

1999

PulseNet wins the Innovations in American Government Award, recognizing excellence and creativity in the public sector.



PFGE analysis software is provided by APHL to all existing PulseNet laboratories allowing the creation of organized databases.

2002

2000

PulseNet wins the prestigious Innovations in American Government Award for the second time.

2005

- » Manufacturers introduce the first commercially available nextgeneration DNA sequencing system. Next-generation sequencing technologies will shape the future of PulseNet and accelerate outbreak detection.
- » PulseNet integrates multiple locus variable number tandem repeat analysis (MLVA) as a genotyping tool for *E. coli* O157:H7 and Salmonella enterica serotype Typhimurium.

2009

PulseNet links peanut butter and peanut products to a multistate outbreak of Salmonella Typhimurium. The infection sickens over 700 people in 46 states and causes 9 deaths. More than 3,000 types of peanut-containing products are recalled.



- » PulseNet begins analyzing data using bioinformatics, which combines biology, computers, and information technology in a single discipline to answer pressing public health questions.
- » 250 historic isolates of Shiga-toxin producing E. coli (STEC) are sequenced to prove the utility of whole genome sequencing for surveillance of foodborne pathogens.
- » Congress passes the FDA Food Safety Modernization Act (FSMA) and directs

- » The National Food Safety Initiative is established, detailing how \$43.2 million is to be used to strengthen food safety in the US. PulseNet becomes one of the first CDC-established networks that this initiative supports.

2001

PulseNet becomes a nationwide system: all 50 state public health laboratories are trained and certified in PFGE.



CDC pilots the Listeria Initiative in 10 states to aid in the investigation of listeriosis clusters detected by PulseNet, decreasing the time from detection to stopping the outbreak.

PulseNet links contaminated bagged spinach to a large multistate outbreak of E. coli O157:H7, prompting a nationwide recall. The outbreak sickens 225 people in 27 states and causes 39 cases of kidney failure and 5 deaths.

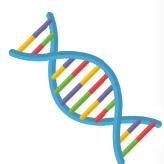


2006

Whole genome sequencing is used for the first time in an ongoing outbreak investigation. PulseNet performs realtime sequencing on three samples from a Vibrio cholerae outbreak that killed thousands in Haiti.

2013

PulseNet scientists begin using whole genome sequencing methods, along with enhanced disease investigation, to study foodborne illnesses caused by Listeria.



CDC to expand national foodborne disease surveillance systems.

2014

- » CDC launches the "Transforming Public Health Microbiology - PulseNet and Beyond" project under the Advanced Molecular Detection (AMD) initiative, which aims to consolidate most foodborne pathogen identification and characterization activities into a single, fast, and efficient whole genome sequencing process.
- » The *Listeria* whole genome sequencing study, that began in 2013, receives the Department of Health and Human Services (HHS) Innovates Secretary's Pick award for implementing an innovative strategy to address an emerging public health challenge.

2017

2020

- » Whole genome sequencing will be used for routine surveillance of Salmonella in states that have the capacity to conduct sequencing.
- » PulseNet will be able to analyze Vibrio and *Shigella* whole genome sequencing data.

2020 and Beyond

PulseNet will use highly sophisticated approaches designed to identify and subtype foodborne pathogens directly from complex clinical samples, without bacterial cultures. The favored approach, known as metagenomics, has the potential to allow extraction of pathogen-specific DNA sequence information directly from complex samples such as stool.

- » The Listeria study receives the CDC Director's Award for Innovation
- » CDC routinely uses whole genome sequencing for investigating foodborne illnesses caused by Listeria, Campylobacter, Shiga toxin-producing E. coli, and Salmonella.

» Whole genome sequencing is used for routine surveillance of Listeria, Campylobacter, and Shiga toxinproducing E. coli (STEC).

- » PulseNet can analyze Salmonella whole genome sequencing data to investigate outbreaks.
- » The American Journal of Preventive Medicine publishes an economic evaluation that suggest that PulseNet prevents at least 270,000 illnesses from Salmonella, E. coli, and Listeria and saves \$500,000 US dollars every year.



- » PulseNet will be able to analyze Yersinia and Cronobacter whole genome sequencing data.
- » All 50 state public health laboratories will be using whole genome sequencing for routine surveillance.
- » Whole genome sequencing will become the new PulseNet gold standard for subtyping pathogens that cause foodborne illness.











2018

