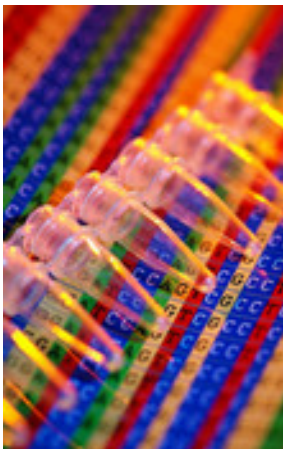


**NATIONAL
SCIENCE
ADVISORY
BOARD FOR
BIOSECURITY**

**Strategic Plan for Outreach and Education
On Dual Use Research Issues**



**Report of the
National Science Advisory Board for Biosecurity
(NSABB)
Working Group on Outreach and Education**

December 10, 2008

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Introduction

The NSABB has made significant progress fulfilling its charges. Specifically, the NSABB has proposed a framework for the oversight of dual use research that includes a criterion and guidance for the evaluation of the dual use potential of research (and, in particular, for identifying “dual use research of concern”¹); tools to assist with the assessment and management of the dual use risk associated with certain information and technologies generated by research; tools for the responsible communication of dual use research of concern; and principles to promote the development and adoption of codes of conduct addressing dual use research issues. In addition, the NSABB has developed recommendations to address dual use research issues associated with the *de novo* synthesis of select agents and has fostered the engagement of the international community on dual use research issues.

A key element of the NSABB’s charge also is to provide recommendations on the development of programs for outreach, education, and training on dual use research issues for all scientists and laboratory workers at federally funded institutions. The purpose of this report is to recommend to the federal government a comprehensive plan toward fulfillment of that charge.

From the start of its deliberations, the NSABB has been concerned that awareness within the life sciences community of dual use research issues is insufficient and, when awareness exists, the importance of the issue tends to be underappreciated. Since researchers bear the primary responsibility for the integrity of their work, the NSABB recognized early that awareness of dual use research issues by the scientific community would be fundamental to any successful system of oversight. Such a system would depend on the ability of researchers to recognize the dual use potential of their work and to consider options on how best to minimize the risk that their findings may be misused or misapplied toward malevolent goals. The NSABB also realized that greater understanding of the importance of the dual use research issue by the research community would help maximize engagement by the various stakeholders in the oversight process.

¹ The NSABB has defined “dual use research of concern” as 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 and safety, agriculture, plants, animals, the environment, or materiel. The NSABB also described specific examples of research that may potentially constitute “dual use research of concern,” which can be found in the Board’s “Proposed Framework for the Oversight of Dual Use Life Sciences Research” at:
http://oba.od.nih.gov/biosecurity/pdf/Framework%20for%20transmittal%200807_Sept07.pdf

To address these issues, the NSABB formed a Working Group on Outreach and Education to identify strategies to enhance awareness and appreciation of dual use research issues. The recommendations in this report are based on the deliberations of that Working Group.

Key Considerations

In developing any effective outreach strategy, it is important to consider a number of factors.

- Target audience(s). First and foremost, target audiences must be identified and assessed as to their level of understanding of the issue since this will guide educational strategies. Appropriate messages, mechanisms for outreach, and other aspects of the program depend on the nature and level of understanding of the target groups. Often, these audiences are diverse and varied, and priorities must be established to discern which groups to reach first or most frequently. Clear identification of different target audiences will determine what types of input can be sought from various constituencies.
- Message points. Messages should be tailored to specific target audiences. Key points must be identified and specifically crafted to effectively convey the nature and importance of the information while simultaneously addressing the unique concerns of different stakeholder groups. For example, the concerns about dual use research voiced by the scientific community differ in some respects from those expressed by the general public, and must be discussed accordingly.
- Vehicles for information dissemination. There are many different mechanisms for communication, and it is important to select those methods that will most effectively reach the intended audiences. Various print and electronic means can be used as part of a coordinated multimedia approach that includes exhibits, training sessions, web-accessible media, study materials, and brochures. In addition to material resources, individuals can also play important roles in disseminating information, and, in many cases, the people who communicate messages will be key to the credibility and compelling nature of outreach efforts. In particular, audiences tend to respond to individuals with the appropriate stature, experience and common background. Finding audience-appropriate emissaries to discuss dual use research issues will be critical to a successful outreach and education strategy.

The NSABB considered all of these matters, which are discussed later in this report, as part of its recommendations regarding specific outreach strategies.

