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Research Note

Complaints of Foodborne Illness in San Francisco, California, 1998

MICHAEL C. SAMUEL,[1]* DIANE PORTNOY,[2] ROB V. TAUXE,[3] FRED J. ANGULO,[3] AND DUC J. VUGIA[1,4]

[1]*California Emerging Infections Program, 1212 Broadway, 12th Floor, Oakland, California 94612;* [2]*San Francisco Department of Public Health, San Francisco, California 94102;* [3]*Centers for Disease Control and Prevention, Atlanta, Georgia 30333; and* [4]*California Department of Health Services, Berkeley, California 94704, USA*

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ABSTRACT

Foodborne diseases are an important public problem affecting millions of Americans each year and resulting in substantial morbidity and mortality. Many foodborne infections occur in outbreak settings. Outbreaks are often detected by complaints from the public to health authorities. This report reviews complaints received by the San Francisco Department of Public Health involving suspected foodborne illness in 1998. Although such foodborne complaints are commonly received by health officials, we provide the first review of population-based data describing such complaints. We use a broad definition of a foodborne disease outbreak. We judged a complaint to be a "likely foodborne disease outbreak" if it involved more than one person and more than one family; no other common meals were shared recently by ill persons; diarrhea, vomiting, or both was reported; and the incubation period was more than one hour. In 1998, 326 complaints of foodborne illness, involving a total of 599 ill people, were received by the Communicable Disease Control Unit in San Francisco. The complaints involved from 1 to 36 ill persons, with 61% involving one ill person and 25% involving two ill persons. Of the 126 reports involving illness in more than one person, 77 (61%) were judged to be likely foodborne disease outbreaks. Three of these 77 outbreaks had been investigated prior to our review. This project confirms that more foodborne disease outbreaks occur than are reported to state and national outbreak surveillance systems. Our review of the San Francisco system highlights opportunities for gleaning valuable information from the foodborne disease complaint systems in place in most jurisdictions.

Foodborne diseases are a significant public health problem in the United States. Estimates indicate that approximately 76 million Americans become ill from foodborne pathogens each year, resulting in approximately 325,000 hospitalizations and 5,000 deaths *(4)*. Many foodborne infections occur in outbreak settings, affecting from 2 to many hundreds and even thousands of persons. Between 1993 and 1997, an annual average of about 550 foodborne outbreaks were reported in the United States by State Health Departments to the Centers for Disease Control and Prevention (CDC) *(2)*. Outbreaks come to the attention of public health officials through complaints from the public, reports of clusters of illness from alert health care providers, and review of data from regular clinical and laboratory surveillance of notifiable diseases. Many outbreaks however, are likely to go uninvestigated, unreported, or both.

For national surveillance, a foodborne disease outbreak is defined as "the occurrence of two or more cases of a similar illness resulting from the ingestion of a common food" *(2)*. In practice, reported outbreaks usually include supporting epidemiologic or laboratory evidence that demonstrates that the source of illness was indeed food and seldom include clusters of undiagnosed illness in a small group, like a family, who eat many meals and foods together and share other exposures. The incubation period (the time between consumption of contaminated food and the first occurrence of symptoms) and the specific symptoms are important criteria in assessing an outbreak. They give some suggestion of the etiology of an outbreak and, when the calculated incubation period does not match the reported symptoms, can indicate that a suspect meal is not the likely cause of illness. For example, a diarrheal illness is unlikely to have resulted from food eaten in the prior hour.

In most public health jurisdictions, some system is in place for receiving telephone complaints from the public about food safety concerns including suspected foodborne illness and foodborne outbreaks. In most states, county communicable disease or environmental health officials are responsible for receiving such complaints and for investigating suspect outbreaks. Public complaints usually involve concerns about alleged unsanitary conditions or practices or an illness thought to be associated with a specific establishment or product. In some jurisdictions, complaints involving illness and complaints involving sanitation are handled in the same manner by the same agency. This report reviews complaints received by the San Francisco Department of Public Health involving suspected foodborne illness. Although such foodborne complaints are commonly

* Author for correspondence. Tel: 510-540-2311; Fax: 510-451-3210; E-mail: msamuel@dhs.ca.gov.

