AMERICAN SOCIETY FOR MICROBIOLOGY

Public and Scientific Affairs Board

American Society for Microbiology's testimony before the Committee on Energy and Commerce Subcommittee on Oversight and Investigations on Federal Oversight of High Containment Bio-Laboratories September 22, 2009

The American Society for Microbiology (ASM) is pleased to testify before the House Energy and Commerce Committee Subcommittee on Oversight and Investigations hearing on Federal Oversight of High Containment Biolaboratories.

My name is Ronald Atlas and I am CoChair of the ASM Public and Scientific Affairs Board Committee on Biodefense and a Past President of the ASM. I am also Professor of Biology at the University of Louisville. The ASM is the largest single life science Society in the world with a membership of about 40,000 scientists and health professionals. ASM members are involved in basic and applied research, clinical laboratory testing and public health activities that are focused on developing new preventions, therapies and cures for infectious diseases. To meet the challenges of emerging and reemerging infectious diseases, microbiologists work in laboratories in which highly pathogenic agents are stored and studied. The ASM is interested in assuring that such agents are maintained in a manner that is safe for laboratory personnel and the public.

Infectious diseases remain among the most difficult global health challenges accounting for about one quarter of all deaths. Newly recognized infectious diseases occur almost yearly, as evidenced by influenza A (H1N1), avian influenza (H5N1), multidrug and extensively drug resistant agents (MDRTB/XDRTB), and severe acute respiratory syndrome (SARS), just in the last decade alone. These episodes have public health as well as economic and political repercussions. It is critical that scientists in the public and private sectors and health professionals have appropriate facilities and laboratories for the development of new therapies, diagnostics, and prevention and detection methods aimed at reducing the risk of infectious diseases. For example, it is essential that investigators in industry and academia have the proper facilities to work on these infectious agents to develop new vaccines and drugs for which in some cases there are few to no existing therapies. Today 30-40 percent of XDRTB strains are untreatable with existing drugs and these strains are becoming more common and widespread. An H1N1 vaccine could not have been rapidly or safely developed without existing research laboratory infrastructure.

Research on pathogenic microorganisms, which is critical for the health and security of the public and the nation, must be performed safely. Accordingly, the ASM has consistently supported responsible regulation, oversight, practices and guidelines that improve biosafety in laboratories and help to protect laboratory personnel, the safety of the surrounding communities, and the efficacious performance of the research that leads to the vaccines, therapeutic drugs, diagnostics, and other measures that are so needed today to protect the public against the plethora of infectious diseases that occur in the United States and globally.

During the past two years, the ASM has met with and provided recommendations to the Trans Federal Task Force on Biosafety and Biocontainment Oversight and the Executive Order Work Group on Strengthening the Biosecurity of the United States. We understand that these groups have undertaken extensive consultation with the public health and research community and that they will soon release reports and recommendations regarding biosafety and biosecurity. We recommend careful consideration of their recommendations, as well as a thoughtful and deliberate approach to any additional or new requirements for biosafety and biosecurity in laboratories. It took a number of years and substantial effort to arrive at the careful equilibrium that currently exists to oversee and manage research activities. We believe that precipitous, excessive policy changes could upset this delicate balance and, therefore, should be considered in the context of the critical need to conduct public health activities, clinical diagnostic testing and research on pathogens that will lead to new and improved vaccines, therapeutics, diagnostics and other measures to protect against infectious diseases, whether naturally occurring or the result of an intentional act.

The ASM would like to comment on 1) the need for biocontainment laboratories, 2) the select agent regulations, 3) the importance of biosafety for laboratories and laboratory personnel and 4) recommendations to improve biosafety. A number of our recommendations continue to reflect those we made to the Subcommittee in 2007 and subsequently to the federal agency groups addressing biosafety, biocontainment and biosecurity.

