Hearing of the United States Senate Committee for Homeland Security Government Affairs

"Risky Research: Oversight of U.S. Taxpayer Funded High-Risk Virus Research"

July 11, 2024

Statement for the Record

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Introduction

That you for the invitation to appear before the United States Senate Committee on Homeland Security and Government Affairs for the hearing, "Risky Research: Oversight of U.S. Taxpayer Funded High-Risk Virus Research."

I am Gerald Parker. I come before you today as an individual who has spent an entire career in biodefense, health security, pandemic and all-hazards preparedness. This includes experience ranging from conducting and managing research in a high containment laboratory to serving in government at strategic, operational, and policy levels; and now mentoring our next generation of public health preparedness and biodefense professionals.

I will offer insights from my role as a public servant that spanned 26 years of active-duty military service and another ten years in the career senior executive service. During my military career, I had the opportunity to serve in leadership roles, primarily in military medical research and development at the United States Army Medical Research and Materiel Command. I served as Deputy Commander and Commander for the United States Army Medical Research Institute of Infectious Diseases (USAMRIID) as well as in senior executive leadership roles at the Department of Homeland Security (DHS), Department of Health and Human Services (HHS), and the Department of Defense (DOD).

But today, the views and opinions I offer are my own, and not representative of past or current organizational affiliations, employers, or federal advisory boards, including the National Science Advisory Board for Biosecurity.

Background

Natural infectious disease outbreaks are occurring with alarmingly increased frequency. Globalization of travel and trade, urbanization, failing states, and conflict are several factors that have created environmental conditions that favor infectious disease outbreaks.

Fortunately, the emergence of a novel virus from birds or animals capable of causing a human pandemic has been rare. The most significant and consequential rapid onset pandemic prior to COVID-19 occurred over 100 years ago, the 1918 Influenza Pandemic.

Nonetheless, the current Highly Pathogenic H5N1 Bird Flu virus that was first reported in 1996 is now causing increasing mammalian infections, including most recently in dairy cattle. Continued evolution of this virus requires enhanced vigilance and our attention.

In addition to natural biological threats, ready access to advanced dual-use technologies, the expansion of high-containment laboratories worldwide, the availability of dangerous pathogens, and expanding scientific capabilities are increasing the potential for unnatural accidental or deliberate outbreaks with potentially grave consequences.

I am grateful that the Committee is working on nonpartisan solutions to strengthen oversight of especially dangerous research that could create pandemic-capable viruses.

I also commend the Committee for keeping your focus on the small subset of especially dangerous research and in a way that will avoid impacting most of the life science research essential for the bioeconomy.

My statement for the record will provide a summary of the USG (United States Government) Bioresponsibility Framework with an emphasis on the evolving policy attempts to govern dual use research of concern in the life sciences with associated controversies.

This is not a new policy debate, but COVID-19 reignited it because SARS-CoV-2 may have emerged from a laboratory research incident.

Regardless of the pandemic's origins, we already know we must act to strengthen biosecurity and biosafety at the animal, human, and environmental interface, both in nature and, especially, in research laboratories worldwide.

With that brief background, I will devote much of my statement for the record to discussing highlights of the new White House Dual Use Research of Concern (DURC) and Pathogens with Enhanced Pandemic Potential (PEPP) policy, emphasizing the policy's key strengths, weaknesses, and gaps.

The new DURC – PEPP policy is a step in the right direction, but only time will tell if the policy will be implemented, resourced, and enforced in a manner that protects public safety, safeguards national security, and preserves life sciences innovation.

The United States Bioresponsibility Framework

The United States has multiple, overlapping policies for biosafety and biosecurity oversight for research involving hazardous pathogens and toxins. Although the framework is expansive, it is fragmented.

Its evolving policies and guidelines came about over a 50-year period in a piecemeal fashion in reaction to lessons learned, scientific and technological innovations, new threats, and new challenges.

The patchwork of governance policies, guidance, and regulations that apply to a research project depends on the source of funding, pathogens studied, procedures used, and laboratory biocontainment levels required.

Today, the principal components of the U.S. Bioresponsibility Framework consist of the following:

1. The NIH Guidelines for Research Involving Recombinant or Synthetic Nucleic Acid Molecules, initially published in 1976 (NIH Guidelines).
2. NIH/CDC Biosafety in Microbiological and Biomedical Laboratories, initially published in 1984 (BMBL).
3. The Federal Select Agent Program (FSAP), initially enacted in 1997 and expanded in 2002.
4. USG Policy for Federal Oversight of Life Science Dual Use Research of Concern published in 2012 (Federal DURC).
5. USG Policy for Institutional Oversight of Life Sciences Dual Use Research of Concern published in 2014 (Institutional DURC).
6. Recommended Policy Guidance for Departmental Development of Review Mechanisms for Potential Pandemic Pathogen Care and Oversight published in 2017 (P3CO), and
7. Dual Use Research of Concern and Pathogens with Enhanced Pandemic Potential published in 2024 (DURC – PEPP).

A summary of these components and my related recommendations to strengthen biosafety oversight can be found in my October 18, 2023, testimony before the House Select Subcommittee for the Coronavirus Pandemic.[1]

Most of the oversight system, including oversight of research that could create a pandemic-capable virus, is based on non-regulatory guidance. Compliance is tied to receiving federal research funding, although punitive funding restrictions are rare and guidance is strictly voluntary for institutions that receive no federal life sciences research funding.

