



# Biosafety in Our Nation's Laboratories

Making Laboratories Safer for Scientists and Communities

“High consequence pathogens (HCP) could appear at any time in any laboratory, as seen during the Ebola outbreak and early SARS-CoV-2 pandemic. **In the US, these events showed critical gaps in biosafety preparedness.** Since then, training programs have been developed to strengthen biosafety practices, biological risk assessment and using enhanced precautions. **APHL realizes the urgent need to maintain training programs, expand on the number of biosafety professionals and provide ongoing consultation to ensure laboratories are prepared to handle HCP and other emerging threats.**”

*Peter C. Iwen, PhD, director, Nebraska Public Health Laboratory*

US laboratories are responsible for protecting laboratory workers from exposure to infectious and hazardous agents and local communities from accidental or intentional release of such agents.

Major strides in improving laboratory biosafety have occurred in recent years, but ongoing reports of exposures to biological agents make it clear that there are still laboratories in the US with inadequate biosafety practices in place and gaps in funding.<sup>1,2,3</sup>

Collaborations across the Association of Public Health Laboratories (APHL) and the US Centers for Disease Control and Prevention (CDC) with state and local public health agencies are helping to reduce these risks to our healthcare workers and communities. **These programs are essential to strengthening healthcare infection control practices and enhancing laboratory biosafety and biosecurity practices.**

Biosafety professionals across state and local public health laboratories have made significant advances in strengthening biosafety and biosecurity practices to protect both scientists and communities. Biosafety professionals within the public health laboratory ensure adequate biosafety training and practices across their institution and support clinical laboratories in their jurisdictions to avoid potential hazards associated with the handling of biological materials, the spread of multi-drug-resistant pathogens, threats of emerging pathogens and acts of biological terrorism.

## BIOSAFETY SAVES LIVES.

“As a public health laboratory biosafety officer, I’ve had the honor of supporting clinical laboratories during challenging times, such as responding to a high-risk exposure event like Brucella. **Biosafety officers (BSOs) play a vital role in post-exposure response.** We conduct biorisk assessments to quickly identify at-risk staff, ensure immediate medical follow up and post exposure prophylaxis to protect laboratory personnel and public health, and improve biosafety programs to prevent future exposure events. Many clinical laboratories lack internal biosafety resources making outreach and partnerships critical. We have not played this critical role alone. With APHL’s support, BSOs receive technical training and leadership development that strengthen our ability to provide expertise and build trust with our partners. APHL also provides BSOs with job aids, risk assessment templates, webinars and hands-on training curriculums to empower us to **safeguard public health.**”

*Anna J. Liddicoat, MPH, RBP (ABSA)  
Biosecurity/biosafety officer, North Carolina State  
Laboratory of Public Health*

1 Journal of Clinical Microbiology (2020, February). Brucella Exposure Risk Events in 10 Clinical Laboratories, New York City, USA, 2015 to 2017. Retrieved from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6989065/pdf/JCM.01096-19.pdf>

2 Emerging Infectious Diseases (2020, July). Laboratory-Acquired Dengue Virus Infection, United States, 2018. Retrieved from: [https://wwwnc.cdc.gov/eid/article/26/7/19-1598\\_article](https://wwwnc.cdc.gov/eid/article/26/7/19-1598_article)

3 The Lancet (2024, February) Laboratory-acquired infections and pathogen escapes worldwide between 2000 and 2021: a scoping review. Retrieved from [https://www.thelancet.com/journals/lanmic/article/PIIS2666-5247\(23\)00319-1/fulltext](https://www.thelancet.com/journals/lanmic/article/PIIS2666-5247(23)00319-1/fulltext)

“Laboratory biosafety and biosecurity are cornerstone programs in clinical and public health laboratories. The APHL Biosafety and Biosecurity Committee works diligently to help our member laboratories adapt to the constantly changing infectious agents that threaten public health. From risk and exposure assessments to training and competency resources, our committee provides tools which help clinical and public health laboratories develop both policy and practice, leading to safer and more secure laboratories.”