Strategies for Outreach

In the context of building awareness of, and developing policies pertinent to, dual use research issues, the NSABB finds that outreach efforts should entail an ongoing dialogue between the federal government and various stakeholder groups. As discussed below, outreach should entail both efforts to educate and provide information to the research community, as well as to ensure avenues of input into the federal policy-making process.

Prior and ongoing outreach efforts by NSABB. To date, the NSABB has developed a set of recommendations regarding the oversight of dual use research of concern, and those recommendations are under consideration by the federal government. Also, federal policies and requirements for the oversight of dual use life sciences research of concern at federally funded institutions are currently under development. Thus, the focus of outreach efforts by the NSABB and the federal government has been: (1) to hone the development of the NSABB's recommendations by taking into account the concerns and perspectives of diverse stakeholders, (2) to promote the broader awareness of dual use research issues and to sensitize life scientists to their importance, and (3) to keep stakeholder communities apprised of the status of the federal policy-making process.

The NSABB members and staff have been engaged in the following outreach efforts, which should be sustained and continued:

- Focus groups and roundtables. These types of events were held to solicit stakeholder views on emerging work products. This process helped the NSABB better understand the concerns of these groups and led to the development of recommendations that were meant to reflect the diverse perspectives of the various communities within the life sciences. These activities had the collateral benefit of raising awareness of the issue with key opinion leaders and promoting dialogue within the organizations they represent.
- Presentations, speeches and seminars. The NSABB members and staff regularly deliver presentations on the dual use research issue and the NSABB's activities at meetings of scientists, biosafety officers, IBC members, research compliance staff, the public, and other stakeholders. Some members have presented on the dual use research issue as part of institutional courses on responsible conduct of research. These presentations are an essential means of sensitizing the research community to this issue and keeping it apprised of evolving federal policymaking activities. These interactions also provide opportunities for feedback from stakeholder groups on emerging policy in this area. There should be continued efforts to identify key stakeholder groups and find opportunities to present to their memberships.
- Exhibits and posters. The NIH staff has developed an exhibit about dual use research issues that it uses at major scientific and professional society meetings to inform attendees about dual use research and biosecurity matters and the development of related federal policy. Exhibits represent an opportunity to

educate at the individual level and enhance the visibility of the issue with key constituencies. These activities should continue to highlight educational materials and specific federal requirements as they are developed.

- International roundtables. The NSABB's Working Group on International Engagement has planned and hosted several successful international roundtables with individuals from a large and diverse set of countries and international organizations. The purpose of these meetings was to share perspectives on the dual use research issue, share specific approaches taken and lessons learned by different countries and organizations in managing dual use research, establish and maintain communication with the international science and policy communities on issues related to dual use life sciences research, and to inform participants about the NSABB's activities. These events play an important role in awareness-building and information-sharing at the international level, and the momentum created by these events should be sustained.

Goals and mechanisms for future efforts. As the NSABB recommendations on the oversight of dual use research are transformed into federal policy, additional types of outreach and education will become appropriate, initially to ensure public input into the policymaking process and subsequently to provide education about emerging federal requirements.

- Input into policymaking - The federal government has already held stakeholder consultation meetings on the NSABB's oversight report and on the report concerning *de novo* synthesis of select agents. As policies are proposed by the federal government, the government should sponsor town-hall style regional meetings orchestrated in conjunction with non-governmental partners (such as universities) as a means of heightening awareness locally and creating more locally accessible forums for scientists and the public to have input into the federal policy-making process.

As formal federal policy is advanced, it will be important not only to keep the public abreast of developments but to solicit public comment through formal channels. As proposed federal policies emerge and are considered by the federal government as ready for public consideration, the Administrative Procedures Act will require multiple opportunities for public comment through publication in the *Federal Register* and a process of notice and comment.