The Federal Select Agent Program is the only component of the Bioresponsibility Framework that has a personnel reliability program and is enforced through regulation backed by the force of law.

The NIH Guidelines and the NIH/CDC BMBL have served us well as foundational components of the framework. Both are underpinned by a culture of responsibility at laboratories and institutions. The NIH Guidelines and BMBL are considered the "gold standard" guidelines worldwide.

The United States Government became concerned about the potential for misuse of biotechnology in the decade after the end of the Cold War, after the tragic events of September 11, 2001, and after concerns that some published research would constitute a security risk if misapplied by malevolent actors.

[1] Gerald Parker. *"Strengthening Biosafety and Biosecurity Standards: Protecting Against Future Pandemics."* House Select Subcommittee on the Coronavirus Pandemic, October 18, 2023. https://oversight.house.gov/wp-content/uploads/2023/10/Parker-Testimony-10162023.pdf

2004 Biotechnology in the Age of Terrorism

The National Research Council published a report in 2004, *"Biotechnology in the Age of Terrorism"* (Fink G. R., 2004).[2] This report is commonly referred to as the Fink Report and its findings and recommendations initiated an intense policy debate about how to govern dual use research in the life sciences.

The Fink Report provided recommendations to the USG that catalyzed the concept of Dual Use Research of Concern, and initiated deliberations that continue today about biosecurity and biosafety risks for what is now referred to as Dual Use Research of Concern (DURC) and Pathogens with Enhanced Pandemic Potential (PEPP).

The Fink Report provided recommendations to mitigate biosecurity risks associated with the rapid advances in biotechnology and described how misapplication of life science research by adversarial state or non-state actors could lead to the use of enhanced dangerous pathogens as biological weapons.

The Fink report identified seven experimental categories of concern that pose significant security risks and should not be performed without a compelling justification, risk mitigation, and stringent oversight. The experimental categories of concern are colloquially known as the "Seven Deadly Sins."

Experiments of concern included altering host range or tropism, enhancing virulence or transmission, and rendering a protective or therapeutic intervention ineffective. The experimental categories identified in 2004 are like the experiments of concern that are identified in the new 2024 White House Policy for oversight of Dual Use of Research of Concern and Pathogens with Enhanced Pandemic Potential (DURC-PEPP).

Over the years these experimental categories of concern have been called, 1) Dual Use Research of Concern (DURC); 2) Gain of Function; 3) Gain of Function Research of Concern (GOFROC); 4) enhanced Potential Pandemic Pathogens (ePPP); and 5) DURC and PEPP. The latest reflects the new policy's direction to unify DURC and PEPP into a harmonized oversight regime.

For consistently, I will use the new term DURC and PEPP where appropriate.

The National Science Advisory Board for Biosecurity (NSABB)

Shortly after the Fink Report, in 2005, the White House established the NSABB. Congress subsequently authorized the NSABB as a federal advisory board that could be charged to assist the USG, upon request, to consider policy options needed to strengthen oversight of Dual Use Research of Concern (DURC) while minimizing impacts to scientific innovation.

[2] National Research Council. "*Biotechnology in the Age of Terrorism".* 2004. *https://nap.nationalacademies.org/catalog/10827/biotechnology-research-in-an-age-of-terrorism*

The NSABB has provided 12 reports to the NIH since 2006. Three of those reports were seminal in that they informed the policies governing what we now call DURC and PEPP. The 3 seminal reports are,

1. "*Proposed Framework for the Oversight of Dual Use Life Sciences Research: Strategies for Minimizing the Potential Misuse of Research Information"* (NSABB, 2007)[3]
2. *"Recommendations for Evaluation of Proposed Gain of Function Research"* (NSABB, 2016)[4]
3. *"Proposed Biosecurity Framework for the Future of Science"* (NSABB, 2023)[5]

2012 and 2014 Dual Use Research of Concern Policies

Informed by the 2007 NSABB report, the White House Office of Science and Technology Policy (OSTP) published the Federal and Institutional DURC Oversight Policies in 2012 and 2014, respectively.

1. *"United States Government Policy for Oversight of Life Science Dual Use Research of Concern"* (OSTP, 2012)[6]
2. *"United States Government Policy for Institutional Oversight of Life Science Dual Use Research of Concern"* (OSTP, 2014)[7]

DURC oversight policies were based on a list of specific biological agents, and experimental categories of concern that if misapplied could have potentially grave national security and public health consequences. Research involving one of the listed agents and one of the listed experiments would be reviewed by the research institution and federal funding agency to ensure the benefits were commensurate with the risks and that an adequate risk mitigation plan was in place.

The experimental categories of concern were based on those identified by the Fink Report. The DURC policies, however, had a limited scope because only fifteen specific biological agents or toxins, all regulated by the Federal Select Agent Program (FSAP), were included.

