



FOODBORNE OUTBREAKS

DESCRIPTION

Foodborne outbreaks are caused by a variety of bacterial, viral, and parasitic pathogens, as well as toxic substances. To be considered a foodborne outbreak, CDC requires at minimum the occurrence of two or more cases of a similar illness resulting from the ingestion of a common food.¹

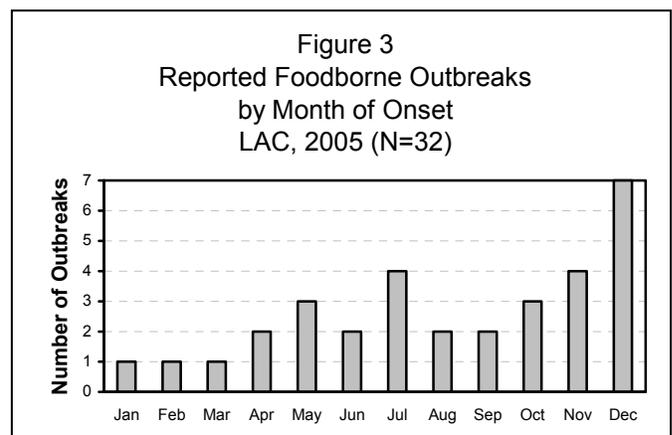
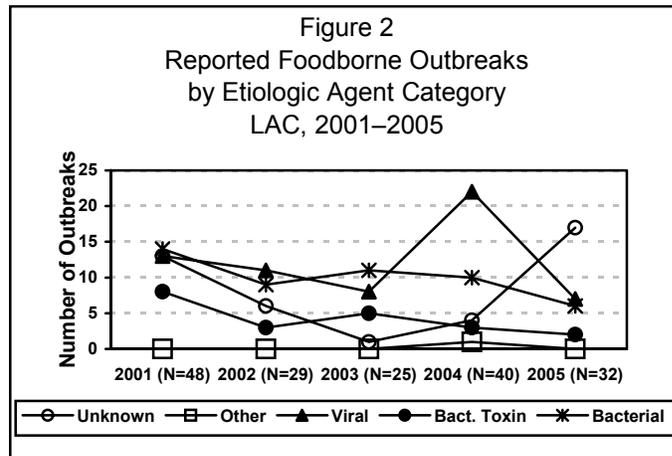
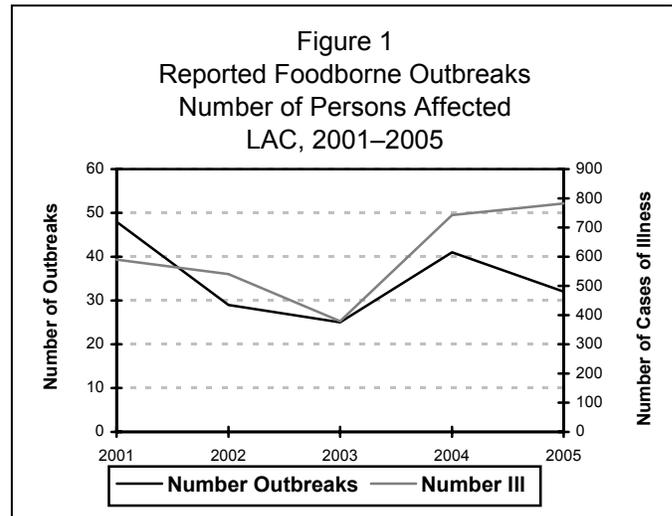
The system used by LAC DHS for detection of foodborne outbreaks begins with a Foodborne Illness Report (FBIR). This surveillance system monitors complaints from residents, illness reports associated with commercial food facilities, and foodborne exposures uncovered during disease-specific case investigations (e.g., *Salmonella*, *Shigella*, *Campylobacter*). LAC Environmental Health Services Food and Milk (F&M) Program investigates each FBIR by contacting the reporting individual and evaluating the public health importance and need for immediate follow-up. When warranted, a thorough inspection of the facility is conducted. In 2005, 50% of FBIRs led to an on-site investigation of the facility—this is often sufficient public health action to prevent additional foodborne illnesses.

