June 2012 COGR Meeting Thursday Afternoon Dual Use Presentation - Patterson

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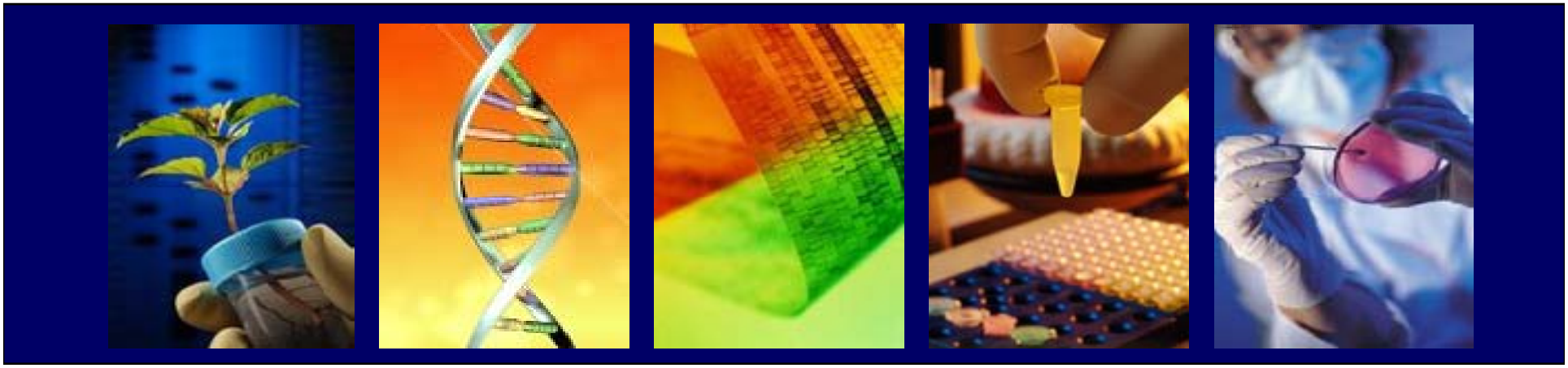
Dual Use Research of Concern: Recent Policy Developments



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Presentation to the
Council on Government Relations
June 7, 2012

Overview

- What is “dual use” research?
- Case study: H5N1 research
- New USG Policy for Oversight of Life Sciences Dual Use Research of Concern (March 2012)
- Development of USG Policy on Institutional Oversight of Dual use Research
- Issues and challenges in policy development

The “Dual Use” Dilemma

- ***Life sciences research underpins:***
  - **Biomedical and public health advances**
  - **Improvements in agriculture**
  - **Safety and quality of food supply**
  - **Environmental quality**
  - **Strong national security and economy**
- ***However, good science can be put to bad uses***

DUR vs. DURC

- **Dual use research (DUR) = legitimate research that yields information or technologies that could be misused for malevolent purposes**
  - **NOTE: Most life sciences research conceivably could be considered DUR in that it has *some* potential to generate information that could be eventually misused**
- **Goal is to identify the subset that has highest potential for generating information that could be readily misused = DUR *of concern* (DURC)**

Dual Use Research of Concern (DURC) Defined

"Life sciences research that, based on current understanding, can be reasonably anticipated to provide knowledge, information, products, or technologies that could be directly misapplied to pose a significant threat with broad potential consequences to public health and safety, agricultural crops and other plants, animals, the environment, materiel, or national security."

