

VERSION 2.0 WORK IN PROGRESS: Evidence Related to Public Health Laboratories September 2018



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This document represents findings from a scan of the literature related to laboratory services and surveillance in public health. It is not meant to be an exhaustive search. If there are other resources on this topic of which you think PHAB should be aware, please contact Nicole Pettenati at npettenati@phaboard.org.

According to Richards et al., “Public health surveillance is the foundation of effective public health practice”¹ and should support timely, efficient, flexible, scalable, and interoperable data acquisition, analysis, and dissemination. As an example of the impact of public health labs and surveillance, one study noted that “PulseNet activities prevent at least 260,000 cases of foodborne disease each year in the United States, saving the U.S. economy one-half billion dollars”²

As the field is evolving, there are several important considerations that emerge from the literature:

- Technological changes. Advances in laboratory methods allow for much faster processing but also produce significantly larger data sets, requiring new IT and data infrastructure – including systems for data transmission, quality assurance, data standards, and data security^{2,3,4,5}
 - For example, next-generation sequencing (NGS) and whole-genome sequencing (WGS) are high throughput lab methods that are replacing traditional techniques and allow for faster detection of outbreaks^{1,2} but “will require fundamental changes in laboratory practice at multiple levels” to incorporate into practice.²
- Different types of data. Future of public health surveillance will depend more on secondary use of existing data – including clinical and social determinants of health data.¹
- Sharing data. As testing can take place in a greater variety of locations, it requires systems that can compile results from decentralized testing in private and public health encounters.^{1,2} This highlights the importance of standards-based interoperability^{3,4} and greater collaboration.²
- Workforce. Advances in technology and changes in laboratory processes necessitate a workforce educated and trained in these new methods, which may be addressed through continuing education and specialized fellowships.^{3,4}

- Shared testing services. Public health laboratories may be able to partner with other laboratories to share testing services to reduce duplication and save on costs, but developing those partnerships requires addressing funding considerations and sharing agreements.^{4,6}
- Shared training services. As part of the CDC's Advanced Molecular Detection (AMD) program, state and local health departments are being encouraged to form local or regional training networks with one lab taking the lead to partner with universities for capacity-building, long-term collaboration, and innovation.²
- Quality Improvement initiatives are a crucial part of the fabric of public health laboratories and have been helpful in improving operations, outcomes, and relationships in the community.^{3,5,7}
- Inhorn identifies several other priority areas for state and local public health laboratories:
 - Effective communication with legislative and administrative bodies;
 - Emergency plans in place that ensure continuity of services; and
 - Effective communication with the public and with partners to build relationships and trust in the community.³

¹ Richards CL, Iademarco MF, Atkinson D, et al. Advances in public health surveillance and information dissemination at the Centers for Disease Control and Prevention. *Public Health Rep.* 2017;132(4):403-410.

² Gwinn M, MacCannel DR, Khabbaz RF. Integrating advanced molecular technologies into public health. *J Clin Microbiol.* 2017;55(3):703-714.

³ Inhorn SI, Astles JR, Gradus S, et al. The State Public Health Laboratory System. *Public Health Rep.* 2010;125(Suppl 2):4-17.

⁴ Ridderhof JC, Moulton AD, Ned RM, et al. The laboratory efficiencies initiative: partnership for building a sustainable national public health laboratory system. *Public Health Rep.* 2013;128(Suppl 2):20-33.

⁵ Ridderhof JC, Wilcke BW Jr. Public health laboratory systems: at the crossroads. *Public Health Rep.* 2013;128(Suppl 2):1-6.

⁶ Hsieh K, Kimsey P, Buehring G. Using interorganizational partnerships to strengthen public health laboratory systems. *Public Health Rep.* 2013;128(Suppl 2):63-69.

⁷ Su B, Vagnone PS. State public health laboratory system quality improvement activities. *Public Health Rep.* 2013;128(Suppl 2):34-39.