



CHAPTER III: FOODBORNE ILLNESS SURVEILLANCE

IMPORTANT RESOURCES

EPIDEMIOLOGY PROGRAM

(Bureau of Infectious Disease and Laboratory Sciences)
617-983-6800 (Regular and Emergency Number)

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Surveillance of foodborne illness serves as the framework from which public health officials can act to control and prevent diseases which can be acquired through food. Surveillance is necessary to determine any significant changes in frequency or distribution of cases. These observations are a continuous process to determine the extent of disease, risk of transmission, and to develop an approach for the prevention and control of illness.

A. Overview and Purpose of Surveillance

Simply stated, surveillance is the regular collection, summarization and analysis of data. The key to recognizing foodborne illness outbreaks and controlling foodborne illness lies in routine surveillance. One has to have some sense of what is usual before an unusual cluster of illness can be recognized. Timely reporting of disease cases is essential to good surveillance. The purpose of foodborne illness surveillance is to interrupt the transmission of disease to susceptible persons by:

- seeking notification of illness through timely reporting,
- identifying outbreaks,
- investigating outbreaks,
- interpreting investigative data, and
- disseminating findings.

It is widely accepted that there are three methods used for foodborne illness surveillance:

1. Pathogen-specific surveillance:

This type of surveillance method is the cornerstone of most local and national surveillance and reporting systems. Reports are made and information collected on individuals when selected pathogens are identified in specimens from those individuals, such as *Salmonella enterica*, *Giardia lamblia*, *Shigella sp.*, etc. This method would also collect reports and information on individuals identified with specific syndromes with or without laboratory confirmation, such as hemolytic uremic syndrome.

2. Notifications or Complaints:

Receiving and responding to notifications and/or complaints of illness from the community, whether from consumers directly or through their health care providers, has always been a basic function of public health departments. These notifications and complaints of single illnesses or clusters of illnesses are often the first indication of a public health problem related to food or water consumption and, therefore, an important component of foodborne illness surveillance.

3. Syndromic Surveillance:

Syndromic surveillance generally involves the collection of information on non-specific health indicators that, in theory, could reflect increased occurrence of disease. Pharmacies noticing a large increase in the purchase of anti-diarrheal medicines would be one example. The utility of syndromic surveillance has not yet been established and has yet to make major inroads as an integral part of most health department foodborne and waterborne illness surveillance systems.

B. Historical Development of Surveillance

Current concepts of surveillance evolved from earlier public health activities. In the late Middle Ages, governments in western Europe began to assume responsibility for health protection in towns and cities. A simple system of monitoring illness led to regulations against polluting streets and public water, and proper food handling. An example of the earliest public health action related to surveillance is during the period of bubonic plague when public health authorities boarded ships in the port near the Republic of Venice to prevent persons with plague-like illness from disembarking.

National disease-monitoring activities did not begin in the United States until 1850 when mortality statistics based on death registration and the national census were first published by the Federal government. A prominent name in the development of public health surveillance at that time was Lemuel Shattuck. Shattuck's *Report of the Massachusetts Sanitary Commission* (1850) was a landmark publication that related death, infant and maternal mortality, and communicable diseases to living conditions. Massachusetts was the first state to begin systematic reporting of disease in 1874 when the Massachusetts State Board of Health instituted a voluntary plan for weekly reporting of prevalent diseases by physicians, using a standard postcard-reporting format. By 1901, all states required notification from physicians to local authorities of selected communicable diseases such as smallpox, tuberculosis, and cholera. It was not, however, until 1925 that all states were participating in the national reporting of infectious disease.

The Council of State and Territorial Epidemiologists (CSTE) was authorized in 1951 by its parent body, the Association of State and Territorial Health Officials (ASTHO), to recommend what diseases should be reported by states to the U.S. Centers for Disease Control and Prevention (CDC). The CSTE meets annually and recommends appropriate changes in morbidity reporting and surveillance, including what diseases should be reported to CDC. This information is published in the Morbidity and Mortality Weekly Report (MMWR) and its supplements.

In Massachusetts, reporting of communicable diseases is required under Massachusetts General Law (MGL), Chapter 111, Sections 3, 6, 7, 109, 110 and 112. These laws are implemented by regulation under Chapter 105, Code of Massachusetts Regulations (CMR), Section 300 et seq: Reportable Diseases, Surveillance, and Isolation and Quarantine Requirements. The purpose of these regulations is "to list those diseases declared dangerous by the MA Department of Public Health (MDPH), and to establish reporting surveillance, isolation and quarantine requirements. This is intended for use by local boards of health, hospitals, laboratories, physicians and other health care workers, veterinarians, education officials, and recreational program health officials, food industry officials, and the public."