DURC: Risk Mitigation Strategies

- Management of DURC may entail a variety of possible strategies, for example:
  - Changes in the design or conduct of research
  - Applying specific biosecurity and/or biosafety measures
  - Monitoring of research for findings with additional DURC potential
- In some rare instances, it may be appropriate to restrict communication of experimental details or other specific information

Weighing Risks and Benefits

Restricting Dissemination

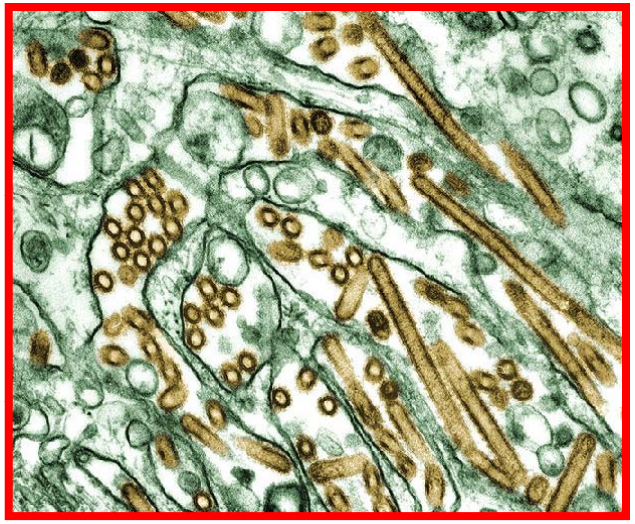
- **Benefits**
  - Keeping DURC information from terrorists
- **Risks**
  - Slowing scientific progress, preparedness efforts
  - Being unprepared for a disease outbreak

Full, Open Communication

- **Benefits**
  - Rapidly furthers validation of findings and scientific progress
  - Provides information needed for preparedness
- **Risks**
  - Increases ease of misuse

Case in Point: H5N1 Research

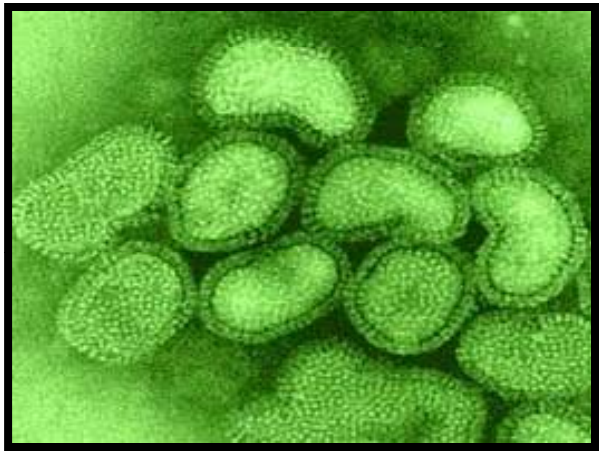
- Results of two NIH-funded studies on respiratory transmission of H5N1 were submitted for publication in two major scientific journals



- The manuscripts raised dual use research questions over whether they contained information that could be utilized to create a potentially human-transmissible form of H5N1 that, in the wrong hands, could be intentionally released to threaten public health and security

NSABB and H5N1 Research

- US Government charged National Science Advisory Board for Biosecurity (NSABB) with:
  - Assessing the dual use research implications of two as-yet-unpublished manuscripts on the avian influenza A/H5N1 virus
  - Considering the risks and benefits of communicating the research results
  - Providing findings and recommendations regarding the responsible communication of the research



NSABB Findings and Recommendations – November 2011

- Noted the importance of the general findings in these manuscripts as they relate to public health preparedness, as well as significant concerns about the potential for the misuse of the specific experimental information
- Recommended that the conclusions of the manuscripts be published without experimental details and mutation data that would enable replication of the experiments
  - Unprecedented recommendation for an unprecedented scenario

Diverse Perspectives

The New York Times

An Engineered Doomsday
…**the research should never have been undertaken because the potential harm is so catastrophic**

the

Hope or Fear: The Opposing Ideas of H5N1 Bird Flu Researchers
By Hans Villarica
Jan 20 2012, 12:06 PM ET
After the government asked journals to cut two studies, concerns about censorship took center stage, but what does it mean for research?

Los Angeles Times

Fear gone viral
Despite government alarms bells, recent research with ferrets didn't create flu strains that threaten the world….there's really not much cause for alarm.