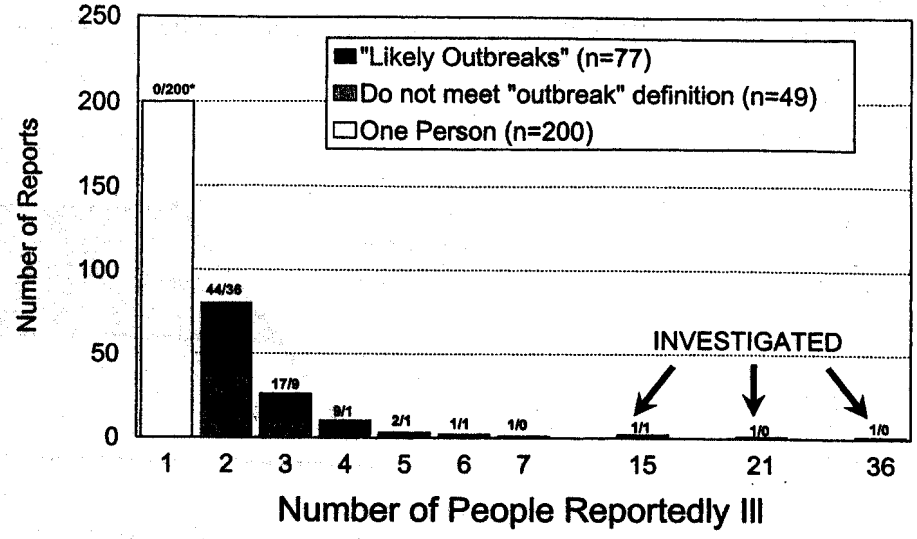

FIGURE 1. *Foodborne complaints, San Francisco, 1 January 1998 to 31 December 1998.*

received by health officials and can on occasion lead to important investigations *(3)*, we provide the first review of population-based data describing such complaints.

MATERIALS AND METHODS

To better understand the burden of foodborne disease in the United States, the Foodborne Disease Active Surveillance Network (FoodNet, http://www.cdc.gov/ncidod/dbmd/foodnet/default.htm) *(1)*, part of the CDC's Emerging Infections Program, was established in 1996 in several sites around the country, including a California San Francisco Bay Area site encompassing San Francisco and Alameda Counties (1998 population estimate = 2,146,096). FoodNet conducts active surveillance for a panel of specific infections that are often foodborne and for outbreaks of foodborne disease.

In San Francisco, all public complaints involving suspect foodborne illness are directed to the Communicable Disease Control Unit of the Department of Public Health. Information is collected from complainants over the phone using a standard questionnaire with selected data subsequently entered into a spreadsheet database. Data collected include: subject of the complaint (in almost all cases a restaurant), date and time of meal consumption, the number of people eating the meal, the number of people reportedly ill, an indicator of whether other meals were eaten together prior to the suspect meal, date and time of illness onset, duration of illness, symptoms, physician contact if any, medical and laboratory findings if any, foods and beverages consumed at suspect meal, and recent meal history. (As part of this review process, a new form has been developed to receive complaints and is available from author M. C. Samuel.) The nature of the complaint determines the level of epidemiologic investigation. Complaints involving only one to three people usually warrant only discussion with the complainant. For complaints involving more people, contact with other ill persons is usually initiated, and in some cases, standard cohort or case-control investigations are conducted. For all complaints, the Environmental Health Management Section is notified and an environmental inspection of the restaurant or other facility is conducted. In some cases, these inspections replace the next regularly scheduled inspection (on average three times per year in San Francisco), and in some cases they supplement the next scheduled inspection. Very few public complaints of foodborne illness are accompanied by a documented diagnosis. The judgment as to whether or not it is actually a foodborne illness is subjective and is made by the complainant, not the health department.

