CDC Update

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Water, Food, and Environmental Health Services Branch

Division of Environmental Health Science and Practice

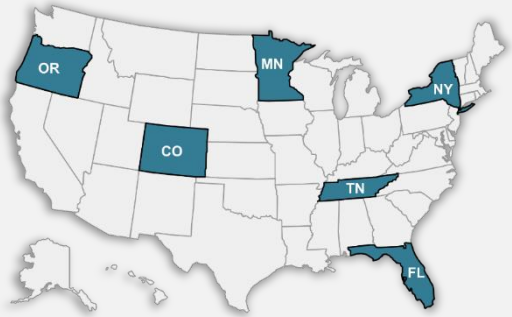
Centers providing updates

- National Center for Emerging and Zoonotic Infectious Diseases (NCEZID)
- National Center for Immunization and Respiratory Diseases (NCIRD)
- National Center for Environmental Health (NCEH)

NATIONAL CENTER FOR EMERGING AND ZOONOTIC INFECTIOUS DISEASES

Integrated Food Safety Centers of Excellence (CoEs) Created Under FSMA to Help Other States

The 6 centers are public health departments with at least one academic partner



Strengthen & Improve surveillance and outbreak investigations

Evaluate & Analyze the timeliness and effectiveness of surveillance and outbreak response

Train & Educate students and public health personnel

Disseminate & Communicate tools and resources

CoEs

One-on-one assistance

Consultation

- Provide guidance during outbreaks and on long-term projects (e.g. database improvements)
- Evaluate processes and systems

Mentorship

- Advise OutbreakNet Enhanced sites

Training

- Deliver Epi-Ready courses

Over 130 free products available at CoEFoodSafetyTools.org

Products, projects, and supplemental activities

- **Online products**
  - Case studies
  - Videos
  - Interview & complaint system forms
  - Training courses
- **Projects**
  - Live learning communities
  - Webinar series
- **Supplemental activities**
  - Veterinary antimicrobial projects
  - Source attribution

FoodNet: Foodborne Diseases Active Surveillance Network

- Conducts population-based, active surveillance in 10 U.S. sites for 9 pathogens
- Collects reports of culture-confirmed and culture-independent test (CIDT)-positive infections
- Current activities:
  - Released estimates of laboratory-diagnosed infections caused by nine pathogens transmitted through food
  - Released FoodNet Fast, an interactive online program for getting information on cases of illness reported to FoodNet


Morbidity and Mortality Weekly Report

Preliminary Incidence and Trends of Infections with Pathogens Transmitted Commonly Through Food — Foodborne Diseases Active Surveillance Network, 10 U.S. Sites, 2006–2017

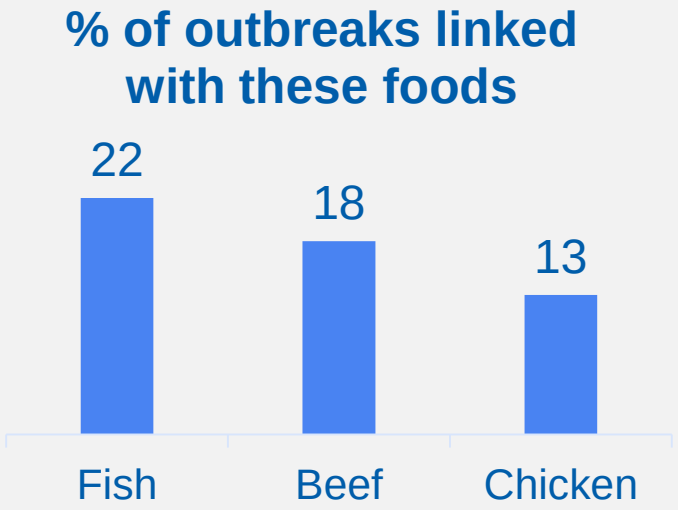
Ellyn P. Marder, MPH[1]; Patricia M. Griffin, MD[1]; Paul R. Cieslak, MD[2]; John Dunn, DVM[3]; Sharon Hurd, MPH[4]; Rachel Jervis, MPH[5]; Sarah Lathrop, PhD[6]; Alison Muse, MPH[7]; Patricia Ryan, MS[8]; Kirk Smith, DVM[9]; Melissa Tobin-D'Angelo, MD[10]; Duc J. Vugia, MD[11]; Kristin G. Holt, DVM[12]; Beverly J. Wolpert, PhD[13]; Robert Tauxe, MD[1]; Aimee L. Geissler, PhD[1]