1) The Need for Biocontainment Laboratories High containment laboratories should be constructed and maintained to ensure the safety of the laboratory workers and the broader community. Newly emerging and reemerging infectious diseases are appearing at the same time that microbial resistance to standard therapeutics is on the increase. This lethal combination of events presents enormous challenges to public health. In an age of extensive international air travel and commerce, infectious diseases have become a security issue for every nation on the globe, including the United States. Despite the best efforts of government agencies, the public may be at risk for exposure not only to infectious diseases arising within the United States but also at risk to infectious diseases outside our borders.

Over the past thirty years, public health agencies have confronted a myriad of infectious diseases, such as pandemic influenza, HIV/AIDS, extensively drug resistant tuberculosis (XDR TB), SARS, methicillin resistant *Staphylococcus aureus* (MRSA) Ebola hemorrhagic fever, Lyme disease, toxic shock syndrome, Legionnaires' disease, hantavirus pulmonary syndrome, West Nile fever, and others. According to the CDC, 75 percent of these emerging and reemerging infectious diseases, including SARS, hantavirus pulmonary syndrome, Nipah virus encephalitis, influenza, and West Nile fever, are zoonotic, which means that they are transmitted from animals to humans. Although terrible to contemplate, we must also confront the possibility of misuse of science. As the scientific community responds to emerging, reemerging, and drug resistant diseases, it also must prepare to deal with the possibility of an intentional misuse of science for the creation, or spread, of infectious diseases.

Public health and safety depends upon skilled and highly trained microbiologists and other health professionals to make every effort to find methods to prevent, diagnose, and treat infectious diseases and to respond rapidly to emerging and reemerging diseases and threat of bioterrorism. To meet these challenges, scientists and public health professionals must have laboratories in which pathogens may be stored and studied in a manner that is safe for microbiologists and to the community-at-large.

Congress recognized the seriousness of the threat of bioterrorism in the aftermath of the 2001 anthrax crime and increased appropriations for biodefense research. In early 2002, the National Institute of Allergy and Infectious Diseases (NIAID) convened a panel of experts, the Blue Ribbon Panel on Bioterrorism and its Implications for Biomedical Research. This Panel provided guidance on the future biodefense and emerging diseases research agenda, research resources, facilities and scientific personnel. The capacity of existing biocontainment facilities were determined to be inadequate to meet needs for biodefense and emerging diseases work. New facilities at BSL 3 and 4 levels of containment needed to be constructed so that the necessary research to protect the nation could be conducted safely and to provide surge diagnostic capacity in the event of a bioterrorism attack or a pandemic disease outbreak. The NIAID has funded 2 National Biocontainment Laboratories and 13 Regional Biocontainment Laboratories to provide safe and secure space for biodefense and emerging diseases research. These laboratories help support the network of 10 nationwide multidisciplinary Regional Centers for Excellence for Biodefense and Emerging Infectious Diseases Research that the NIAID has established to meet the growing challenge of infectious diseases and to combat the threat of bioterrorism.

The establishment of new biocontainment laboratories has been done openly and under the scrutiny of local municipalities and a federal regulatory and oversight system. They have been constructed in accordance with environmental impact assessments and other applicable standards for biosafety. The new BSL3 and BSL4 laboratories constructed with funds provided in part by

the National Institutes of Health (NIH) have been subject to rigorous oversight by NIH/NIAID program staff throughout all phases of design and construction. They are a critical resource in the nation's response to the public health issues posed by emerging and reemerging infectious diseases.

2) **Select Agent Regulations** The select agent regulations already provide mandatory oversight of biosafety and biosecurity for laboratories working with these agents, including all private as well as public laboratories. These laboratories are subject to federal laws, regulations and policies which seek to ensure a safe and secure environment in which to conduct research on dangerous pathogens and toxins. They must follow biosafety procedures to protect personnel working in the laboratory and the outside community. The select agent regulations specify reporting requirements for any significant problems, violations, or any research related accidents and illnesses. Institutions are also required to comply with the CDC and US Department of Agriculture APHIS Select Agent regulations if they possess, use, or transfer select agents and toxins that have been determined to have the potential to pose a severe threat to public health and safety. These regulations mandate an FBI security risk assessment for individuals authorized to have access to select agents, incident response plans, and a security and safety plan to safeguard the select agents (42 CFR Part 73, 7 CFR Part 331 and 9 CFR Part 121). The ASM recommends regular review of the select agent regulations. This review should involve the broad scientific community. As needed the lists of agents and the requirements of the regulations should be modified to ensure appropriate biosecurity and biosafety.

