

TWENTY-EIGHT

INFECTION-MONITORING (SURVEILLANCE) ACTIVITIES

KEY CONCEPTS you will learn in this chapter include:

- Why it is important to monitor patient care practices
- What the purpose and limitations of surveillance are
- When surveillance should be considered
- How casefinding can be used to investigate outbreaks of, or exposures to, nosocomial infections
- What some of the common mistakes in investigating outbreaks are

BACKGROUND

Efforts to prevent patients from acquiring an infection or bad outcome (e.g., phlebitis following intravenous infusions) while in a hospital require that healthcare workers use infection prevention practices of demonstrated value and monitor the care being provided. In the broadest sense, infection-monitoring (surveillance) activities are designed to guide **corrective action** based on accurate information, or to provide the rationale for **not acting** when only selective or biased information is available. Poorly designed monitoring activities can, however, waste resources by collecting data that are never used or that fail to provide an accurate picture of what is happening. This occurs most often when surveillance is inconsistent or analysis is incomplete.

Although all healthcare facilities should monitor patient care practices to prevent nosocomial (hospital-acquired) infections and minimize the chance of bad outcomes, surveillance is labor-intensive. Infection surveillance has a long history, and there remains considerable debate about the design, utility and value of surveillance (Lynch et al 1997). How then does a healthcare facility monitor infection-related quality of care activities where resources are limited? As a general rule, monitoring by surveillance should be used only if it will provide specific information not available at less cost. Moreover, it should not consume resources that could be better spent elsewhere. For most facilities with limited resources, the priority should be:

- Ensure recommended infection prevention practices, such as sterilization, or where appropriate HLD, of all items that come in contact with normally sterile tissue, are adhered to.
- Ensure patient care practices are performed according to the best available evidence (i.e., use Standard Precautions for all patients).

- Monitor compliance with recommended practices for certain high-risk procedures, such as inserting central venous catheters.
- Work to eliminate unnecessary and unsafe injections.

Finally, routine surveillance should not outweigh investigating outbreaks, or providing safe water, food and sanitation within the hospital or healthcare facilities. On the other hand, well-organized surveillance ranks ahead of repetitive “staff education” programs, especially those not linked to behavior change activities (**Chapter 3**).

DEFINITIONS

- **Casefinding.** Method of identifying patients with nosocomial infections through a combination of: 1) reviewing medical records, 2) asking questions directed to patients or health workers, and 3) checking laboratory, X-ray or other relevant data, if available.
- **Nosocomial or hospital-acquired infection (terms used interchangeably).** Infection that is neither present nor incubating at the time the patient came to the healthcare facility. (Nosocomial refers to the association between care and the subsequent onset of infection. It is a time-related criterion that does not imply a cause and effect relationship.)
- **Surveillance.** Systematic collection of relevant data on patient care, the orderly analysis of the data and the prompt reporting of the data to those who need it. **Active surveillance** consists of collecting information directly from patients or staff, while **passive surveillance** includes examining reports, laboratory information and data from other sources.

PURPOSE OF SURVEILLANCE

Traditionally surveillance has been used to:

- determine baseline rates of nosocomial infections;
- evaluate infection control measures (e.g., management of multidrug-resistant infections);
- monitor good patient care practices;
- meet the safety standards required by regulatory agencies; and
- detect outbreaks and exposures.

While infection surveillance (collecting some data on all nosocomial infections and calculating rates based on discharges or patient days) is not a useful starting point, knowing when to investigate a situation, what data to collect, how to analyze and interpret the result and how long to measure may be extremely useful. Knowing the difference between monitoring a process (Are they doing what they’re supposed to be doing? Why not?)

and monitoring an outcome (Is something bad happening? Who? What? Where? When?) is essential.

Where resources are limited, the use of surveillance as an infection-monitoring tool generally should be restricted to investigating outbreaks or exposures. When considering initiating other types of surveillance activities, the objectives should be reasonable in terms of the resources and time available, and the projected uses for the data should be clearly defined before routine collection of data is established. It is much more difficult to discontinue data collection than to never collect it in the first place.