FDOSS/NORS: Foodborne Disease Outbreak Surveillance System/National Outbreak Reporting System

- **Foodborne outbreak data**
  - **patient demographics**
  - **pathogen**
  - **food vehicle**
  - **outbreak setting**
  - **contributing factors**
- **Outbreak summaries for 1998–2016 on CDC website**

Epidemiology of restaurant-associated foodborne disease outbreaks, United States, 1998–2013

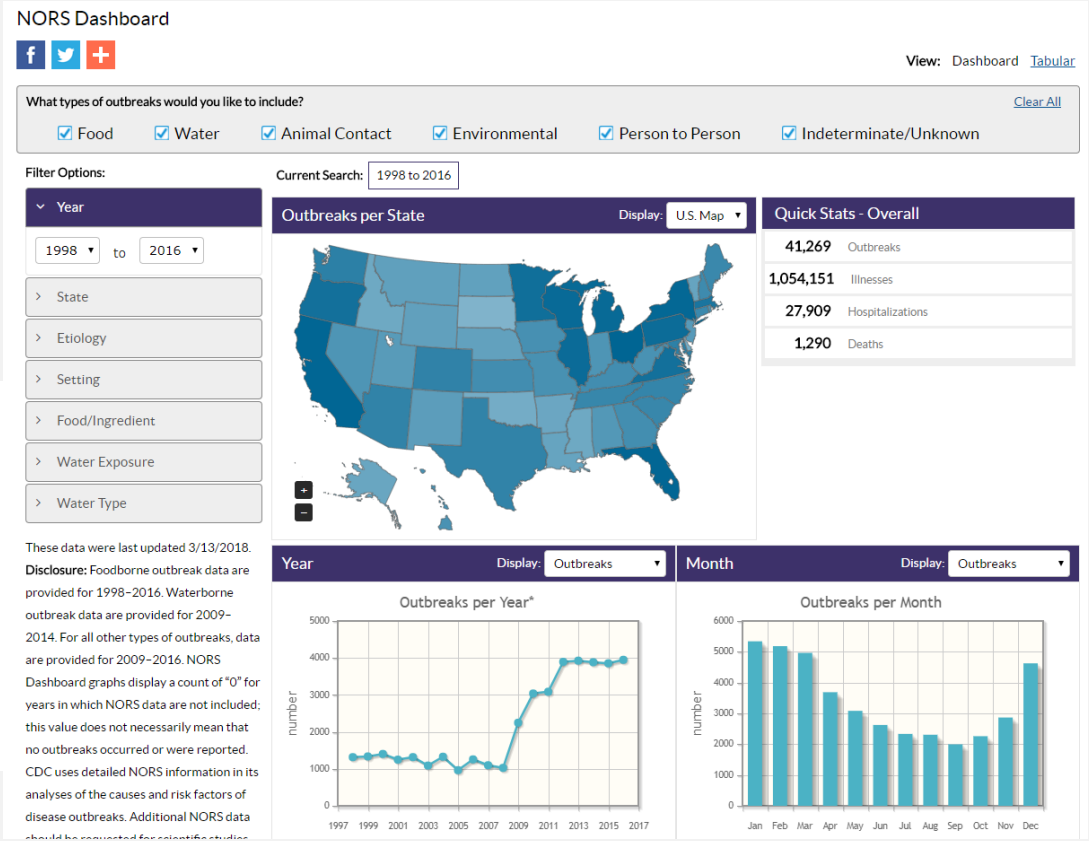
- 56% of all outbreaks were restaurant-associated (9,788)
- 3,072 had confirmed etiology
  - Norovirus most common (46%)
  - then *Salmonella* (24%)
- Fish most common food (22%)
- Food workers contributed to 25% of outbreaks