ACDC Food and Water Safety Unit also reviews all FBIRs. Typically, an epidemiologic investigation will be initiated when there are illnesses in multiple households, multiple reports from the same establishment with similar symptoms in a short period of time, or ill individuals who attended a large event with the potential for others to become ill.

DISEASE ABSTRACT

- In 2005, the number of outbreaks investigated was less than the previous year. The overall number of cases of individual illness, however, was higher than the previous four years (Figure 1).
- A food item was implicated in 50% of the foodborne outbreaks (Figure 5).
- Probable contributing factors were determined for 50% of the outbreaks investigated (Figure 8).

STRATIFIED DATA



1 CDC. Surveillance for foodborne disease outbreaks—United States, 1988–1992. MMWR 1996; 45(SS-5):58. Available at: www.cdc.gov/mmwr/preview/mmwrhtml/00044241.htm



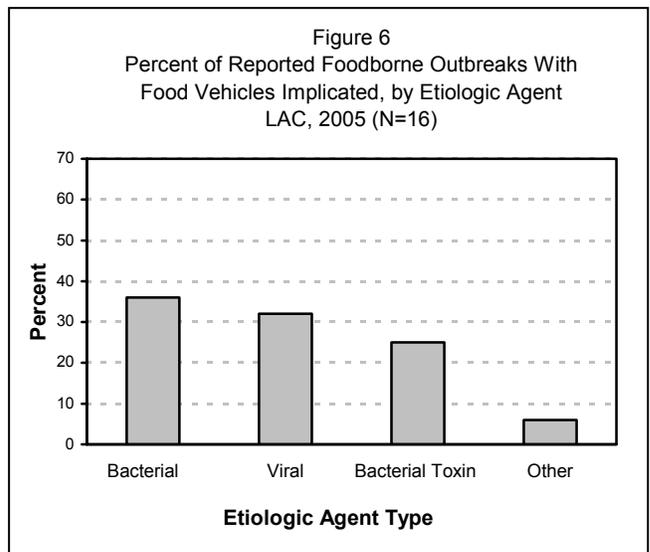
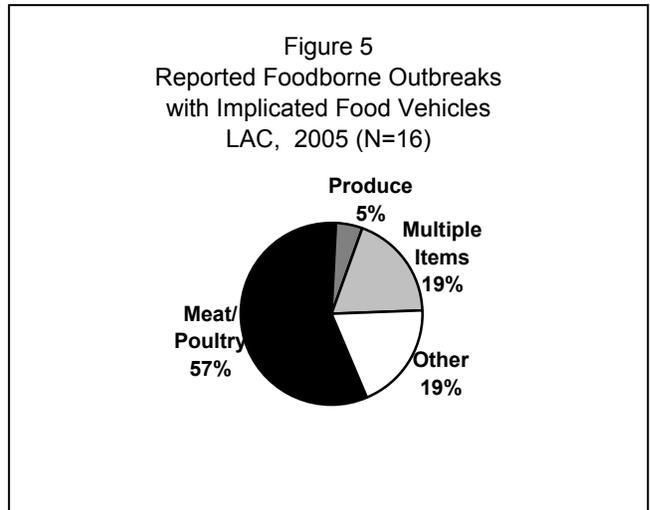
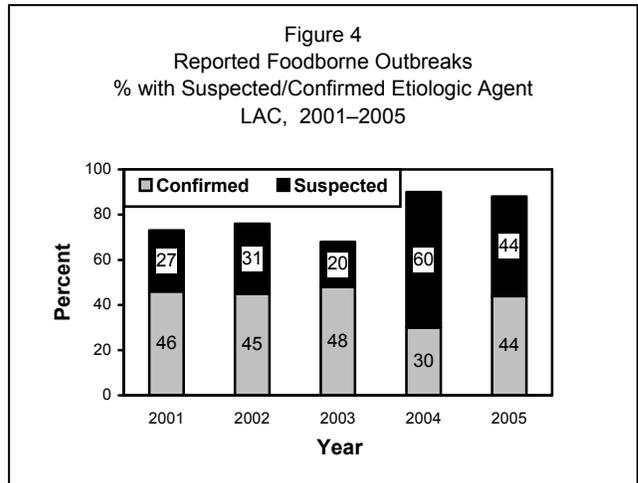
Overview: Of the 1535 FBIRs in 2005 reported by consumers eating food from establishments located in LAC, F&M investigated 762 (50%), and referred 762 (50%) to district inspectors or another agency for follow-up. ACDC investigates foodborne outbreaks with the greatest public health importance. In 2005, ACDC investigated 32 foodborne outbreaks representing 783 cases of foodborne illness (Table 1, Figure 1). These outbreaks were caused by a variety of pathogens (Figure 2). The mean number of cases per foodborne outbreak was 25 (range 2–187 cases). There was one waterborne outbreak reported in 2005. There were no foodborne outbreaks in health facilities.