*Tim Southern, PhD, director, Nevada State Public Health Laboratory and APHL Biosafety and Biosecurity Committee Chair*

## APHL ACTIVITIES

APHL’s goal is for the US to host a national cadre of professionally trained biosafety professionals working to strengthen biosafety and biosecurity practices and policies in public health laboratories as well as supporting private laboratories with strengthening their quality and safety systems. To achieve this goal, APHL supports laboratorians by providing resources, such as risk assessment templates, training, leadership development programs, peer-to-peer networks, communities of practice and technical guidance. APHL maintains an advisory committee—the Biosafety and Biosecurity Committee—which provides leadership and guidance on policies and practices that impact biosafety and biosecurity in state and local governmental laboratories. Key activities for the committee include serving as technical experts and assisting member laboratories and federal partners, such as CDC, with strengthening biosafety and biosecurity programs; collaborating with partners to provide guidance to private clinical laboratories to assist them with implementing biosafety programs; and developing and delivering biosafety and biosecurity training programs.

## IMPACT STORIES

### Highly Pathogenic Avian Influenza (HPAI)

“During the ongoing HPAI response, I prioritized biosafety for field teams in bird culling operations by developing a risk assessment that integrated biosecurity and biosafety to protect agriculture, communities and field workers. In my role as a Biosafety Coordinator, we updated respiratory pathogen risk assessment to include H5N1 with help from APHL. When no risk assessment resources existed for raw milk handling and testing, especially for groups not familiar with risk assessment, the APHL Biosafety and Biosecurity Committee and Foodborne Diseases Committee developed the [Risk Assessment Guide: Testing Raw Milk Samples That May Contain Highly Pathogenic Avian Influenza](#). Before this, food testing labs lacked risk assessment practices, relying solely on external guidance from APHL, FDA, USDA and CDC.”

*Eric Lundquist, RBP (ABSA), MLS, biosafety coordinator, Minnesota Department of Health*

### Culture of Safety

“When I think back to 2014 during the Ebola incident in the United States and compare it to the recent events, such as the Lassa Fever virus incident in Iowa, I see a world of difference in the competency of clinical and public health laboratorians when facing a high-consequence pathogen. In 2014, there was great panic among laboratorians and other health professionals. In 2024, while not everything went perfectly, clinical and public health laboratorians had the knowledge, performed risk assessments and handled the situation calmly. This tremendous improvement could not have been achieved without the collective expertise and efforts of the APHL Biosafety and Biosecurity Committee and APHL staff. When you look at the great resources available on the APHL [biosafety and biosecurity website](#), you can’t help but to be impressed by what has been created in just 10 short years. None of this existed in 2014! I am truly grateful and happy to see that APHL members and staff have strengthened the culture of biosafety throughout the nation.”

*Michael Pentella, PhD, director, State Hygienic Laboratory at the University of Iowa and member of APHL Board of Directors*

## LESSONS LEARNED AND NEXT STEPS

US scientists are routinely exposed to hazardous pathogens—and the risks associated with this work must not be ignored. APHL, CDC and public health laboratory biosafety professionals are critical to ensuring the nation’s public health system safeguards the health of laboratory staff and their communities. Without sustained support for these efforts, the US risks losing its investment in a safer laboratory system—and the effects will be multiple:

**There will be a lack of guidance for biosafety and biosecurity practices.** It is essential to develop overarching guidance towards handling infectious and potentially infectious agents and implement strategies to enforce these practices.

**Gaps in the implementation of routine risk assessments and training programs will become prevalent.** Without the development of standardized tools and training around laboratories implementing biosafety practices, laboratories will not have the knowledge and skills needed to avoid exposure when working with microorganisms.

**Biosafety and biosecurity practices at clinical laboratories will decline.** Without the support of a biosafety professional, clinical laboratories will not be able to keep pace with risks from emerging pathogens, toxic spills, contaminated foods and other evolving threats.