Angelo, et al. Epidemiology and Infection, 2017

NORS Dashboard

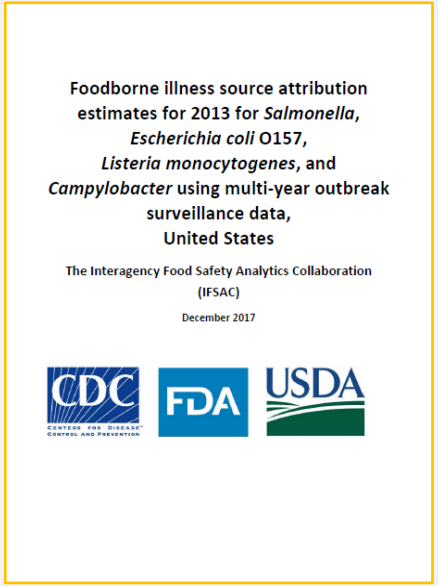
- Web-based public data access tool
- Includes basic outbreak data on all outbreaks submitted to NORS



wwwn.cdc.gov/norsdashboar

Food attribution: Improved methods for estimating the sources of illnesses and new burden estimates

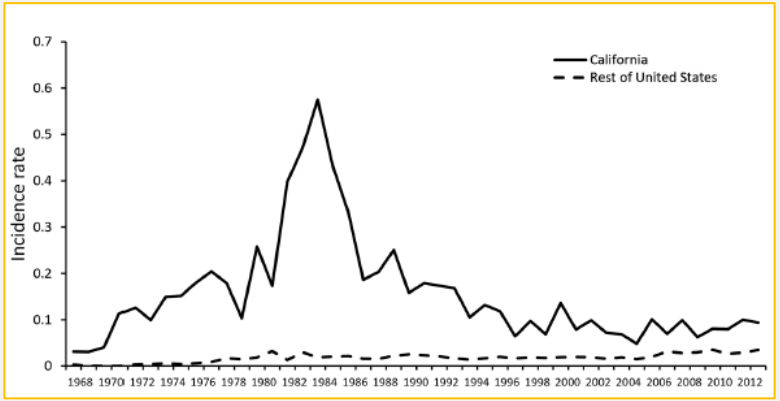
- Estimated the % illnesses caused by 4 pathogens transmitted by food, water, persons, animals, and the environment
  - Using NORS data, expert elicitation
  - in partnership with the University of Florida Center of Excellence
- Created an attribution annual report with IFSAC, posted on IFSAC website
- Developed improved methods for attributing illnesses to particular food categories



NARMS: National Antibiotic Resistance Monitoring System

Salmonella **serotype Dublin infections in humans: Increase in incidence and multidrug resistance in an invasive serotype, United States**

- **Incidence rate increased 7x from 1968 to 2013**
- **Comparing from 1996-2004 to 2005-2013, it is causing**
  - **more infections resistant to ≥7 classes of antimicrobial drugs- 2% to 50%**
  - **more hospitalizations- 68% to 78%**
  - **more deaths- 3% to 4%**
- **50% of cases in California**



Harvey RR et al. Emerg Infect Dis. 2017

Culture-Independent Diagnostic Tests (CIDT) activities

Challenge: Number and types of CIDTs are increasing

- **Impacts monitoring of trends of diseases that were formerly diagnosed exclusively by culture**
- **Impacts surveillance activities that depend on isolates (CIDTs do not produce isolates) such as PulseNet (PFGE and WGS), antibiotic resistance monitoring systems**