Local boards of health (LBOH) or their designee (often local Visiting Nurse Associations) are authorized to accept, investigate and submit reportable disease case information to the MDPH, Bureau of Infectious Disease and Laboratory Sciences (BIDLS), Office of Integrated Surveillance and Informatics Services (ISIS). Certain conditions such as AIDS, tuberculosis (in most cities and towns) and sexually transmitted diseases are directly reportable by health care providers and laboratories to the BIDLS. Summary information on nationally-notifiable diseases is submitted to the CDC on a weekly basis without personal identifiers. This information is used to track national and regional disease trends.

C. Information You Need to Collect

1. Descriptive Information

First, information is needed regarding the time(s), place(s) and persons connected with a particular complaint. Collecting this descriptive information will enable one to decide whether a complaint is valid. When notified of a potential foodborne illness, one should answer the following questions:

- **WHO** became ill and what are the characteristics of this person such as age, sex and occupation?
- **WHEN** did the person(s) become ill?
- **WHAT** foods, beverages, or meals are suspect?
- **WHERE** did the ill person(s) eat or purchase these foods and when did they consume them?

2. Investigational Findings

Based on the information above, a foodborne illness investigation may be initiated. A second category of information will be collected as an investigation proceeds. These investigational findings are a crucial component of a foodborne illness surveillance system because such finds enable public health officials to more clearly understand the causes of foodborne illness. Findings may include the answers to some or all of the following questions:

- What specific food item(s) or ingredients(s) were linked to the illness?
- What type of contaminant (bacterium, virus, parasite, toxin or chemical) caused the illness?
- What were the factors leading to the contamination, survival or growth of a particular contaminant in an implicated food item? Was the item improperly cooked or stored? Did a sick food employee prepare food?

3. Your Surveillance System

By consistent and accurate recording of the above data, the public health official is maintaining a foodborne illness surveillance system! Data can be reviewed or analyzed for different purposes, including answering the following questions:

1. How many complaints about possible foodborne illness were received during defined time periods?
2. How many persons were ill during those periods?
3. Do the number and/or nature of the complaints appear to be changing over time?
4. Have certain food establishments or food items been associated with an increase in complaints?
5. Can you identify links among complaints (using the descriptive information discussed in Section 1 above), possibly indicating a more widespread cluster of foodborne illness?
6. Of the complaints received during a defined time period, how many were investigated?
7. How many complaints were deemed valid but could not be investigated because of the lack of personnel or training?
8. Do certain investigational findings (for instance, certain contributing factors) appear to be related to particular types of establishments or foods?

By routinely examining your data, the answer to these and other questions regarding foodborne illness in your community will emerge. Such answers will help guide you in making policy and directing resources towards commonly identified problem areas.

D. Reporting Issues: Timeliness, Priorities and Confidentiality

1. Timeliness

Information collected must be delivered via fax or MAVEN to the Food Protection Program as soon as possible. If written reports are still the standard in the health department, the Epidemiology Program and/or the Food Protection Program must be called as soon as possible, so that the delay in receiving the information is as short as possible.

The importance of timely investigation and reporting cannot be overemphasized. If data are reported or collected sporadically, it is difficult, if not impossible, to actually mount a reasonable and timely public health response. Likewise, potential outbreaks among neighboring towns might be missed because no data were received from the local health authority in a particular town until it was too late.

2. Priorities

Incidents that are a severe threat to an individual's health or where a timely control response is critical should be prioritized. There are times when cases of foodborne illness may be of a lower priority than other cases. Top priorities would include:

- Clusters of illness potentially connected with a specific individual or facility;
- Foodborne illness in a food employee or a household contact of a food employee;
- Indications of adulterated food presenting an imminent danger;
- One or more botulism cases; and
- Hepatitis A in a food employee.

If you are unsure about which investigations to do first, or need technical assistance, feel free to contact the MDPH on-call epidemiologist at 617-983-6800.

3. Confidentiality

Confidentiality is a legal requirement. The information that public health practitioners collect is often of an extremely personal nature. Success and cooperation lies in protecting the privacy rights of the individuals. It is important to realize that it is not just the investigator who needs to be concerned about confidentiality. Clerical staff, administrative staff, interns and elected officials, who may be aware of personal information on a case, should all be familiar with and mindful of the basic tenets of maintaining an individual's confidentiality. Only individuals who have a "**need to know**" should have access to sensitive records. At your agency, evaluate who those individuals are and be certain that the concept and practice of confidentiality is well understood.

