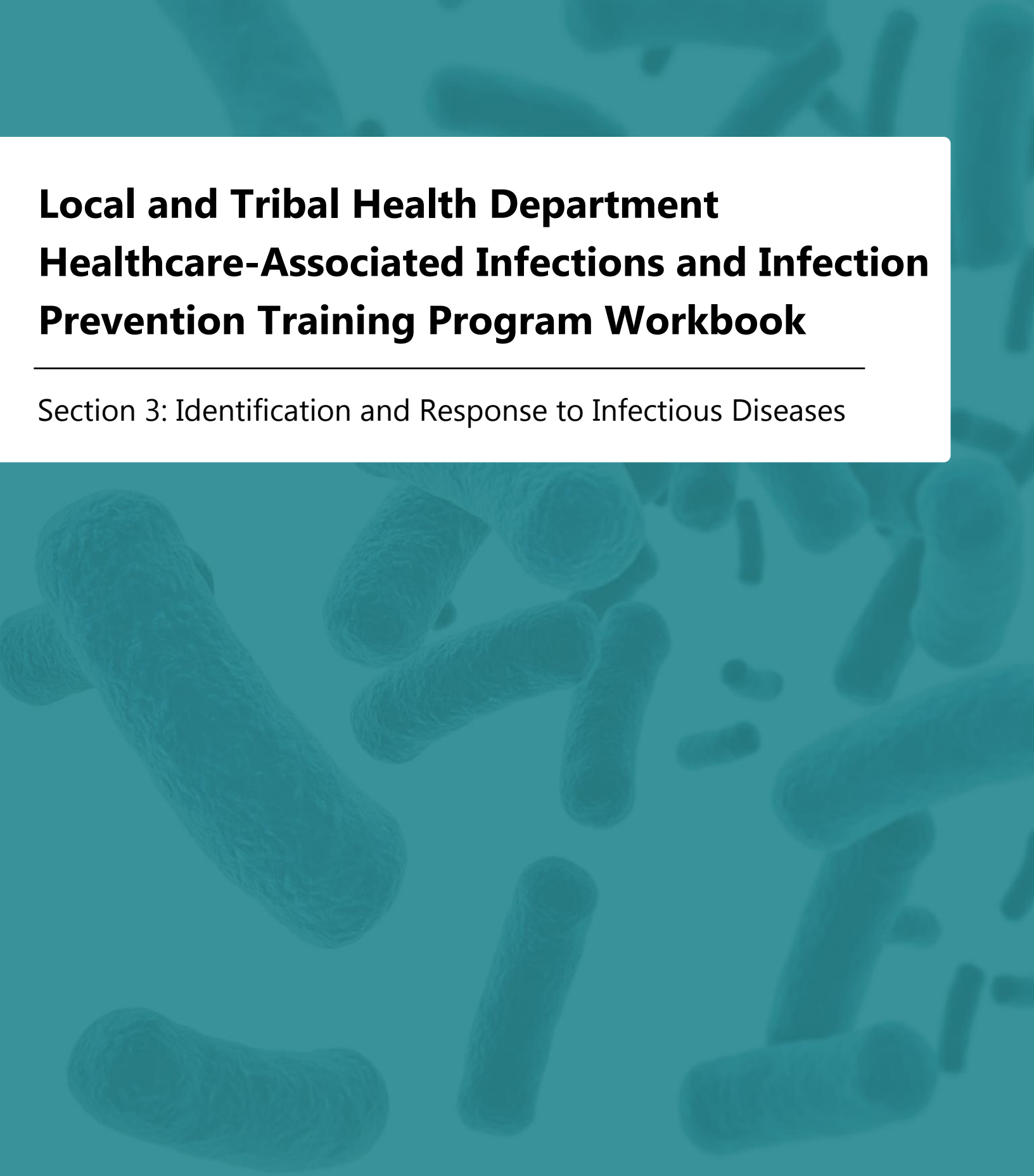
Local and Tribal Health Department Healthcare-Associated Infections and Infection Prevention Training Program Workbook

Section 3: Identification and Response to Infectious Diseases



WISCONSIN DEPARTMENT of HEALTH SERVICES

Wisconsin Healthcare-Associated Infections Prevention Program

P-03373B (09/2023)

