Chapter 4
Surmounting the Barriers

The need to incorporate STH expertise into realms once reserved for "hard" security issues has become an accepted fact for most policymakers since the anthrax assaults of 2001. Slowly, with the weight of numerous reports, briefings, workshops, symposia, hearings, and media articles, many decision-makers with little or no familiarity with the life sciences before fall 2001 have come to understand that biological organisms reproduce, can be found in nature (with the exception of smallpox), and that the basic tools of health-enhancing research cannot be distinguished on a purely technical basis from the building blocks of biological weapons production. For the most part, initial reflexive urges to impose a nuclear threat-control paradigm upon biological agents have dissipated with increased sophistication among the relevant stakeholders. Nonetheless, the fields of biological and biomedical research continue to advance rapidly, and policy mechanisms designed to counter known biological threats identified three years ago may already be obsolete. A constant influx of fresh perspectives, born of active communication between technical experts, science policy professionals, and experts in security and law enforcement issues will be required to prevent the first reactions to a domestic biological attack from becoming entrenched and unyielding dogma.

Although some decision-makers, STH technical policy advisors, and science policy professionals have developed personal networks to exchange STH information, whether many of these fairly new S&T advisory mechanisms for biodefense and biosecurity issues will prove robust enough to survive the comings and goings of individual personalities remains unclear in a still-evolving policy environment. In order to secure a new supply of qualified S&T experts capable of sustaining these networks, and the goodwill of the bioscience and public health communities – critical to providing both technical expertise and fostering mutually beneficial education and outreach efforts – obstacles to strong communication between security and life sciences professionals must be identified and removed. In some cases, conceptual barriers may result from cultural conflicts between the bioscience, public health, and security paradigms. Practical barriers include customs or deficiencies that hinder the development or participation of qualified S&T professionals, bureaucratic obstacles to intra- or interagency communication, inadequate support for S&T advice process from high-level authorities, and insufficient resources to carry out potentially helpful research projects. In considering both the conceptual and practical barriers to

achieving consistent incorporation of life science expertise at every stage of this process, roundtable participants attempted to look beyond transient political attitudes to address systemic issues.

CLASSIFICATION AND SECRECY ISSUES

A barrier with both practical and conceptual aspects facing the S&T policy community lies in access to classified materials, stemming from a relatively small population of bioscientists accustomed to secrecy issues and cultural differences between the bioscience and intelligence and law enforcement communities on the desirability of open information. The National Academies have a record in dealing with classified security analyses when necessary that extends back to World War II, and OTA decided that – as its main consumers had access to classified materials – those should be included as source materials. On the other hand, most NGOs, and some governmental advisory organizations such as CRS, rarely work with classified materials; for organizations that attempt to inform policy decisions by reaching a broad audience, or that disseminate their recommendations through electronic means, relying upon such materials makes little sense. Although some real frictions have manifested over classification or suggested classification of science policy recommendations generated from open meetings or based solely upon open sources,[1] participants agreed that, in many cases, researchers' concerns reflect "not as much of a tension as a perceived tension." Participants familiar with classified studies agreed that many researchers new to classified study environments regard the process as somewhat shrouded in mystery, and may be reluctant to participate in studies that require clearances because of misapprehensions about what they might be allowed to address. As one participant described the response of a scientist who had somewhat dubiously applied for the clearance necessary to participate in a classified biosecurity discussion, "I can remember him saying with absolute amazement, 'You know, those were good discussions. They were open. We were exchanging ideas. People weren't inhibited. They weren't prevented.'….[It's important for a scientist] to hear that, in the right circumstances, a classified environment is an enabling environment because it simply lets you put all issues on the table."

