



A Novel Approach for Conducting Environmental Investigations of Foodborne Outbreaks



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Abstract

Historically, environmental investigations of foodborne outbreaks are often complex and take several weeks or months to complete. Investigations involve completing epidemiologic studies of ill individuals, tracing products from table-to-farm, seeking contamination sources/modes, testing numerous samples, and writing detailed reports. Because of the scope and complexity of these environmental investigations and the fact that contamination events likely happened weeks or months before, public health agencies face significant challenges in determining the exact source(s) and mode of contamination. In addition, duplication of effort among various regulatory agencies reduces efficiency and impedes the implementing of targeted preventive measures to decrease risk of recurrences.

To increase efficiency, communication, and effectiveness of investigations, the California Department of Public Health in partnership with US Food and Drug Administration's San Francisco and Los Angeles District Offices formed the California Food Emergency Response Team (CaFERT) in 2005.

CaFERT's focus is developing a team of highly trained investigators, microbiologists, chemists, and epidemiologists from federal and state agencies to jointly investigate foodborne outbreaks as expeditiously and effectively as possible. Members meet regularly to receive training on investigation protocols and sampling techniques at the processor, retailer, and farm level. Exercises are conducted to continually refine existing procedures and develop new techniques.

During the *Escherichia coli* O157:H7 outbreaks in the fall and winter of 2006, teams of investigators from four different federal and state agencies conducted investigations of dozens of possible farms and processors and collected over 1,000 environmental samples. Of these samples, several genetically matched the *E. coli* O157:H7 outbreak strains. This enabled investigators to narrow the focus of their investigations and gain valuable clues as to the source of contamination.

Pooling limited resources allows agencies to efficiently investigate numerous leads, increase sampling size, increase opportunities to find clues to contamination source(s), reduce redundancy, and improve efficiency and effectiveness of investigations. This joint approach also provides opportunities for investigators to meet and train together to develop trust, expertise and shared experiences; thus creating a highly specialized and experienced investigation team.

What is CaFERT?

CaFERT refers to the California Food Emergency Response Team. The team is a group of state and federal investigators and scientists that are specially trained in conducting foodborne illness outbreak investigations.

The concept of CaFERT was first developed in 1999. In 2004, members were selected for the Emergency Response Team that was later renamed CaFERT.

CaFERT Consumer Safety Officers from the Food and Drug Administration (FDA) are associated with the Los Angeles and San Francisco District Offices and have the authority to conduct inspections, examinations and investigations of factories, warehouses, establishments, and vehicles, and all pertinent equipment, finished and unfinished materials, containers, and labeling therein where food is manufactured or held, and to conduct sample collections of food as defined under the Food, Drug & Cosmetic (FD&C) Act and related regulations.

CaFERT investigators from the Food and Drug Branch (FDB) of the California Department of Public Health (CDPH) are peace officers and have the authority to enter and inspect any area where food is prepared, processed or held, collect records and samples, and embargo food products that may be contaminated.

Scientists on the team include microbiologists associated with FDA labs, chemists and microbiologists associated with the Food and Drug Laboratory Branch of CDPH, and research scientists associated with the FDB Emergency Response Unit.

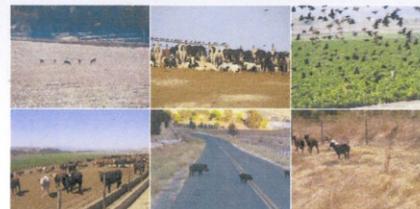
What does the team do?

The team conducts environmental investigations of foodborne illness outbreaks. A key objective is to narrow the scope of the investigation, pinpoint the contamination source and/or mode(s), and stop the problem. The team's number one priority is to take the necessary steps to stop the outbreak (if it is still ongoing).

An environmental investigation is launched after a food vehicle is identified by epidemiologists (either in California or another state), sometimes assisted by Epidemiologic Investigation Service (EIS) officers assigned by the Centers for Disease Control (CDC).