[3] NSABB, 2007. https://osp.od.nih.gov/wp-content/uploads/Proposed-Oversight-Framework-for-Dual-Use-Research.pdf
[4] NSABB, 2016. https://osp.od.nih.gov/wp-Content/uploads/2016/06/NSABB_Final_Report_Recommendations_Evaluation_Oversight_Proposed_Gain_of_Function_Research.pdf
[5] NSABB, 2023. https://osp.od.nih.gov/wp-content/uploads/2023/03/NSABB-Final-Report-Proposed-Biosecurity-Oversight-Framework-for-the-Future-of-Science.pdf
[6] OSTP, 2012. https://www.phe.gov/s3/dualuse/Documents/us-policy-durc-032812.pdf
[7] OSTP, 2014. https://www.phe.gov/s3/dualuse/documents/durc-policy.pdf

2017 Pandemic Pathogen Care and Oversight Framework (P3CO)

The White House OSTP established a new policy in January 2017 after a series of significant biosafety breaches occurred in premier laboratories in the United States.

The OSTP P3CO policy required additional pre-funding review and higher-level oversight by federal Departments funding enhanced Potential Pandemic Pathogens (ePPP). In response to the White House directive, the Department of Health and Human Services (HHS) adopted a policy in December 2017 for their internal federal funding agencies, ending a 3-year pause placed on funding new ePPP experiments with Avian Influenza, MERS coronaviruses, and SARS coronaviruses.

1. *"OSTP Recommended Policy Guidance for Departmental Development of Review Mechanisms for Potential Pandemic Pathogen Care and Oversight"* (OSTP, 2017)[8]
2. *"HHS Potential Pandemic Pathogen Care and Oversight Framework (P3C0)"* (HHS, 2017)[9]

HHS was the only federal agency to respond to the OSTP Directive.

The OSTP policy and HHS P3CO Framework required funding agencies to identify high-risk research proposals that could be *"reasonably anticipated to create, transfer, or use enhanced potential pandemic pathogens (ePPP)"* and refer them to a higher federal department level for an additional interagency, multisectoral review of associated risks and benefits, and other identified criteria.

A*n ePPP (enhanced Potential Pandemic Pathogen or enhanced PPP) was defined as an enhanced pathogen generated in the laboratory with the potential to trigger a pandemic.*

The 2017 P3CO policy was not accompanied by: 1) An implementation directive; 2) Comprehensive guidelines for principal investigators, institutions, and federal funding agencies; 3) Expectations for review, timelines, and ongoing oversight throughout the research review continuum; 4) Publicly available criteria needed to reliably identify projects by institutions and the funding agency that require elevation to the P3CO review board; 5) Expectations for transparency to inform the public about the risks and benefits; and 6) Resources required to implement the policy.

The lack of an implementation directive, comprehensive guidelines, expectations for review, and resources may partially explain why only three projects were identified as ePPP research projects and forwarded to HHS for additional prefunding review between 2017 and 2019 required by the P3CO Framework.

[8] OSTP, January 9, 2017. https://obamawhitehouse.archives.gov/blog/2017/01/09/recommended-policy-guidance-potential-pandemic-pathogen-care-and-oversight

[9] OSTP, December 2017. https://www.phe.gov/s3/dualuse/Documents/P3CO.pdf

2024 OSTP Policy for Oversight of Dual Use Research of Concern and Pathogens with Enhanced Pandemic Potential (DURC – PEPP)

On May 6, 2024, following a multi-year review, the White House issued the latest policy on federal oversight of life sciences research: *United States Government Policy for Oversight of Dual Use Research of Concern (DURC) and Pathogens with Enhanced Pandemic Potential (PEPP)* (OSTP, 2024).[10]

The policy was informed by the 2023 NSABB Report and was responsive to the 2022 National Biodefense Strategy and 2022 PREVENT Pandemics Act. The White House also incorporated comments and concerns on the 2023 NSABB Report from scientists, biosafety/biosecurity professionals, and other stakeholders through a Request for Information (RFI).

I will provide a summary of the new policy, emphasizing its key strengths, weaknesses, and gaps.

Summary of Significant Policy Changes

The 2024 DURC — PEPP policy is comprehensive, but complex. In length alone, the policy is 36 pages compared to the P3CO's 6-page document. The policy is also accompanied by an 85-page guidance document (OSTP, 2024).[11]

Highlights of the policy include: 1) Expands the scope of covered research requiring additional USG oversight; 2) Provides unified framework with an intent to support more consistent identification of research subject to the policy accounting for safety, security, and ethical considerations; 3) Delineates roles and responsibilities of principal investigators, research institutions, federal funding agencies, and federal departments/agencies with an emphasis on at the role of research institutions in management and oversight.

Achieving these policy goals is only possible with effective implementation by researchers, institutions, and executive departments and agencies, paired with continued interest from Congress.

Unified Federal Oversight Framework for Biological Agents and Toxins: Integration of DURC and PEPP

The first notable change is that the policy signals a move by the Administration toward a more unified federal oversight framework for federally funded research on biological agents and

[10] OSTP DURC PEPP Oversight Policy. May 6, 2024. https://www.whitehouse.gov/wp-content/uploads/2024/05/USG-Policy-for-Oversight-of-DURC-and-PEPP.pdf
[11] OSTP DURC PEPP Implementation Guidance. May 6, 2024. https://www.whitehouse.gov/wp-content/uploads/2024/05/USG-DURC-PEPP-Implementation-Guidance.pdf

toxins that pose the greatest risks to public health or national security. The policy is complementary to the Federal Select Agent Program (FSAP).

The new policy combines and replaces three previous policies: *United States Government Policy for Oversight of Federal Life Sciences Dual Use Research of Concern* (2012), *United States Government Policy for Institutional Oversight of Life Sciences Dual Use Research of Concern* (2014), and the *Recommended Policy Guidance for Departmental Development of Review Mechanisms for Potential Pandemic Pathogen Care and Oversight* (2017).

However, the new policy separates oversight into two categories that mirror the distinction between the previous policies for oversight of Dual Use Research of Concern (DURC) and research involving an enhanced Potential Pandemic Pathogen (ePPP), replaced by a newly defined but closely related term, Pathogens with Enhanced Pandemic Potential (PEPP).

Category 1 Research: Dual Use Research of Concern (DURC)

Category 1 research covers Dual Use Research of Concern.

As with previous DURC policies, research is only covered by the policy if it involves both a biological agent from a list of high-risk biological agents and an experiment from a list of high-risk experimental categories.

In the new policy, Category 1 research has been expanded significantly. The previous policies covered work with only 15 of the most dangerous pathogens and toxins from the Select Agents List.

Category 1 will now cover all 68 Select Agents and most agents classified as Risk Group 3 and Risk Group 4 in the *NIH Guidelines for Research Involving Recombinant or Synthetic Nucleic Acid Molecules*.

The list of experimental categories of concern has been slightly updated. The list now contains 9 experimental outcomes rather than the 7 from the Fink Report and previous DURC policies. The fundamentals have not changed.

Category 2 Research: Pathogens with Enhanced Pandemic Potential (PEPP)

Category 2 research covers what was formerly known as enhanced Potential Pandemic Pathogen research (ePPP) under the P3CO Framework.

The scope of what formerly constituted an ePPP has been expanded, and a new term defined, Pathogens with Enhanced Pandemic Potential (PEPP).

The scope includes the creation of a new PPP, enhancement of an existing PPP, and resurrection of an eradicated or extinct PPP that may pose a significant threat to public health, the ability of the health care system to function, or national security.

The definition of a PPP has also been changed; it now refers to a "pathogen that is likely capable of wide and uncontrollable spread in a human population and would likely cause moderate to severe disease and/or mortality in humans."

The requirement for the potential for uncontrollable spread remains approximately the same, but the previous definition required a PPP to be "likely highly virulent and likely to cause significant morbidity and/or mortality in humans."

The new definition and scope of PEPP represents a significant but necessary expansion and improvement. The definition recognizes the devastating consequences a highly transmissible novel pathogen with only moderate morbidity and/or moderate mortality can have on public health, the health care system, and national security, like SARS-CoV-2.

Responsibilities of Researchers, Research Institutions, Federal Funding Agencies, and Federal Departments

Responsibilities of Principal Investigators and Research Institutions:

For both categories of research, Principal Investigators (PIs) have primary responsibility – before any other review – for identifying whether ongoing or proposed future research might meet the definition; if ongoing research is identified, they must pause the work until the appropriate review is completed. It is unclear whether prefunding and ongoing research covered by this policy but not flagged by a PI would be captured by institutions or funding agencies.

Institutions must have an Institutional Review Entity (IRE) which can then review PIs' initial determination and provide a thorough assessment to the federal funding agency.

- If the research falls into Category 1 or Category 2, the IRE must conduct a risk-benefit analysis and develop a risk mitigation plan for the research itself and the communication of its results. All of this is then sent to the federal funding agency.
- The criteria for this review must be made available to the public, and reviews and risk mitigation plans must be retained for at least three years.

Principal investigators and research institutions are responsible for establishing internal policies and practices to identify Category 1 and Category 2 research and oversee its conduct, including implementation of any risk mitigation plans created under this policy.

Research institutions are also responsible for providing education and training on the policy

Responsibilities of Federal Agencies and Departments:

For Category 1 research, the federal funding agency will review the IRE's analysis. Final decisions on whether to fund Category 1 proposals will be made by an SES-level authority.

For Category 2 research, the federal funding agency is to refer the IRE's analysis to a department-level review board and receive their recommendation. An Assistant Secretary (or equivalent) at the funding agency will make the final decision to on whether to recommend and fund proposals.

Federal agencies may additionally request information or review individual research proposals or ongoing research projects to determine whether they fall under these categories.

The policy instructs agencies to support in-person inspections or site visits or review evidence of these by an institutional or governmental authority to ensure Category 1 and Category 2 research is being conducted properly.[12] For example, this could include reviewing inspections conducted under the Federal Select Agent Program.

Federal agencies are meant to engage with and provide guidance to institutions and PIs. To this end, agencies are instructed to develop risk-benefit assessment tools, training tools, and funding application forms to support this policy.

Strengths, Weaknesses, and Gaps

The new DURC — PEPP policy is a significant step forward in the right direction.

I commend the effort of dedicated career federal professionals across the USG interagency that developed the policy and implementation guidance.

The policy has potential to strengthen oversight of risky DURC and PEPP research if implemented correctly, taken seriously, and resourced.

Despite this potential, it also has weaknesses that should be addressed. Effective implementation will require linking bottom-up responsibility to USG top-down oversight and regulation with independent oversight.

Strengths

I am especially pleased to see that the new policy includes:

1. A unified framework for DURC and PEPP research that reduces the number of competing policies and compliments the Federal Select Agent Program (FSAP) and the NIH Guidelines for Risk Group 3 and Risk Group 4 biological agents and toxins. This unified approach also provides risk-based flexibility for expansion to cover emerging biological agents consistent with the NIH Guidelines.

[12] Not all agencies may have the authority or funding to do this, and the policy cannot provide additional authorities or appropriations, so this applies only "subject to appropriations and authorities."

The unified framework could also serve as a model for a future policy that seeks to modernize and harmonize some components of the Bioresponsibility Framework, especially DURC, PEPP, and FSAP under a regulatory regime.

2. The policy is accompanied by a detailed implementation guide that provides examples and explanations to help researchers and institutions follow the letter and the spirit of the new policy.

3. The policy directs federal funding agencies and research institutions to educate researchers on their compliance responsibilities and the importance of biosecurity and biosafety. Federal funding agencies are also directed to support research institutions because they must understand their new compliance responsibilities and accountabilities to implement the policy.

   While most researchers seek to comply with biosafety and biosecurity standards and best practices, many may not be fully aware of DURC and PEPP research and new accountabilities they will have under the new policy.

   More awareness and an understanding by scientists is essential.

   Training and education must also encourage the use of safer alternatives.

4. The policy's definitions of Category 1 and Category 2 research expand the scope of federal research oversight, reflecting lessons learned.

   The scope includes a wider range of biological agents and experimental categories of concern, including a more appropriate and comprehensive list of biological agents and toxins in Category 1 that aligns with FSAP and NIH Guidelines for Risk Group 3 and Risk Group 4 biological agents.

   The definition of Category 2 research and what constitutes a PEPP clarifies that the outcome of a gain of function experiment is paramount, not the starting pathogen. The starting pathogen does not have to be a PPP or a human pathogen.

   The PEPP definition encompasses pathogens that evade existing immunity or that cause only moderate disease, provided they pose a significant threat, incorporating lessons learned from a virus like SARS-CoV-2.

5. The policy removes the blanket exceptions for vaccine (and therapeutic) development and disease surveillance. Blanket exemptions are not needed for basic research, and the policy includes a provision that can allow an exception from DURC — PEPP oversight in the rare event that it becomes necessary for an impending or declared public health emergency.

6. The policy provides increased transparency requirements, especially the requirement to issue an annual public report for Category 2 research reviewed by department-level committees annually. This will help provide increased insights for the public, so they have an opportunity to provide feedback on risks they were exposed to. Unfortunately, this will

not provide the public with an opportunity to learn about proposed and ongoing Category 2 experiments before being exposed to additional risks.

Regardless, if implemented in the spirit of greater transparency, this requirement could provide an opportunity for federal agencies and research institutions to engage more proactively in communities that host high containment laboratories about their biosafety practices to protect workers, the public, and the environment, whether they conduct DURC and PEPP research or not. It is also a chance to educate the public about the importance of research with hazardous pathogens.

7. The policy provides a single framework with a harmonized, though dual-tracked, review process. The policy lays out clear roles for principal investigators, institutions, and federal funding agencies, although questions about transparency will remain.

8. The policy provides clearer definitions and terminology that includes an attempt to provide more clarity on how to interpret "reasonably anticipated" within scientific disciplines. Increased clarity on definitions is intended to decrease uncertainty and inconsistent implementation arising from different interpretations of the policy.

   The definition of "reasonably anticipated" in the new policy still relies heavily on expert judgment to use in practice, although this may be a necessity due to the complexity of the issues.

   Effective governance will require unbiased expert judgement along the entire continuum of the research review process. This will also require responsible dialogue that encourages probing and frank discussions and reviews, not work-arounds and deflection to avoid additional oversight.

9. The policy provides noncompliance penalties for principal investigators and research institutions that fail to follow the DURC – PEPP policy. Failure to comply may result in suspension, limitation, or termination of federal funding and loss of future federal funding opportunities for individual researchers and research institutions.

10. The DURC – PEPP Implementation Guidance states that the USG will not fund Category 1 or Category 2 research in the following countries: 1) the Democratic People's Republic of Korea (DPRK); 2) the Islamic Republic of Iran; 3) the Russian Federation; 4) the People's Republic of China (along with the Special Administrative Regions of Hong Kong and Macau; 5) Cuba; 6) Syria, and 7) Venezuela. The countries of concern will be revisited and updated, as necessary.

While I welcome these aspects of the new policy and once again congratulate the many dedicated public servants and stakeholders who guided it through the interagency process, gaps in the nation's biosafety and biosecurity policies remain. Further effort, including Congressional action, is needed to address these shortcomings.

Weaknesses

I am concerned that:

1. Oversight of non-federally funded research, especially at institutions that receive no federal funds, remains minimal. In fact, the new policy weakens federal oversight for non-federally funded research.

   The 2014 DURC policy applied to all research at federally funded institutions, regardless of funding source, with oversight of non-federally funded research routed to an appropriate agency by NIH. The new policy only asks federally funded institutions to attest that they are applying the same internal controls to non-federally funded research projects. Although the federal government is the largest funder of life sciences research, this is a significant and growing gap as philanthropic and other private funding expands.

   It will require Congressional action to provide the authorities needed to extend oversight.

2. This policy is comprehensive but complex. Research institutions and universities will face significant challenges trying to implement the policy. Research institutions have new responsibilities with attendant accountability that will require resources to implement and sustain.

   Although the new policy is a significant improvement over the previous DURC policies and P3CO Framework, it is an unfunded mandate.

   Unfunded mandates often fail.