WHEN TO CONSIDER PERFORMING SURVEILLANCE

Logically, surveillance should begin only after all recommended steps for preventing nosocomial infections have been taken. For hospitals in most countries, rigorously employing the evidence-based infection prevention practices detailed in the preceding **Chapters 3–19** should be the primary strategy for preventing nosocomial infections and avoiding bad outcomes in hospitalized patients. Then the use of measures proven to reduce infection risk at specific sites or from invasive procedures should be checked (**Chapters 22–27**). Only after successfully implementing and monitoring these recommendations should the use of surveillance be considered.

Finding Patients with Nosocomial Infections

An inexpensive, fairly simple way of finding patients with nosocomial infections is by casefinding. Casefinding consists of reviewing medical records and asking questions of patients and health workers (active surveillance). It is guided by clues obtained from passive surveillance (reports and laboratory information). Routine casefinding is time-consuming and not recommended where resources are limited, but when used to investigate a suspected outbreak (e.g., an increased number of newborns with infectious diarrhea and septicemia over a short time period), casefinding can be extremely helpful.

Using the above example of a suspected outbreak of infectious diarrhea, the **clinical review** of medical records should include collecting basic demographic information (e.g., name, age, date of birth, admission diagnosis), checking for fever, new antibiotic use, new cases of diarrhea, clinical sepsis or the presence of an inflamed surgical wound, drain or IV site. **Talking with patients** (or parents of newborns in this example) should focus on their health, the health of other young children at home, general hygiene, food handling and sanitation. **Discussions with staff** working in the affected area (e.g., the newborn nursery or neonatal ICU) should deal with ensuring that recommended patient care activities (e.g., hand hygiene and use of gloves) are being performed both correctly and at the appropriate times. **Laboratory information** to be checked should include a review of positive cultures and other diagnostic findings if

available. In addition, if laboratory or X-ray staff are informed about the kinds of information that may suggest nosocomial infections, they can alert the infection prevention coordinator or working group with useful tips.

Where time and resources are limited, routine use of casefinding should focus on high-risk areas such as intensive care and postoperative units. In a large study, for example, more than 70% of all nosocomial infections occurred in the 40% of patients who had surgery (Haley et al 1985a and 1985b). Moreover, the infections in these units tended to be more serious than in other areas where infections occur less frequently.

DETECTING AND MANAGING OUTBREAKS

Outbreaks of nosocomial infections do occur, despite the best efforts to prevent them. When they occur, it is important to identify and interrupt the process or practice responsible as quickly as possible to minimize the risk to patients and staff. Investigating and managing suspected outbreaks, however, can be very complex, requiring the assistance of epidemiologists and more experienced infection prevention personnel from national or international health agencies (e.g., CDC). In many instances, however, the cause of the outbreak can be easily identified (i.e., related to a common source, patient care practice or nonpractice) and can be resolved without a complete investigation.

Fortunately, outbreak management is more straightforward, but both require speedy resolution and both are labor and resource intensive. In addition, once the source(s) of the outbreak or exposure is identified, implementing the corrective action may be the most difficult management issue.

Common Mistakes in Outbreak Investigations

Some of the more common errors include:

- Assumption that an outbreak exists when it really does not. An apparent increase in cases over recent experience is often only normal variation; therefore, where possible, confirm the diagnosis, search for additional cases and determine whether the increase is real before concluding that an outbreak is occurring.
- Isolation of an organism rarely explains an outbreak.
- The presence of organisms from multiple sites or personnel usually suggests that these sites became colonized from another source and were not the cause of the outbreak.
- Negative cultures do not justify concluding that the site (e.g., staff or inanimate objects) was not responsible for the outbreak. There could be many reasons the cultures were negative: incorrect specimen collection and handling, poor culture technique, including performing the test incorrectly or using the wrong reagents, and failure to collect the right specimen.

Note: The goal in an outbreak is preventing more patients or staff from becoming infected or at risk.

