Outline For Healthcare-Associated Infections Surveillance

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This outline is intended to list the essential elements for surveillance of healthcare-associated infections (HAI) and succinctly describe the traditional surveillance methodology that has been used in HAI surveillance systems conducted by the Centers for Disease Control and Prevention since 1970, i.e., the National Nosocomial Infections Surveillance (NNIS) System and the National Healthcare Safety Network (NHSN). Numerator and denominator data to collect and their sources are also described, as is how an infection control professional (ICP) collects such data. References to more detailed accounts of HAI surveillance are provided.

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I. Essential Elements of Surveillance[1, 2, 3]

A. Assess the population and identify those at greatest risk for the outcome or process of interest

1. Healthcare-associated infections (HAI) (outcomes)

2. Patient care practices aimed at preventing HAI (processes)

B. Select the outcome or process for surveillance

1. Examples of outcomes: HAI, infection or colonization with a specific organism, pyrogenic reaction or vascular access infection in hemodialysis patients, sharps injuries, etc.

2. Examples of processes: Central line insertion practices (CLIPs), surgical care processes (e.g., preoperative antimicrobial prophylaxis), medication errors, influenza vaccination rates, hepatitis B immunity rates, personnel compliance with protocols, etc.

3. Examples of other events: Occurrence of reportable diseases and conditions, communicable diseases in personnel, organisms or syndromes indicative of bioterrorist events, etc.

C. Determine observation time period

D. Choose the surveillance methodology (See Section II)

E. Monitor for the outcome or process using standardized definitions for all data collected

F. Collect appropriate denominator data, if rates are to be calculated

G. Analyze surveillance data

H. Report and use surveillance information in a timely manner

II. Surveillance Methodology[1, 4, 5]

Routine HAI surveillance in most in-patient healthcare facilities should be conducted by an infection control professional (ICP) in an active, patient-based, prospective, priority-directed

manner that yields risk-adjusted incidence rates, as defined below. This methodology will be most useful for the detection of endemic HAI, rather than for outbreak detection.

A. Active and passive

1. Active surveillance

a) Trained personnel, mainly ICPs, vigorously look for HAI

b) Information accumulated by using a variety of data sources within and beyond the nursing ward (See Section IIIB and IVB)

2. Passive surveillance

a) Persons who do not have a primary surveillance role, such as ward nurses or respiratory therapists, identify and report HAI

B. Patient-based and laboratory-based

1. Patient-based

a) Count HAI, assess risk factors, and monitor patient care procedures and practices for adherence to infection control principles

b) Requires ward rounds and discussion with caregivers

2. Laboratory-based

a) Detection is based solely on the findings of laboratory studies of clinical specimens

C. Prospective and retrospective

1. Prospective surveillance

a) Monitor patients during their hospitalization

b) For SSIs, also monitor during the post-discharge period

2. Retrospective surveillance

a) Identify infections via chart reviews after patient discharge

D. Priority-directed and comprehensive

1. Priority-directed (also called targeted, focused, or Surveillance by Objective)[6]

    a) Objectives for surveillance are defined

    b) Focus is on specific events, processes, organisms, and/or patient populations

2. Comprehensive

    a) Continuous monitoring of all patients for all events and/or processes

    b) Highly personnel resource intensive if done manually

E. Risk-adjusted rates and crude rates

1. Risk-adjusted rates

    a) Rates are controlled for variations in the distribution of major risk factors associated with an event's occurrence

    b) Such rates allow inter- and intra-facility rate comparisons

2. Crude rates

    a) Rates assume equal distribution of risk factors for all events

    b) Such rates cannot be used for inter-facility comparisons

F. Incidence and prevalence

1. Incidence

    a) Count only new events occurring during some defined time period

2. Prevalence

    a) Count all events (new and previously existing) occurring at either a point in time or during some defined time period

III. Numerator Data Collection[1, 4, 5, 7]

Personnel other than ICPs may be trained to screen data sources for HAI, or automated screening of electronic databases may be used, as long as the ICP makes the final determination of presence of HAI according to the criteria for defining HAI.

A. Numerator data to collect

1. Demographic – name, date of birth, gender, hospital identification number, admission date

2. Infection – onset date, site of infection, patient care location of HAI onset

3. Risk factors – devices, procedures, other factors associated with HAI

4. Laboratory – pathogens, antibiogram, serology, pathology

5. Radiology/imaging – X-ray, CT scan, MRI, etc.

B. Sources of numerator data

1. Admission/discharge/transfer records, microbiology laboratory records

2. Visits to patient wards for observation and discussion with caregivers

3. Patient charts (paper or computerized) for case confirmation

a) Laboratory and radiology/imaging results

b) Nursing and physician's notes and consults

c) Admission diagnosis

d) History and physical examination findings

e) Records of diagnostic and surgical interventions

f) Temperature chart

g) Information on administration of antibiotics

4. For post-discharge detected SSI, sources include records from surgery clinics, physician's offices, emergency departments[8]

C. How an ICP collects numerator data

1. Screens admission/discharge/transfer records for patients admitted with infection and those whose diagnoses put them at risk of acquiring HAI

2. Reviews laboratory reports looking for patients with possible infections (e.g., positive microbiology cultures, positive pathology findings) and converses with

laboratory personnel trying to identify patients that might be infected and to identify clusters of infections, especially in areas not targeted for routine HAI surveillance

3. During ward rounds, quickly screens nursing care reports, temperature charts, antibiotic administration sheets, and Kardexes; converses with nurses and physicians trying to identify patients who might be infected

4. Performs chart review of patients suspected of having HAI: reviews physician's progress notes and nurse's notes, laboratory data, radiology/imaging reports, surgery reports, etc.; if electronic charts are available, these can be reviewed from the ICP's desk, but ward rounds are still essential for surveillance, prevention, and control activities

5. Completes HAI data collection forms/screens as data sources are reviewed

IV. Denominator Data Collection[1, 4, 5, 7]

Denominator data may be collected by someone other than the ICP as long as that person is trained. When denominator data are available from electronic databases (e.g., patient tracking systems, respiratory therapy database), these sources may be used as long as the counts are not substantially different from those collected manually.

A. Denominator data to collect

1. Counts of the cohorts of patients at risk of acquiring HAI

2. For device-associated HAI incidence density rates[9]: record daily the total number of patients and total number of ventilator-days, central line-days, and urinary catheter-days in the patient care area(s) under surveillance; sum these daily counts at the end of the surveillance period for use as denominators

3. For SSI rates stratified by the NNIS basic or modified risk index[9]: record information on operative procedures selected for surveillance (e.g., type of procedure, date, risk factors, etc.)

B. Sources of denominator data

1. For device-associated incidence density rates: visits to patient care areas to obtain daily counts of the number of patients admitted and the number of patients with each of the commonly used devices associated with HAI (i.e., one or more central line, ventilator, or indwelling urinary catheter)

2. For SSI rates: detailed logs from the operating room for each operative procedure

C. How an ICP collects denominator data

1. For device-associated incidence density rates: records daily counts of the number of patients admitted and the number of patients with each of the commonly used devices associated with HAI (i.e., one or more central line, ventilator, or indwelling urinary catheter)

2. For SSI rates: obtains data on operations from operating room logs and patient charts as needed

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