NewScientist

One mistake away from a worldwide flu pandemic
AFTER a hard day at the lab, a biologist travels home on the subway. Later that evening…

nature

Don't censor life-saving science
Controlling who is allowed access to information about mutations in the H5N1 bird flu virus is unacceptable

Response of the Influenza Research Community

- **Voluntary pause on the conduct of H5N1 research**

Sciencexpress Letter

Pause on Avian Flu Transmission Research

Ron A. M. Fouchier,[1]* Adolfo García-Sastre,[2] Yoshihiro Kawaoka,[3] Wendy S. Barclay,[4] Nicola M. Bouvier,[5] Ian H. Brown,[6] Ilaria Capua,[7] Hualan Chen,[8] Richard W. Compans,[9] Robert B. Couch,[10] Nancy J. Cox,[11] Peter C. Doherty,[12] Ruben O. Donis,[13] Heinz Feldmann,[14] Yi Guan,[15] Jaqueline Katz,[16] H. D. Klenk,[17] Gary Kobinger,[18] Jinhua Liu,[19] Xiufan Liu,[20] Anice Lowen,[21] Thomas C. Mettenleiter,[22] Albert D. M. E. Osterhaus,[23] Peter Palese,[24] J. S. Malik Peiris,[25] Daniel R. Perez,[26] Jürgen A. Richt,[27] Stacey Schultz-Cherry,[28] John Steel,[29] Kanta Subbarao,[30] David E. Swayne,[31] Toru Takimoto,[32] Masato Tashiro,[33] Jeffery K. Taubenberger,[34] Paul G. Thomas,[35] Ralph A. Tripp,[36] Terrence M. Tumpey,[37] Richard J. Webby ,[38] Robert G. Webster[39]

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The continuous threat of an influenza pandemic represents one of the biggest challenges in public health. Influenza pandemics are known to be caused by viruses that evolve from animal reservoirs, such as in birds and pigs, and can acquire genetic changes that increase their ability to transmit in humans. Pandemic preparedness plans have been implemented worldwide to mitigate the impact of influenza pandemics. A major obstacle in preventing influenza pandemics is that little is known regarding what makes an influenza virus transmissible in humans. As a consequence, the potential pandemic risk associated with the many different influenza viruses of animals cannot be assessed with any certainty.

Recent research breakthroughs identified specific determinants of transmission of H5N1 influenza viruses in ferrets. Responsible research on influenza virus transmission

ScienceInsider
Breaking news and analysis from the world of science policy

In Dramatic Move, Flu Researchers Announce Moratorium on Some H5N1 Flu Research, Call for Global Summit

by David Malakoff and Martin Enserink
20 January 2012, 12:42 PM

Stung by a growing global controversy over the potential dangers of experiments involving the H5N1 avian flu virus—and worried about heavy-handed government regulation—the world's leading H5N1 researchers have agreed to a 60-day moratorium on a controversial category of studies "to allow time for international discussion.“

World Health Organization

Roundtable
Geneva – February 16-17

- **Goal: Establish a common understanding around H5N1 research, especially for pandemic flu preparedness**
- **New information made available**
  - **Additional data and clarifications from authors**
  - **New non-public epidemiological information**
- **Conclusions:**
  - **Studies provide an important contribution to public health surveillance of H5N1 viruses**
  - **Delayed publication of full manuscripts preferable to urgently publishing redacted manuscripts**

Revised Manuscripts

- **Based on research conducted prior to the voluntary "pause," as well as input from the external reviewers, the authors revised their manuscripts to incorporate:**
  - **Additional data**
  - **Clarifications of findings in the original Fouchier manuscript**
    - **Virus produced after ferret passaging was not highly lethal when transmitted by aerosol**