Seasonality: In 2005 a peak in reported foodborne outbreaks occurred during October-December (Figure 3) due to an increase in norovirus outbreaks.

Agent: Typical foodborne pathogens can be categorized according to common characteristics of illness. Five categories of pathogens are used in this report (Figure 2). Bacterial agents that cause infection include *Salmonella*, *Campylobacter* and *E.coli*. Bacteria that produce toxins include *Staphylococcus aureus*, *Clostridium perfringens*, and *Bacillus cereus*. Viral gastroenteritis (Viral GE) includes norovirus (NV) and suspected NV disease, as well as hepatitis A. The “other” category includes fish poisonings and enteric parasites. The last category is unknown etiology.

A specific pathogen was laboratory confirmed in 44% and epidemiologically suspected in 44% of foodborne outbreaks investigated in 2005 (Figure 4); the etiologic agent was undetermined in 4 (12%) outbreaks. Two outbreaks, both bacterial, were identified by routine disease surveillance (Table 2). Laboratory testing was conducted in 16 of the 32 foodborne outbreaks (47%). Reasons for no laboratory testing include lack of cooperation (n=10) delayed notification (n=6), and cases out of town/unavailable (n=1).

Implicated Food Vehicles: A food vehicle was epidemiologically implicated in only 50% of foodborne outbreak investigations (Figure 5). The largest proportion of outbreaks with a food vehicle identified was caused by the meat/poultry category (57%), followed by the multiple items and other categories (19% each), with the produce category having the smallest proportion (5%). Among outbreaks in which a possible food vehicle was identified, 32% were bacterial toxin outbreaks, 36% were bacterial outbreaks, and 32% were viral outbreaks (Figure 6).



