense and alert you and also [decontaminate] a material for example. It's very difficult now to do that with the organisms that have some bio tools in them now,” like E. coli.

Her near-term focus is “using biology to do and accelerate the nano-science in traditional coatings that exist now.” The hope is that soldiers will one day be able to produce or print new coatings in the field to conceal equipment in the open. “We're looking to build next-generation coatings where we can dovetail into additive manufacturing [essentially 3D printing] and other more point-of-need production technologies.” Those could be useful to “control and minimize detection of our materials or of our assets,” she said.

Back to the November JHU event, where U.S. Chief of Naval Operations Adm. John Richardson said the United States, and the Navy in particular, is investing heavily in synthetic biology to better compete with China, an emerging synthetic-biotechnology powerhouse.

“We’ve taken a look at this in terms of its implications in terms of the operating environment. … biotechnology as a form of sensing, whether that be algae, or any number [of other organisms.] The ability to detect DNA as its left behind in the water column, advanced sensors on the beach heads,” he said. “We recently stood up Task Force Ocean, which is about getting us back into a competitive stance in terms of ocean science.”

#### Biosensor solvency deficit

Rico Maderthoner, 8-6-2021, Commander J.G. (OF-3) Germany Navy, https://www.bundeswehr.de/en/organization/bundeswehr-medical-service-/biosensors-in-the-medical-service-workshop-for-the-future-5086922, "Biosensors in the Medical Service: Workshop for the future," No Publication (ermo/sms, Acc:6-20-2022)

From 18 to 20 May 2021, the Koblenz Multinational Medical Coordination Centre/European Medical Command (MMCC/EMC) hosted a civil-military digital event on the subject of biosensors. With 30 high-ranking lecturers from science and future users, the event offered a comprehensive programme and forum.

The 130 registered participants from approx. 20 countries listened to topical and interesting briefings on the main topics fitness for duty, biosensor technology in support of medical care, as well as ethical and legal provisions regarding the use of biosensors. Beside the issues from the different subject and specialised areas like biology, physics, medicine, military medicine, cyber security, as well as sports and health sciences, a controversial discussion on the use of biosensors or wearables in the medical service was initiated.

Biosensors in the military

International lecturers demonstrated first positive experience and illustrated that some of the medical services of EU and NATO armed forces already make use of this technological progress. In many situations, military personnel must also go to their performance limits and even beyond. Biosensors can help to support health-promoting and preventive measures. They offer a particular role in military medicine, and especially in the treatment of casualties. They can accelerate decision-making processes, record the medical condition of the casualties more quickly, and this way relieve medical personnel.

Tried and tested in private life

The sports scientist and passionate runner, Captain Dr Monika Rausch is supported by biosensors almost every day. "I monitor physiological and performance-related data, like my heart rate, running speed, and distances. Biosensors have long been indispensable in sports, so why not also in the military?" asked Rausch.

CAPTAIN DR MONIKA RAUSCH, SPORTS SCIENTIST AND MEMBER OF THE ORGANISATION TEAM OF MMCC/EMC

"I am convinced that biosensors can improve military performance and provide practical support to training."

Save lives in critical situations

Lieutenant Alexander Schäbler, who also was part of the team organising the workshop, can report from his own experience. "As operations officer, I have already experienced several grave situations and, therefore, know how important it is to stay on top of things in critical moments." In a mass casualty (MASCAL) incident, the real-time recording and transmission of casualty data, that is the data of the injured and wounded service members, could be ensured and, thus, lives saved, said Schäbler.

Biosensors as interface between man and machine

Trust in the evaluation of the data gathered by artificial intelligence within the scope of casualty care was one of the core issues of the workshop. Classification of injured and wounded soldiers by means of a combination of sensors and artificial intelligence, and the decision on who will receive life-saving treatment and who will not, is not only a technical but also a moral and ethical issue.

Applications improving and reducing performance

When using biosensors and wearables as a new method for improving the performance of service members, various ethical questions have to be answered. Regarding data security, it must be prevented that data collected by biosensors are manipulated or intercepted. Implementation of data protection was one of the key issues of this workshop to be answered in the future.

Focal tasks and challenge of the future

MMCC/EMC is involved in the operational use of this promising field of medical care, which is one of its future focal tasks. Telemedicine (telehealth) is a highly relevant challenge. In cooperation with the NATO Telehealth Panel, MMCC/EMC - with the networking of leading experts in the field of biosensor technology - will continue to contribute to establishing a community of interest (COI) on the subject of wearables and telehealth. The workshop provides the basis for establishing a multinational, civil-military and interdisciplinary hub. From here, common fields of action and projects are to be identified in the future.