In addition to simple unfamiliarity with classification issues, many researchers – especially those conducting biodefense studies with pathogens categorized as select agents – fear that classification of and imposition of the vague "sensitive but unclassified" label on basic research publications in well-intentioned efforts to prevent biological weapons proliferation could actually hinder the development of critical defenses against disease. Profound philosophical differences toward information control can be

[1] As described in Chapter 3, the CIA's initial intention to release only a classified report on an unclassified workshop on scientific openness spurred acrimonious public debate. Another controversial, if less bitterly debated, decision involved the classification of portions of an NRC study committee's report on agricultural threats, which derived information that could have provided insights into US vulnerabilities solely from open-source materials.

characterized by a fierce loyalty toward open publication, a mainstay of validating peer-reviewed research, on the part of the scientific community, and what one participant described as a tendency in the intelligence community to stamp "classified" over any information collected, even if it can be found in open sources. Participants with extensive experience in law enforcement and intelligence agreed that classification powers are often wielded overzealously for a combination of cultural and psychological reasons: first, if we have the information, it should naturally be secret, and second, classified information may get more attention from high-level decision-makers.

Participants agreed that this cultural divide on classification issues can be surmounted to build trust between the two communities through concentrated outreach on both parts. A relatively easily accomplished task involves increasing accurate perceptions of the nature of classification and secrecy in science and science policy analyses within the community of potential biodefense experts. Some progress toward fulfilling this need should evolve from the actions of the NSABB, whose members will all receive secret clearances themselves, as a natural part of its educational mission. Because the concepts of not divulging details for national security purposes strongly resemble those adopted to protect proprietary pharmaceutical information, the parallel mechanisms should be obvious to most biological and biomedical researchers when the case for protecting such information appears justified.

The converse action recommended by participants, a concerted effort by STH experts to help the intelligence community understand and accommodate concerns about classification of research issues, may prove more challenging. One participant with extensive security experience admitted being puzzled by the lack of "pushback" from the bioscience policy community on reflexive, and not always informed, wielding of the classification stamp. One avenue for achieving such pushback, in addition to continued education on biosecurity and biodefense issues by governmental and non-governmental organizations and more stringent Congressional and internal oversight, might be found in the S&T advisory councils to the FBI, DHS, the HHS Office of Public Health Preparedness, and other agencies where they exist, as part of their technical missions. Accomplishing this task would require outreach within the S&T community as well as to the intelligence and law enforcement agencies to establish a clear message on when classification of biodefense and biosecurity information might prove counter-productive, and to provide willing expertise where possible to help make informed decisions on restricting information.

As one aspect of the latter, some participants described a need to create formal channels for continuing feedback between scientists and policy or intelligence analysts after workshops or studies have been concluded, rather than relying on groups of academic experts who "operate in a vacuum, present ideas, and then go away." This would require identification of resources and an operating base for the

science policy professionals who would be needed to serve as liaisons between the two communities for the duration of the relationship. If accomplished, such efforts could create a trusted group of experts "on retainer" to various decision-makers for a pre-determined period of time.

DEEPENING THE POOL OF EXPERTS

Participants discussed at length the barriers that, in practice, can limit the pool of technically trained science professionals both interested and willing to participate in the national biological security policy process to either quite senior scientists or those who have given up professional recognition within their disciplines for the less tangible rewards of a science policy career. These obstacles include a lack of encouragement or mentoring for those interested in science policy options, especially for professionals considering a policy career but not yet ready to "leave the fold," and the nature of tenure demands for those scientists who would like to contribute time to public service (as experts on National Academies panels, etc.) without leaving their laboratories for a prolonged period.

Many participants encouraged further investigation into the demand for career development programs for scientists with an interest in public service and science policy who might not be ready for or interested in a year-long fellowship commitment. The AAAS and other S&T fellowship programs offer one means for learning more about science policy within the confines of an academic year, but most participants felt that – with a few exceptions, including applicants to the pilot Jefferson S&T Fellowship program – scientists willing to sacrifice that much time to interests other than research had probably already pondered a career transition. Few fully supported the idea of presenting such an introduction to policy issues in very short "policy boot camps" for purposes other than helping researchers understand the security implications of their work, fearing that an education in biodefense and biosecurity concepts designed to conclude within a week or two might result in a cadre of scientists with a little knowledge, and credentials that might appear impressive to decision-makers, but no real world experience. Again, some participants emphasized that lessons could be learned from the Defense Science Study Group and its successes in recruiting rising academic stars, and how the program has maintained strong relations with not only the individuals who participate but their institutions.