3. The new policy provides requirements for annual reporting to increase transparency, but this may not satisfy demands for more transparency and public accountability.

   DURC – PEPP research oversight, transparency, and biosafety are intrinsically linked. To achieve full public accountability and improve our understanding of how to prevent accidents and improve biosafety practices, additional reporting of incidents and near-misses coupled to biosafety-focused research is needed.

   Laboratory accidents happen, and they are more frequent than many realize. Most accidents or containment breaches are rapidly mitigated and contained but some are serious.

   A laboratory accident or biocontainment breach with a PEPP could be a worldwide catastrophe.

   The DURC – PEPP policy does not include laboratory incident reporting requirements even though this is the most dangerous form of life sciences research. For example, there are no additional requirements to inform local, state, or federal public health authorities before research commences or if a laboratory incident or near miss occurs. Public health authorities should have this knowledge so they can preemptively or immediately establish risk-based disease surveillance.

   Additional reporting requirements of laboratory incidents by the principal investigator to their funding sponsor and/or higher-level departments for laboratory incidents involving PEPP research are also unclear or absent in the policy.

This gap goes beyond DURC and PEPP research. Although there are reporting requirements for FSAP and the NIH Guidelines, the reports are not readily available to determine long-term patterns and there is no near miss reporting that could drive biosafety research requirements and near real-time sharing of best practices.

The Federal Aviation Administration's extensive reporting system, which includes both voluntary, no-fault reporting and mandatory incident reporting, has contributed to the safety and success of the U.S. airline industry.

A similar no-fault incident reporting system is needed across our high containment laboratory enterprise to enable near real-time lessons learned and shared best practices.

4. The policy provides details regarding the principal investigator's and the research institution's primary role to identify and flag Category 1 and 2 research for federal agencies and departments. But the policy provides few details to ensure bottom-up responsibility is linked to prudent top-down oversight.

   It is unclear whether prefunding and ongoing research covered by this policy but not flagged by a PI would be captured by institutions or funding agencies and how federal agencies and departments should exercise their authority to request additional information on projects they may not be aware of. It is also unclear how departments will ensure their funding agencies are correctly and consistently identifying covered research, especially Category 2 Research, and forwarding those proposals for additional review and oversight. The policy is also unclear on how departments will audit their funding agencies and research institutions for compliance, other than they are permitted to ask questions, review additional proposals, and make site visits. In a system built on trust, how will agencies and departments verify that their trust is well placed?

5. The roles of institutional biosafety officers, biosafety professionals, and Institutional Biosafety Committees (IBCs) are not specified in the new policy. Biosafety professionals are our last line of defense to proactively mitigate laboratory biosafety and biosecurity risks.

6. Compliance with the new policy is not codified in law and oversight is not independent from the agencies and departments funding research.

   Although PI and institutional responsibility and accountability as detailed in the new policy are essential features of an effective risk management system, they must be united with prudent top-down oversight.

   Similarly, the policy leaves each federal department and agency responsible for developing and using its own internal processes for overseeing the research it funds. This will lead to inconsistent implementation across federal departments and agencies, creating compliance challenges for research institutions.

   While agencies are empowered to restrict funding to noncompliant researchers and institutions, historically they have been hesitant to use hard punitive measures, and this threat may not be a credible deterrent to irresponsible and unethical actors until it is too late.

Congress should mandate that federal agencies follow their stated policy and provide legal accountability for researchers and institutions that disregard their responsibilities.

To avoid any conflicts of interest, Congress should authorize an independent oversight authority outside of the departments or agencies funding life sciences work.

Additional Gaps

Given that only three projects were forwarded by NIAID to HHS under the P3CO Framework, the policy clearly had challenges with correctly and consistently identifying and forwarding covered research for additional pre-funding review. It is not clear that the new DURC — PEPP policy will correct that weakness.

The policy is silent on the need to engage internationally through diplomacy to galvanize support to limit research that could create pandemic-capable viruses worldwide.

The policy does not identify the resources (financial, staff, and technical) needed to support research institutions and federal agencies in implementing the policy.

The policy discusses providing independent oversight to avoid potential conflicts of interests only for Category 2 research.

High risk research that could potentially create pandemic-capable viruses should be limited and regulated. Limiting this type of dangerous research is not a stated goal of the policy.

The policy does not envision Congressional legislation accompanied by regulations that would provide authorizations, appropriations, and oversight to mandate compliance.

Discussion

The new White House policy is a significant step forward toward a more unified oversight system for DURC and PEPP, and one closely aligned to the Federal Select Agent Program that regulates Biological Select Agents and Toxins.

The policy and Implementation Guidance are comprehensive, but complex, and complying with the policy will pose significant resource challenges for research institutions.

Without additional resources appropriated or reallocated by Congress, the primary responsibility for oversight will remain with the relatively small number of dedicated and often overworked biosafety professionals at laboratories and research institutions. Most biosafety policies amount to unfunded mandates. While compliance is meant to be funded out of institutional overhead, biosafety must compete with other institutional priorities for this funding.

This does not necessarily mean new appropriations are needed. Congress could direct the Administration to reallocate appropriated program funds to support biosafety and biosecurity

in a directed budget line item as a cost that must be covered to perform hazardous pathogen research.