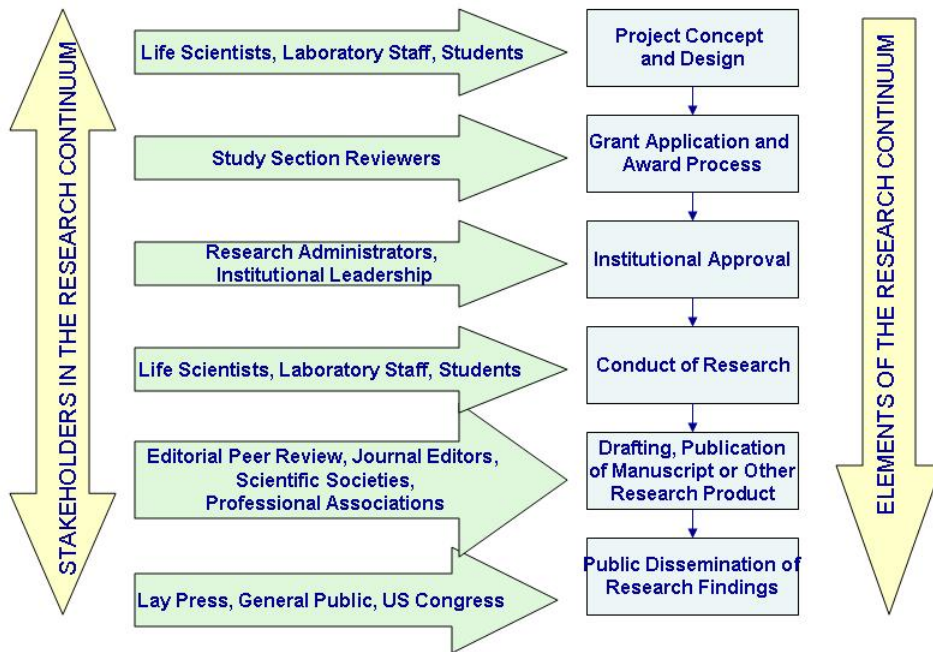
- Education about formal requirements - Finally, when requirements on the oversight of dual use research and the *de novo* synthesis of select agents are formally adopted by the federal government, a communications plan will be needed for the introduction of new federal policies. This plan should include an educational package consisting of an intensive and ongoing campaign of workshops, presentations, print and electronic materials, exhibits, and other activities to educate about and promote compliance with the new requirements. These materials and venues should be used by the federal government to educate

institutions and their staffs, as well as by institutions in training their own investigators.

Strategic considerations for future outreach efforts. To optimize the effectiveness of future outreach and education efforts aimed at increasing awareness of dual use research issues, the NSABB has developed the following recommendations regarding target audiences, communication strategies for reaching those audiences, and key message points that should be included in outreach efforts.

Target Audiences. Many groups hold a stake in life sciences research, ranging from those people and institutions that conduct the research to those who are impacted by the resulting knowledge or technology. The schematic of the research continuum below can serve as a helpful reminder of the variety of individuals involved in the research process and, thus, the diversity of audiences who should be made aware of, and educated about, dual use considerations.

The Outreach and Education Continuum



Life scientists should evaluate the dual use potential of their work. Therefore, investigators must also be a primary focus of outreach and education efforts. Outreach efforts should be directed at scientists in all life sciences fields (agricultural, biomedical, zoology, plant biology, marine biology, microbiology, etc.) as well as in any fields that interface with the life sciences, particularly emerging fields in engineering, computational science, and the physical sciences.

In addition to investigators, the individuals and institutions that support life sciences research should also be included in an outreach program. This includes **laboratory staff** who often play a central role in conducting experiments and managing individual laboratories as well as **research administrators** and the **institutional leadership** that oversee larger research programs.

Professional associations and **scientific societies** provide important avenues for outreach and education as their positions in the research communities provide direct access to researchers and other stakeholders. Professional societies are uniquely positioned to take a leadership role in raising awareness about dual use research issues throughout their particular fields, and can also be instrumental in establishing a set of best practices for responsible research. These societies are also positioned to compile concerns and questions about the oversight of dual use research of concern from their membership, and, in turn, provide important input for continuing to develop responsible oversight procedures.

The **peer-reviewed scientific journals** should also be part of an outreach effort as they play a role in disseminating research findings to the scientific community and the general public. The NSABB believes that the publication of research findings should proceed in as unencumbered a manner as possible but suggests that increasing awareness about dual use research issues within the peer-reviewed scientific journals, editors and peer-reviewers can enhance the identification of and response to manuscripts that may convey information that constitutes dual use research of concern. The NSABB has issued a communications tool to guide these individuals toward that goal.