- Prevention measures are not implemented immediately. As soon as an outbreak is suspected, patient care practices that could be responsible should be evaluated and any problems identified and corrected, without waiting for results from an investigation. (Table 28-1 outlines common sources for nosocomial infections at various sites and some recommended risk-reduction practices.)
- Other similar practices are not evaluated. When a problem with reprocessing instruments or specific patient care practices is identified, often the same faults exist elsewhere in the hospital; all similar situations should be evaluated and corrected as soon as possible.

**Administrative
Responsibilities**

Hospitalized patients, staff and visitors are all linked to the community at large. In addition, there is considerable interaction between healthcare facilities. Patients may begin care in an ambulance, visit an emergency room, have an inpatient stay and be discharged to a nursing home or receive homecare—all in the same episode of illness. As such, countless health workers, other patients, visitors and staff may be affected. For example, nosocomial outbreaks of measles and hepatitis B have resulted in cases in the community because information regarding an outbreak or exposure in a hospital was not shared. The temptation to withhold this information because it may reflect badly on the hospital, administration or personnel is natural—but must be avoided. Other facilities may have contact with the patients or may use some of the same practices or commercial products that were responsible for the outbreak. Without the frank exchange of information, preventable nosocomial infections may continue to occur. Thus, to minimize the risk to all, the occurrence of exposures and outbreaks should be widely publicized.

Table 28-1. Measures Identified as Effective in Investigating Outbreaks

SITE	WHERE TO LOOK FOR SOURCE AND/ OR MODE		INTERIM MEASURES
	Common	Uncommon	
Urinary tract infection	Urinary tract instrumentation Cross-contamination via hands of personnel Poor hand hygiene	Inadequately processed instruments Contaminated antiseptic solution (e.g., povidone-iodine)	Re-emphasize known aseptic practices relating to insertion and maintenance of urinary catheters, and monitor compliance. Institute glove use for any contact with urine. Separate catheterized patients from each other. Put on clean gloves just before contact with urinary meatus. Wash hands, or use an antiseptic handrub, after removal of gloves.
Surgical wounds	Organisms acquired intraoperatively by contact with symptomatic or asymptomatic shedders among staff Contaminated products (wound irrigating solutions) Poor surgical technique (hemostasis, glove puncture)	Airborne spread Preoperative contamination (contaminated antiseptic solution)	Re-emphasize known aseptic practices and surgical technique. Exclude infected personnel from patient care. Separate those at risk from those infected. Put on sterile or high-level disinfected gloves just before wound contact. Use sterile fluids for wound care. Wash hands, or use an antiseptic handrub, after removal of gloves.
Lower respiratory tract	Colonization of upper airway with secondary aspiration into lung Contamination of nebulized solutions or respiratory therapy equipment surfaces Cross-contamination via hands of personnel	Airborne spread	Re-emphasize known aseptic practices and surgical technique. If respiratory therapy is associated with cases, examine technique used for disinfection and delivery of therapies (e.g., multidose vials). Separate those at risk from those infected. Put on clean gloves just before contact with mucous membranes and suctioning of patients. Wash hands, or use an antiseptic handrub, after removal of gloves.
Blood	Intravascular, especially central venous catheters Contamination of insertion site	Inadequately processed instruments Preoperative contamination (contaminated antiseptic solutions)	Re-emphasize known aseptic practices and surgical technique. Intravenous catheters should be changed every 96 hours. Put on sterile or high-level disinfected gloves before inserting catheter and wound contact. Wash hand, or use an antiseptic handrub, after removal of gloves.

Adapted from: Lynch et al 1997.

REFERENCES

Haley RW et al. 1985a. The efficacy of infection surveillance and control programs in preventing nosocomial infections in U.S. hospitals. *Am J Epidemiol* 121(2): 182–205.

Haley RW et al. 1985b. The nationwide nosocomial infection rate: A new need for vital statistics in U.S. hospitals. *Am J Epidemiol* 121(2): 159–167.

Lynch P et al. 1997. Surveillance, outbreak investigations, and exposures, in *Infection Prevention with Limited Resources*. ETNA Communications: Chicago, pp 31–48.