Depending on the situation, an environmental investigation may include:

- Environmental investigation at the point of service
- Environmental investigation at the manufacturer
- Environmental investigation at the farm
- Traceback/traceforward of the food vehicle to manufacturer and/or farm
- Environmental sampling
- Product sampling (raw/finished)
- Collection and examination of records
- Root Cause Analysis



Outbreaks CaFERT has investigated

In California, state and federal investigators worked side by side on foodborne outbreak investigations prior to the establishment of CaFERT. In 2004, selected members from both agencies (CDPH-FDB and US-FDA) worked on the *Salmonella* Enteritidis outbreak associated with almonds. While the agencies worked side by side, both were conducting independent investigations and collecting their own sets of samples and records and independently asking the firm representatives the same questions. This created a significant amount of unnecessary duplicative work for the firms, and slowed the process of the investigations for both agencies.

In 2005, CaFERT was formally established. Team members met together outside of outbreak situations to develop investigative protocols. The established partnership among the state and federal public health agencies increased efficiency, communication, and effectiveness of investigations.

In the fall of 2005, members from the FDB and FDA, under the umbrella of CaFERT jointly investigated an *E. coli* O157:H7 outbreak associated with bagged lettuce, and a *S. Enteritidis* outbreak associated with tomatoes.

In the fall and winter of 2006-2007, the team has investigated three separate foodborne outbreaks of *E. coli* O157:H7. One was associated with spinach and the other two with shredded lettuce.

Follow-up to the outbreaks associated with leafy greens has included review and input by CaFERT members of the document that has become the California Leafy Greens GAPs (url provided below) for safe growing and handling of leafy green produce.



How does CaFERT's work protect the public health?

One of the most significant impacts is the rapid and streamlined pace at which this joint team is able to conduct foodborne illness investigations. Prompt response and the developed expertise of team members has led to more rapid detection of the outbreak's cause and the initiation of corrective action.

CaFERT also applies the knowledge and experience gained from past investigations of foodborne outbreaks, and utilizes such information to refine investigative protocols and tools, and further train team members. Empowerment of team members via lessons learned coupled with continuous training and relationship building (which includes open communication) among members, elevates the level of skills and renders the team more equipped to tackle future outbreak scenarios. As such, more effective and expeditious service is provided to safeguard the public.

Examples of outcomes from previous investigations

- Leafy greens industry has introduced the California Leafy Greens GAPs document for safe growing and handling of leafy greens.
- Produce industry has begun to think of harvest workers as food handlers, enforcing hand washing procedures and harvest equipment sanitation.
- New commodity-specific guidelines have been introduced for lettuce and tomatoes.
- Almond industry has adopted a mandatory "kill step" for raw almonds (url provided below).
- Development of the California Marketing Agreement.

How does CaFERT relate to other state and federal agencies?

Depending on the nature of the environmental investigation and jurisdiction, CaFERT may advise and/or seek assistance from other state or public agencies such as the California Department of Food and Agriculture (CDFA), the US Department of Agriculture (USDA), and the Centers for Disease Control. Examples include:

- CDFA worked with CaFERT members during inspections of dairies adjacent to produce fields.
- USDA Wildlife Services worked with CaFERT in the trapping and testing of wild pigs during recent farm investigations.
- CDC water experts provided expertise in their respective areas and worked with CaFERT to investigate the recent spinach and *E. coli* O157:H7 outbreak.
- FDA Pacific Regional Dairy Specialist, CDFA Dairy Specialists, Environmental Protection Agency (EPA) and local water authority provided their expertise during a recent lettuce and *E. coli* O157:H7 outbreak investigation.

How are local health jurisdictions involved?

Illnesses are reported by local public health programs to the CDPH's Division of Communicable Disease Control (DCDC).

- DCDC provides information to FDB about clusters of illnesses where food may be the vehicle.
 - If a food vehicle is implicated by epidemiological investigation (statistically significant association), FDB begins an environmental investigation and informs FDA.
 - CaFERT is activated by a joint decision of FDB and FDA management.
- Local health department will be asked to supply information about the Point of Service (POS) for selected case-patients.
 - Those with clear recall of where/when they ate the implicated food
- If it is necessary to visit the retail POS, local environmental health will be invited to participate.
- Environmental health may be asked to collect documentation from the retailer, such as invoices.

Related websites

FDB Website: www.cdph.ca.gov/fdb

FDA Website: www.fda.gov

Almonds Final Rule: <http://www.almondboard.com/files/Rule.pdf>

California Leafy Greens GAPs document: <http://www.usda.com/WhoWeAre/ScienceTech/FoodSafety/DRAFTBestPracticesforLeafyGreenTable250Default.aspx>

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