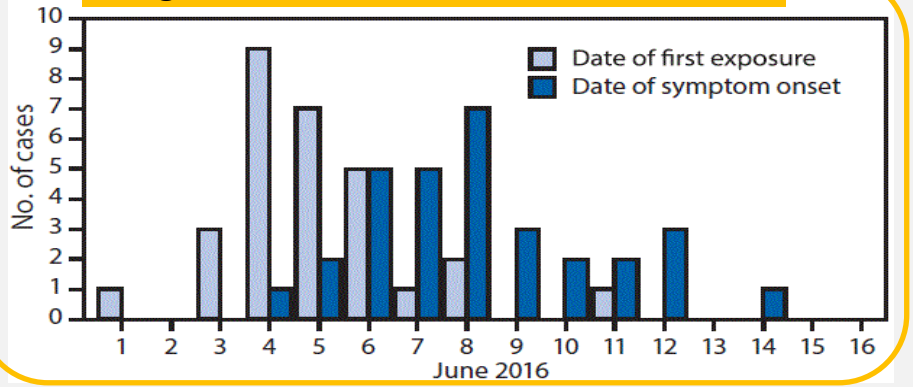
CDC Response:

- **2nd International Forum on CIDTs and Public Health (May 8-9, 2018, Washington, DC)**
- **Facilitate/encourage reflex culture of CIDT positive specimens**
- **Update epidemiology systems to accommodate CIDTs**
- **Develop surveillance programs for new pathogens identified by CIDTs**

Botulism outbreak from drinking prison-made illicit alcohol in a federal correctional facility—Mississippi, June 2016

- **Source was “hooch” or “pruno”**
- **31 cases**
  - 24 hospitalized, 0 died
  - 15 admitted to ICU, 9 required ventilation
  - 20 received antitoxin

Largest U.S. botulism outbreak since 1978



Hooch

- Honey, tomatoes, potatoes, apples, tomato paste
- Fermented in sealed plastic bag at room temperature for 3-5 days

McCrickard, et al., MMWR, 2017

NATIONAL CENTER FOR IMMUNIZATION AND RESPIRATORY DISEASES

Norovirus outbreak surveillance system integration

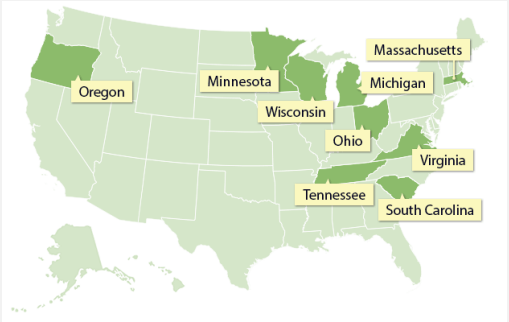
- Collects **epidemiological** data on foodborne, waterborne, and enteric disease outbreaks

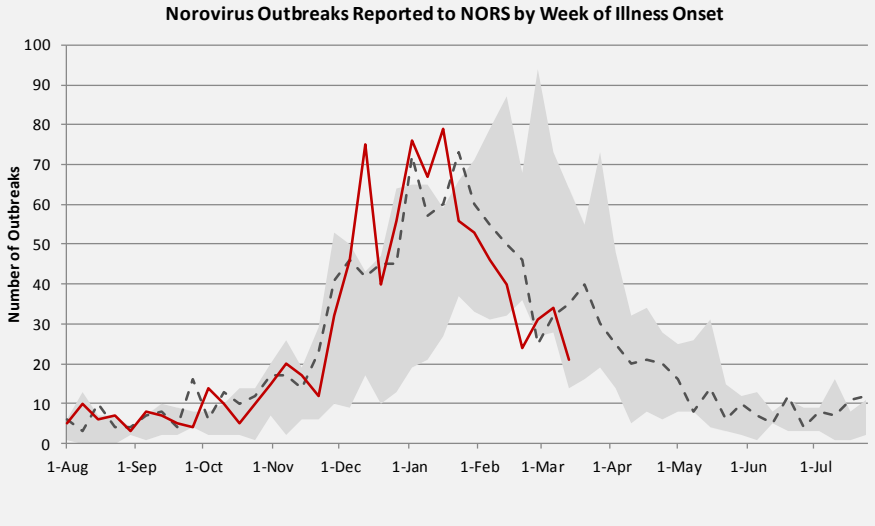
- Collects **laboratory** data on norovirus outbreaks
- Collects genetic sequence data to monitor current strains and identify new strains

- Reduces manual data entry
- Allows users to import etiology and norovirus strain data from CaliciNet into a matching NORS record
- Improves completeness of norovirus outbreak data
- Allows for better characterization of norovirus outbreaks and associated genotypes