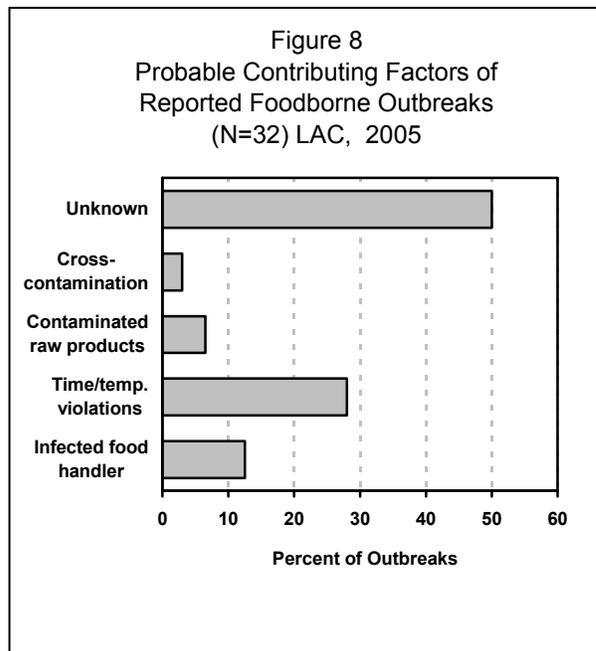
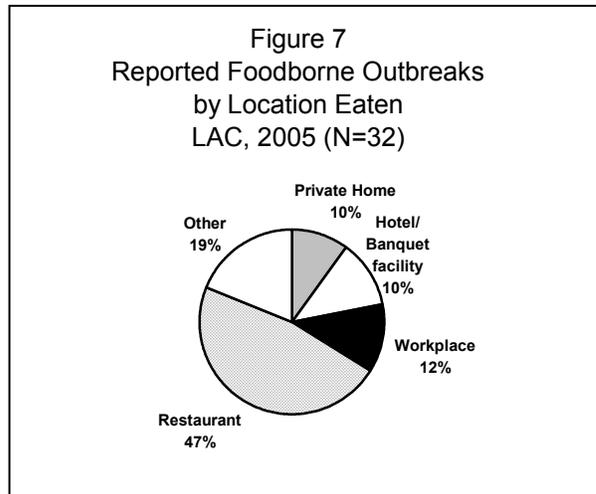


Outbreak Location: The most common locations for reported foodborne outbreaks were restaurants (47%), followed by locations in the other category (19%, Figure 7). These locations include places of worship, schools, and parks. Outbreak-associated food was most often prepared by a restaurant (60%) or from a caterer (25%).

The geographic distribution of the outbreaks by SPA is summarized in Table 3. SPA 4 had the most foodborne outbreaks (n=9); SPA 7 had the least (n=0). There were two multi-district outbreaks, but there were no outbreaks that involved multiple counties or states.

Contributing Factors: In 16 of 32 outbreak investigations, probable contributing factors of the outbreak were found on F&M inspection (Figure 8). The most frequent factors identified were improper holding time/temperature (56%) and infected food handler (25%).

Viral GE Summary: Many of the outbreaks reported as foodborne investigated in 2005 were categorized as viral GE (n=15, 47%). Laboratory testing was completed on four of these viral GE outbreaks, with four testing positive for NV. Viral GE was suspected in the remaining 11 outbreaks based on symptoms, incubation period, duration of symptoms, secondary cases in households, and/or negative bacterial test results. The mean number of cases per outbreak for 2005 was 17 cases. About 33% of the viral GE outbreaks had an undetermined implicated food vehicle, and were possibly due to person-to-person transmission. Although these outbreaks were reported as foodborne, some of them might not have involved food. Restaurants were the most common food source for 2005 viral GE outbreaks (60%). In 73% of the viral GE outbreaks, contributing factors were unknown.



COMMENTS

Since 1999, the LAC Public Health Laboratory has been testing human specimens for NV using the reverse transcription-polymerase chain reaction (RT-PCR) method. This method is still considered to be experimental and is only used to diagnose outbreaks as a whole, not for individual patients. There has been a marked increase in the number of viral GE and confirmed NV outbreaks since 1999.

PulseNet is a public health network sponsored by the CDC that uses the collaboration of laboratories and health departments at local, state, and federal levels to detect outbreaks through comparison of results of pulsed-field gel electrophoresis (PFGE) of pathogens. The PFGE are monitored for strains of various etiologic agents. When similar resulting patterns are detected, an investigation may be initiated. In addition, PFGE results can link solitary case occurring locally to a larger, previously identified outbreak occurring on a wider geographical scale (i.e., multistate *E. Coli* O157:H7 outbreak).

Persons with mild symptoms, long incubation periods, and poor public and medical community awareness of public health procedures may contribute to under-reporting of foodborne disease.



