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OVERSIGHT AND CLEARANCE OF DUAL-USE RESEARCH OF CONCERN

Sections:

Attachments:

I. PURPOSE

The Centers for Disease Control and Prevention (CDC)[1] is committed to ensuring that all public health research conducted by CDC is used for its intended purpose: to improve the public's health. Research that is beneficial to society that could also pose risks to health or security if used malevolently is referred to as "dual-use research of concern" (DUR). Such research requires scrutiny and review for dual-use potential prior to initiation of research as well as during the scientific review and publication process. Scientists must also be mindful of dual-use issues while research is being conducted and as dual-use concerns may develop during the execution of a research plan. The objective of this policy is to ensure that CDC's intramural research is consistent with CDC's imperative to safeguard the nation's health and well-being.

II. ABBREVIATIONS, ACRONYMS, AND DEFINITIONS

A. For the purposes of this policy, the following abbreviations and acronyms apply:

1. ADS – Associate Director for Science
2. CDC – Centers for Disease Control and Prevention
3. DUR – Dual-Use Research of Concern
4. DUR WG – Dual-Use Research of Concern Work Group
5. HHS – Department of Health and Human Services
6. IBB – Institutional Biosafety Board
7. NAS – National Academy of Sciences

[1] References to CDC in this policy also apply to the Agency for Toxic Substances and Disease Registry (ATSDR)

8. NC[2] – national center
9. NSABB – National Science Advisory Board for Biosecurity
10. OCSO – Office of the Chief Science Officer
11. USC – United States Code

B. For the purposes of this policy, the following definitions apply:

1. Biological agent: Any microorganism (including, but not limited to, bacteria, viruses, fungi, rickettsiae, or protozoa), or infectious substance, or any naturally occurring, bioengineered or synthesized component of any such microorganism or infectious substance capable of causing (a) death, disease, or other biological malfunction in a human, an animal, a plant, or another living organism; (b) deterioration of food, water, equipment, supplies, or material of any kind; or (c) deleterious alteration of the environment. (18 USC 178)

2. Chemical: A chemical or precursor that through its chemical action on life processes can cause death, temporary incapacitation, or permanent harm to humans or animals.

3. Clinically and/or agriculturally useful prophylactic or therapeutic interventions: First or second line prevention and treatment measures or alternative therapeutics in the form of algicides, antibiotics, antivirals, antiparasitics, antibodies, fungicides, herbicides, insecticides, vaccines, etc.

4. Dissemination: The process by which infectious diseases or toxins are dispersed. The same routes of entry pertinent to natural spread of diseases are also relevant when their etiologic agents are delivered intentionally (e.g., inhalation of biological agent disseminated as an aerosol or ingestion of a biological agent disseminated through a water supply).

5. Dual-use research of concern: Research that, based on current understanding, can be reasonably anticipated to provide knowledge, products, or technologies that could be directly misapplied by others to pose a threat to public health, agriculture, plants, animals, the environment, or materiel.

6. Harmful consequences: The ability of a chemical or biological agent or toxin to critically alter normal biological functions, inflict damage on public health resources, materiel, and public safety. This includes consequences resulting from manipulation of agent virulence, infectivity, stability, transmissibility, or the ability of the biological agent or toxin to be disseminated.

7. Host range: The number of different species or populations that can become infected by a biological agent, causing disease in the host or allowing it to become a carrier.

[2] For ease of reference within policy documents, "NC" will refer collectively to CDC's national centers, institute, the National Immunization Program, the National Office of Public Health Genomics, and the Agency for Toxic Substances and Disease Registry (an independent Health and Human Services Agency that is led by the CDC director and for which CDC provides administrative services).

8. Host population: A collective of organisms that constitutes a specific group or occur in a specified habitat. In the context of dual-use research of concern, the use of this phrase implies that the misapplication of the knowledge, products, or technologies derived from the research has the potential to broadly impact a population of host organisms.

9. Immunity: Encompasses all aspects of host immunity (e.g., active, adaptive, adoptive, immune, innate, and passive modulators).

10. Immunization: Refers to the active or passive induction of immunity through inoculation (e.g., natural inoculation or vaccination) with an immunizing agent or with antibodies, including antitoxins and toxoids.

11. Infectivity: The characteristic of a disease agent that enables the agent to enter, survive, and multiply in a susceptible host.

12. Risk/benefit assessment: A risk assessment, conducted qualitatively or with a NSABB tool, to determine the relative benefits verses potential harm of conducting or disseminating the research.