The ASM has consistently supported the leadership role of the Department of Health and Human Services (HHS), the Centers for Disease Control and Prevention (CDC) and the US Department of Agriculture Animal Plant Health Inspection Service (APHIS) in administering the select agent and toxin regulations for facilities that possess, use or transfer select agents and toxins. The HHS, CDC and APHIS are experienced and knowledgeable about infectious diseases involving select agents and toxins. The HHS, CDC and APHIS are committed to the protection of public health and safety. We recommend that any changes needed to improve biosafety and to ensure biosecurity in laboratories build upon existing HHS and USDA programs, including the Select Agent program, rather than through new statutory programs. We continue to support locating the Select Agent Program at the HHS/CDC for human and overlap agents and at the USDA/APHIS for animal and plant pathogens because these agencies have the appropriate public health expertise, laboratory experience in the life sciences and oversight capacity for biosafety and biosecurity.

3) The Importance of Biosafety Requirements for Microbiology Laboratories and Personnel The Biosafety in Microbiological and Biomedical Laboratories (BMBL) must set the standards for the safe handling of infectious agents in the laboratory and best practices to ensure

biosafety. Laboratories with capacity at BSL3 and BSL4 are designed to maximize the safety of laboratory staff and minimize the potential that a pathogen could escape.

There is already extensive government guidance, oversight and regulation of activities involving microbes and toxins. The Biosafety in Microbiological and Biomedical Laboratories, BMBL, 5th Edition, published by the CDC and NIH, describes microbiological practices, laboratory facilities and safety equipment for work with infectious agents. Through the BMBL, CDC and NIH have set standard procedures to be followed when working with infectious agents. There are also additional guidelines that come from other documents. The shipment of infectious agents is regulated by the DOT, Department of Commerce, CDC and USDA. Bloodborne pathogens are regulated by OSHA. The NIH Guidelines for Research Involving Recombinant DNA Molecules establish safety guidelines for research with recombinant DNA,including recombinant DNA research with infectious agents. They require institutions receiving NIH funding to have Biosafety Officers and Institutional Biosafety Committees (IBCs). The NIH Office of Biotechnology Activities provides resources and training on the role and responsibilities of IBCs, which examine research protocols, expertise, potential hazards and containment plans. Many institutions assign IBCs broader responsibility for overseeing research with nonrecombinant infectious agents.

4) Recommendations to Improve the BMBL, Lists of pathogens, Training, Oversight, Inventory, International exchange, Transportation, Resources, Reporting and Accreditation Although there are procedures in place for providing biosafety if properly followed, there is an ongoing need to review and enhance biosafety. In this regard, there is a need to ensure adequate training and strict compliance to provide the levels of protection engendered in those procedures. Laboratory workers who handle infectious pathogens are at potential risk of acquiring an infection. Therefore, adequate training in microbiological practices and biosafety is essential to working safely with hazardous biological agents, and protecting the public health. Exposure and risk may be prevented or minimized by rigorous implementation of appropriate laboratory practices and containment, safety equipment, improvement and maintenance of facilities, and formal, validated training of technical, support and administrative personnel. Laboratory risk assessment is very important because it enables the selection of the appropriate microbiological practices, safety equipment and facility safeguards for research and testing.

With these considerations in mind, ASM makes the following recommendations:

Biosafety in Microbiological and Biomedical Laboratories Manual (BMBL: The BMBL should be subject to regular biennial review and update as needed. More guidance is needed on specific competencies for biosafety training and recommended procedures for incident reporting.