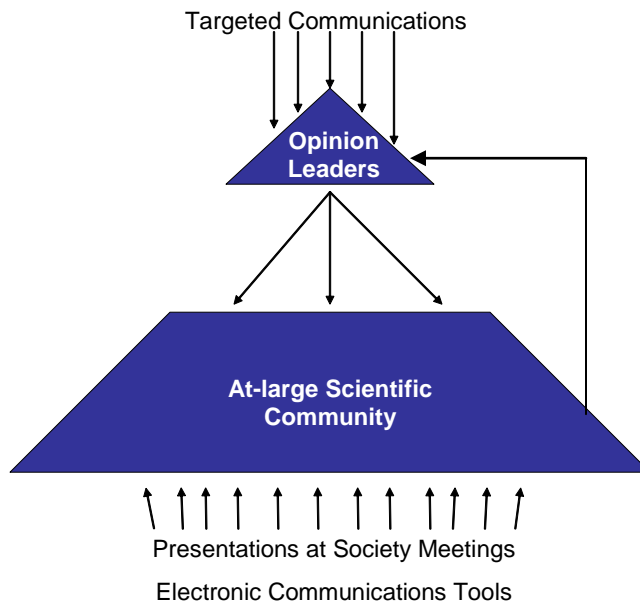
Students and trainees in the life sciences, as well as disciplines that interface with the life sciences, should receive education about dual use research issues. In particular, outreach should be focused on graduate students and post-doctoral researchers since they not only conduct much research themselves, but also will become the next generation of scientists and educators. Dual use research issues should also be addressed with college-level students, particularly in their laboratory courses. Indeed, certain aspects of the dual use research issue may even be addressed as part of a larger scientific curriculum directed at students in secondary school.

Journalists in the popular media (e.g., newspapers, television, magazines, Web-site commentators) play a key role in interpreting science for the public and can play a role in raising awareness about the issue of dual use research that can lead to cultivating an understanding about efforts by the scientific community and federal government to address these matters.

Other professionals, not strictly part of the research community, can be important to educate as well. For example, **public health professionals, veterinarians, and agriculturalists** may each be among the first to detect the consequences of a deliberate misuse of research results to the extent that such misuse leads to a biological event involving humans, animals, or plants.

Finally, it will be important to direct outreach efforts toward the **general public** and their representatives in the **U.S. Congress**. It is imperative that the public and members of Congress are aware of and comfortable with oversight efforts aimed at managing the potential risks posed by dual use research of concern.

Outreach strategies: Opinion leaders and at-large constituencies. The NSABB has identified two outreach approaches that may be applied simultaneously. First, it is important to research respected opinion leaders, such as leaders of institutions, scientific societies, and other key organizations, who are then in a position to communicate credibly and compellingly about the dual use research issue to organizational members, constituents, and the general public. These approaches will often employ different communication mechanisms than those utilized to reach out directly to these at-large constituencies. Efforts to reach opinion leaders, as well as at-large memberships, have the potential to reinforce one another. As awareness is raised at a “grassroots” level, individuals will likely contact the leadership community regarding dual use research issues, who will in turn respond by disseminating information to the community at large. Conversely, it is important to reach opinion leaders in order to create opportunities to reach at-large memberships of organizations. These strategies are represented schematically and described in greater detail below.



Opinion leaders. Opinion leaders, such as nationally recognized scientists and the executive staff and governance members of institutions and professional societies, are often the most influential individuals in various stakeholder groups and are key to ensuring that dual use research issues are a priority concern in their respective organizations. These individuals are also in a position to ensure that the issue attains visibility among large and diverse audiences. Communication with opinion leaders often entails direct dialogue tailored to the specific concerns and needs of the constituencies

represented by these opinion leaders, and thus particular message points will vary from group to group. For example, communications directed toward working scientists may emphasize the importance of public trust to the future support of their funded research activities. Communications to the publishing community, on the other hand, may underscore this community's status as the stewards of scientific progress and responsibility.

One goal of communicating directly to these individuals is to enlist them as articulate spokespersons who can educate broadly about the importance and significance of issues related to dual use research of concern. A second goal is that, as an appreciation for the issue develops among society leadership, it will be considered on the agenda of the various membership activities of these organizations, and the dialogue will thus proceed to larger stakeholder gatherings, meetings, and conferences of these associations.

Among other opinion leaders, members of Congress are an important audience. Briefings of Congressional members and staff will be key to assuring Congress and the public that the federal policies are yielding a system of review and oversight that will effectively manage the risks of dual use research.

At-large constituencies. Communications and educational strategies targeted at the at-large memberships of scientific societies, professional associations, and institutions typically employ techniques that have a more general focus and have the capacity to reach broad and diverse audiences. The federal government's outreach efforts should continue to involve the development of tools such as standardized slide presentations, electronic and print materials, and audiovisual products that make a compelling case for the need to address dual use research. These outreach tools should also effectively communicate key information about the dual use research issue itself. These activities should be aimed at conveying general concepts and educational material about dual use research.

Communications and educational strategies to particular constituencies will need to be crafted to meet the concerns of the audience at hand. As discussed previously, pertinent audiences are diverse, and their stake and potential contributions to the responsible management of the issue will vary. As part of these communications, it may be useful to encourage individuals to contact organizational leadership to express their interest in making education about dual use research issues a priority. This type of communication to the leadership can reinforce the outreach strategy as a whole.