13. Stability: The ability of a biological agent to remain viable when exposed to various environmental factors, including temperature, relative humidity, atmospheric pollution, and sunlight. Stability also includes persistence in a host.

14. Toxin: The toxic material or product of plants, animals, microorganisms (including, but not limited to, bacteria, viruses, fungi, rickettsiae, or protozoa), infectious substances, or a recombinant or synthesized molecule, whatever their origin and method of production, and includes (a) any poisonous substance or biological product that may be engineered as a result of biotechnology produced by a living organism; or (b) any poisonous isomer or biological product, homolog, or derivative of such a substance. (18 USC 178)

15. Transmissibility: The ease with which an agent spreads from host to host or from vector to host (e.g., via arthropod vectors).

16. Virulence: The ability of or degree to which a pathogenic biological agent can cause disease. The term is often described in terms of case-fatality rates or the biological agent's ability to cause serious disease in a susceptible host.

III. BACKGROUND

Great achievements in the life sciences over the last 50 years have produced advances that have revolutionized the practice of medicine and public health. The very technologies that have fueled these benefits to society, however, pose a potential risk as well—the possibility that these technologies could also be used to create the next generation of chemical or biological weapons. A portion of the research leading to these advances has been termed "dual-use research of concern" (DUR) to convey the idea that some technologies and discoveries intended to improve health and well-being can

also be intentionally misused to pose a biological or chemical threat to public health or national security.

A. The National Science Advisory Board for Biosecurity (NSABB)

The NSABB (http://www.biosecurityboard.gov/) was established in 2004 to advise the Federal government on dual-use research, including the communication of dual-use research results that may raise national security concerns. Specifically, the NSABB is charged with completing the following activities:

- Strategies for local and federal biosecurity oversight for all federally funded or supported life sciences research.
- Development of guidelines for biosecurity oversights of life sciences research and provide ongoing evaluation and modification of these guidelines as needed.
- Strategies to work with journal editors and other stakeholders to ensure the development of guidelines for the publication, public presentation, and public communication of potentially sensitive life sciences research.
- Development of guidelines for mandatory programs for education and training in biosecurity issues for all life scientists and laboratory workers at federally funded institutions.
- Development of a code of conduct for life scientists and laboratory workers that can be adopted by federal agencies as well as professional organizations and institutions engaged in the performance of life sciences research domestically and internationally.

CDC will periodically revise this policy in accordance with appropriate HHS/NSABB recommendations as they become available. This policy will apply to information products (e.g., abstracts, manuscripts, models, oral presentations, posters, and software) developed by CDC scientists that contain information that falls within the definition of dual-use research as described in Section IV.

B. The CDC Institutional Biosafety Board (IBB)

In order to be responsive to biosecurity concerns, CDC has formed an Institutional Biosafety Board, led by the Office of the Chief Science Officer (OCSO) or designee, Office of the Director to consider (1) the possibility for deliberate misuse of CDC's research findings and technologies and (2) how such information with dual-use potential can be responsibly communicated.

The IBB has 3 primary functions:

- To interface with the NSABB and ensure implementation of NSABB guidance at CDC.
- To provide guidance and consultation to CDC scientists, associate directors for science (ADS), senior science advisors, and management regarding DUR issues.
- To review plans for experiments, protocols for studies, and information products (as defined in CDC's policy for Clearance of Information

Products Disseminated Outside CDC for Public Use [CDC-GA-2005-06]) about which the NC ADS seeks consultation and review.

Members of the IBB include senior scientists from across the agency and *ad hoc* members with subject matter expertise as needed for consultation and reviews. The IBB meets at minimum twice per year for updates, business and as needed for consultation and reviews.

This policy describes the requirements for additional clearance by the IBB for research and findings that may meet the definition of "dual-use research of concern." This policy complements the CDC policy for Clearance of Information Products Disseminated Outside CDC for Public Use (CDC-GA-2005-06). Review of DUR described in this policy occurs in conjunction with routine clearance through the researcher's official clearance chain.

