

WIPAG

WY Infection Prevention Orientation Manual

Section #5, Surveillance

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Table of Contents

Section #5: Surveillance	3
Objectives.....	3
Required Readings	3
Overview	3
Key Concepts	4
<i>Types of Surveillance</i>	6
Methods.....	8
<i>Definition of Cases</i>	8
<i>Sources of Cases</i>	8
<i>Data Collection</i>	10
<i>Data Management</i>	12
<i>Data Analysis</i>	12
Documentation and Reporting.....	13
Other Issues	14
Resources	14
<i>Helpful/Related Readings</i>	14
<i>Helpful Contacts (in WY or US)</i>	15
<i>Related Websites/Organizations</i>	15
My Facility/City/County Contacts in this Area	15

Section #5: Surveillance

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Objectives

At the completion of this section the IP will:

1. Describe a surveillance program within the Infection Prevention Program of your facility and assess its strengths and limitations in terms of:
 - Purpose and objectives
 - Type of surveillance used
 - Data sources for identifying cases
 - Definition used to confirm cases
 - Data collection methods and forms
 - Data analysis method
 - Summary of the findings including conclusions, recommendations and follow-up
2. Collect, manage, analyze, interpret and report data from a surveillance program.

Number of hours

- Key Concepts - 4 hours
- Methods – 4 hours

Required Readings

- Grota P, Allen V, Boston KM, et al, eds. *APIC Text of Infection Control & Epidemiology. 4th Edition*. Washington, D.C.: Association for Professionals in Infection Control and Epidemiology, Inc.; 2014.
 - Chapter 10, General Principles of Epidemiology, by SM Tweeten
 - Chapter 11, Surveillance, by K Mehan Arias
 - Chapter 13, Use of Statistics in Infection Prevention, by A Potts
 - Chapter 15, Risk-adjusted Comparisons, by MA Dudeck and JR Edwards
- Outline for Healthcare-Associated Infections Surveillance. Centers for Disease Control and Prevention National Healthcare Safety Network website. Available at: www.cdc.gov/nhsn/pdfs/outlineforHAIsurveillance.pdf

Overview

Surveillance, in general, is the ongoing systematic collection, analysis, and interpretation of disease or adverse events in order to monitor their occurrence and prevent them in the future. Because an IP will spend considerable time performing disease surveillance, it's important to be able to identify problems in order to direct interventions toward improving patient outcomes. Each healthcare –associated infection (HAI) surveillance program, such as surgical site infections (SSI), catheter-associated urinary tract infection (CAUTI), ventilator-associated events (VAE), multi-drug resistant organisms (MDRO) (e.g., methicillin resistant *Staphylococcus aureus* [MRSA]), or central line-associated blood stream infection (CLABSI), should have a clear purpose and specific objectives. Focused data collection and analysis helps to sell the program to administrators. It is prudent for the IP to determine what HAI surveillance is already taking place in the facility.

Exercise #1: After speaking with your mentor and or supervisor, list your facility’s HAI surveillance programs in each of the rows of Table 1. For each program (row) identify the purpose and specific objectives. Keep in mind that objectives are measurable for example, the CLABSI rate will be xx or the standard infection ratio will be 20% below the prior year.

Table 1. Surveillance programs.

Surveillance Program Name	Purpose and specific objectives

Key Concepts

Surveillance is the on-going, systematic collection, consolidation, and evaluation of data that enables an IP to monitor trends within the hospital or facility. By conducting routine surveillance, an IP is able to detect aberrations that could indicate a problem in which an intervention is needed.

Exercise #2: Using knowledge gained from the required reading and through discussions with your mentor or supervisor, complete Table 2.

Table 2: The definition and purposes of surveillance.

Define surveillance:
List five purposes of surveillance:
1.
2.
3.
4.
5.

Exercise #3: Using knowledge gained from the required reading, complete Table 3. Provide a definition for the key surveillance terms listed.

Table 3: Key surveillance terms.

Term	Definition
Epidemiology	
Population	
Case	
Case definition	
Numerator	
Denominator	
Rate	
Attack rate	
Endemic	
Cluster	
Epidemic	
Pandemic	
Prevalence	
Incidence	
Incidence density	

Distribution	
Proportion	
Baseline	

Types of Surveillance

There are eight different types of surveillance approaches, each of which has strengths and limitations. It is important to decide which approach will best suit your surveillance program's purpose and objectives. An IP may use a variety of surveillance types depending on the issue or problem they need to address. The different types of surveillance methods are detailed in the required reading. There are eight general categories of surveillance used in healthcare settings. They differ mostly on the population or physical location chosen to be under surveillance.

Exercise #4: In order to learn more about the different types of surveillance, use the required readings to complete the Table 4. Provide a definition, strengths, limitations, and an example(s) of each type of generic surveillance program.

Table 4: Types of surveillance.

Type of Surveillance	Definition	Strengths	Limitations	Example(s)
Total				
Targeted				
Syndromic				
Sentinel				
Process				
Outcome				
Retrospective				
Prospective				

Methods

Definition of Cases

Consistent criteria must be used to define cases in order to accurately collect surveillance data and to be able to compare the results of different surveillance programs. National organizations have identified case definitions for surgical site infections, urinary tract infections and other healthcare-associated infections. For example, the Centers for Disease Control and Prevention’s (CDC) HAI surveillance definitions are widely used in acute care hospitals, ambulatory surgical centers and critical access hospitals (CAH). These are referred to as NHSN or National Healthcare Safety Network definitions. They are available by both facility type and infection type at <http://www.cdc.gov/nhsn/settings.html>. HAI surveillance definitions for use in the long term care setting are those discussed in the paper by Stone et al. (2012) and referred to as the McGeer Criteria (<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3538836/>). For the most current definitions it is recommended that the IP visit the abovementioned website and Society of Healthcare Epidemiology of America (SHEA; <http://www.shea-online.org/>).

Exercise #5: Review the surveillance programs in your facility and choose one (e.g. Clostridium difficile infections [CDI]) to use as an example to complete Table 5.

Table 5. A review of case definition(s) used in one of your surveillance programs.

Enter the name of the program you chose:
Identify the case definition(s) used for the HAI in the program.
Are the definition(s) clear and concise?

Sources of Cases

Depending on the type of surveillance method, type of HAI, and other logistical constraints, it may be necessary to collect information on suspect cases from multiple sources such as the pharmacy, chart reviews, x-ray data, and/or laboratory data.

Exercise #6: Complete Table 6 to help you summarize the strengths and limitations of the different options to identify cases for your surveillance programs. The strengths and limitation will be variable between facilities. For example, a facility may have electronic laboratory results that are easily and quickly queried. Additionally, a facility may have charts that are not easily obtained.

Table 6. Sources of data to inform surveillance.

Source of information	Strengths	Limitations
Admission forms		
Chart review (retrospective)		
Chart review on unit		
IP ward rounds		
Microbiology laboratory reports		
Antibiotic use reports		
Reports from nurses		
Reports from doctors (e.g. post discharge)		
Others		

Exercise #7: Review the surveillance programs in your facility and choose one (e.g., CDI). It may make sense to choose the one you selected for Exercise #5. Answer the following questions.

1. Identify the sources of data for identifying infections used in the surveillance program you have chosen. Can you identify additional strengths or limitations?

2. Explain why you need multiple sources for identifying possible cases

Data Collection

Data collection procedures should include strategies for ensuring accuracy and completeness of data. In addition, due to both efficiency and ethical considerations, data collected should include the minimum information necessary. For example, race may not be a risk factor in a particular surveillance program; hence, patient/resident race would not be collected. In order to standardize data collection, especially when multiple sources are necessary, a form is required. Surveillance forms can be modified templates from other surveillance programs or created from scratch at the beginning of implementing a new program. Typical data collected on surveillance forms depends on the type of HAI being monitored and type of surveillance program in place. Sample surveillance forms are available on the [NHSN.gov/forms](https://www.nhsn.gov/forms) under Tracking Infection in Acute Care Hospitals/Facilities; Tracking Infections in Long-term Care Facilities.