NoroSTAT- Norovirus Sentinel Testing and Tracking network

- Collaborative group of 9 state health departments and CDC
- Allows for near real-time tracking of norovirus outbreak activity
- Participants **reduced from 22 to 2 days** the median lag time between outbreak notification to health departments and reporting to NORS





Epidemiology of foodborne norovirus outbreaks, United States, 2009–2015

- 493 foodborne norovirus outbreaks linked in NORS and CaliciNet
  - Most frequently reported genotypes: GII.4 (52%), GII.6 (9%), and GI.3 (8%)
- GII.4 outbreaks had higher hospitalization rates than non-GII.4 outbreaks (13 vs 5 per 1,000 cases)
- A food was implicated in 35% of outbreaks
  - Molluscan shellfish were more often implicated in non-GII.4 outbreaks
- Among 240 outbreaks with known contributing factors:
  - Food workers were implicated as source of contamination in 76% of outbreaks
  - Bare hand contact with ready-to-eat food was implicated in 54% of food worker outbreaks

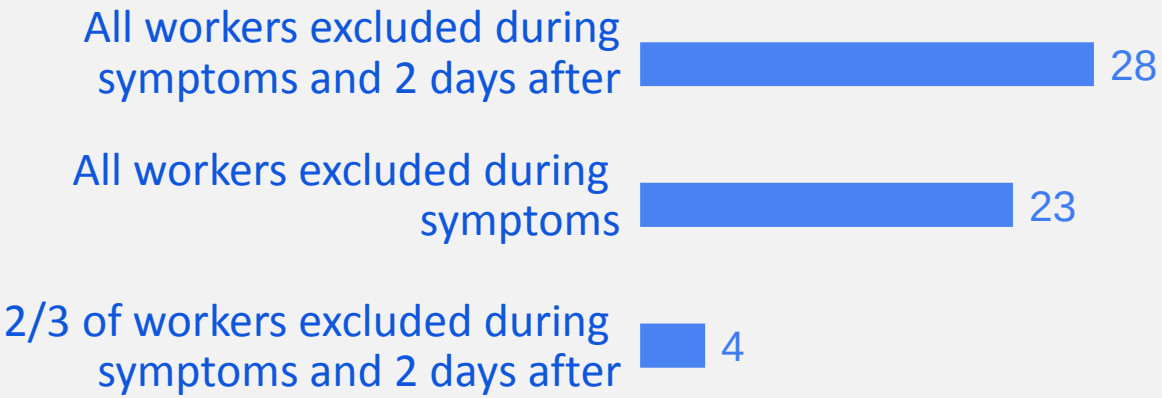
Marsh, et al., in press, 2018

Attribution of US disease burden to infected food workers

Question: What percent of cases could be averted by full compliance with CDC recommendations to exclude workers with norovirus for the duration of their symptoms and two days after?

Method: Deterministic, population-based models simulating the effects of various worker exclusion scenarios on the number of norovirus cases.

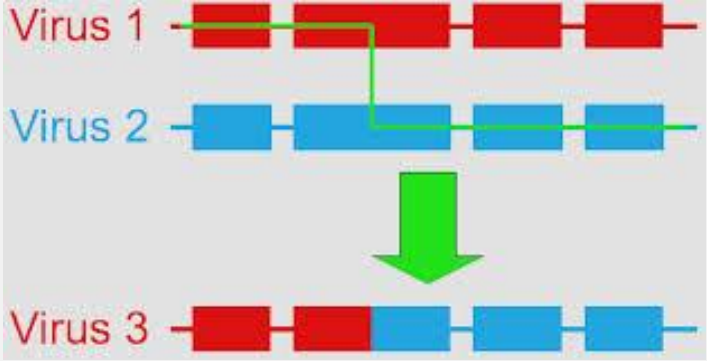
Compared to excluding 2/3 of workers during symptoms only, % more cases averted