Another question, even less amenable to easy answers, lies in seeking methods to make short-term commitments to public service a "career builder" for academic researchers, rather than a potential obstacle to earning tenure. The MacArthur Foundation-funded academic Science and Security Centers do promote changes in the tenure environment for their faculty, especially at land-grant schools with a strong

tradition of service, but finding ways to extend academic rewards for science policy service beyond jointly appointed faculty in those centers may be difficult.

A potential method for introducing researchers interested in public service (for example, as technical experts), but not necessarily eager to leave the laboratory entirely, to policy concepts could come in the form of a curriculum to develop non-technical communications skills. As explained by a participant with both science training and security experience,

> One of the reasons that scientists have difficulty interfacing with policy community is because the way they're accustomed to presenting the information. It's a very difficult process to get people to move from the scientific abstract to the executive summary….You don't deal with the materials, the methods, the results, the conclusions. That's not there. You have to include the players, the context, the reason and the recommendations and the conclusions may be irrelevant.

Such a curriculum could be conducted in short classes over a long period without interfering unduly in research obligations, be open to scientists at every career level, and encompass an introduction to the history of science policy as well as technical skills in composition and presentation. Although not calculated to appeal to every researcher, a communications education program could benefit the policy analysis community by preparing researchers interested in serving as technical experts to do so more productively, and the individual researchers by augmenting an often-neglected part of science training.

Finally, although science policy careers are not and should not be the norm for graduates of biological and biomedical research programs, neither should a young researcher's decision to pursue such a career penalize his or her training institution and provide a concrete reason for a department's educational leadership to discourage such choices. Participants suggested that attention should be paid to ongoing discussions at the NIH, the main funding source for bioscience training, regarding the categories of post-training career choices deemed as indicators of successful service for former recipients of federal pre-doctoral or post-doctoral training grants. Including policy analysis or policy advisory positions along with research appointments as worthy outcomes of federally funded scientific training could cultivate a more positive environment for young scientists interested in policy issues, or at least ensure that academic institutions do not "lose points" for their graduates who go on to serve the nation's science needs as policy professionals rather than laboratory researchers. In addition, some participants noted with irony that many professional societies that provide S&T policy advisory and advocacy functions to policymakers on behalf of their members fail to include options common to S&T policy careers when conducting salary or employment surveys, making evaluating the growth of this population difficult other than as some percentage of the nebulously classified "other." Organizations that benefit from science

policy professionals or promote their development should encourage membership organizations, professional societies, and funding organizations such as NIH to edit their regular surveys as necessary to allow an accurate census of the population of S&T policy professionals in the context of planned studies to examine career choices within the larger community of S&T research professionals.

RELIANCE ON INTERAGENCY EXPERTISE

One aspect of providing STH expertise articulated by some participants reflected a bias that might not be intuitive to policy analysts in the NGO community: a tendency for government decision-makers to seek technical information, when necessary, from other government sources.

> ….Within the [executive branch agency] I've found that 95%, 99% of the time is involved in talking to other people in the government, in the US government or other governments. It is very, very rare when I'm interacting with people outside of government. I'm actually familiar with the UPMC Center somewhat, and there is a handful of people in my head that I can say okay, I have an issue or question, that I can call on. But more often, if I or a colleague is wrestling with a scientific or technical question, I'm probably going to call someone in another government agency.[2]