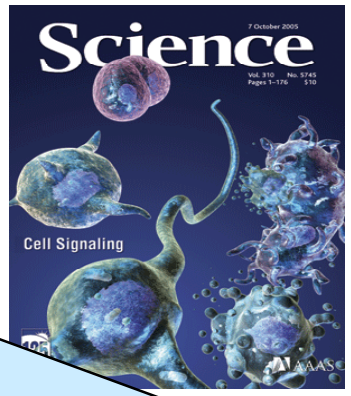
New Charge to the NSABB

- **"Taking into account the additional information in the revised manuscripts, epidemiological information presented during the meeting, and the security information that will be presented in the classified briefing:**
  - **Assess the dual use research implications of two unpublished, revised manuscripts on the transmissibility of avian influenza A/H5N1 virus;**
  - **Consider the risks and benefits of communicating the research results; and**
  - **Develop findings and recommendations regarding whether or not the information should be communicated, and if so, to what extent."**

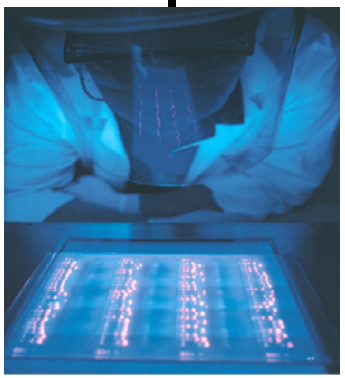
NSABB Recommendations March 30, 2012

- Revised Kawaoka manuscript should be communicated in full (unanimous; published online May 2, 2012)
- Data, methods, and conclusions presented in revised Fouchier manuscript should be communicated, but not as currently written (12-to-6)
- The U.S. Government should
  - Continue to develop national, and participate in development of international, policies for oversight of dual use research of concern
  - Develop a mechanism to provide controlled access to sensitive scientific information

Proposed Oversight Approach: Comprehensive Coverage of Research Process



Conceptualize project → **Funding review** → **Institutional review** → **Conduct research** → **Discuss work:** Seminars, Posters, abstracts → **Publish or post online**



“It takes a village”

- **To deal with the issue effectively:**
  - **Responsibility must be shared among the researcher, publishers, institutional officials, local oversight bodies, and the Federal government**

USG Policy on Oversight of DURC

- Issued by the Administration on March 29, 2012
- Purpose: To establish regular review of USG funded or conducted research with certain high-consequence pathogens and toxins for its potential to be DURC in order to:
  - mitigate risks where appropriate; and
  - collect information needed to inform the development of an updated policy, as needed, for the oversight of DURC

USG Policy on Oversight of DURC

- **Aim: To preserve the benefits of life sciences research while minimizing the risk of misuse of the knowledge, information, products, or technologies provided by such research.**
- **Complements existing regulations and policies governing the possession and handling of pathogens and toxins.**
- **Will be updated, as needed, following domestic dialogue, engagement with international partners, and input from interested communities**

Step 1: Identification of research involving any of the 15 agents or toxins listed

1. Avian influenza virus (highly pathogenic)
2. *Bacillus anthracis*
3. Botulinum neurotoxin
4. *Burkholderia mallei*
5. *Burkholderia pseudomallei*
6. Ebola virus
7. Foot-and-mouth disease virus
8. *Francisella tularensis*
9. Marburg virus
10. Reconstructed 1918 Influenza virus
11. Rinderpest virus
12. Toxin-producing strains of *Clostridium botulinum*
13. Variola major virus
14. Variola minor virus
15. *Yersinia pestis*

Rationale for Scope

- **Focused on a subset of biologic agents considered to present greatest risk of deliberate misuse with highest potential consequences**

- **Once experience with the oversight framework is gained and the effectiveness and impact are assessed, the scope may need to be adjusted**