Table 1. Foodborne Outbreaks in LAC, 2005 (N=32)***

Agent	Strain/Type	Confirmed/ Suspected	Cases*	Jurisdictions
Bacterial Toxin		Suspected	13	West
Bacterial Toxin		Suspected	17	Compton
Bacterial Toxin		Suspected	70	Multiple
Botulism		Lab Confirmed	2	Inglewood
<i>C. perfringens</i>		Suspected**	187	East Valley
<i>Campylobacter</i>	<i>jejuni</i>	Suspected**	6	Antelope Valley
<i>Giardia</i>		Lab Confirmed	10	Foothill
Hepatitis A		Lab Confirmed	5	Central
Hepatitis A		Lab Confirmed	15	Central
Hepatitis A		Lab Confirmed	5	Central
Norovirus		Lab Confirmed	14	Pomona
Norovirus		Lab Confirmed	52	Alhambra
Norovirus		Lab Confirmed	12	Foothill
Norovirus		Lab Confirmed	13	Central
Norovirus		Suspected	10	Northeast
Norovirus		Suspected	4	Torrance
Norovirus		Suspected	6	Central
Norovirus		Suspected	10	Hollywood Wilshire
Norovirus		Suspected	11	Pomona
Norovirus		Suspected	40	Torrance
Norovirus		Suspected	14	Antelope Valley
<i>Salmonella</i>	<i>Enteritidis</i>	Lab Confirmed	12	West
<i>Salmonella</i>	<i>Enteritidis</i>	Lab Confirmed	20	Torrance
<i>Salmonella</i>	<i>Enteritidis</i>	Lab Confirmed	20	Torrance
<i>Salmonella</i>	<i>Enteritidis</i>	Suspected**	30	Hollywood Wilshire
<i>Salmonella</i>	<i>Heidelberg</i>	Lab Confirmed	6	West Valley
<i>Shigella</i>	<i>sonnei</i>	Lab Confirmed	5	Hollywood Wilshire
Toxin	Histamine (scombroid)	Suspected	5	Alhambra
Unknown GI		Suspected	13	West
Unknown GI		Suspected	15	East Valley
Unknown-GI		Suspected	4	Glendale
Unknown-GI		Suspected	37	Multiple

* Includes only LAC residents.

**Only one case was lab confirmed.

***Fourth quarter outbreaks in **bold**



**Table 2. LAC Foodborne Outbreaks Laboratory Summary:
Outbreaks by Suspect/Confirmed Etiologic Agent, 2005**

	Bacterial	Bacterial Toxin	Norovirus	Hepatitis A	Unknown /Other	Total
Number of outbreaks investigated	9	5	15	3	0	32
Number of outbreaks tested	9	0	4	3	0	16
Number of outbreaks with agent confirmed	7	0	4	3	0	14
Number of outbreaks identified by routine surveillance	2	--	--	--	--	2

**Table 3. Frequency of Foodborne Outbreaks
by Location, 2005**

SPA	Frequency	Percent
1	2	6
2	4	13
3	6	19
4	9	28
5	3	9
6	1	3
7	0	0
8	5	16
Multi-district	2	6
Multi-county	0	0
Multi-state	0	0
Total	32	100

ADDITIONAL RESOURCES

LAC resources:

- Communicable Disease Reporting System
Hotline: (888) 397-3993
Faxline: (888) 397-3779
- For reporting and infection control procedures consult the LAC DHS Foodborne Disease Section in the B-73 Manual – www.lapublichealth.org/acd/procs/b73/b73fh.pdf

CDC:

- Foodborne and Diarrheal Diseases Branch – www.cdc.gov/ncidod/dbmd/foodborne/index.htm
- Outbreak Response and Surveillance Unit – www.cdc.gov/ncidod/dbmd/outbreak
- FoodNet – www.cdc.gov/foodnet



Other national agencies:

- FDA Center for Food Safety and Applied Nutrition – www.vt.cfsan.fda.gov/list.html
- Gateway to Government Food Safety Information – www.FoodSafety.gov