Several participants illustrated examples of successful intra- and interagency exchange of STH expertise, sometimes as a result of formal mechanisms for consulting on particular issues, and sometimes as a result of the "Rolodex Effect," in which science policy professionals or technical science advisors deliberately cultivate relationships with decision-makers in order to provide an obvious source of STH expertise when necessary. Although some agencies collaborate well on issues of overlapping jurisdiction (participants, for example, discussed how responsible offices at HHS and the State Department consider the technical aspects of international biosecurity issues to coordinate public health and security concerns), participants also acknowledged that interagency relationships cannot always surmount the "neighboring tribes" mentality that can segregate programs with technical missions from their more broadly charged counterparts within a single agency. As a participant representing a science-based program explained,

> It's not as interagency as we would like it to be. For example, when I contact State I like to contact State INR [Bureau of Intelligence and Research]. When I contact the Agency, I would like to contact not just the S&T people, but the CI people, the Intel people. The same thing with the NSC. I can talk to all the health experts, that's fine. But what are the national security implications?

[2] The name of the Federal agency in question has been omitted to preserve confidentiality of participants, as agreed upon in the conditions of the roundtable sessions.

When building strategies to ensure the availability of appropriate STH expertise throughout the national biological security policy process, it is necessary to recognize that the majority of government decision-makers – with the possible exception of members of Congress and their staffs – are most likely to turn first to other government experts for necessary information. Participants emphasized that this results not only from convenience, but from trust in the motives of the organization providing the expertise. Obviously, this requires not only that government organizations hire an adequate number of science policy professionals and technical policy advisors, but that these communicate with each other when necessary. Building a strong core of internal STH expertise depends, in part, upon the availability of professionals with the appropriate skills and knowledge, and the commitment of the organization's leadership to fostering integration of S&T professionals into the decision-making process. Lessons in determining the most effective methods of encouraging interagency sharing of appropriate STH expertise may be drawn from the examples of interagency working groups, temporary assignments of employees from one agency to another, and "virtual committees" of experts representing different programs and agencies that have been favored by the intelligence community. OSTP remains in the best position to assess and guide appropriate interagency exchange of STH expertise if connections between individuals or offices do not arise naturally.

A growing body of STH expertise on biodefense and biosecurity issues now resides in the NGO community; for it to be accessed, such organizations must build trust with government decision-makers. Such relationships may be easier to build with members of Congress and their staffs, who have diverse agendas and levels of interest in technical advice, than with the more politically uniform executive branch agencies. Some NGOs have achieved such trust by building a large portfolio of work, while others do so by couching their goals unambiguously. For example, the National Academies enjoy a long-standing reputation for politically neutral, unbiased, scientifically credible STH policy advice; FFRDCs function as quasi-governmental organizations, establishing trust because they produce advice and analyses specifically at the request of government agencies. Such a process of building credibility could be the work of years or decades, especially when decision-makers may have neither the time nor the technical knowledge to evaluate the objectivity of specific STH advice. Adopting a reliable system for quality assurance in technical reports, as recommended by the Carnegie Commission on Science, Technology, and Government more than a decade ago,[3] might provide one mechanism to allow NGOs to validate STH findings or recommendations, as can the more academically oriented peer-reviewed publication process.

[3] Carnegie Commission on Science, Technology, and Government, *Facing Towards Governments* (1993).

BUILDING A BETTER STUDY

As described in the previous chapter, many types of reports can convey STH expertise, and all meet different needs. However, some participants felt strongly that adopting specific approaches while developing such reports could help ensure that decision-makers make the best use of specific S&T recommendations. Participants with extensive experience in security fields, rather than science-based agencies, emphasized the need for reports that include operational recommendations when possible, to help those organizations that lack a substantial science policy professional core to translate less-specific observations into recommendations. The second roundtable session in particular also focused on the need to complement core expertise in biodefense and biosecurity studies – those who study pathogens, infectious diseases, and potential countermeasures – with a broader community of relevant experts who can help decision-makers consider policy recommendations in a richer context. Participants suggested that lessons could be learned from examining successful cross-disciplinary working groups and advisory committees to build a "template" for a typical biodefense study group that includes experts in sociology, anthropology, political science, and other social sciences in addition to biology and security.

