

In the News



Scientific Diplomacy and International Cooperation Key, Say BSL4 Directors

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Network for safe and secure labs

The current outbreak of Ebola virus in the Democratic Republic of Congo is a reminder that dangerous diseases exist in many corners of the world and that they can cause substantial human suffering and financial devastation locally and internationally. In response, institutions and nations are constructing maximum biocontainment laboratories (MCLs) to address these threats. MCLs operate at the highest level of biological containment to diagnose, perform research on, and validate cures for life-threatening diseases like Ebola. These are among more than 50 MCLs that are operational, under construction, or in advanced planning around the world. The global proliferation of these facilities raises questions of how to ensure their safe and secure operations while enhancing their contributions to science and global health. One solution is to establish an MCL network that enables the sharing of best practices, collaboration, transparency, and exchange of specimens and technology.

A multitude of challenges are associated with MCLs. Even in the idea stage, a serious issue is the objection of local communities to the construction of an MCL in their neighborhood. Several MCL operations were delayed or never realized because of public concern. Gaining community trust and support is vital to planning and operating MCLs and so a network of such labs would be valuable for sharing experiences and providing guidance in these situations.

Beside the millions of dollars that it costs to build a modern MCL, there are annual operations – maintenance, utility and security – that can amount to 5-10% of the construction costs. Moreover, there is a need for experienced guidance and qualified oversight to ensure that an MCL is built and operated safely and securely. Yet few such resources exist, and available training opportunities are inconsistent and often costly. An MCL network could fill the personnel pipeline more efficiently by connecting experienced personnel and professional societies to develop standards for globally accepted training and create mentoring opportunities.

Importantly, MCLs must share a culture of responsibility. These labs handle the world's most dangerous pathogens known, and there must be safeguards to prevent theft or misuse. At the same time, security must be balanced against mechanisms that support collaboration, including specimen sharing. Again, by working together through an MCL network to develop standards and guidelines a culture of responsibility could be fortified.

We direct a newly constructed MCL in Wuhan, China (Z.Y.) and an established MCL in the United States (J.W.L.), in Galveston, Texas. In preparation for the opening of the new China MCL, we engaged in short- and long-term personnel exchanges focused on biosafety training, building operations and maintenance, and collaborative scientific investigations in biocontainment. We succeeded in transferring proven best practices to the new Wuhan facility. Both labs recently signed formal cooperative agreements that will streamline future scientific and operational collaborations on dangerous pathogens, although funding for research and the logistics of exchanging specimens are challenges that we have yet to solve.

Ours is a promising first step in MCL partnerships; however, wider national, regional, and international cooperation is needed. We benefited from meetings jointly sponsored by the U.S. National Academy of Sciences and the Chinese National Academy of Sciences and from World Health Organization initiatives, but stakeholders are not limited to human and animal health. Our partnership still requires input from foundations and governmental agencies involved in security, commerce and transportation, as well as from the commercial sector.

Not every country requires an MCL, but every country can benefit from the collaborative operation of these labs. We encourage existing MCLs to convene a forum that brings together all stakeholders to conceive of an MCL network so that these critical labs can tackle urgent global health needs safely, securely and productively.

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