Support Advanced Molecular Detection at the Centers for Disease Control and Prevention:
Invest in Precision Public Health

AMERICAN SOCIETY FOR MICROBIOLOGY

APHL ASSOCIATION OF PUBLIC HEALTH LABORATORIES

The Advanced Molecular Detection (AMD) program brings cutting edge technology to the front lines of public health by harnessing the power of next-generation sequencing and high performance computing with bioinformatics and epidemiology expertise to study pathogens.

To fully achieve its potential, the AMD program at the Centers for Disease Control and Prevention (CDC) needs $57 million in FY 2021. The program's ability to support its mission is threatened by increasing demands and costs.

The CDC's AMD program has transformed many areas of public health by enabling the agency to rapidly incorporate a novel and versatile technology into CDC operations—next-generation sequencing (NGS). Established in FY 2014 and funded at $30 million /year, AMD helped close a widening technological gap in pathogen genomics through which the public health system was falling behind. Its success has demonstrated the critical importance to the nation's health security of staying abreast of technologies that are both cutting edge and relevant.

The CDC AMD program is rapidly growing as a result of its own success. NGS-related technologies continue to advance at an astounding pace, giving us new and expanded tools to detect disease faster, identify outbreaks sooner, and protect people from emerging and evolving disease threats. Current funding has become insufficient to meet the demand for equipment, training and expertise required to support state and local health departments with precision public health and expanded collaborations.

With additional funds, the AMD program can:

- **Promote greater innovation** through improved metagenomics, data integration, and cross-cutting genomics infrastructure. Doing so will directly benefit states and localities.
    - There is an increased need to sequence pathogens directly from specimens.
    - Secure, user-friendly methods for sharing pathogen genomic data are needed.
- **Expand workforce development** to meet the demands from state and local health departments and streamline laboratory operations.
- **Provide competitive grants** to academic institutions to build on productive partnerships that are advancing knowledge.

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How do we use AMD?

Improve Food Safety: State-of-the-art AMD methods help solve bacterial foodborne outbreaks faster by linking food sources to clusters of illness. This is has led to the transformation of a national network, PulseNet, which includes more than 80 public health laboratories. PulseNet has allowed for improvements including:

- Sequence pathogens directly from specimens without a need for culture, which is acutely needed when addressing bacterial foodborne illness; and
- Remove contaminated food products from store shelves and get them out of people's homes more quickly to save more lives.
- Early experience with surveillance for listeria, which switched to whole-genome sequencing in 2014, is encouraging. In the first three years of whole-genome sequencing, 18 outbreaks of listeriosis were solved, with a median of 4 cases per outbreak.

Emerging Infections: Studying the genetic makeup of micro-organisms helps identify and track rare and deadly pathogens such the Ebola and Zika viruses. AMD technologies are playing an instrumental role in identifying and understanding the novel coronavirus that has recently emerged from Wuhan, China.

- Map the spread of infections sooner so resources can be targeted where they will have the greatest impact;
- Developing diagnostic procedures and vaccines for emerging infections; and
- Gain a better understanding of the evolution of the epidemic.

Improving Vaccines: Applying AMD to vaccine-preventable diseases, such as whooping cough and flu, helps CDC monitor genetic changes and understand why vaccine effectiveness may decrease. Next-generation sequencing has allowed CDC to:

- More effectively monitor and support vaccine development by targeting evolving pathogens;
- Utilize next-generation sequencing data to forecast relative importance of emerging strains and assess risk, characterize viruses used in vaccine effectiveness studies, and inform treatment for patients infected with viruses that have high-pandemic risk.

ASM & APHL Call on Congress to:

Increase the investment in AMD technologies to both support its current successes and to expand its scope of innovation as technology continues to advance. This will facilitate expansion of state and local public health laboratories, provide critical coordination with academic institutions to strengthen the public health workforce pipeline, and ensure the U.S. stays ahead of the next potential deadly disease.

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