

THE REGISTERED APPRENTICESHIP OCCUPATIONS AND STANDARDS CENTER OF EXCELLENCE (AOSC)

Infection Preventionist National Occupational Framework

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Introduction to Using This Document

Under the Registered Apprenticeship Technical Assistance Centers of Excellence award, the Urban Institute leads the Occupations and Standards work. One of the main objectives of Urban's project is to create high-quality, well-researched, consensus-based work process schedules that are nonproprietary and widely available. This document is a product of that work and contains three sections: the occupational overview, the work process schedule, and the related technical instruction.

The **occupational overview** is a general introduction, including alternative job titles, any prerequisites, and, if applicable, the total number of hours needed to complete a time-based or hybrid program.

The **work process schedule** outlines the major job functions, competencies, and/or hours an apprentice completes in a registered apprenticeship program. It outlines what apprentices are expected to learn on the job with the support of a mentor or journeyworker (a worker mastering the competencies of an occupation in a particular industry), including both core competencies and those deemed optional by experts in the field. The work process schedule is the foundational document guiding a program.

Urban works with numerous experts to ensure the content is thoroughly researched and vetted to reflect the expectations of industry, educators, labor unions, employers, and others involved in apprenticeship for this occupation. Sponsors and employers can use the work process schedule as their program standards with assurances it has been approved by experts in the field.

The **related technical instruction** presents considerations for the coursework that apprentices will undertake to supplement on-the-job learning. It is intended to serve as a reference to sponsors exploring their options for the accompanying classroom, virtual, or hybrid training.

How to Use the Work Process Schedule

Sponsors can adapt the work process schedule to accommodate their needs for competency- or time-based or hybrid programs. In a **competency-based** apprenticeship, sponsors assess apprentices' progress across core and optional competencies listed in the work process schedule. In a **time-based** apprenticeship, apprentices complete a predetermined number of hours across major job functions and the program overall. In a **hybrid** apprenticeship, sponsors monitor apprentices' hours spent on major job functions and assess their proficiency across competencies.

Each program type has a different method of assessment:

- **For a competency-based program**, apprentices engage in activities and make progress toward proficiency in the identified competencies. Sponsors overseeing apprentices' work assess their mastery of the outlined competencies using the following rating scale:

4—Competent/proficient (able to perform all elements of the task successfully and independently)

3—Satisfactory performance (able to perform elements of the task with minimal assistance)

2—Completed the task with significant assistance

1—Unsuccessfully attempted the task

0—No exposure (note the reason—absence, skill isn't covered, etc.)

The competencies may be completed in any order. Apprentices must perform at a level 4 or 3 in all competencies listed as “core” to complete the apprenticeship program successfully.

- **For a time-based program**, sponsors monitor apprentices' completion of hours in training across major job functions. The total number of hours recommended for this occupation is listed in the occupational overview and is based on guidance from the US Department of Labor. Generally, apprentices must have at least 2,000 hours overall for on-the-job learning, but occupations of greater complexity may require more hours. Sponsors will provide apprentices with supervised work experience and allocate the total number of hours across the major job functions to adequately train their apprentices.
- **The hybrid approach** blends both competency- and time-based strategies. Sponsors measure apprentices' skills acquisition through a combination of completing the minimum number of hours of on-the-job learning successfully demonstrating identified competencies. Sponsors will assess apprentices' proficiencies as described for competency-based programs with a rating scale of 0–4 for every core competency. Generally, apprentices have at least 2,000 hours overall for on-the-job learning, but occupations of greater complexity may require more hours. Sponsors will document apprentices' completion within a minimum and maximum range of hours assigned for each major job function.

Infection Preventionist Occupational Overview

Occupational Purpose and Context

An infection preventionist (IP) is responsible for performing and overseeing infection prevention and control efforts in health care or congregational settings. They are involved in all aspects of work occurring in these settings, utilizing data collection and analysis and policy development to ensure a safe environment. IPs review many factors to understand how infections occur and spread in a facility, using epidemiologic principles to identify patterns and trends. They observe health care and other practices affecting people and patients within the facility, educate health care teams, develop targeted interventions, and advise leadership and other professionals. They also accumulate and analyze infection data about their facility and community, establish policies and procedures to reduce infections, and coordinate with public health agencies.

IPs have not typically entered the field directly through a defined university curriculum pathway. Instead, most IPs prepare through additional on-the-job training and education after serving in a health care occupation, most commonly as Registered Nurses or in other disciplines such as medical technology, microbiology, or public health. Although IP-specific degree programs are now becoming more widely available, most IPs in practice do not have these specialized degrees.

The most common setting for most IPs is hospitals. But IP positions are found in a wide variety of venues, including but not limited to outpatient clinics, long-term care facilities, ambulatory surgery centers, dialysis centers, psychiatric hospitals, local and state health departments, dental offices, acute care educational settings, prisons, schools, entertainment, and sports venues, and in the travel industry, such as cruise lines and hotels.

Potential Job Titles

Infection preventionist, infection control professional/practitioner, IP manager, local/regional IP director, system or corporate IP director, quality nurse consultant, VP for IP, senior IP, executive director IP

Apprenticeship Prerequisites

General prerequisites for this occupation include having a bachelor's degree plus experience in a health care-related field as a Registered Nurse, public health professional, epidemiologist, medical technician,

laboratory scientist, or microbiologist. However, the apprenticeship program prepared in this National Occupational Framework intends to remove some of the current work and credential requirements for participation in the occupation.

Recommended Length of Apprenticeship (Time-Based/Hybrid Programs Only)

The recommended length of time for on-the-job training in a IP apprenticeship is 2,000 to 3,000 hours.

Work Process Schedule

Infection Preventionist

ONET Code: 19-1041.00

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Instructions for Use:

Competency-based programs: In the “performance level achieved” column of the work process schedule (see examples starting on the next page), assess apprentices’ performances on each competency with the scale below. No monitoring of hours is required for this approach. See “Guidelines for Competency-Based, Hybrid and Time-Based Apprenticeship Training Approaches,” US Department of Labor, Employment and Training Administration, Office of Apprenticeship, October 20, 2015,

<https://www.apprenticeship.gov/sites/default/files/bulletins/Cir2016-01.pdf>.

- 4—Competent/proficient (able to perform all elements of the task successfully and independently)
- 3—Satisfactory performance (able to perform elements of the task with minimal assistance)
- 2—Completed the task with significant assistance
- 1—Unsuccessfully attempted the task
- 0—No exposure (note the reason—absence, skill isn’t covered, etc.)

Time-based programs: In the “hours” row, specify the number of hours apprentices will fulfill for each job function. No assessment of competencies is required for this approach.

Hybrid programs: In the “performance level achieved” column, assess apprentices’ performances on each competency using the 0–4 scale above. In the “hours” row, identify a range of hours apprentices should spend working on each major job function.

Job Function 1: Conducts risk assessments and develops surveillance plans for epidemiologic investigation

Hours (time-based and hybrid programs only):

Competencies	Core or optional	Performance level achieved (0–4) (competency-based and hybrid programs only)
A. Demonstrates risk assessment concerning surveillance plans, populations served, and other regulatory requirements	Core	
B. Integrates surveillance across multiple settings as applicable	Core	
C. Develops a work plan, including surveillance to be conducted, based on risk assessment	Core	
D. Establishes a notification system within surveillance plans for epidemiologically significant findings	Core	
E. Identifies when and to whom possible incidents of communicable disease or infections should be reported in alignment with local, state, and national regulatory requirements	Core	
F. Uses standardized definitions within the field in all reporting activities	Core	
G. Monitors and tracks pathogens of significance to the setting, including but not limited to multidrug resistant organisms and emerging pathogens, and participates in antimicrobial stewardship	Core	
H. Collaborates with the appropriate persons to review and interpret the relevance of findings related to pathogens of significance to the setting	Core	
I. Differentiates between prophylactic, empiric, and therapeutic uses of antimicrobials	Core	
J. Implements and evaluates infection prevention and control measures through ongoing surveillance	Core	
K. Interprets the relevance of diagnostic and laboratory reports as they apply to surveillance definitions and isolation	Core	

Job Function 2: Investigates outbreaks and exposure		
Hours (time-based and hybrid programs only):		
Competencies	Core or optional	Performance level achieved (0–4) (competency-based and hybrid programs only)
A. Establishes processes to identify the potential existence of an infectious disease outbreak or demonstrates how to verify an outbreak versus endemic disease	Core	
B. Follows (or can state how to follow) the steps of an outbreak investigation based on their institution's policy	Core	
C. Directs multidisciplinary team to establish the case definition, period of investigation, and case-finding methods for outbreak investigations	Core	
D. Prepares and disseminates reports to multiple stakeholders with the use of appropriate graphs, tables, charts, and other visuals, regarding surveillance and outbreaks	Core	
E. Formulates hypothesis on source and mode of transmission using time, place, person, and risk factors	Core	
F. Develops and implements outbreak mitigation action plans	Core	

Job Function 3: Analyzes and interprets data and builds infectious disease knowledge		
Hours (time-based and hybrid programs only):		
Competencies	Core or optional	Performance level achieved (0–4) (competency-based and hybrid programs only)
A. Applies established definitions; collects, verifies, and reports denominator data for infection trends appropriate to the setting, such as patient days, central lines days, ventilator days, and indwelling urinary catheter days	Core	
B. Calculates and analyzes infection data, including specific infection rates or ratios (e.g., stratified by risk factors such as provider-specific, location-specific, device-specific, procedure-specific, standardized infection ratio)	Core	
C. Demonstrates understanding of epidemiology and statistical techniques to describe data (e.g., mean,	Core	

standard deviation, rates, ratios, proportions, sensitivity, and specificity)		
D. Organizes, manages, and interprets data in ways that can be shared with colleagues, leadership, regulatory agencies, residents, staff, etc.	Core	
E. Identifies appropriately when new epidemiologic patterns merit further investigations	Core	
F. Evaluates surveillance and data analysis techniques for practical improvements based on published data, input from stakeholders, and effectiveness of conducted surveillance	Optional	
G. Correlates clinical signs and symptoms with infectious disease processes to track and monitor health care-associated infections and proper isolation needs for patients	Core	
H. Differentiates between colonization, infection, and contamination	Core	
I. Demonstrates proficiency in microbiology, including basic understanding of bacteria, viruses, fungi, and parasites. (e.g., organism recovery sites, basic knowledge of testing modalities, and interpretation of results)	Core	

Job Function 4: Prevents and controls the transmission of infectious agents and health care-associated infections (HAIs)		
Hours (time-based and hybrid programs only):		
Competencies	Core or optional	Performance level achieved (0–4) (competency-based and hybrid programs only)
A. Implements, and sometimes develops, evidence-based infection prevention and control policies and procedures	Core	
B. Provides education, training, and plans for tracking and controlling infection and communicable diseases	Core	
C. Consults with appropriate stakeholders regarding practices for specimen collection, transportation, handling, and storage to avoid contamination (IP practices)	Core	
D. Facilitates or participates in root cause and apparent cause analyses of infection events to identify processes for improvement	Core	

E. Outlines the situations in which isolation of a patient is required	Core	
F. Creates plans for isolation that include type and duration of isolation dependent upon the infectious agent involved	Core	
G. Collaborates with responsible parties (e.g., occupational health, human resources) on staff work restriction policies related to communicable diseases	Optional	
H. Collaborates with others to select and evaluate environmental disinfectant products for appropriate cleaning and disinfection practice	Core	
I. Collaborates with their faculty stakeholders, relevant groups, and agencies in planning community or facility responses to biologic threats and disasters (e.g., public health, pandemics, novel influenza, bioterrorism, etc.)	Core	
J. Identifies and implements evidence-based IPC strategies, including but not limited to <ul style="list-style-type: none"> • hand hygiene; • standard and transmission-based precautions; • respiratory hygiene; • cleaning, disinfection, and sterilization; • environmental cleaning; • dialysis (optional); • linen and laundry; • food safety; • infection risks associated with therapeutic and diagnostic procedures and devices; and • recall of potentially contaminated equipment, food, medications, and supplies 	Core	
K. Consults or educates staff on principles of safe injection practices	Core	
L. Facilitates appropriate implementation of infection prevention isolation precautions, including <ul style="list-style-type: none"> • appropriate selection, use, and disposal of personal protective equipment (PPE); • criteria and process for patient or resident placement into any specific isolation; • establishment of processes for safe transfer and discharge; and • disinfection of shared medical equipment and spaces 	Core	
M. Educates, measures compliance, and provides feedback on IPC policies to staff, patients, and other impacted parties	Core	

N. Develops guidelines and institution plans for responding to multidrug resistant organisms, including screening, clearance, isolation, and disinfection	Core	
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Job Function 5: Collaborates with key stakeholders to guide and improve infection prevention and control within the institution

Hours (time-based and hybrid programs only):

Competencies	Core or optional	Performance level achieved (0–4) (competency-based and hybrid programs only)
A. Assesses institutional needs and makes recommendations for specific products, services, equipment, personnel, and resources for the IPC program	Core	
B. Recommends changes in practice, processes, or built environment based on current evidence, clinical outcomes, and financial implications	Core	
C. Incorporates business modeling to assign value to the prevention of or presence of HAIs (e.g., cost-benefit analysis, return on investment)	Core	
D. Prepares and presents communications, both verbally and in writing, of IPC findings, recommendations, and supporting rationale to appropriate stakeholders	Core	
E. Evaluates accreditation and regulatory requirements and facilitates compliance accordingly	Core	
F. Develops, monitors, measures, evaluates, and reports performance indicators to drive performance improvement initiatives	Core	

Job Function 6: Infection Prevention Leadership and Communication

Hours (time-based and hybrid programs only):

Competencies	Core or optional	Performance level achieved (0–4) (competency-based and hybrid programs only)
A. Demonstrates the ability to communicate succinctly and effectively both verbally and in writing (e.g., email, reports, educational materials, presentations/public speaking)	Core	

B. Leads or facilitates performance improvement activities aimed at reducing the risk of infection transmission	Core	
C. Demonstrates the ability to build collaboration and effective relationships across the organization to influence change positively	Core	
D. Demonstrates leadership in providing executive reports to senior professionals	Core	
E. Demonstrates flexibility, resilience, and tolerance of ambiguity concerning the scope of work, feedback, and surveillance results	Core	
F. Demonstrates diversity, equity, and inclusion and health equity awareness	Core	
G. Demonstrates professional email, text, and phone etiquette, including responding in an appropriate and timely manner	Core	
H. Maintains accountability for surveillance of health care-acquired infections for residents, staff, volunteers, and visitors	Core	
I. Approaches sensitive situations with respect and empathy in dealing with a patient, coworker, or stakeholder needs	Core	
J. Communicates to different audiences' needs in providing education, guidance, and feedback around the IPC plan or guidance during an outbreak	Core	
K. Demonstrates active listening	Core	

Job Function 7: Practices safe care environments and sterilization procedures		
Hours (time-based and hybrid programs only):		
Competencies	Core or optional	Performance level achieved (0–4) (competency-based and hybrid programs only)
A. Recognizes and monitors elements necessary for a safe care environment (e.g., heating, ventilation, and air conditioning; water management standards; construction)	Core	
B. Articulates issues of concern and provides recommendations for improving safety regarding safe care environments	Core	
C. