

FDA's tracking and analysis of surveillance sampling isolates for outbreak detection

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Objective

To create a forum and database for FDA and CDC epidemiologists, laboratorians, and outbreak scientists for tracking recent food and environmental surveillance sampling isolates identified through Reportable Food Registries reports and regulatory inspectional findings, and analyzing them for matches to clinical isolates for early outbreak detection.

Introduction

Identifying, solving, and stopping foodborne outbreaks in the U.S. requires the collaboration and coordination of multiple federal agencies and centers as well as state and local authorities. FDA's Coordinated Outbreak Response and Evaluation (CORE) Network is responsible for outbreak surveillance, response, and post-response activities related to incidents involving multiple illnesses linked to FDA-regulated food. CORE collaborates with CDC to obtain data on foodborne illnesses and illness clusters and with FDA Centers and field staff to obtain laboratory and inspectional information related to contaminated foods and foodborne illness outbreaks. CORE's Signals and Surveillance team coordinates isolate tracking activities among several organizations within FDA and CDC and the isolate database was developed for timely information sharing and early signal detection.

Methods

The isolate tracking database combines information from established laboratory, inspectional, and regulatory programs; investigators across FDA and CDC evaluate the information for early outbreak signals. PulseNet is a national laboratory network that compares the Pulsed-field Gel Electrophoresis (PFGE) patterns of clinical and non-clinical bacterial isolates and identifies increases in numbers of isolates with matching PFGE patterns as outbreak clusters. Foodborne outbreak investigational partners, including the CDC and FDA, utilize the CDC/Palantir Technologies-developed platform, the System for Enteric Disease Response, Investigation, and Coordination (SEDRIC), to evaluate clinical, food, and environmental isolates. CORE provides additional firm-identifying metadata for new food and environmental isolates from FDA, contract lab, and Reportable Food Registry (RFR)-reported samples and analyzes them for PFGE patterns matching those of recent clinical isolates. FDA laboratorians provide early information about food and environmental isolates that are in queue for PFGE and whole genome sequence analyses, trend analysis for recently completed isolates, and genetic clustering with clinical and other isolates. The RFR is a FDA-hosted platform for industries and public health officials to report when there is a reasonable probability that a human or animal food that is regulated by FDA will cause serious adverse health consequences. The RFR coordinator tracks patterns of adulteration in food, and gathers information from FDA district investigators on the availability of pathogen isolates for FDA analysis, from FDA inspections of firms, and from investigations into the root-cause of contamination. Each

pathogen detection is evaluated for associations to current outbreak clusters.

Results

The isolate tracking activities have provided investigators with information for hypothesis development, identified trends in laboratory and inspectional findings, aided in the identification of causal food sources in illness clusters, and provided early laboratory and inspectional information to outbreak investigations. Within the past year, isolate tracking activities identified early indicators of the presence of *Listeria monocytogenes* in frozen foods before a multistate outbreak of listeriosis was linked to frozen vegetables; identified early indicators of the presence of *Salmonella* in pistachios before identification of a multistate outbreak of *Salmonella* Montevideo and *Salmonella* Senftenberg; further characterized the microbial hazards of cucumber and pepper contamination through FDA's enhanced surveillance sampling program; and expanded the forum's scope to include animal foods and their link to human and animal illnesses.

Conclusions

The database and forum provides a platform for information sharing, and collaboration between agencies, offices, and centers by informing the participating groups about early signals of contamination and emerging food risk trends.

Keywords

foodborne; outbreak; surveillance; regulatory; food

Acknowledgments

We would like to thank the efforts of our partners within FDA and CDC.

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