If you are unsure about whether it is appropriate to release information, ***do not release it!*** Check with a supervisor, the municipal attorney or legal advisor, or contact the BIDLS Office of Integrated Surveillance and Informatics Services (ISIS) (617-983-6801) for advice. Make sure information is released only to people who are authorized to receive it. Do not be pressured into a hasty decision. One should not confirm that an individual is even in your records unless one is certain it is appropriate to release that information. Obtain the request in writing, with a notarized proof of identification before releasing information.

It is, of course, important to realize that information must often be shared between municipalities, with providers, and with MDPH, during the course of public health investigations and control activities. However, even in these instances the "need to know" rule described above applies. Information on individual cases is

available only from the BIDLs if one is the responsible representative of a local health authority involved in an investigation of the case, or if the person who is the case, their guardian or designee, requests it with written informed consent. If there is a need to share confidential information with another municipality, this may be done on an individual basis through MAVEN using the "share event" functionality.

Always consider what type of information is "personally-identifying" and what is not. When releasing information on a small number of cases, such as during an investigation, demographic information such as age, race, sex, or zip code could easily be used to identify individuals.

Local and State public health authorities have investigated cases of infectious disease and collected sensitive information for more than 100 years. These efforts would not be so successful if all personnel did not uphold the public's trust by maintaining strict confidentiality.

Figure 3-1: Important Points Regarding Confidentiality

- Sharing confidential information should be kept to a minimum.
- Confidential information should be shared only on a "need to know" basis. If unsure of someone's identity, request better confirmation such as a driver's license.
- Confidential information that is being reported to the LBOH or MDPH should be sent in a way which guards confidentiality. Sharing information through MAVEN, on the telephone or through a secure fax are the best options for guarding confidentiality.
- Information contained in MAVEN or paper-based forms with personal identifiers CANNOT be released to an entity which does not pass the "need to know" test without a signed consent form from the individual involved.
- Information with personal identifiers should not be shared via e-mail.

E. Limitations of Data

Several problems inherent in data obtained through surveillance must be recognized if the data are to be interpreted correctly.

1. Under-Reporting and Incomplete Data

Because most surveillance systems are based on diseases reported by health care providers, under-reporting is inevitable. It is estimated that 5% to 80% of cases that actually occur will be reported. Individuals with foodborne illness frequently do not consult a health care provider, due to lack of time or health insurance. A diagnosis of "gastrointestinal illness" is made by a physician and treated, but no diagnostic tests are done to determine the causative organism. Even with incomplete information, however, it is often possible to detect key trends and/or sources of infection. Each individual case must be treated as a possible "key" event.

2. Lack of Representativeness of Reported Cases

Health conditions are not reported randomly. For example, illnesses in a health care facility are reported more frequently than those diagnosed by private providers. A health problem that results in hospitalization is more likely to be reported than health problems dealt with in an outpatient setting. A provider is more likely to report a case of hepatitis A if the patient is severely ill, than if the patient has few or no symptoms. A case of

meningitis is more likely to be reported than is a case of chickenpox. Thus, reporting biases can distort interpretation of reported disease data.

3. Changing Case Definitions

Different practitioners frequently use different case definitions for health problems. The more complex the disease syndrome, the greater the difficulty of reaching consensus on a case definition. Moreover, with newly emerging diseases, as understanding progresses, case definitions are frequently adjusted to allow greater accuracy of diagnosis. As new diagnostic tests are developed, case definitions sometimes change to incorporate those tests. Persons who interpret surveillance data must be aware of any changes in case definitions and must adjust interpretations accordingly. These case definitions establish uniform criteria for disease reporting and should not be used as the sole criteria for public health action. Use of additional clinical, epidemiological, and laboratory data may enable a physician to diagnose a disease even though the formal surveillance case definition may not be met.

The real art of conducting surveillance lies in collecting accurate and timely data, and in carefully and correctly interpreting the data. The interpretation should focus on elements that might lead to control of the condition. Investigators can use surveillance as a basis for appropriate public health action. Epidemics can be recognized, preventive strategies applied, and the effects of such actions can be assessed.

References:

Council to Improve Foodborne Outbreak Response (CIFOR). Guidelines for Foodborne Disease Outbreak Response. 2nd edition. Atlanta: Council of State and Territorial Epidemiologists; 2014.