Yang, et al., in review

Dual typing for norovirus

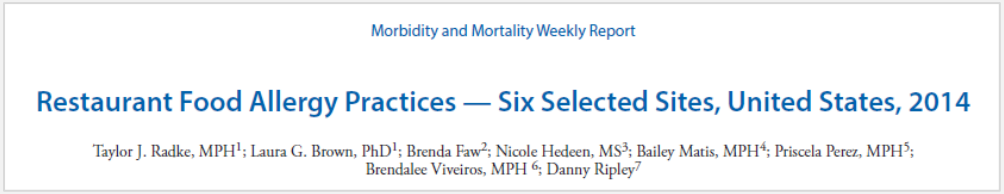
- Recombinant strains
  - Emergence of new GII.4 Sydney “untypeable” strain, 2015 – 16
- New dual typing method
  - Uses B and C regions of the genome, rather than just C
  - New B-C typing yields both Polymerase and Capsid types
  - GII.4 Sydney → GII.P16-GII.4 Sydney



NATIONAL CENTER FOR ENVIRONMENTAL HEALTH

Research on retail food safety: Pubs & plain language

- **Restaurant food allergy practices**
- **Retail deli slicer cleaning and inspection practices**
- **Retail deli cold storage practices**
- **Federal laws and talking to sick workers**


Morbidity and Mortality Weekly Report

Restaurant Food Allergy Practices — Six Selected Sites, United States, 2014

Taylor J. Radke, MPH[1]; Laura G. Brown, PhD[1]; Brenda Faw[2]; Nicole Hedeen, MS[3]; Bailey Matis, MPH[4]; Priscela Perez, MPH[5]; Brendalee Viveiros, MPH [6]; Danny Ripley[7]


How Restaurants Address Food Allergies:
EHS-Net Findings & Recommendations

EHS-Net Recommends

We recommend that restaurants

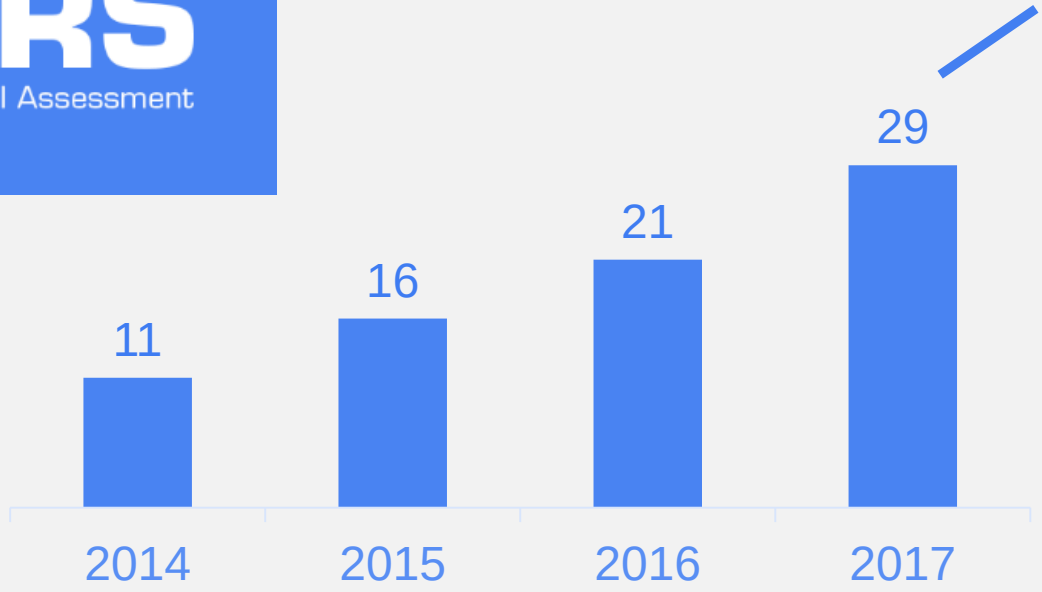
- Provide food allergy training for staff.
- Use dedicated equipment and areas for preparing

EHS-Net found that while most restaurants had ingredient lists available, many restaurants did not take other steps that could reduce the risk of food allergic reactions.

Increasing participants in EH surveillance on retail-related foodborne illness outbreaks

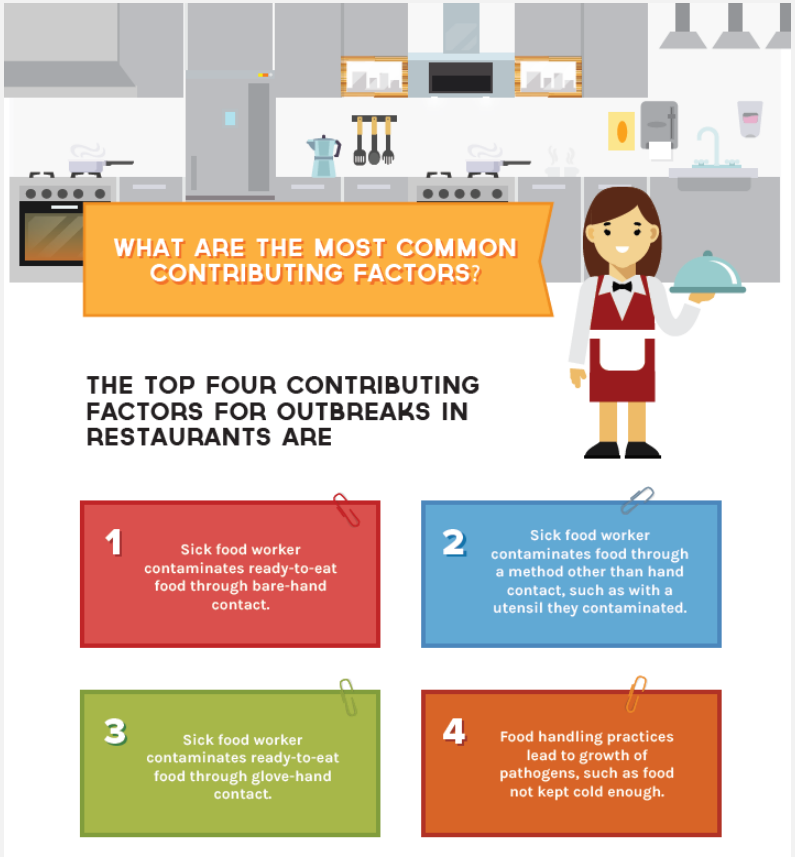
NEARS
National Environmental Assessment Reporting System

Participating sites increased by 38% since 2016



Surveillance on retail-related foodborne illness outbreaks

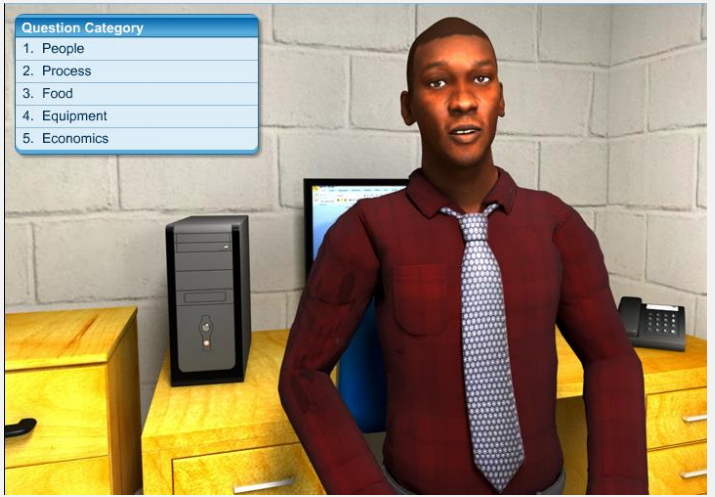
- **First publication based on NEARS data**
  - Timely, thorough environmental assessments linked with identifying contributing factors
- **Outbreak contributing factors infographic**
  - Sick food worker most common contributing factor



Brown, et al., Epidemiology and Infection, 2017

Environmental Assessment Training Series

- **Continued knowledge increases of 25 percentage points**
- **New! EATS 102 - skill building in outbreak scenarios**



NCEH resources

- All resources available at
- www.cdc.gov/nceh/ehs

Thank you

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