Some participants felt that the demise of OTA had left significant gaps in two specific areas: reports designed to provide insights on (sometimes politically controversial) technical issues for a public constituency, and anticipatory reports allowed the luxury of taking the long view. Although National Academies reports are made available to the public, many participants felt that the generally low levels of scientific literacy mean that these reports may be accessible to the public only through the prism of media interpretation, which may or may not capture nuances accurately. Part of the responsibility, participants agreed, rested with science experts' frequently inadequate efforts to communicate scientific uncertainty and risk issues to policymakers or the public, especially if the analysis will eventually be reduced to a short news clip or a single line in a short memo. Potential solutions posed included suggestions that risk communication strategies be emphasized more strongly in scientific training, especially if made part of a curriculum aimed at developing scientists' non-technical communication skills. A participant also emphasized that guidelines exist within the intelligence community to attempt to quantify certainty for policymakers using a set of pre-determined criteria; although these may not apply directly to STH policy advice, such a rubric could provide some basis for helping technical experts find ways of expressing degrees of certainty or agreement within programs that rely upon consensus.

Among its many studies, OTA's relative institutional flexibility provided the opportunity for self-driven, anticipatory investigations – as long as they captured the interest of members of Congress and their staffs – inspired by working groups of experts invited to brainstorm about possible looming policy

issues. With the demise of OTA, CRS acquired more technical experts who can also prepare anticipatory reports that staff predict might be useful for the closed audience of Congressional staffs. The previously cited Fink Report on dual-use biotechnologies provides one example of an anticipatory study conducted by the National Academies with the support of non-government funding; only about 20% of the projects conducted through the National Academies receive funding from a non-federal source. Participants agreed on the need for studies that can anticipate, rather than merely respond to, serious biodefense and biosecurity policy issues before political pressures or events demand immediate actions. Participants in the second session cited the decision to create multiple Biosafety Level 4 (high-level biocontainment) laboratories at several academic centers within the US as an example of a biodefense issue that, with hindsight, would have benefited from an anticipatory study to estimate typical and emergency capacity needs, long-term costs to the government and the host institutions, and community concerns. Although several participants cautioned that high-level policymakers would be extraordinarily unlikely to peruse purely speculative reports, a need remains for studies that anticipate issues on the horizon. In order to achieve this, policy analysis organizations, including the National Academies, require the necessary financial resources to develop anticipatory, self-driven, open broad policy analyses that focus on issues identified by technical experts as of imminent but not current concern.

Some participants suggested that further research might find suggestions to address how to focus whatever resources might be available for anticipatory studies, which – with the exception of national securities studies on emerging technologies – would not be expected to draw wide support from government agencies. Anticipatory reports produced in the past by OTA, the National Academies, and other organizations met a mix of fates, with some destined directly for the bookshelf, some stirring the opinions of policymakers and the public, and some becoming "technical bibles" relied upon by science policy professionals for years. As an example, many participants cited the two-volume reference on *Technologies Underlying Weapons of Mass Destruction* published by OTA in 1993, which remains a useful source more than a decade later. Although timing certainly plays a role in whether anticipatory reports fill a suddenly apparent need (as illustrated vividly by the Fink Report), some participants believed that most cases would prove more complex:

> I suspect …that if you could find truly successful studies you would find that they all share something. That the failures are diverse, that the recommendations were fuzzy or difficult, that they were so broad, that the expert committee took their charge into such a broad light it was impossible to boil it down. The timing was bad. Whatever was recommended was technically feasible but not politically feasible.

Although not all participants agreed, an enthusiastic minority advocated an analysis of successful and unsuccessful anticipatory studies, interviewing contributors and consumers to determine whether certain characteristics could be used to predict the usefulness of proposed anticipatory studies.