I am confident that the USG has the resources and can optimize use of available appropriations to modernize and strengthen biosafety and biosecurity oversight. For example, regulating all Biological Select Agents and Toxins under the FSAP cost only $26.5 million in 2016, a small budget item compared to the $4.7 billion allocated to research at the National Institute of Allergy and Infectious Diseases (NIAID) in the same year.[13,14] Provision of resources is primarily an issue of elevating biosafety and biosecurity as the priority it demands. Biosafety is too important to leave as an indirect cost that research institutions must find ways to cover in the context of ever-increasing unfunded mandates.

Congressional action is also needed to provide additional authorities, ensure prudent oversight, and address other gaps that are of importance to the Committee.

The United States has an expansive biosafety and biosecurity oversight system that has evolved over several decades. Some assert we have the most comprehensive oversight system in the world. However, the United Kingdom is a nation that I believe has a more effective system largely because that country has mitigated the potential for organizational conflicts of interest by placing its biosafety oversight authority within a department that does not fund life sciences research or manage laboratories (GAO, 2017).[15] This structure also provides a single focal point for biosafety knowledge to support their research institutions.

Although the USG oversight system is expansive, it is fragmented. Overlapping guidance and regulations can be confusing, even for responsible principal investigators and research institutions, while offering few levers to identify or deter unethical or reckless behavior until it is too late.

The new DURC – PEPP policy will add to the confusion. Universities are already uncertain about how to comply with the new policy and its unfunded mandate in the context of the existing patchwork of policies.

Significant education and training will be required to build the infrastructure research institutions need to dynamically assess the risk of their work and ensure near real-time compliance across their laboratories. But it must be done.

These challenges are compounded by the continued rapid advances in biotechnology that have outpaced our ability to provide effective and efficient oversight policies and/or regulations that can stay current to emerging challenges. Further, the USG cannot even accurately inventory our nation's own Biosafety Level-2 (BSL-2) and Biosafety Level-3 (BSL-3) research laboratories, unless they are registered by the FSAP.

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[13] GAO. "High Containment Laboratories: Coordinated Actions Needed to Enhance the Select Agent Program's Oversight of Hazardous Pathogens." October 2017. https://www.gao.gov/assets/gao-18-145.pdf

[14] NIH. "Fiscal Year 2018 NIH Congressional Justification." https://officeofbudget.od.nih.gov/br2018.html

[15] GAO. "High Containment Laboratories: Coordinated Actions Needed to Enhance the Select Agent Program's Oversight of Hazardous Pathogens." October 2017. https://www.gao.gov/assets/gao-18-145.pdf

Unfortunately, risk mitigation measures are not based on empirical research or systematic analysis of research incidents, leaving gaps while also retaining practices that burden researchers while providing only a false sense of security.

Institutional Biosafety Committees (IBC) and biosafety professionals are our last line of defense to mitigate risk, but they are not included in the new White House policy. Regardless, biosafety professionals and IBCs (which should be linked to IREs) must be elevated to be on par legally and functionally with the Intuitional Animal Care and Use Committees (IACUC) for laboratory animal care, the Institutional Review Boards (IRB) for clinical research, and have the ear of senior executives at research institutions and funding agencies to enable independent oversight at all levels.

Finally, no senior USG senior executive or agency is in charge of and accountable for biosafety and biosecurity; consequently, these issues are consistently deprioritized over other research program priorities.

These challenges require a novel approach that re-imagines the relationship between safety, security, and innovation in the life sciences.

Recommendations for Congressional Consideration to Govern DURC – PEPP Research and Enhance Biosafety and Biosecurity Overall

1. Mandate full implementation of the White House DURC – PEPP policy by federal agencies through provision of authorities, appropriations or reallocation of resources (financial, personnel, and technical), and provide ongoing Congressional oversight.

   Congress should consider closing gaps and weaknesses identified in the new policy. Bottom-up responsibility must be linked to prudent top-down oversight using principles of "trust but verify."

   DURC and PEPP research that could potentially create pandemic-capable pathogens should be limited and regulated.

2. Create a national biosafety program to fund and support research advancing the fields of biosafety and biosecurity. This will complement and strengthen the safety and security culture needed to support the accelerating pace of advances in biotechnology and improve our understanding of the risks associated with DURC and PEPP research.

3. Establish a program and resources to create drop-in biosafety and biosecurity education and training resources for scientists, research institutions, and funding agencies.

4. Establish a confidential, anonymous, no-fault reporting system for employees of research institutions and laboratories working with hazardous pathogens, especially for DURC and PEPP projects, to report accidents, near-accidents, or other safety incidents occurring or potentially occurring, to foster an environment of continuous safety improvement without potential for liability—except in the case of criminal negligence or intentional misconduct or fraud.

5. Develop mechanisms to extend federal research oversight, including pre-funding and ongoing review of DURC and PEPP projects, to institutions that do not receive federal funding.
6. Establish a comprehensive registry of all BSL-3 and BSL-4 high containment laboratories in the United States and a comprehensive registry of research institutions that work with biological agents and toxins subject to potential DURC – PEPP oversight. Consider how to incorporate a lower-tier or volunteer registry for BSL-2 research laboratories to provide additional visibility to the federal government in a way that would be helpful to research institutions and avoid government overreach.
7. Support the White House *Framework for Nucleic Acid Synthesis Screening* by establishing its provisions for screening DNA/RNA synthesis orders in legislation.
8. Establish a new, independent authority to consolidate security-related biosafety USG functions in a single entity with a dedicated mission. This is essential to enable life sciences innovation in the United States. This is not a new idea, but the time has come to give it serious consideration.