**Many clinical laboratories will not be able to package and ship infectious agents when the next Ebola hits the United States.** Frequent turnover at clinical laboratories requires ongoing training to ensure that each facility has at least two staff able to package and ship highly infectious agents. Without access to regular training, clinical laboratories will quickly lose this capacity.

**The laboratory workforce will be vulnerable to absences from laboratory-acquired infections.** With limited support to enhance and improve biosafety practices, limited resources may lead to increased laboratory-acquired infections.

**Highly skilled biosafety professionals will be hired away by private firms.** In the rapidly growing field of biosafety, professionals with this specialized skill set are in high demand. If positions at public health laboratories are no longer available, biosafety professionals will leave for positions in universities and research centers, leaving the public health system and its clinical laboratory partners without their expertise.

“Before I began working in biosafety, a microbiology laboratory colleague passed away from *Neisseria meningitidis* sepsis, which she acquired while working in a public health laboratory. Her passing led to critical changes in how suspected *N. meningitidis* samples are handled nationwide. Shortly after, the Amerithrax attacks also highlighted the importance of working safely in the laboratory, and how as laboratorians, “when you know better, do better” (Maya Angelou). The APHL Biosafety and Biosecurity Program has been invaluable, providing the tools, education and training to strengthen our biosafety culture.”

*Carrie Anglewicz, Biosafety, Laboratory Outreach, Michigan Department of Health and Human Services*

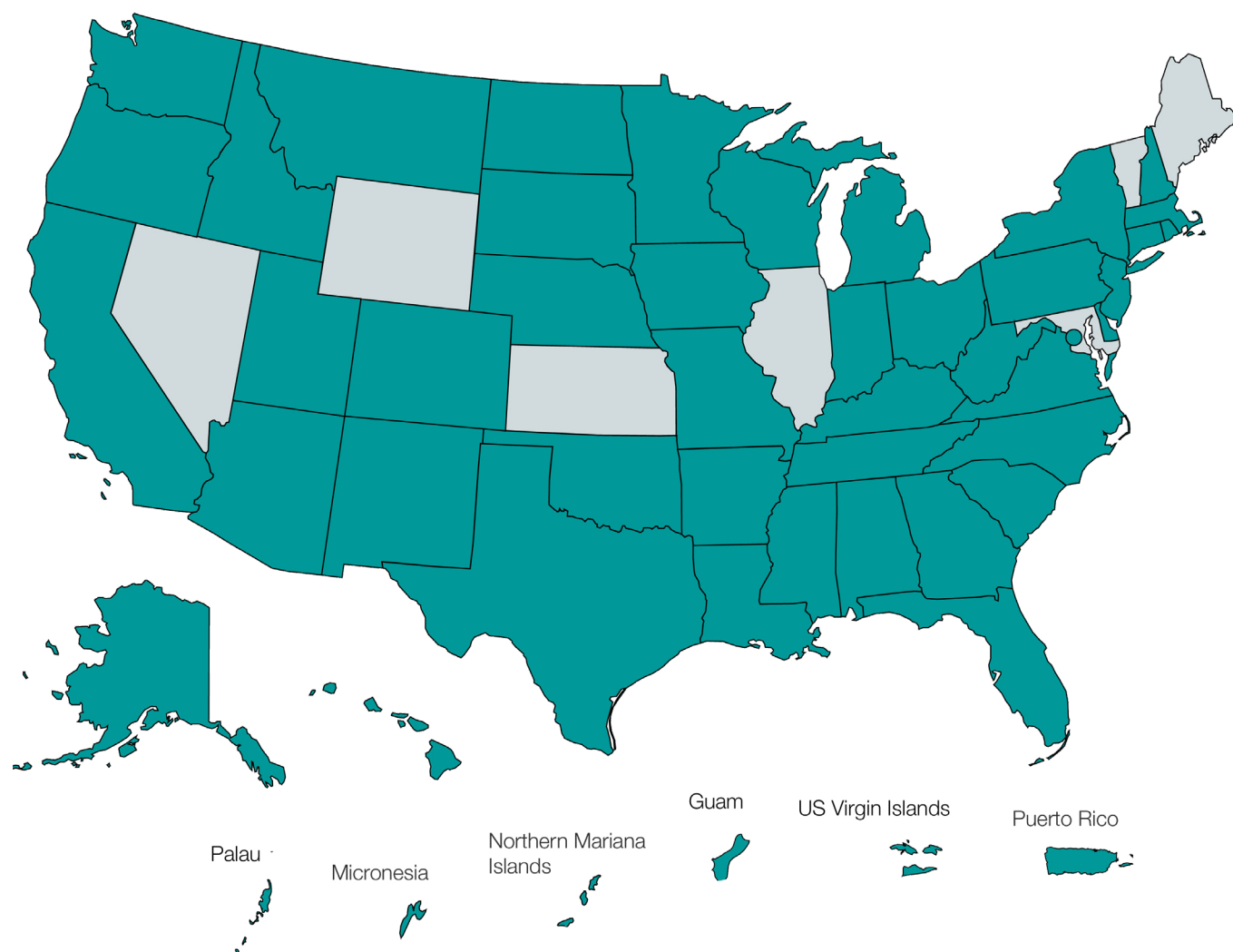


## APHL BIOSAFETY PEER NETWORK

State, local and institutional laboratories from across the US and its territories have participated in the APHL Biosafety Peer Network. The network connects public health laboratories in order to facilitate mentoring and information sharing among biosafety professionals. **The collaboration fostered by the network serves to advance and harmonize biosafety and biosecurity in laboratories**—ultimately, improving public health laboratory biosafety and biosecurity nationwide.

“By having APHL provide opportunities such as the Biosafety Peer Network Program for public health safety professionals to come together to share knowledge, ideas and inspirations on how our respective labs operate, and to learn from each other on ways to improve laboratory safety and culture has helped our institution tremendously.”

*Heather Matthies, Laboratory Safety Officer, Washington State Department of Health*



“This was one of the best learning experiences in the 40+ years of my career. The sharing of BSO experiences, procedures and testing experiences ended up working both ways.”

*Marian Fowler, retired biosafety officer, Delaware Public Health Laboratory*

## ROLES OF A BIOSAFETY PROFESSIONAL

**Biosafety professionals promote the culture of safety by encouraging the reporting of potential hazards, assessing risks and implementing systems to reduce exposure.** They also develop laboratory policies and procedures, provide input on emergency management and response policies and collaborate with safety committees, occupational health and other partners to maintain a comprehensive biosafety program. Key responsibilities include:

- Conducting biological risk assessments
- Training on personal protective equipment use and decontamination, and packaging and shipping of infectious agents
- Review waste management plans
- Provide subject matter expertise and outreach for external institutions

## APHL: SUPPORTING LABORATORY BIOSAFETY AND BIOSECURITY

APHL has developed **more than 30 tools, templates and resources** to support development of sound laboratory biosafety and biosecurity practices and **over 30 trainings and webinars** for biosafety officers developed and supported via members of the APHL Biosafety and Biosecurity Committee

- Offered 15+ trainings and webinars for biosafety officers
- Established a community of practice for over 575 public health biosafety professionals
- Drafted a framework to help laboratories to assess their operations and better integrate biosafety and biosecurity practices (ISO 35001)
- Develop a strategy to support the implementation and use of a biorisk management system across public health laboratories.



## **Association of Public Health Laboratories**

The Association of Public Health Laboratories (APHL) works to strengthen laboratory systems serving the public's health in the US and globally. APHL's member laboratories protect the public's health by monitoring and detecting infectious and foodborne diseases, environmental contaminants, terrorist agents, genetic disorders in newborns and other diverse health threats.

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