Exercise #8: Describe how you collect data to confirm or reject a case.

What data do you collect and why, and how do you collect it (e.g., form to use, accessing electronic medical records results).

Identify the methods used for collecting data to confirm or reject cases.

Describe strategies to ensure you are collecting quality data.

Describe the methods used for obtaining denominator data.

Exercise #9: For the surveillance activity you have chosen, collect some data, e.g., perform a chart review using your own or your facility's form and definition; collect the information from the other sources such as the laboratory, pharmacy, etc.

Assess what worked and didn't work well in terms of identifying infections e.g., issues with applying the definition, finding the information, etc. How could data collection be improved?

Assess what worked and didn't work well in terms of identifying the denominator. How could this be improved?

Data Management

How surveillance data is both stored and managed can affect the efficiency and effectiveness of the overall surveillance program. There are many options available for computerized nearly automated system. However, rather than being familiar with the variety of potential options, it is important for the IP to understand the one used in the facility in which they work, even if the IP is not responsible for data entry.

Exercise #10: For the surveillance program you have chosen answer the following questions. Describe the system used for data management:

- 1. What database is used?*
- 2. Who enters the data?*

Who is responsible for maintaining the system?

What strategies are used to ensure data entry is accurate and complete, and data are “clean”?

Practice entering data from at least 3 data collection forms.

Data Analysis

Surveillance data are used to generate infection rates, which can then be interpreted to identify if there is a problem to be addressed and if interventions have been effective. Calculating rates, generating base-line rates, and identifying aberrations are all topics that should be understood from the required reading.

Exercise #11: For the surveillance program you have chosen calculate and interpret the listed rates (as appropriate for the data). Interpretation could be: rates are high, low, changed, etc.

Incidence rate

Prevalence rate

Discuss sources for benchmark or comparison data (e.g., NHSN, other published literature) with strengths and limitations (e.g., definitions used, completeness of data, availability, comparability of populations). Defend the choice of comparison data.

Interpret the rates using an appropriate benchmark or comparison.

Documentation and Reporting

Each surveillance system evaluation should be documented in a written report that is generated on an on-going, regular basis. The frequency of the documentation will depend on the needs of the facility, but should be frequent enough to quickly identify aberrations or potential outbreaks/clusters.

Exercise #12: Using the information supplied above and in the required reading answer the following questions:

Discuss the purpose and value of writing reports. Who should get the report and what information do they need, and how often?

Describe the parts of a report

Discuss the role of the IP in your facility for following-up on recommendations of the report

Exercise #13: If possible, review a previously written report for your surveillance program and perform the following tasks and answer the question.

Assess the written report in terms of its readability, completeness and clarity.

Determine what actions were taken as a result of the report to improve patient outcomes and/or surveillance practices.

What recommendations would you make for improving the report or follow-up?

Other Issues

Exercise #14: Discuss with your mentor and/or supervisor ethical issues relating to surveillance in terms of why they are issues and how they can be addressed in your facility. As the discussion unfolds or afterward, complete Table 7.

Table 7. Surveillance ethical issues.

Ethical Issues	Description of the issue and how it might be addressed
Confidentiality	
Privacy	
Mandatory reporting	