The lay public should be considered as a key audience for at-large communications strategies. All citizens have a stake in the responsible management of dual use research, and educating the public at large about the seriousness with which the scientific community is addressing this issue will be important, as will getting input from the public on pertinent federal policies.

Key message points. The NSABB has developed a set of key message points that should be conveyed in outreach briefings and presentations about the dual use research issue.

1. Research in the life sciences is a critically important national endeavor that yields tremendous benefits to agriculture, medicine, public health, the environment, the economy and national security.
2. The value of life sciences research notwithstanding, knowledge and technologies in the life sciences have evolved to a point where individuals who intend to apply them maliciously could inflict extraordinary harm to public health, agriculture, the environment, the economy and national security.
3. Life scientists and others in the research community have an exceedingly important responsibility to minimize the potential for this misuse of the information and technology associated with their research when such potential exists.
4. The dual use potential of life sciences research is not always immediately evident, and scientists have a responsibility to be mindful of this potential, and handle dual use information and technologies responsibly. In particular, scientists need to consider the dual use potential of emerging technologies, such as synthetic genomics and synthetic biology.
5. Scientists should engage – and as appropriate educate – others about dual use research issues. Audiences should include not only their own laboratory staff, but also colleagues, the public, federal officials, and members of Congress.
6. If even only a few scientists fail to attend to their responsibilities to handle dual use research appropriately, the results could be extremely damaging to public and agricultural health, the economy, national security, and public confidence in science. Therefore, it is incumbent upon life scientists and their professional organizations to initiate and continue dialogue on this matter to maximize awareness and appreciation for the significance of concerns related to dual use research.
7. The future of research depends heavily on public trust, and even one incident involving the misapplication of dual use information or technologies could threaten that support and the future vitality of the life sciences enterprise.
8. If someone is intent on doing harm, he or she will most likely be able to do so; thus the intent of an oversight system is to assist those who behave responsibly and to avoid inadvertently aiding those who seek to do harm.

Other Recommendations

Educational programs help foster a culture of responsibility, which is important to cultivate early in the development of future scientific talent. It is also logical to extend these programs to all settings in which life sciences research takes place or is considered.

Consequently, educational efforts on dual use research should have a broad reach, and, toward that end, the NSABB makes the following recommendations:

- All federal agencies involved in the conduct and support of life sciences research, e.g., the U.S. Departments of Agriculture, Commerce, Defense and Energy, Health and Human Services, should require that their employees, contractors, and institutional grantees train all research staff in the identification and management of dual use research of concern.
- The National Institutes of Health (NIH) currently require formal training in the responsible conduct of research for all recipients of NIH-funded training grants and fellowships. The NIH outlines various topics that these training programs may include, and institutions should routinely incorporate dual use research issues into the content of NIH-mandated training programs.
- Although instruction in the responsible conduct of research is an essential ingredient of collegiate and graduate education, instructional materials and resources should be developed for incorporation into secondary school science programs.
- Programs should also be developed for U.S. commercial research entities and international audiences.
- Scientific associations and professional societies have special contributions to make with respect to promoting responsible research conduct generally, including best practices, and a number of important and impressive efforts are already underway. The federal government should stimulate educational initiatives on the part of nongovernmental organizations, including the development of case studies, course curricula, and multimedia educational tools.
- The federal government should foster the development of standardized training tools to facilitate the conduct of training programs and to help ensure that they meet baseline standards with respect to content and quality.
- Evaluation of the effectiveness of outreach efforts will be essential. Baseline surveys of awareness should be performed and then re-performed to test the impact and effectiveness of educational modalities, message points, and other features of outreach and education programs. The National Academies and the American Association for the Advancement of Science (AAAS) already have conducted a survey of the AAAS membership to test awareness and attitudes among scientists about this issue. This survey may provide an important baseline to be compared against future survey findings.

Ongoing Role for the NSABB

The NSABB should play a continuing advisory role in outreach and education strategies, consulting as appropriate with representatives of professional societies and government who are involved in education and public relations. Specifically, the NSABB remains poised to advise regarding the (1) continued means of promoting awareness of dual use research issues, (2) specific strategies for engaging stakeholder groups on proposed federal policies, (3) development of training curricula mapped to federal policy when it emerges, (4) development of tools to convey educational content effectively to the research community, members of Congress, and the public, and (5) assess the efficacy of ongoing outreach and education efforts.

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