IV. DUAL-USE RESEARCH AS CURRENTLY DEFINED

The National Academy of Sciences (NAS) in its 2004 report titled "Biotechnology Research in an Age of Terrorism" (http://ncseonline.org/NLE/crs/abstract.cfm?NLEid=1597) identified seven classes of experiments that illustrate the types of endeavors or discoveries that require review before they are undertaken or, if carried out, before they are published in full detail. In addition to the biological research described by NAS, CDC has expanded the definition of these classes of experiments to include other types of research (e.g., chemical, modeling). This policy covers experiments, studies, or research that would:

- Enhance the harmful consequences of a biological agent or toxin by augmenting properties such as virulence, infectivity, stability, transmissibility, or the ability of the biological agent or toxin to be disseminated.
- Increase the dissemination of a potentially harmful chemical or alter its absorption and pharmacokinetics to increase toxicity.
- Impart to a biological agent, toxin, or chemical resistance to clinically and/or agriculturally useful prophylactic or therapeutic interventions, such as first or second line prevention and treatment measures against that agent, toxin, or chemical.
- Enable a biological agent, toxin, or chemical to evade detection methodologies.
- Enhance the susceptibility of a host population to the harmful consequences of a biological agent, toxin, or chemical.
- Disrupt immunity or the effectiveness of an immunization or medical countermeasure or alter the host range or tropism of a biological agent or toxin.
- Generate or reconstitute a biological agent, toxin, or chemical for which there are no known or widely available prophylactic or therapeutic interventions that could evade detection or for which there is no known immunity or natural body defense.

V. POLICY

A. Determination of research as DUR

At the development stage of all research projects or experiments, the principal investigator (PI) must make a determination of whether it is likely that the results of the research may constitute DUR as defined in Section IV. NSABB and the CDC IBB have developed tools to assist CDC personnel with determining whether research is dual-use. The current versions of these tools are available from the CDC IBB. The draft Assessment Tool is included in the Appendix. (See also Figure 1 in this policy.)

At the clearance/dissemination phase (e.g., presentation, manuscript, abstract, poster or other information product intended for distribution outside of CDC), the PI must again make a determination of whether the results constitute DUR. It is at this stage that DUR review is documented during the scientific clearance process.

If the PI initially determines that the information product does not have potential for dual-use, concurrence must be sought from the division associate director for science (ADS) (or, if no division ADS, by the division director or designee). (If the division ADS concurs that the research is not DUR, this should be documented in the clearance record, and clearance of the information product continues according to the CDC clearance policy.) If the PI or the division ADS judges that the research has DUR potential, concurrence from the NC ADS (or, if no ADS, other senior science advisor with clearance responsibilities) must be sought.

If the research is determined to have dual-use potential, a risk/benefit assessment must be conducted by the NC ADS. Tools designed by NSABB for assessing risks and benefits for DUR are available from the CDC IBB. The most current version is included in the Appendix.

B. Research determined to be DUR and poses risk to the public's health or national security

For proposed protocols and experiments: If a proposed protocol or experiment meets the DUR criteria and poses risk, the PI should work with the supervisor, division ADS, and NC ADS/Senior Science Advisor as needed to determine the appropriate level of oversight necessary. Plans for the level and nature of release of findings must be considered. If assistance from the IBB is requested, the proposal or experiment plan along with documentation of the DUR assessment must be sent to the IBB via the Assistant Science Officer in OCSO.

For information products: If a manuscript, presentation, poster, or other information product intended for distribution outside CDC meets the DUR criteria and poses risk, the NC ADS/Senior Science Advisor determines what, if any, changes must be made and what, if any, limits are to be placed on the release. If assistance from the IBB is requested, the information product, the scientific clearance form, and DUR assessment documentation should be sent to the IBB via the Assistant Science Officer in OCSO.

The NC ADS/Senior Science Advisor is encouraged to consult with the IBB for general guidance on DUR and at any time during the process of determination of DUR, risk/benefit assessment, determination of oversight, and revisions for presentation or publication.

C. Documentation of assessment of DUR

As part of the existing scientific clearance process, NC ADSs/Senior Science Advisors or their designee must maintain records that DUR assessments have been conducted for all information products intended for distribution outside CDC.

D. Training

All CDC scientists who conduct research or prepare information products to be distributed outside CDC as well as all clearance officials must attend at least one training session for DUR. The session may be a classroom training experience or self-study web-based training.

VI. RESPONSIBILITIES

For the purpose of this policy, the following responsibilities apply:

A. CDC OD, Office of the Chief Science Officer (OCSO)

OCSO provides support for the IBB. The Assistant Science Officer chairs the IBB and ensures that each review includes a subject matter expert on the topic under discussion. OCSO provides DUR training materials for scientists and clearance officials and provides updated materials to NC ADSs/Senior Scientists to ensure timely and accurate assessment of potential DUR. OCSO participates in decisions to request consultation from NSABB.