Resources

Helpful/Related Readings

- Society for Hospital Epidemiology of America (SHEA)/Centers for Disease Control and Prevention (CDC). Surveillance Definitions of Infections in Long-Term Care Facilities: Revisiting the McGeer Criteria. 2012. *Infection Control and Hospital Epidemiology*, volume 33, issue 10, pages 965-977. Available at: www.ncbi.nlm.nih.gov/pmc/articles/PMC3538836/.
- Mayhall CG, ed. Hospital Epidemiology and Infection Control (4th Edition). Philadelphia, PA: Lippincott Williams & Wilkins, a Wolters Kluwer business; 2011.
 - Chapter 2, Modern Quantitative Epidemiology in the Healthcare Setting, by JI Tokars
 - Chapter 3, Biostatistics for Healthcare Epidemiology and Infection Control, by EA Tolley
 - Chapter 4, Principles of Healthcare Epidemiology, by MD Nettleman, RL Roach and RP Wenzel
 - Chapter 5, Data Collection in Healthcare Epidemiology, by SB Kritchevsky and RI Shorr
 - Chapter 89, Surveillance of Healthcare-Associated Infections, by K Allen-Bridson, GC Morrell and TC Horan
- Bennett J and Brachman P, eds. Bennett & Brachman's Hospital Infections. 6th Edition. 2014. Philadelphia, PA: William R Jarvis.
 - Chapters 5, The Development of Infection Surveillance and Prevention Programs, by HM Babcock and KF Woeltje
 - Chapter 6, Surveillance of Healthcare-Associated Infections, by M Andrus, TC Horan and RP Gaynes
 - Chapter 7, The Use of Prevalence Surveys for Healthcare-Associated Infections, by BP Coignard
 - Chapter 8, Investigating Endemic and Epidemic Healthcare-Associated Infections, by W R Jarvis
 - Chapter 9, Epidemiologic Methods for Investigating Infections in the Healthcare Setting, by JH Han and E Lautenbach
 - Chapter 10, Use of Computerized Systems in Healthcare Epidemiology, by KF Woeltje
 - Chapter 30, Incidence and Nature of Endemic and Epidemic Healthcare-Associated

Infections, by LK Archibald and WR Jarvis

- Bennett G, Morrell G and Green L, ed. Infection Prevention Manual for Hospitals; revised edition. Rome, GA: ICP Associates, Inc.; 2010. Section 2: pages 1-82.
- Bennett G. Infection Prevention Manual for Ambulatory Care. Rome, GA: ICP Associates Inc.; 2009. Section 2: pages 1-35.
- Bennett G and Kassai M. Infection Prevention Manual for Ambulatory Surgery Centers. Rome, GA: ICP Associates, Inc.; 2011. Section 2: pages 1-35.
- Schweon S, Burdsall D, Hanchett M, et al. *Infection Preventionist's Guide to Long-Term Care*. Washington, D.C.: Association for Professionals in Infection Control and Epidemiology, Inc.; 2013.
 - Chapter 4, Surveillance, Epidemiology, and Reporting, by D Patterson Burdsall
- Lautenbach E, Woeltje KF and Malani PN, eds. SHEA Practical Healthcare Epidemiology (3rd Edition). Chicago, IL: University of Chicago Press; 2010.
 - Chapter 11, Surveillance: An Overview, by TM Perl and R Chaiwarith
 - Chapter 16 Surveillance and Prevention of Infections Associated with Vascular Catheters, by WE Bischoff
 - Chapter 15 Basics of Surgical Site Infection Surveillance and Prevention, by LL Maragakis and TM Perl

Helpful Contacts (in WY or US)

- Emily Thorp, MS, Infectious Disease Surveillance Epidemiologist and HAI Prevention Coordinator, Wyoming Department of Health, 307-777-8634, emily.thorp@wyo.gov
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- Tracy Murphy, MD, State Epidemiologist, Wyoming Department of Health, 307-777-7716, tracy.murphy@wyo.gov

Related Websites/Organizations

- Wyoming Department of Health, Infectious Disease Epidemiology Program: www.health.wyo.gov/phsd/epiid/epiid.html
- Wyoming Department of Health, Healthcare-Associated Infection Prevention: www.health.wyo.gov/phsd/epiid/HAIgeneral.html
- Association for Professionals in Infection Control and Prevention (APIC): www.acip.org
- Society for Healthcare Epidemiology of America (SHEA): www.shea-online.org/

My Facility/City/County Contacts in this Area

Position Title	Name	Phone number	Email address



WIPAG welcomes your comments and feedback on these sections.
For comments or inquiries, please contact:

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