Multi-Laboratory International Collaboration Environment Phase II

Real-time collaboration and information sharing between researchers, diagnosticians, subject-matter experts, responders, and field staff

- Improve the day-to-day communications between individuals unable to efficiently come together to collaborate and cooperate on research and/or problem solving due to time, distance, space, or access limitations
- Enable secure communication between the scientific and response communities, better aligning science to support outbreak activities
- Allow sharing of diagnostic and scientific data/information about a new or emerging disease, as well as presenting new diagnostics or other techniques
- Sustain collaboration to help with the identification and control of disease spread
- Support the virtual training of state and federal officials in the clinical and laboratory diagnosis of foreign animal diseases (FADs)

Background

Network-based collaboration tools are increasingly being used to support and enhance communication and interaction between communities separated by large geographic distances or tight biosecurity boundaries. Exchange of high-quality audio and video, including sharing of documents or images, and the remote manipulation and/or streaming of data directly from laboratory instruments and other physical devices, can allow for virtual presence and collaborative interaction between distributed participants to better support complex problem solving. Such collaborative technologies can be used to facilitate meetings, research discussions and data analyses, training events, and formal briefings between researchers, subject-matter experts, diagnosticians, field staff, and emergency responders, linking domestic and international BSL-3 and BSL-4 laboratories both in support of day-to-day operations and in the face of an emerging disease outbreak.

The Multi-Laboratory International Collaboration Environment (MICE) is a virtual collaborative platform that helps to improve communication, coordination, and collaboration between state/university and federal animal health diagnostic and research biocontainment laboratories. MICE is purpose built for multi-node conferencing between biocontainment laboratories, integrating laboratory instruments and other data feeds with video conferencing capabilities. Live video and data from integrated devices can be shared in real-time between laboratories from both sides of the biocontainment barrier, including: light microscopes, electron microscopes, image analysis stations, necropsy and biocontainment PTZ cameras, necropsy "first-person" tablets, grossing stations, PCR/workbench devices, on-site field veterinarian tablets, and conference room systems. MICE easily relays science through biocontainment barriers, and can serve as a useful tool in fostering international scientific collaborations.

During Phase I of a DHS S&T funded effort, MICE was successfully investigated, implemented, piloted, and evaluated at several state/university and federal animal health diagnostic and research biocontainment laboratories. MICE was also demonstrated in a nation-wide exercise that included vignettes in three different focus areas, including: disease research, virtual training, and outbreak response. As part of a Phase II effort, IIAD will further identify, study, and demonstrate the ability to improve coordination and collaboration internally within a high containment laboratory as well as externally to emergency responders. Phase II will further enhance system configuration and availability, refine instrument integrations at partner laboratories, demonstrate system capabilities and benefit, and provide support for transition and future operationalization processes.

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MICE Phase I Pilot Sites:

1. Texas A&M Veterinary Medical Diagnostic Laboratory – Amarillo
2. Texas A&M Veterinary Medical Diagnostic Laboratory – College Station
3. Plum Island Animal Disease Center
4. Kansas State Veterinary Diagnostic Laboratory
5. Biosecurity Research Institute

Objectives

- Assist the transfer of the technology infrastructure to a DHS provided, public facing platform
- Explore additional device integration (e.g., fluorescent microscopes, robotic stage microscopes, animal surveillance cameras, biosafety cabinet cameras, large radiograph/photograph/cytology monitors) and PPE-compatible integration (e.g., body-mounted video cameras, wireless microphones, external speakers)
- Evaluate video bridge improvements to enhance still and video imagery resolution/quality
- Document system specifications focused on readability, transparency, stability, and trustworthiness
- Develop and implement controls in an appropriate test and development environment to ensure that all components of the system (i.e., technology infrastructure, devices, and enabling software) will comply with industry best practices for configuration and capable of meeting government Certification and Accreditation (C&A) in order to support transition/use within a high containment laboratory
- Assess advantages and disadvantages for incorporation/implementation in a given high containment laboratory into a final specification document
- Demonstrate usability in a high containment laboratory to government end-users
- Provide ongoing maintenance, support, and training

Phase I Demonstration Exercise

Opportunities

- Provide an immediate capability that can help improve communication and collaboration between federal, state/university, and international biocontainment laboratories
- Enable further exploration, evaluation, and assessment of capabilities by an expanded network of participating organizations

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