



WHOLE GENOME SEQUENCING PROVIDES EGGCELLENT DATA DURING OUTBREAK INVESTIGATION



Eggs are a versatile food that can fill nutritional gaps when eaten as part of a balanced diet. A protein powerhouse, eggs are packed with essential fatty acids and other micro and macronutrients, and are economically cheaper than other conventional protein sources.¹ This versatility has led to numerous unique uses and recipes such as a savory breakfast omelet or mouth-watering quiche. They can even transform lettuce into a hearty salad meal for the health conscious. However, it was this item that caused public health officials concern in Texas, Florida, South Carolina, Pennsylvania and Maine.²

In December 2019, the US Centers for Disease Control and Prevention (CDC) opened an investigation into mysterious cases of listeriosis in seven individuals in the states mentioned above. In a series of interviews, four out of five individuals indicated that they had food items containing eggs. Moreover, three out of those four individuals further identified deli salads with hard boil eggs. Armed with this knowledge, epidemiologists seemed certain that the source of the outbreak was hard-boiled eggs. Conclusive scientific evidence was discovered within the PulseNet national database.

A search of the PulseNet database revealed two environmental samples from February 2019 that were genetically related to the clinical samples. The US Food and Drug Administration (FDA) collected these environmental samples during a routine inspection of Facility A. Linking the clinical and environmental isolates through whole genome sequencing data provided strong evidence that Facility A was the source of the outbreak. Additionally, given that the clinical isolates were from specimens collected from April 2017 through November 2019, it seems likely that Facility A had been harboring this strain of *Listeria monocytogenes* for years.

PulseNet enables public health scientists to detect and characterize clusters of bacterial foodborne pathogens and identify potential sources of contamination.

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In December 2019, FDA again inspected Facility A and found *L. monocytogenes* in another environmental sample that was a genetic match to outbreak strains. Facility A voluntarily recalled hard-boiled and peeled eggs in pails on December 20, 2019. On December 23, 2019, Facility A expanded the initial recall to include all hard-boiled egg products.³

Whole genome sequencing is a powerful tool that allows scientists to compare the DNA fingerprinting profiles of bacteria from patients and contaminated food products, as well as identify clusters of related illnesses with a small number of cases. This technology continues to provide extremely valuable surveillance information that enables PulseNet and other food safety programs to identify outbreak culprits.⁴ WGS continues to help public health officials keep our food safe.⁵

References

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