APHL ASSOCIATION OF PUBLIC HEALTH LABORATORIES®

APHL Position Statement

Combating Public Health Threats Using Advanced Technology

A. Statement of Position

APHL supports the Advanced Molecular Detection and Response to Infectious Disease Outbreaks Initiative. Moving forward with this initiative enables public health laboratories to obtain the critical tools necessary to provide their invaluable service to meet the nation's current and future public health needs.

B. Implementation

1) Collaborate with the Council of State and Territorial Epidemiologists working groups to incorporate new technologies into case definitions

2) Partner with clinical laboratories to share data on and evaluate new technologies

3) Build a community of practice using the Emerging Technologies Blog (www.aphltech.org) and other mechanisms for outreach

4) Develop training tools to facilitate the implementation of AMD in public health laboratories

C. Background/Data Supporting Position

The Advanced Molecular Detection (AMD) and Response to Infectious Disease Outbreaks Initiative will advance laboratory technologies used to identify infectious diseases as well as build and sustain necessary capacity to improve response to outbreaks and other public health threats (1). The initiative focuses on building sustainable capacity to improve pathogen identification and detection using technologies such as next generation sequencing, Matrix-assisted laser desorption/ ionization Time of Flight Mass Spectrometry (MALDI-TOF MS), bioinformatics, and metagenomics. (2). Public health laboratories (PHLs) play a pivotal role in the first line of defense against new disease threats and an effective response to these emergencies requires the use of the best tools available. As technology is rapidly evolving, the AMD will ensure public health laboratories are able to acquire key technologies, such as high throughput whole genome sequencing (WGS) and mass spectrometry. These and other new technologies enable a more effective response to a wide range of disease threats from bioterrorism to novel or emerging infectious diseases like pandemic influenza or extremely drug resistant tuberculosis (XDR-TB). The availability of more robust laboratory data to inform decision making will further empower public health agencies to quickly investigate outbreaks, understand transmission patterns, and implement control measures (1, 2).

Finally, the implementation and use of the new technologies will enable savings to the health care system overall since they not only aid in the prevention of disease through enhanced detection and response, but also can improve laboratory efficiency by enabling higher throughput and potentially more cost-effective testing.

The AMD initiative provides an opportunity to utilize technology to advance laboratory testing that aids both patient care and public health measures to prevent or halt the spread of disease in the community. For example, the use of mass spectrometry technology has utility in applications ranging from expediting the diagnosis of both common and rare infectious diseases (3) to reducing the time, effort and costs associated with detection and characterization of potential biothreats such as botulism (4). Meanwhile, several reports are demonstrating the value of applying WGS technology to public health investigations and patient care (1,5). For example, WGS was recently used to identify the source and understand transmission of carbapenem-resistant *Klebsiella pneumoniae* at the National Institutes of Health Medical Center in Maryland (6). Public health investigators in Canada showed how data produced from WGS improved understanding of the transmission dynamics of a chronic tuberculosis outbreak within local communities including the recognition of cases that were "superspreaders" of this important public health disease (7). In recent years, the application of WGS in foodborne disease surveillance has shown the potential of this technology to radically advance our ability to detect and respond to adulterants in the food supply (8). In all of these instances, technology improved the response to diseases including the detection of unexpected transmission routes that would have been unknown otherwise.

In order for laboratories to build capacity for AMD, several gaps need to be addressed. First and foremost, PHLs must gain instrumentation to enable the use of WGS and mass spectrometry since currently less than 25% of PHLs have the required equipment. Training is also necessary to expand expertise in using these technologies including building a strong core of users for the required bioinformatics and data management tools. With the breadth of information provided by AMD, enhancements to bioinformatics tools for data interpretation and management will also be vital to ensure key results are effectively delivered to both public health and clinical partners.

In conclusion, public health laboratories play an essential role in the overall mission to combat disease and protect the US population. The passage of AMD will allow public health laboratories to modernize their capacity and improve their support of efforts to reduce the burden of infectious and non-infectious diseases and keep our citizens healthy.

D. References

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