   This will require thoughtful consideration by Congress, but there are historical precedents that can serve as models. An independent biosafety entity would add tremendous value to all stakeholders by incorporating a "trust but verify" approach that links bottom-up responsibility to top-down independent oversight. This would also contribute to rebuilding public trust.

   In addition to providing overall policy direction, an independent regulatory authority would provide the strategic and operational leadership needed to implement the new DURC-PEPP policy.

   An independent authority should:

   a. Provide a consistent, fully independent review process across the USG interagency and non-federally funded research. This should include a mandate to establish and verify adherence to clear standards for identification review of potential DURC and PEPP research.

   b. Provide timely guidance and advice on biosafety and biosecurity and compliance with DURC and PEPP policies in response to requests by researchers and institutions, with legal safe harbor for individuals and institutions according to a process set by the independent authority.

   c. Consolidate and harmonize federal security-related biosafety responsibilities, and inform Congress about the full range of hazardous pathogen research, including DURC and PEPP, occurring within the U.S. life sciences research enterprise, the risks and benefits of this research, and the risk mitigation measures in place.

      As part of this effort, Congress should consider giving policy and operational direction of FSAP to the independent authority. The independent authority could

house a registry of high containment laboratories, a no-fault reporting system, training and educational resources, and biosafety research, and serve as a central hub for sharing best practices for biosafety and biosecurity.

d. Serve as a focal point for public transparency about high-risk life sciences research. The independent authority should operate under the principle to maximize transparency to the extent permitted by relevant laws and regulations and the imperatives to protect national security and proprietary information.

e. Establish a national strategy to optimize utilization of existing high containment laboratories and ensure operations and maintenance are maintained and sustained at the highest standards.

I cannot overstate the importance of having a single independent authority with a sole focus on, and responsibility for security-related biosafety.

Such an entity would support principal investigators, research institutions, and funding agencies by providing processes, resources, expertise, and guidance to streamline compliance with a more consistent and harmonized Bioresponsibility Framework.

Conclusion

It is essential that the United States Government (USG) maintain a leadership role in the bioeconomy. This will require the USG to re-commit to leadership on modernizing and harmonizing biosafety and biosecurity standards worldwide, especially strengthening governance and oversight of DURC and PEPP research.

DURC and PEPP research utilizes enormously powerful basic science tools that may provide fundamental insights about the underlying molecular mechanisms for alterations in the host range of pathogens (i.e., understand how a bat virus becomes a human virus) and evasion of countermeasures. However, there are safer alternatives that must be prioritized first; rather than unnecessarily generating novel pandemic capable viruses in the laboratory.

Some argue that DURC and PEPP research may also provide insights on vaccine and drug design against potential emerging pandemic threats. But such research on vaccine candidates is unlikely to transition beyond basic research discovery phases unless a natural pandemic pathogen follows the exact same evolutionary pathway as the one simulated in the laboratory. That is unlikely, and those experiments come with increased risks.

While expanding knowledge through basic science is a worthy goal, the benefits of DURC and PEPP research must be compelling with assurances that risks and ethical concerns will be mitigated. Unfortunately, there is no agreed upon standard for weighing the balance of risks and benefits to arrive at a final decision despite recognizing this gap for over a decade.

Compounding these problems, DURC and PEPP research has dual use security implications. The same experimental approaches used in DURC and PEPP research could be misused by adversaries as a road map to develop novel pathogens and deploy them as biological weapons.

Because of the open nature of our scientific publishing system, and because new discoveries can be used for good or for ill, researchers and federal funding agencies must rigorously consider how scientific knowledge and inadvertent technology transfer can be misused.

In addition to national security risks, there are public safety risks. An accidental biocontainment breach or laboratory acquired infection could occur while conducting DURC or PEPP research, especially if performed haphazardly without adequate biosafety controls and oversight.

Strengthening oversight, to include regulating DURC and PEPP research, is not intended to stop meritorious research that has a compelling justification with assurances that risks will be mitigated. Prudent oversight is intended to ensure the small subset of especially dangerous research has especially important benefits and that the research will be performed safely and securely.

Rapidly advancing technologies are expanding capabilities and risks worldwide. This will continue to create incredible new opportunities for biotechnology to drive economic growth and advance human health and well-being. However, advanced capabilities are also increasingly accessible to individuals around the world who may have intent to inflict harm and who do not share our values. Given that this genie is out of the bottle, Congress and the Executive Branch must provide international leadership.

The United States must lead by example by providing responsible governance and oversight for especially dangerous research. But before we can assume a leadership role internationally, the USG must ensure our own house is in order, to include implementing a policy that limits and regulates risky research that could potentially generate pandemic-capable viruses. The new DURC – PEPP policy is a significant step forward, but it requires Congressional action to ensure that prudent, independent oversight is adopted. With Executive Branch and Congressional leadership, the new governance policy will serve as a model for other nations.

Your responsibility to take legislative action to strengthen biosafety and biosecurity with independent oversight is not a condemnation of the scientific system. On the contrary, both Congress and Executive Branch must act in a nonpartisan manner to protect the integrity of the scientific system, rebuild public trust in the high containment laboratory research enterprise that is essential for biodefense and pandemic preparedness, protect public safety, and preserve national security.