The Evolution of Information
Health Informatics and the COVID-19 Response

APHL

Even before America's first case of COVID-19 was confirmed in January 2020, public health laboratories were preparing to track and combat the virus's eventual spread. For the Association of Public Health Laboratories (APHL), coordinating a national response meant harnessing the full power of its health informatics solutions—systems developed to improve the accuracy and accelerate the transmission of critical health data.

This is a synopsis of how the informatics ecosystem came to be and how APHL, the Centers for Disease Control and Prevention (CDC) and various state and federal partners adapted and customized these elements for COVID-19.
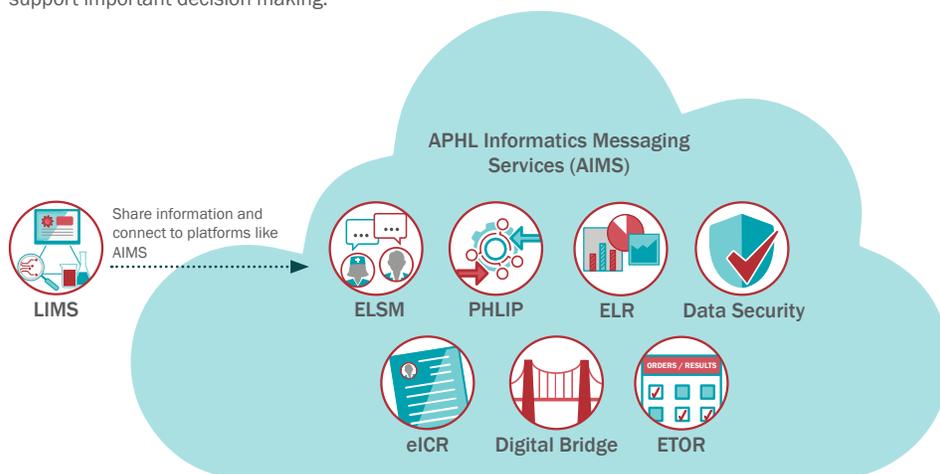
A Pioneering Breakthrough

One of public health's greatest responsibilities is to defend against outbreaks, including infectious diseases, contaminated food and water, and exposure to dangerous substances. Many of these are designated as "reportable" conditions, which must be communicated to public health jurisdictions by law. ("Nationally notifiable" conditions must also be reported to the CDC.)

Until the late 20th century, public health lab personnel submitted information on reportable conditions to CDC and other agencies by mail or fax. Then Electronic Lab Reporting (ELR) changed everything. As public health's first foray into digital informatics, ELR allowed providers and labs to send reports online instead of with handwritten paper forms and vastly improved data quality and accuracy.

Electronic test orders and results (ETOR) streamlined the process even further by introducing bidirectional communication. The ETOR process immediately notifies labs of incoming test orders that come from providers, such as hospitals and urgent care clinics. When the test is completed, ETOR automatically sends the results back to the provider.

AIMS

AIMS is a cloud based platform that serves public health by providing a secure place for entities to exchange critical information—laboratory test orders, results, surveillance data and more—quickly. AIMS receives, stores, transmits, validates, and transforms COVID-19 electronic messages so that data can inform and support important decision making.

APHL Informatics Messaging Services (AIMS)

LIMS — Share information and connect to platforms like AIMS → ELSM · PHLIP · ELR · Data Security · eICR · Digital Bridge · ETOR

Find out more about APHL's response to COVID-19 from an informatics standpoint, or about reporting on AIMS.

Systems Expedite Sharing

In 2001, APHL worked with CDC and other agencies to initialize the Laboratory Information Management System (LIMS) project. Where public health labs previously had their own messaging practices—making collaboration and data-sharing difficult, if not impossible—the goal of this initiative was to determine standardized language and coding so the public health system could effectively communicate despite the variety of systems in use. This exponentially increased the possibilities for public health labs to share data beyond their borders.

The Public Health Laboratory Interoperability Project (PHLIP), developed in 2006, expanded the capacity for transmitting data. Initially created as a link for six state public health labs to share influenza reports with CDC, PHLIP now serves as a data exchange network for hundreds of partners on more than a dozen nationally notifiable diseases.

That same year, the APHL informatics team created APHL Informatics Messaging Services (AIMS), a cloud-based platform to electronically exchange data across public health. The initial function was something like a post office: labs could drop messages in AIMS for routing to CDC, partner laboratories and other state public health agencies. Today, AIMS also translates, manages, and stores data, and hosts a variety of shared tools and services making it the default solution for public health data exchange.

Automating Alerts

Electronic initial case reporting (eICR) adds an element of automation to ELR. When an individual's electronic health record is updated, eICR checks the report for trigger codes that indicate certain conditions (which can vary based on jurisdictions). If such a code is found, a case report is automatically sent to the appropriate public health agencies, and guidance is sent back to the provider. eICR makes it easier to track the spread of diseases, reduces the amount of data entry even more and improves the speed and accuracy of reports.

eICR is one of the most advanced forms of automated communication between health care and public health. To capitalize on its effectiveness, Digital Bridge is an ongoing effort by the public health community, industry partners and healthcare to expand eICR for widespread use and to make bidirectional communication available nationwide.

Adjusting for COVID-19

When the threat of the coronavirus pandemic became imminent, the public health system worked quickly to modify its informatics network to track COVID-19 activity. CDC directed state health labs to send COVID-19 reports using the existing PHLIP feed. However, the routing was designated for only influenza messages. APHL's informatics team created new coding guidelines and modified the route to allow for 58 state and local public health labs to send COVID-19 data to CDC. In a matter of weeks, APHL finished a process that, in normal circumstances, could have taken a year.

AIMS has assumed center stage in CDC's COVID-19 response as a data repository. Data flowing in and out of AIMS has helped create a national snapshot of the virus's spread, both geographically and demographically. This information helps officials illuminate the most at-risk populations and take appropriate actions to help protect them.

APHL has also created eICR platforms for COVID-19 that enable near-instantaneous reporting of new cases directly from healthcare providers. Because eICR sends full case reports, agencies receive demographic data and contact information for tested patients to assist with tracking and follow-up efforts.

As COVID-19 and other public health threats continue to evolve, APHL and its partners will respond with the ongoing innovation of health informatics.