All foodborne illness complaints received by the San Francisco Communicable Disease Control Unit for 1998 were reviewed and form the basis of this report. We assessed how many complaints were received, how many were likely to be true food-related outbreaks, and how many were investigated. For the purpose of this report, we use a broad definition of a foodborne disease outbreak. We judged a complaint to be a "likely foodborne disease outbreak" if (i) it involved more than one person; (ii) it involved more than one family; (iii) no other common meals were shared recently by ill persons; (iv) diarrhea, vomiting, or both was reported; and (v) the incubation period was more than one hour. We also reviewed the records of the Communicable Disease Control Unit to record foodborne disease outbreaks that were investigated, but where the initial notification was from a source other than the complaint system (e.g., from a health care provider or laboratory surveillance data).

RESULTS

In 1998, 326 complaints of foodborne illness involving 599 ill people were received by the Communicable Disease Control Unit in San Francisco. The complaints involved from 1 to 36 ill persons, with 200 (61%) involving one ill person and 80 (25%) involving two ill persons (Figure 1). Of the 126 reports involving illness in more than one person, 77 (61%) are judged to be likely foodborne disease outbreaks. Of these, 43 (56%) had incubation times of 1 to 7 h, 12 (16%) of 8 to 14 h and 22 (29%) of ≥14 h. Of the 49 (39%) considered unlikely to be outbreaks, 31 (63%) included a report of other common meals shared by the ill persons, 9 (18%) involved only a single family, 4 (8%) included no mention of diarrhea or vomiting, 1 (2%) had conflicting information, and 4 (8%) had diarrhea or vomiting, but incubation times of <1 h.

Three (3.8%) of the 77 complaints that we judged to be likely foodborne disease outbreaks had, per routine, been investigated by the Communicable Disease Control Unit prior to our review. These three complaints involved the

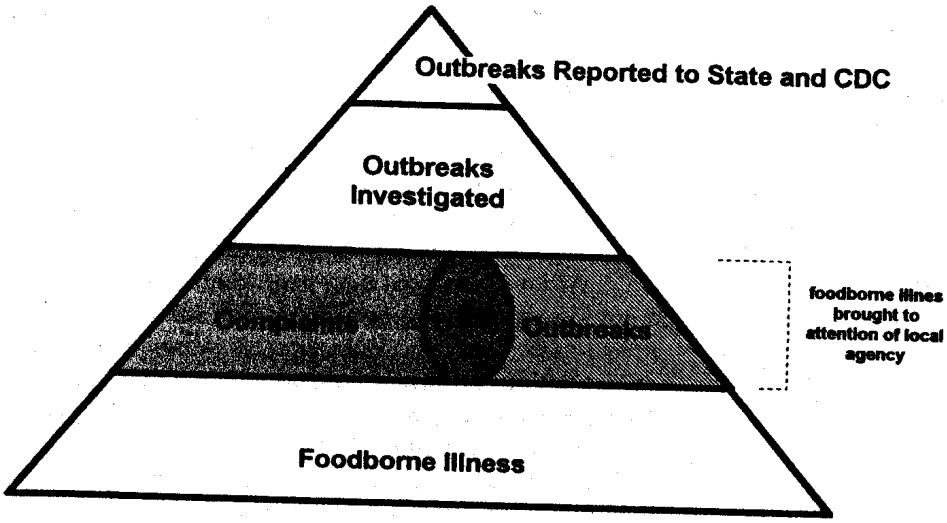

FIGURE 2. *Schematic diagram of foodborne illness to reporting of confirmed outbreak system.*

most people (n = 15, 21, and 36). One outbreak was caused by *Salmonella* serotype Enteritidis and was associated with a crab dish likely cross-contaminated by an egg-containing dish. The investigators were able to emphasize a number of sanitation measures with the facility including the proper use and cleaning of cutting boards and the use of pasteurized eggs. The two other investigated outbreaks were of undetermined etiology but, based on symptoms, were consistent with Norwalk-like viral gastroenteritis. No food vehicles or practices were found to be statistically associated with illness in either outbreak, but illness was suspected to be associated with contaminated sandwiches in one outbreak and with an ill bartender in the other. In all cases, the investigators were able to provide advice on effective hygiene and sanitation measures. Six other foodborne disease outbreaks, which were first detected by means other than the public complaint system, were also investigated by the Communicable Disease Control Unit in 1998. In total for 1998, nine foodborne disease outbreaks were reported from San Francisco to the California Department of Health Services and subsequently to CDC.