B. National Centers (NCs)

NC directors provide final approval for all research and information products developed in the center. NC directors may delegate this authority to an associate director (e.g., ADS).

The NC ADS is responsible for the following activities:

- Maintains sufficient current knowledge of DUR.
- Provides guidance to Division clearance officials and center scientists for identifying potential DUR and assessing risk/benefit.
- Maintains record of DUR assessment for each information product intended for distribution outside CDC.
- Notifies IBB/OCSO of DUR stating which DUR criteria the project met and providing documentation of DUR assessment completed on the project.
- Consults with IBB as necessary to identify DUR and assess risk/benefit.
- Ensures center scientists and other clearance officials are trained on DUR issues, policies, and procedures.

C. CDC employees and managers who perform clearance

Clearance officials at all levels provide guidance to CDC scientists regarding identification of DUR and assessment of risk/benefit.

Employees who perform clearance:

- Maintain sufficient current knowledge of DUR.
- Consult with scientists to determine whether project or product is DUR.
- Ensure that NC ADS is aware of work with DUR potential.

D. CDC investigators and scientists

All CDC investigators and scientists must indicate whether their projects, protocols, experiments, or information products are DUR as defined herein.

Investigators and scientists:

- Attend and complete DUR training.
- Ensure that research protocols and products are assessed for DUR potential.
- Consult with ADS to determine risk/benefit.

VII. PROCEDURAL CONSIDERATIONS

Timeline: The review to determine whether research or information products are DUR takes place prior to initiation of research and during the clearance process. For clearance of presentations and publications, such review should not add substantial additional time to the clearance process. Protocols and information products submitted to the IBB will be addressed as quickly as is feasible with the goal of no more than 2 weeks to complete the review process.

Retention: Documentation related to determination of DUR and risk/benefit analysis should be maintained with the clearance record in accordance with the CDC Records Control Schedule B-321, the ATSDR Schedule B-371, and the CDC Clearance Policy.

VIII. REFERENCES/BIBLIOGRAPHY

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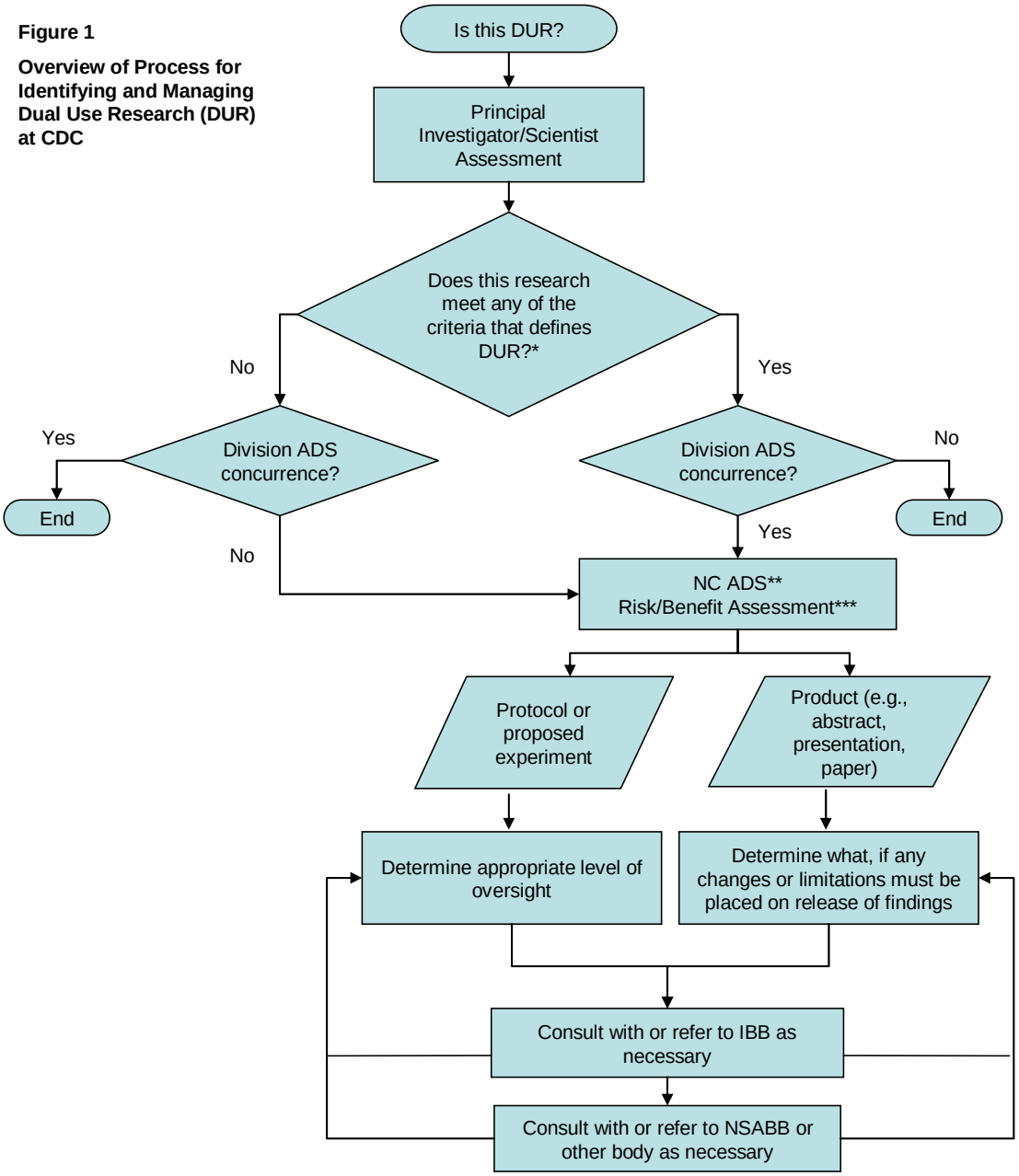
Figure 1

