AMD Projects

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CDC's Advanced Molecular Detection (AMD) initiative fosters scientific innovation to transform public health and protect people from disease threats.

AMD Projects: Learning from *Listeria*

Maximizing the potential of real-time whole genome sequence-based *Listeria* surveillance to solve outbreaks and improve food safety

Many germs can be spread through food. Some, like Listeria can be deadly. Listeria is the third leading cause of death from food poisoning. Most people found to have Listeria infection require hospital care. About 1 in 5 people with the infection die—it strikes hard at pregnant women and their newborns, people 65 or older, and people with weakened immune systems.

And if Listeria illnesses occur far apart, current methods cause health officials to lose time figuring out which illnesses are part of an outbreak.

Listeria, *a rare but deadly germ, is the third leading cause of death from food poisoning.*

For decades, scientists have tested Listeria germs using a technique called pulsed-field gel electrophoresis, or PFGE, to find which infections are related and part of an outbreak. But with PFGE, unrelated Listeria germs can sometimes look similar and closely related ones can look different. In comparison, whole genome sequencing determines an organism's complete genetic composition with greater clarity. This technology also replaces several steps of laboratory work with a single, fast method and allows for detailed comparison of Listeria germs submitted from diverse sources.

In September 2013, scientists at CDC, NIH, USDA, and FDA—along with state public health departments—began comparing PFGE with whole genome sequencing. This partnership is the key to connecting clues about human illness, contaminated foods and environmental hazards—and making that information available to others.

This project will apply lessons from Listeria to further transform outbreak detection and response for other priority foodborne infections, such as E.coli and Salmonella. These new techniques enable CDC to give partners the information they need to be more confident in their food safety decisions, whether it is through regulatory action and enforcement, recalls, changes in manufacturing and processing, or more precise consumer messaging during outbreaks.