

Chapter 16: Enhancing Surveillance

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I. Surveillance activities

Surveillance activities are critical to the detection of vaccine-preventable diseases and for providing information to help control or address a problem. However, reporting of cases is dependent on many factors such as reporting source, timeliness of investigation, and completeness of data. In addition, different methods for conducting surveillance are used to collect information. Passive surveillance of vaccine-preventable diseases is the most common method. However, active surveillance may be needed in special surveillance situations such as outbreaks. Active surveillance is often short-term and usually requires more funding than passive surveillance.

Common systems used for disease surveillance include national notifiable disease reporting, physician- or hospital-based surveillance, laboratory-based surveillance, population-based surveillance,¹ and sentinel surveillance. Sentinel surveillance involves a limited number of recruited participants such as health-care providers or hospitals to report specified health events that may be generalizable to the whole population.²

Currently efforts are being made to integrate and enhance the surveillance systems for national notifiable diseases. A collaborative effort between CDC and state and local health departments is in progress to enhance surveillance system capabilities with the implementation of the National Electronic Disease Surveillance System (NEDSS).³ NEDSS will eventually replace the National Electronic Telecommunications System for Surveillance (NETSS) and will become the system to report national notifiable diseases in the United States and territories.

Enhancing the surveillance system is only one part of improving surveillance data; data for notifiable diseases are still dependent on reporting, timeliness and completeness. This chapter outlines activities that may be useful at the state and local level to improve reporting vaccine-preventable diseases. Some are more routinely used (encouraging provider reporting), while others, such as searching laboratory or hospital records, may be more helpful under certain circumstances.

II. Encouraging provider reporting

Most infectious disease surveillance systems rely on receipt of case reports from health-care providers and laboratories.⁴ These data are usually incomplete and may not be representative of certain populations; completeness of reporting has been estimated to vary from 6%–90% for many of the common notifiable diseases.⁵ However, if the level of completeness is consistent, these data provide an important source of information regarding the disease trends and the

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characteristics of the persons affected. Some mechanisms to encourage health-care provider reporting are described here.

Promoting awareness of the occurrence of vaccine-preventable diseases

Some health-care providers may be particularly likely to encounter patients with vaccine-preventable diseases. For example, some practitioners may see immigrants and travelers returning from areas where vaccine-preventable diseases may be endemic.

Promoting awareness of reporting requirements

Although there is a list of disease designated as nationally notifiable by the Council of State and Territorial Epidemiologists in conjunction with the CDC,⁶ each state has laws or regulations stipulating which diseases are reportable.⁴ Efforts should be made to increase health-care providers' awareness of their responsibility to report suspected cases.⁷⁻¹¹

The list of reportable diseases with detailed instructions explaining how, when, and to whom to report cases should be widely distributed. Mailings, e-mail list serves, websites, in-service and other continuing education courses, and individual provider interaction may be used to accomplish this goal. However, while these are all examples of possible methods to raise awareness of reporting requirements, studies of interventions have demonstrated that telephone and other personal contact with *individual* health-care providers, rather than groups, is most effective.¹² For example, interaction with health-care providers in the Vaccines for Children Provider Profile offers an opportunity to promote awareness of reporting requirements. Face-to-face communication is the most direct and dynamic means of communication, allowing feedback and responses to overcome objectives and concerns.¹³

Giving frequent and relevant feedback

Providing regular feedback to health-care providers and others who report cases of vaccine-preventable diseases reinforces the importance of participating in public health surveillance.¹⁴ Feedback should be timely, informative, interesting, and relevant to the provider's practice. Ideally, it should include information on disease patterns and disease control activities in the area. Some examples of methods of providing feedback are monthly newsletters, e-mail list serves, regular oral reports at clinical conferences such as hospital grand rounds, or regular reports in local or state medical society publications.

Contact with individual providers may be most effective. Some examples of positive individual interaction for giving feedback on disease reporting include:

- Providing feedback to the provider on the epidemiologic investigation for their patients
- Providing feedback to the provider for any cases that were first reported to the health department by the laboratory (or other source), rather than the laboratory
- Using every professional interaction with the provider to at least briefly discuss surveillance issues

Reporting should be as simple and as painless as possible for the health-care provider.

Simplifying reporting

Reporting should be as simple and as painless as possible for the health-care provider. Health department personnel should be easily accessible and willing to receive telephone reports and to answer questions. Reporting instructions should be simple, clear, and widely distributed to those who are responsible for disease reporting. Forms should be available, printed in a way that they can be readily photocopied and transmitted by fax machine, and should have clear instructions for completion and mailing.

III. Assuring adequate case investigation

Collecting detailed and adequate case information is very important and can be used to prevent continued spread of the disease or to change current disease control programs. The following steps are essential to assuring adequate case investigation.

Obtaining accurate clinical information

During a case investigation, clinical information (e.g., date of symptom onset, signs and symptoms of disease) about a case-patient is often obtained by a retrospective review of medical records and interviews with family, friends, caretakers, and other close associates of the case-patient. Detailed and accurate information (e.g., date of onset, laboratory results, duration of symptoms) may indicate the source of the infection and possible contacts, allowing interventions to prevent the spread of disease. This clinical information also may be aggregated by disease to study other aspects of the diseases (e.g., trends, incidence, prevalence).

Efforts should be taken to ensure health-care providers obtain necessary and appropriate laboratory specimens.

Obtaining appropriate laboratory specimens

Efforts should be taken to ensure that health-care providers obtain necessary and appropriate laboratory specimens. For example, specimens for bacterial cultures should be taken before administering antibiotics, and paired sera are often required for meaningful serologic testing. For more information on

laboratory support for vaccine-preventable disease surveillance, see Chapter 19, “Laboratory Support for the Surveillance of Vaccine-Preventable Diseases.”

Ensuring access to essential laboratory capacity

Availability of laboratory testing needed to confirm cases of vaccine-preventable diseases must be assured. Health-care providers should be encouraged to contact the local or state health department for assistance in obtaining appropriate laboratory testing.

Laboratory testing needed to confirm diagnosis of public health significance is a public responsibility and should be made available at no cost to the patient. For information on laboratory support available in your state, contact the state health department.

Investigating contacts

Identification of all case contacts and follow-up of susceptible persons may reveal previously undiagnosed and unreported cases. This investigation will also indicate persons eligible for any indicated prophylaxis, thereby facilitating disease control efforts.¹⁵

IV. Improving the completeness of reporting

Complete reporting involves accounting for as many of the cases of vaccine-preventable diseases as is possible; complete reporting be enhanced by laboratory reporting,² administrative datasets, and expanding sources of reporting.

Searching laboratory and hospital discharge records

For some vaccine-preventable diseases, a regular search of laboratory records for virus isolations or bacterial cultures may reveal previously unreported cases.⁸ Likewise, hospital discharge records may also be reviewed for specific discharge diagnoses^{7,16} such as *H. influenzae* meningitis, tetanus, and other vaccine-preventable diseases. Such searches may assist in evaluating completeness of reporting and may help improve reporting in the future.^{14,17} Identifying the source of missed cases may lead to modifications that make the surveillance system more effective and complete. Although not a substitute for timely reporting of suspected cases, such searches can supplement reporting when resources for more active surveillance are unavailable.

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Using administrative datasets

Administrative datasets, such as Medicare or Medicaid databases or managed care organization databases, may be useful for surveillance; when linked to immunization records, administrative records have been useful for monitoring rare adverse events following vaccination.^{18,19} However, unless extensive efforts are made to validate diagnoses, misclassification is likely.²⁰ Most vaccine-

preventable diseases are now rare, and data quality may be insufficient for these datasets to be useful adjuncts to vaccine-preventable disease surveillance.²¹

Expanding sources of reporting

Notifiable disease reporting has traditionally relied on reporting by physicians. Other health-care personnel such as infection control practitioners, school nurses, employee health nurses, laboratories, and childcare center personnel may be underutilized yet appropriate sources of case reports and surveillance information.^{14,17,22-25} These professionals often give the first indication that a health event is occurring that affects more than one person. In general, the most complete surveillance systems at the state and local levels involve multiple sources of reporting.

V. Strengthening surveillance infrastructure

Health surveillance reporting arrangements and procedures may differ from department to department at both state and local levels. To ensure an effective national surveillance system, reporting institutions and organizations need to maintain and strengthen independent reporting mechanisms. Some methods for maintaining a strong surveillance infrastructure are described here.

Making technical assistance available

Training and documentation should be available to health department personnel participating in surveillance activities, including topics such as reporting requirements, epidemiologic methods, case finding, and investigation. Likewise, the health department should make this information readily available to health-care providers who are required to participate in disease reporting and surveillance.

Creating networking opportunities

Meetings, conferences, and other professional interactions between public health professionals, where practices and plans for surveillance are discussed, can validate the importance of surveillance activities. In addition, those attending these meetings gain knowledge and strengthen professional interactions. These functions can help establish strong, professional links between public health professionals and private health-care providers.

Monitoring surveillance indicators

Surveillance activities have many measurable components (surveillance indicators) including timeliness of reporting, completeness of reporting, and the ability to obtain all of the information needed during case investigation. Regular monitoring of surveillance indicators may identify specific areas of the surveillance and reporting system that need improvement. For more information on this topic see Chapter 15, "Surveillance Indicators."

VI. Special surveillance activities

Special surveillance activities include contacting providers in active surveillance, sentinel surveillance systems, and active laboratory-based surveillance. The following provides a brief overview of these special surveillance systems.

Contacting providers in active surveillance

Active surveillance, in which the health department initiates the contact with the health-care provider to identify cases, involves regular (e.g., weekly) contact with health-care providers.^{9,12, 14, 22, 26} This regular contact with individual health-care providers promotes increased awareness of reporting responsibilities and increased cooperation with the health-care department. Active surveillance is generally limited to short-term disease control activities or seasonal activities such as during influenza season or during other outbreaks, because of the expense of sustaining such an active system and the low yield when disease incidence is low.

Using sentinel surveillance systems

Sentinel surveillance,^{12,14,22} in which a network of health-care providers or hospitals are recruited by the health department to regularly report specified health events, is useful for some vaccine-preventable diseases (e.g., influenza) in which the goal of surveillance is information on disease trends rather than individual case investigation. Sentinel surveillance systems may also be based in schools, childcare centers, hospitals, or other institutions serving specific populations. When targeted toward communities with a high risk of disease, sentinel surveillance may be a useful adjunct to other reporting sources and may supplement disease reporting when resources for more active surveillance are unavailable.

Using active laboratory-based surveillance

Active laboratory-based surveillance, in which a group of laboratories is recruited by the health department to regularly report specified laboratory results, is useful for the surveillance of the vaccine-preventable diseases (e.g., *Haemophilus influenzae* invasive disease) for which diagnosis and/or case confirmation requires laboratory testing. Laboratory-based surveillance systems may include both public and private laboratories; when targeted to include laboratories most likely to provide testing for vaccine-preventable diseases, laboratory-based surveillance may be a useful adjunct to other reporting sources and may supplement disease reporting when resources for other surveillance activities are scarce.

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