The CDC, NIH and USDA should take the lead for BMBL revisions and for maintaining the currency of the list of organisms requiring containment. There should be a broad advisory committee that includes representation from the relevant scientific and biosafety organizations. The BMBL should be published in hard copy and made widely available, with aggressive communication to all involved parties for use as a reference for biosafety. It is important to establish the rules for biosafety and then accumulate suggestions for modifications based on experience and evolving scientific knowledge. Compliance with the BMBL biosafety and biosecurity standards should be a term of award by all federal agencies and there should be assurance that institutions are adhering to the BMBL.

Lists of Pathogens: Lists of pathogens designated as select agents and those requiring BSL 3 and 4 containment should be regularly updated. The CDC, NIH and USDA should review and update the BMBL list of agents biennially as is required and more often as needed. A scientific advisory committee to help guide which organisms are included should be established. There is also need to harmonize internationally the appropriate levels of containment for pathogenic microorganisms.

Training*:* There should be mandatory, periodic training for all personnel working in BSL3 and BSL4 laboratories. Learning competencies should be established for biosafety training and formal training programs should be required and documented. The training that laboratory personnel receive should be validated to ensure the adequacy of biosafety knowledge. Not only should laboratory personnel be properly trained, but also those who are responsible for facility operations, equipment and management should receive appropriate training. This training is needed to ensure that all personnel in laboratories where work with biohazardous are competence to work at a level that provides for their own safety and that of the community.

The NIH Regional Centers of Excellence serve an important role for training and exchange of information about biosafety practices. Their role should be encouraged and enhanced. As these Centers develop it will be important to learn from experience, share information, and implement improved procedures to protect the safety of workers and the wider community.

Oversight*:* There should be mandated training and performance requirements for biosafety personnel overseeing the safety of high containment laboratories. The NIH and CDC should make educational and training programs available. Oversight of biosafety at multiple levels is essential. Harmonized integrated systems of oversight of all pathogens are needed. Institutional Biosafety Committees, Biosafety Officers and Laboratory Directors, which evaluate risk and safety issues at the local level, as well as the institutionally designated Select Agent Responsible Officials, should ensure institutional adherence to the BMBL, the NIH Guidelines, and other applicable regulations for laboratory safety and security.

The CDC and NIH should ensure that good communication channels are in place for biosafety personnel to assist them in making informed decisions about risk management. The NIH and the CDC should consider further guidance and outreach activities for biosafety personnel to assist them in regulatory interpretation and containment for research on highly infectious agents and new scientific techniques, where guidance and uniformity of risk information may not be well established. Biosafety personnel should work closely with researchers in containment settings to review and improve safety procedures that protect public health. The occupational health clinic (or other medical oversight) is also an important part of open communications between those laboratory workers and the biosafety officers.

The NIH should ensure that biosafety personnel have a clear understanding of the circumstances for consulting with the NIH Office of Biotechnology Activities on research containment and regulatory issues. The BMBL and the NIH Guidelines are essential reference documents for biosafety practice and oversight and should be required for institutions conducting research. The CDC and NIH should work with research institutions, and the scientific and biosafety communities to ensure that current biosafety guidelines, regulations for biosafety and biosecurity are well understood, appropriate and implemented to ensure safe laboratory procedures. Understanding and adhering to biosafety principles and practices, risk assessment, appropriate containment and facility safeguards will contribute to safe laboratories, research and testing.

Inventory: The select agent regulations should be revised to change the requirements for inventory of vials of select agents. Given the intrinsic biological properties of microbes, the actual counting of vials is meaningless, ineffective, misleading and should not be required. Rather laboratories should be accountable for which agents they possess and where these agents are located.