Figure 2 provides a schematic representation of the basic components of the systems discussed in this report. Although we are unable to construct the diagram to scale, it provides a visual tool and emphasizes that the number of reported outbreaks is a fraction of the total true number. The base includes all foodborne illness in a region. The second level up indicates that only some of the foodborne illnesses come to the attention of a local agency in the region, either from a complaint system, other outbreak detection systems, or both. The third level indicates that a smaller number are investigated, and the top level represents those few outbreaks that are reported to state and national surveillance systems.

DISCUSSION

This report indicates that more foodborne outbreaks occur in San Francisco than are reported to state and national surveillance systems. This undercounting of outbreaks almost certainly occurs to some degree in all other jurisdictions and probably occurs to a larger degree in areas with fewer public health and environmental resources.

Although only nine foodborne outbreaks were investigated and reported to CDC in San Francisco in 1998, many more complaints about possible outbreaks were received. Three hundred and twenty-six complaints were received and 77 (24%) met the broadest definition of an outbreak. Not all of these possible outbreaks, however, were likely to be true foodborne outbreaks. In some cases, the incubation period was not consistent with the illness reported. In other cases, food items unlikely to cause illness were involved. Some individuals registered complaints about restaurants not because of illness, but to retaliate against an establishment because of dissatisfaction with food, service, or other factors unrelated to illness.

On the other hand, of the true outbreaks that occurred—particularly small outbreaks—many undoubtedly were never reported or otherwise came to the attention of the Department of Public Health. Also, a small number of complaints, excluded as "likely outbreaks" by our definition, may in fact have been real outbreaks. Examples of where this could occur are outbreaks without vomiting or diarrhea (e.g., botulism, scombroid fish poisoning, listeriosis) and outbreaks with incubation times of less than 1 h (e.g., chemical intoxications, including scombroid fish poisoning). Also, the criterion of "no other common meals were shared recently by ill persons" could have eliminated some true outbreaks but was included in this analysis to remove small groups who regularly eat together, where determining the correct exposure may be impossible.

There are currently insufficient data to accurately determine the true number and rate of outbreaks that occurred in San Francisco in 1998 (or any particular year). The true number presumably is closer to the 77 likely outbreaks (or 10.3 per 100,000 population) described in this review than to the 9 (or 1.2 per 100,000) more well documented and investigated outbreaks. Based on these 77, the 9 investigated and reported outbreaks represent 12% of the outbreaks that occurred in San Francisco in 1998.

The San Francisco foodborne illness complaint system led to 326 environmental health inspections, the general description of 74 additional probable outbreaks, and 3 detailed epidemiologic investigations. This range of public health response is based on a balance of resources and the

understanding that no jurisdiction, including San Francisco, has the resources or reason to perform epidemiologic investigations of all complaints and small outbreaks. In situations suggestive of a large outbreak, unusual agents, or unusual modes of transmission, epidemiologic investigation and environmental inspection are the appropriate action. In other situations with no such evidence, only an environmental inspection or other action determined locally may be the appropriate public health response.

Our review of the San Francisco system resulted in a modification of the complaint form to better capture information to determine the true number of outbreaks and to initiate an outbreak investigation if warranted. The review has also resulted in productive discussions between the Communicable Disease Control Unit, the Environmental Health Unit, and the California Emerging Infections Program and has led to more consistent outbreak investigation protocols. Because our experience in San Francisco is not unique, other health departments or agencies may want to also review their complaint system. Such review may include consideration of appropriate "cut points" for initiating epidemiologic investigations of complaints. For example, the 1998 San Francisco data indicate that if a decision had been made to investigate all complaints involving five or more persons, only seven additional outbreaks would have to have been investigated. Any local choice of such a cut point would likely include consideration of available public health resources, and the reality that even thorough investigations of most very small suspect outbreaks will rarely result in important epidemiologic findings.

A careful review of a local complaint system may reveal ways the complaint system can be used productively to target public health and environmental resources where they are most needed and may help to estimate the size of the local foodborne disease problem.

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