Overview of Process for Identifying and Managing Dual Use Research (DUR) at CDC



*Current tools for determining whether research is dual use are available from NSABB and CDC IBB

**If CC/CO has no ADS, then appropriate Senior Science Advisor or designee

***Current tools for assessing risks and benefits for DUR are available from NSABB and CDC IBB

APPENDIX

CDC's Assessment Tool for Dual-use Research of Concern: Assessment for Dual-Use Research

Instructions: The investigator must answer NO or YES to all questions and subparts below. This form should be completed prior to initiation of research as well as during the review and clearance process prior to dissemination of scientific information.

1. Is it likely that the research could:

    - Enhance the harmful consequences of a biological agent or toxin by augmenting properties such as virulence, infectivity, stability, transmissibility, or the ability of the biological agent or toxin to be disseminated?
    - Increase the dissemination of a potentially harmful chemical or alter its absorption and pharmacokinetics to increase toxicity?
    - Impart to a biological agent, toxin, or chemical, resistance to clinically and/or agriculturally useful prophylactic or therapeutic interventions, such as first or second line prevention and treatment measures against that agent, toxin, or chemical?
    - Enable a biological agent, toxin, or chemical to evade detection methodologies, thereby restricting the capacity to identify and effectively treat infection, disease, or other medical consequences?
    - Enhance the susceptibility of a host population to the harmful consequences of a biological agent, toxin, or chemical?
    - Disrupt immunity or the effectiveness of an immunization or medical countermeasure or alter the host range or tropism of a biological agent or toxin?
    - Generate or reconstitute a biological agent, toxin, or chemical warfare agent for which there are no known or widely available prophylactic or therapeutic interventions that could evade detection or for which there is no known immunity or natural body defense?

2. Is it likely that the knowledge, products, or technologies derived from this research could be inadvertently or deliberately misapplied by others to pose a threat to public health, agriculture, plants, animals, the environment, or materiel?

3. Are the knowledge, products, or technologies associated with this research considered to be readily available and accessible to other researchers in the field? (Note: The answer to this question may be available or answerable only after the research has been completed.)

If any answer to any subpart of Question 1 or Question 2 is YES, then that aspect of the research must be carefully evaluated by the center-level Associate Director for Science or other designated official for its dual-use potential according to CDC policy.

If the answers to Questions 1 and 2 are NO, then the research is not dual-use research of concern; however, this determination must be certified by the division-level Associate Director for Science or other designated official.

If the answers to Questions 1 or 2 are YES, and the answer to Question 3 is YES, then the research is dual-use but its impact may be ameliorated by the common accessibility of the technology.

If the answers to Questions 1 and 2 are YES, and the answer to Question 3 is NO, then the conduct and publication of such research may be of high potential consequence, and there is a possibility that changes or limitations may be placed on dissemination of the findings.