International Exchange: The NIH requirements that foreign institutions must have comparable facilities and standards to their US collaborators should be changed to remove hurdles for international collaboration. The current requirements are impeding collaborative research on infectious diseases and making it difficult to share reagents, antigens and to exchange biological samples and specimens. Many of the agents of concern only produce disease outside the United States and studies involving them require that we have a robust and fruitful scientific exchange with international colleagues. It is critical to maintain collaboration with foreign researchers on science and public health, particularly on infectious diseases where extensive work is done internationally. It is vital to ensure the open flow of biological samples into the United States and the shipment of samples abroad.

Transportation: A single web site with up to date information on how infectious agents should be transported should be created. Distribution of microorganisms for identification, research, reference production, and diagnostic purposes is essential to public health and scientific progress. Safe handling that minimizes risk is essential. Effective communication from regulators such at DOT, Department of Commerce, and USDA will aid compliance with regulations.

Resources*:* The Congress should enhance funding, as needed, to ensure the upkeep of high containment laboratories are met and that there are adequate funds for biosafety needs, including personnel training. Biocontainment laboratories are expensive and a large investment, not only in the cost of construction, but in the cost of operations, maintenance, training, oversight and community relations. The design and building of biocontainment facilities requires careful guidance from funding agencies, the development of useful standards for biosafety experts and managers to ensure effective biosafety, oversight and inspection over the life-cycle of the laboratory. Facilities must ensure that maintenance and renovations do not result in breeches of containment.

The needs for additional support for biosafety oversight and maintenance of biocontainment laboratories should be evaluated to ensure there is adequate institutional, agency and community support. It is important that the investments made to date by the government in these laboratories be sustained to ensure their continued safe operation.

Reporting*:* An improved surveillance and reporting of laboratory acquired illness and response should be established, even for those incidents not covered by the Select Agent regulations. There should be a reporting requirement for illnesses suspected of being laboratory acquired. Incidents of laboratory acquired infections have been documented in the United States. Notifiable infectious diseases must now be reported to local and/or state public health agencies to enable assessment of risk and response and to alert physicians and the public to take appropriate steps, if necessary. However, data on whether the infection occurred in a laboratory is not routinely collected for many reportable diseases. CDC and local/state public health authorities should work with institutions, investigators and biosafety personnel to analyze occurrences of laboratory acquired illnesses and to provide reports and information in a way that will help reduce the risk and reoccurrence of any incidents. Improved reporting of laboratory acquired illness, investigation and response would provide valuable lessons for maintaining safe conditions in research and clinical laboratories. To prioritize interventions and to determine the effectiveness of those inventions.

Accreditation: Accreditation of high containment laboratories may be desirable and the costs and benefits should be carefully explored. Any accreditation of laboratories should be well defined and standards would need to be established before such a program is undertaken. The

select agent regulations already require facilities to be registered, to undergo a safety and security risk assessment, to clear personnel with access to select agents and to be inspected. The scientific community is greatly concerned about issues surrounding laboratory accreditation and should be fully engaged and consulted during federal decision making on standards, guidelines, and the process for any accreditation program. A formal assessment should be undertaken to evaluate the costs, benefits and efficacy of registering and/or accrediting high containment laboratories. The study should address: which high containment laboratories, if any, should be registered and or accredited; who should be responsible for registration and or accreditation and what should be the budgetary considerations and how costs associated with accreditation should be covered.

In conclusion, the laboratory infrastructure in the United States has made tremendous strides in the past decade to meet the challenges of emerging diseases and biothreats. This progress is based on the careful balance of research needs and regulatory oversight. Any changes to the current system should be carefully considered and crafted to ensure this delicate balance is not upset and impedes research and countermeasures development. These changes should also be considered with input from the scientific and public health community. We should take steps to enhance biosafety and assure biosecurity of high containment laboratories by increasing awareness within the scientific community, improving federal government guidance, establishing standards for biosafety and, carefully evaluating moving toward a defined accreditation system. To enhance biosafety we need to build on the culture of responsibility across the scientific community and enhance a culture that embraces the premise that the misuse of science is absolutely wrong and that good laboratory practices should be required. Awareness and education are the most critical components. The ASM would be pleased to work with Congress and the oversight agencies to accomplish these tasks.