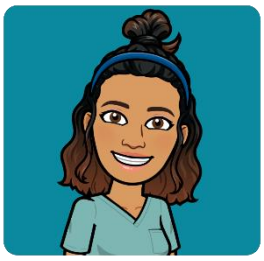
How to Use this Workbook

The Local and Tribal Health Department (LTHD) Healthcare-Associated Infection (HAI) and Infection Prevention Training Program covers a variety of topics and experiences to increase basic healthcare-associated infection and infection prevention and control (IPC) knowledge. Each section of the program has a corresponding workbook with self-paced learning activities and links to additional resources to help supplement your learning. Each workbook includes a list of learning objectives for the section, a tentative meeting and presentation schedule, and self-paced learning activities.

The scenarios and questions included in this workbook are for your own learning and will not be graded. They are intended to supplement group activities and underscore key points in the provided resources. Be prepared to discuss questions, concepts, and scenarios introduced in the self-paced learning sections of this workbook with your regional infection preventionist (IP) or other participants during various follow up activities.

Meet Izzy

Throughout the program, you will follow Izzy, an infection preventionist (IP) at a nursing home, as she encounters IPC scenarios at her facility. Using what you learn in each section, you will help Izzy make decisions that reduce the risk of spreading HAIs in her facility.



Section 3 Objectives

By the end of this section, participants will be able to:

- Interpret common lab reports and results.
- Interpret the Centers for Disease Control and Prevention (CDC) *Guidelines for Isolation Precautions*.
- Identify targeted multidrug-resistant organisms (MDROs).
- Explain the difference between colonization and active infection with an MDRO.
- Explain the importance of an antimicrobial stewardship program.

Week 1 Activities

Activity 1: Introduction to laboratory 20 minutes

Read through the "Laboratory" section of the IP Starter Kit to become familiar with key terms and considerations.

a. Why is the laboratory important for infection prevention?

b. What is colonization testing?

Activity 2: Laboratory and infection prevention 30 minutes

Complete the following questions while referring to the Section 3 introductory presentation slide deck that was shared with you.

a. Fill in the blank: There are three main classes of _____ including protozoa, helminth, ectoparasites.

b. Which of the following are closely related to humans?

- ○ Viruses
- ○ Bacteria
- ○ Fungi
- ◉ Parasites

c. What is an obligate pathogen, and what is an example of one?

d. What is an opportunistic pathogen, and what is an example of one?

e. In your own words, explain the connection between the laboratory and infection prevention.

f. What is the purpose of obtaining microbiology cultures?

g. How long do microbiology culture results generally take to be returned?

h. You see a lab result that reads >100,000 colony-forming units (CFU)/mL of *E. coli*. Is this a quantitative result or qualitative result?

i. You see a lab result that reads scant, moderate, or heavy growth. Is this a quantitative result or qualitative result?

j. What do sensitivity results indicate?

k. What are the two mycobacteriology testing methods?

l. Which of the two testing methods above can yield false positive results? Why?

m. List three examples of diseases or conditions diagnosed through molecular testing.

n. This presentation talks about the ways an IP uses lab results. How do you interact with lab results in your current role, if at all?

Week 2 Activities

Activity 1: Introduction to microbiology 40 minutes

Watch Microbiology Basics: Introduction for a review of common specimen types for microbiology testing.

a. What information should be included with and on the specimen that is being sent to the laboratory?

b. List the six common specimen tests described:

c. True or false: Sputum is essentially saliva.

d. Why is an early morning urine specimen best?

e. A cerebrospinal fluid specimen is collected to test of what type of infection?

f. What is an important consideration when collecting a specimen with a swab?

Activity 2: Anatomy of a lab report 30 minutes

Use what you've learned so far to interpret the below lab results. Refer back to the slides and resources to help you. We will go deeper into interpreting lab results during a case study in this section.

Identify the following elements of a lab report.

a.

b.

c.

d.

e.

Answer options:

- Specimen source
- Pathogen/organism identified
- Organism quantification
- Sensitivity results (quantitative)
- Sensitivity results (qualitative)

TEST ORDERED: URINE, BACTERIAL CULTURE

A

Testing on this culture has been completed. If additional testing is required, please contact the mi crobiology laboratory within 48 hours.