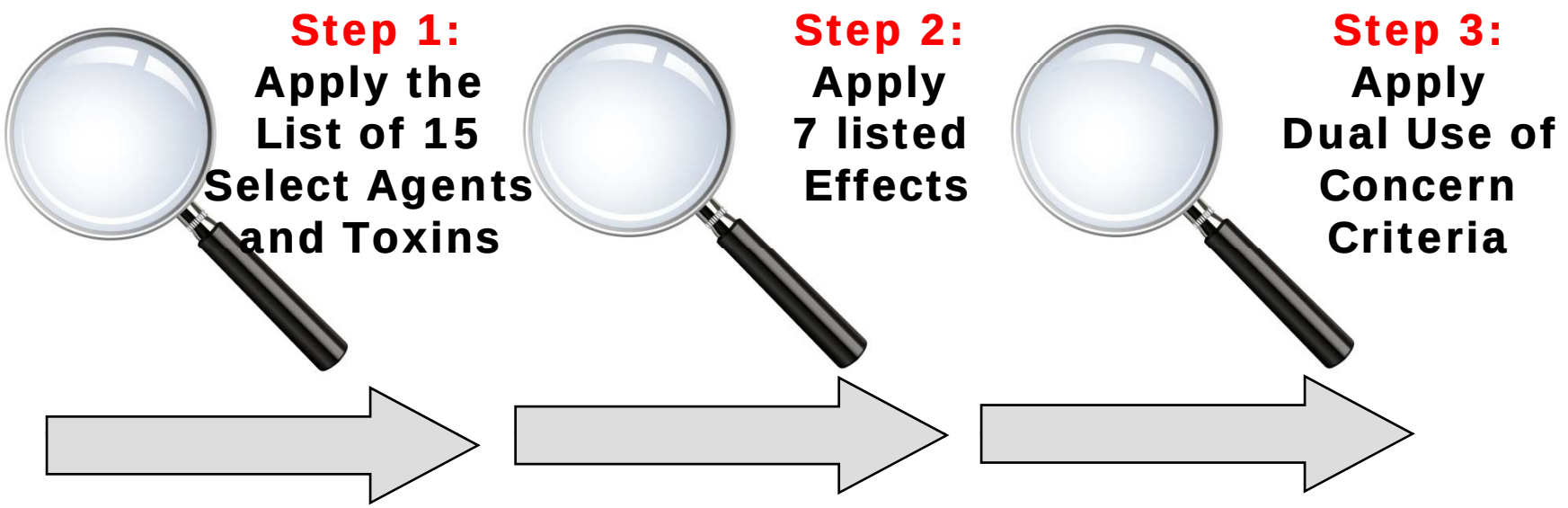
Step 2: Identification of research that produces, aims to produce, or is reasonably anticipated to produce any of the listed effects

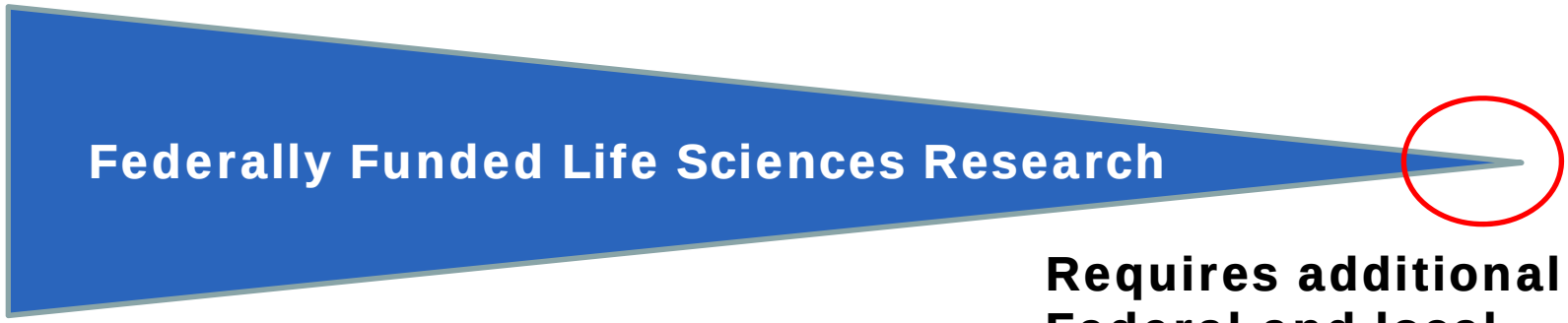
1. Enhances the harmful consequences of the agent or toxin;
2. Disrupts immunity or the effectiveness of an immunization against the agent or toxin without clinical and/or agricultural justification;
3. Confers to the agent or toxin resistance to clinically and/or agriculturally useful prophylactic or therapeutic interventions against that agent or toxin or facilitates their ability to evade detection methodologies;
4. Increases the stability, transmissibility, or the ability to disseminate the agent or toxin;
5. Alters the host range or tropism of the agent or toxin;
6. Enhances the susceptibility of a host population to the agent or toxin; or
7. Generates or reconstitutes an eradicated or extinct agent or toxin listed in Section III.1

Step 3: Determination of whether the research is DURC

Dual Use Research of Concern

Life sciences research that, based on current understanding, can be reasonably anticipated to provide knowledge, information, products, or technologies that could be directly misapplied to pose a significant threat with broad potential consequences to public health and safety, agricultural crops and other plants, animals, the environment, materiel, or national security.





Requires additional Federal and local oversight and risk mitigation strategies to address dual use concerns

Risk Assessment

- **For projects that fall within the scope and that are determined to meet the definition of DURC, departments and agencies will:**
  - **Assess the risks and benefits of such projects, including how research methodologies may generate risks and/or whether open access to the knowledge, information, products, or technologies generates risk**
  - **Develop, in collaboration with the institution or researcher, a risk mitigation plan to apply any necessary and appropriate risk mitigation measures**

Risk Mitigation

- **Risk mitigation measures may include, but are not limited to:**
  - **Modifying the design or conduct of the research**
  - **Applying specific or enhanced biosecurity or biosafety measures**
  - **Evaluating existing evidence of medical countermeasures (MCM) efficacy, and where effective MCM exist, including that information in publications**
  - **Regularly reviewing, at the institutional level, emerging research findings for additional DURC**

Risk Mitigation, *continued*

- **Risk mitigation measures may include, but are not limited to:**
  - **Requesting that institutions notify funding departments or agencies if additional DURC is identified, and propose modifications to the risk mitigation plan, as needed**
  - **Reviewing annual progress reports from Principal Investigators to determine if DURC results have been generated, and if so, flagging them for institutional attention**
  - **Determining the venue and mode of communication of the research (addressing content, timing, and possibly the extent of distribution of the information)**

Risk Mitigation, *continued*

- **If the risks posed by the research cannot be adequately mitigated with the measures described, Federal departments and agencies will determine whether it is appropriate to:**
  - **Request voluntary redaction of the research publications or communications**
  - **Classify the research, in accordance with National Security Decision Directive / NSDD-189**
  - **Not provide or terminate research funding**

Current Risk Mitigation Measures

- **Biosafety**
  - **NIH Guidelines for Research Involving Recombinant DNA Molecules**
  - **Biosafety in Microbiological and Biomedical Laboratories (BMBL)**
  - **Select Agent Rules**
- **Biosecurity**
  - **Personnel Reliability Programs**
  - **Select Agent Rules**
- **Occupational Health and Safety**

USG Policy on Institutional Oversight of DURC

- Under development
- Will define roles and responsibilities of research institutions and investigators funded by the USG
- Will be issued for public comment
- Companion document - Set of tools to assist institutions in implementing policy, including:
  - Risk/benefit assessment tool
  - Guidance for responsible communication of DURC
  - Tool for developing a code of conduct

Educational Tools on DURC

http://oba.od.nih.gov/biosecurity/biosecurity.html

Discussion

- **A lot is at stake:**
  - **Public health**
  - **National security**
  - **Public trust**
- **Getting oversight right:**
  - **Amount**
  - **Locus**
  - **Mechanisms**
  - **Measuring impact**
  - **Adjusting as needed**
- **Your input on the proposed policy development is critical**

Discussion

- Questions?
- Comments?