CEMENTING SCIENTIFIC LEADERSHIP

Participants agreed strongly that developing and supporting scientific leadership within government agencies and programs, ideally in the form of a senior science advisor, constitutes a critical step in securing both adequate in-house expertise and institutional receptivity to STH advice. Without authority, permanence, and sufficient resources, the science advisor can end up being "a cheerleader for science," whose most effective possible role is "trying to connect disparate agencies and perspectives as opposed to being an advisor and influencing how science is driven."

In addition to building upon lessons learned from the early successes in establishing a senior science advisor at the State Department and from failures where they have occurred, participants also suggested further study of how agencies with security missions have functioned when policymakers with science or technical expertise served at the highest levels. The tenures of former CIA Director John Deutsch and former Secretary of Defense William Perry provide case studies to examine whether institutional receptiveness to S&T advice, or formal mechanisms for incorporating STH expertise into decision-making, increased when technically trained professionals helmed the programs.

RECOGNIZING THE LIMITS AND REACHING OUT

All three roundtable sessions reached the independent conclusion that no single form of STH expertise meets every need, and that no one expert has access to all of the necessary information, or all of the right contacts. Even in the course of the roundtable discussions on providing STH expertise to policymakers, the science policy professionals involved expressed differences of opinions on various technical issues, based on their own experiences and sources of information. Explaining the processes through which scientists resolve difference of opinion remains very difficult in the context of providing science advice to policymakers, especially if the contacts between decision-makers seeking expertise and STH experts result from informal networking rather than any formal mechanism. One participant outlined both the strength and the weaknesses of the ways in which STH policy experts representing NGOs establish personal networks for providing STH expertise to Congressional policymakers:

> I walked in the door and said, "Here is what we have. If you need information about public health, you call me. If you ever have a question, you call me," and established a relationship with the offices where I would tell them what we could find out, whether it suited our agenda or not….It was a good thing for the offices that called, but the problem with that is that it's not uniform. There will be offices that call me because we've got an established relationship and trust. Not all 535 and not all the committees. It's still very selective and those relationships that occur between members of Congress and the NGO's are all very spotty and happenstance and, you know, there may be this one little group that you really trust and you call them all the time, but is that really the most objective advice that you could get and do you know that? So, it's important that those resources are there, but I don't think it's the perfect system. And collectively maybe it is; collectively, each office is getting informed a little differently by a slightly different expert view and then when they come onto the floor and hash it out, you end up with a good product at the end. At least they all have access to expertise, even if the experts aren't necessarily giving them all the same information.

Many participants discussed, with varying degrees of optimism, the likelihood that OTA could be revived in a form based more or less upon the original organizational structure, to resume its place in conducting anticipatory as well as requested studies and providing members of Congress with more uniform access to STH expertise. Whether the new AAAS Center for Science, Technology and Security Policy can fulfill its ambitious goals of linking experts from the MacArthur Initiative Centers with scientists and policy analysts from the NGO community to provide policymakers with a clearinghouse for relevant STH expertise remains to be seen, but its success could conceivably provide a structure for improving both access to and evenness of STH policy advice on biosecurity issues.[4]

Whether or not a proposed OTA successor develops, policymakers considering biological security questions will continue to rely on a mix of in-house expertise, advice from trusted advisory committees, and reports from NGOs, with trust and accessibility determining the acceptability of S&T policy advice. The likelihood that STH expertise can be successfully incorporated into the decision-making process at every level of the national biosecurity policy process depends not only on institutional structures, but on continued outreach among the bioscience research community, science policy professionals, and the security, law enforcement, and intelligence communities to develop a shared vocabulary, increase mutual understanding, and identify the problems that STH expertise can and cannot solve. As one participant remarked, "I think we're following the comforting pattern of going to science and technology experts for science and technology fixes, to problems that are socio-political, much larger than the sciences themselves."

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[4] Information on the Center, launched in early 2004 with the support of the MacArthur Foundation, can be found at http://www.aaas.org/programs/science_policy/cstsp/about.shtml (accessed August 2004).