RESULT	VALUE	UNITS	REFERENCE RANGES	ABNORMAL	RESULT STATUS
CULTURE, URINE	PROTEUS MIRABILIS			Abnormal	Final
Bacteria Ur Cult	PROTEUS MIRABILIS			Abnormal	Final

B

C

>100,000 CFU/mL Proteus mirabilis

KPC carbapenemase producing organism. Implement Contact Precautions Per System Isolation/De-Isolation Protocol.

Performing Organization: [redacted]
Performing Organization Address: [redacted]

TEST ORDERED: ETEST~PROTEUS MIRABILIS~PROTEUS MIRABILIS

RESULT	VALUE	UNITS	REFERENCE RANGES	ABNORMAL	RESULT STATUS
CEFTAZIDIME/AVIBACTAM	0.094	ug/mL	Susceptible <=8 ug/mL, Resistant >8 ug/mL	Susceptible	Final
Ceftazidime+Avibactam Susc Islt	0.094	ug/mL	Susceptible <=8 ug/mL, Resistant >8 ug/mL	Susceptible	Final

D

E

Week 3 Activities

Activity 1: Antimicrobial resistance (AR) and targeted MDROs 30 minutes

Answer the following questions while referring to the Section 3 introduction slide deck that was shared with you.

a. Explain the difference between colonization and infection.

b. In your own words, explain how antibiotic resistance happens.

c. What are the four methods of resistance, and which one is the Wisconsin HAI Prevention Program most concerned about?

d. Explain the difference between intrinsic resistance and acquired resistance.

e. True or false: Many of CDC's targeted MDROs are healthcare-associated.

f. True or false: Carbapenem antibiotics should be used as a line of last resort when treating bacterial infections.

g. What is carbapenemase?

h. What is a carbapenemase-producing organism (CPO)?

i. What are the three CPOs that Wisconsin prioritizes by having them as reportable conditions?

Activity 2: How AR happens and spreads 30 minutes

1. Review Where Resistance Spreads: Healthcare Facilities to learn more about how antibiotic resistance spreads in health care facilities and beyond.

   a. What is the estimated national cost to treat infections caused by MDROs?

   b. What are three critical efforts to prevent HAIs and slow the spread of resistance?

   c. What types of infection control measures can health care personnel use to prevent the spread of germs?

   d. Without the use of infection control measures, germs can:

   e. How does hospital wastewater contribute to antibiotic resistance?

2. Review CDC's Health Departments: Action to Combat Resistance.
   a. What are actions local, Tribal, and state health departments can take to combat antimicrobial resistance?

   b. What are you currently doing in your role or at your LTHD to combat antimicrobial resistance? If you're not doing anything at this time, brainstorm what could be done.

Activity 3: MDROs 45 minutes

1. Review the Wisconsin Department of Health Services (DHS) MDRO webpages to learn more about each MDRO:
   - *Candida auris (C. auris)*
   - Carbapenem-resistant Enterobacterales (CRE)
   - Methicillin-resistant *Staphylococcus aureus* (MRSA)
   - Vancomycin-intermediate *Staphylococcus aureus* and Vancomycin-resistant *Staphylococcus aureus* (VISA/VRSA)
   - Carbapenem-resistant *Acinetobacter baumannii* (CRAB)
   - Carbapenem-resistant Pseudomonas aeruginosa (CRPA)

   a. Of the above MDROs that you just reviewed, which ones are considered reportable conditions Wisconsin?

   b. Which one of these organisms is not a bacterium?

   c. Which of these organisms is still relatively rare?

   d. True or false: Antibiotics do not work against *C. auris*.

   e. True or false: People who are colonized with CRE require treatment.

   f. What types of infections can CRE cause?

   g. True or false: VISA, VRSA, and MRSA are resistant *Staphylococcus aureus* bacteria.

   h. What are the two types of MRSA infections?

   i. What do MRSA infections typically look like and where do they appear?

2. Review the MDRO factsheet for residents and families.

   a. How do MDROs spread in health care settings?

b. Can someone with an MDRO spread it to others? Who is at greatest risk?

c. How can spread be prevented? Please provide detail on each prevention method.

Activity 4: MDROs in Wisconsin 35 minutes

Watch the MDROs in Wisconsin presentation until minute 24:20. You will finish watching the rest of this presentation in Section 4.

a. When did Wisconsin start testing for CP-CRE?

b. True or false: The Wisconsin State Laboratory of Hygiene (WSLH) can test for all five carbapenemases seen in CP-CRE.

c. Which is the most common carbapenemase associated with CP-CRE found in Wisconsin?

d. In what Wisconsin region is CP-CRE most common and why?

e. Which bacterium is naturally drug resistant?

f. What are risk factors for CP-CRPA and why?

g. Most CRAB isolates tested produce which kind of carbapenemase?

h. What is an important risk factor for CP-CRAB?

Week 4 Activities

Activity 1: Antimicrobial Stewardship Presentation 60 minutes

Watch the pre-recorded DHS presentation on antimicrobial stewardship.

a. List three takeaways from the presentation that are applicable to your role at the LTHD.

Activity 2: Antibiotic Prescribing in Wisconsin 45 minutes

Review the DHS report on outpatient antibiotic prescribing trends in Wisconsin.

a. List the three most commonly prescribed oral antibiotics by class.

b. Which site of care was most likely to result in an antibiotic prescription?

c. The rate of visits associated with prescriptions was greatest in which Wisconsin public health region?

d. True or false: The rate of visits associated with antibiotic prescriptions was greatest for female patients.

e. What actions are recommended based on the findings of this report?

f. According to this report, the number of Wisconsin outpatient visits with antibiotics prescribed (per 1,000 visits) were highest during which quarter and year?

g. What is the area deprivation index?

h. Fill in the blank: Match the medical condition with its antibiotic indication tier using the word bank below.

Tier 1 Antibiotics are almost always indicated.	Tier 2 Antibiotics are sometimes indicated.	Tier 3 Antibiotics are never indicated.
• Urinary tract infection • Pneumonia • Pyelonephritis • •	• Acute pharyngitis • Acute sinusitis • Dysuria • Chronic sinusitis • •	• • •

- Acute bronchitis
- Otitis media
- Cutaneous abscess
- Acute upper respiratory infection
- Streptoccocal pharyngitis
- Cough
- Cellulitis

i. How many prescriptions were associated with either cough, acute upper respiratory infection, or acute bronchitis in 2021?

j. True or false: There was no significant difference in antibiotic prescribing associated with cough, acute URI, or bronchitis by location type (such as emergency department, urgent care, office, or clinic).

Activity 3: Antimicrobial Stewardship Programs 30 minutes

Watch the CDC *What's New in the Core Elements of Hospital Antibiotic Stewardship Programs, 2019 video* and review the accompanying webpage, Core Elements of Hospital Antibiotic Stewardship Programs.

a. List five things that hospital antibiotic stewardship programs can reduce.

b. What is the purpose of the CDC core elements of hospital antibiotic stewardship programs?

c. List the seven core elements and briefly summarize each.

Additional Resources

The following are optional readings, articles, and other resources for information on the topics covered in Section 3.

Laboratory

- CDC Reminds Clinical Laboratories and Healthcare Infection Preventionists of their Role in the Search and Containment of Vancomycin-Resistant Staphylococcus aureus (VRSA), CDC
- Lab Training and Training Job Aids, CDC
- Introduction to Public Health Laboratories, CDC
- Lab's Important Role in Infection Control, Commission on Office Laboratory Accreditation, COLA
- Serology Basics: Testing for Diseases, Dr. A
- *Infection Preventionist's Guide to the Lab,* Association for Professionals in Infection Control and Epidemiology

AR

- 5 Things to Know, CDC
- Fight Antimicrobial Resistance with Infection Control, CDC
- Where Resistance Spreads, CDC
- Actions to Fight Antibiotic Resistance, CDC
- Antibiotic Resistance, DHS
- Antibiotic Resistance Threats in the United States (2019), CDC

Stewardship

- Antimicrobial Stewardship: Resources for Patients and Health Care Professionals, DHS
- Antimicrobial Stewardship and Infection Prevention—Leveraging the Synergy: A position paper update, American Journal of Infection Control

Notes, questions, and comments