Surveillance of Healthcare-Associated Infections; Basics and Challenges

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Editorial

Surveillance of healthcare-associated infections (HAIs) is a critical component of infection prevention and control activities. It is defined as the ongoing and systematic collection, analysis, and interpretation of infection-related data for the purpose of sharing such information with those who can help in taking preventive actions.[1] It should be noted that the surveillance definition is describing a cycle that starts with data collection and ends with report communication (Figure 1). Therefore, the report's findings should be discussed by the staff of infection prevention and control (IPC) and the relevant unit to come up with appropriate steps to reduce high HAI rates or to maintain low ones. If intervention is to be taken, they may decide to continue the surveillance to assess the impact of intervention. Unfortunately, many hospitals do not complete this cycle as described above. They either ignore to communicate the surveillance findings with the relevant stakeholders or do not follow up with them regarding the appropriate interventions required. These practices deprive surveillance from its patient-safety purpose and change it to a routine non-purposeful data collection. Surveillance design is considerably different from survey and monitoring. For example, survey design involves data collection for a specific aim using a questionnaire at only one point of time as compared with the ongoing nature of surveillance. Therefore, surveillance can be seen as conducting repeated standardized surveys with a specific preventive purpose. Monitoring is sometimes used interchangeably with surveillance. However, it involves continuous or intermittent collection of routine measurements such as environmental measures, program functions, or health characteristics.[2]
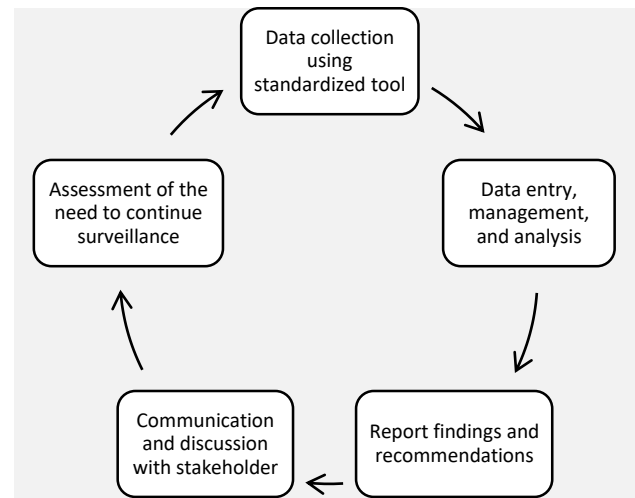
Figure (1): Surveillance cycle

While HAI surveillance usually has a binary outcome (e.g., infection detected or not detected), monitoring outcomes usually have acceptable and unacceptable levels. In fact, surveillance is more comprehensive and complex activity than monitoring.

The methodology of HAI surveillance can be differentiated into active and passive surveillance.[3] Active HAI surveillance means that IPC staff who is collecting the data is actively searching different hospital resources to confirm the presence or absence of infection or other surveillance outcomes. This is in contrast with passive surveillance when the responsible IPC staff is passively receiving reports of infection from relevant units or committees. Obviously, active surveillance is more time and effort consuming compared with passive surveillance. On the other hand, passive surveillance has lower data quality and higher probability of underestimation of surveillance outcomes. Enhanced surveillance is a

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term that is usually used to indicate active surveillance that use several overlapping sources of information of one type of infection.[4] These include clinical presentation, microbiologic results, radiologic findings, and others. Automated surveillance is increasingly utilized in high-resource countries to reduce the data collection burden and to produce instantaneous reports.[5] However, most of the available systems are not fully automated, cannot easily abstract important data from patient records, require well-established information technology infrastructure, and restricted to few types of surveillance.

As regards scope, surveillance can be comprehensive covering all types of HAIs in all hospital units all year round or targeted covering specific types of HAIs in specific hospital units for specific durations.[3] Targeted surveillance is the preferred methodology because of the limited time and staff available to run comprehensive surveillance. Additionally, surveillance outcome should be recognized as an indicator for infection-promoting versus demoting healthcare environment rather than sieving for all HAI events. Nevertheless, targeted surveillance obviously miss the whole picture and small clusters of patients can pass unnoticed. Furthermore, interrupted surveillance periods preclude the ability to build and interpret infection trends over time.

The key point in HAI surveillance is standardization of methods and outcomes. Standardization is the basis of benchmarking, which is defined as standardized comparisons of surveillance outcomes in same units in different hospitals (external benchmarking) or current outcomes with baseline data (internal benchmarking).[6] Any change of surveillance methods or outcomes make both external and internal benchmarking meaningless. The purpose of benchmarking is to create a competitive environment rather than mere comparisons of rates/outcomes. Therefore, benchmarking is likely to stimulate patient-safety improvement projects and provide proof for potential improvement following prevention strategies. Standardization of methods usually can be achieved by using the same standard definitions for HAI events/processes, similar data collection tools, and same surveillance methodology such as active targeted prospective surveillance. Standardization of outcomes usually can be achieved using the same

metrics and same adjustment method. For example, rates for device-associated HAI are calculated as number of events per 1000 device-days. This adjusts for the duration of exposure to devices (such as central line, ventilator, and urinary catheter) which are major risk factors for developing relevant infections.

HAI surveillance has several challenges, especially in low-resource countries.[7,8] There is usually limited number of competent IPC staff who can conduct HAI surveillance as per the specified standards. The number of units that need to be covered by surveillance activities is frequently beyond the staff and time capacity of IPC department. Therefore, targeted surveillance that is based on annual IPC risk assessment plan should help to minimize the staff and time challenge. The surveillance definitions of HAI events are complex and usually difficult to implement compared with clinical definitions. Additionally, surveillance definitions are heavily dependent on the presence of accessible microbiological laboratory services and liberal microbiological requests. Therefore, training and certification of IPC staff is critical for successful implementation of HAI surveillance. Additionally, more simplified surveillance definitions with tested validity are urgently needed, especially in low-resource countries. Additionally, the use of modern technology and artificial intelligence can make HAI simpler and less burdensome activity. There is usually insufficient communication between IPC staff and the staff of the units where data were collected. This can create difficulties in implementing prevention strategies as per the surveillance report recommendations. Additionally, the unit staff are sometimes embarrassed by the surveillance reports that are recognized as methods to uncover their mistakes. This put additional responsibility on IPC staff to pursue more communication and professionalism. HAI surveillance cannot be achieved without close cooperation of the staff of both IPC department and microbiological laboratory. Therefore, there should be some local policies for timely sharing of data, data ownership, and reporting responsibilities. These clear roles and responsibilities can reduce the conflict of interest between both parties and streamline the surveillance process.

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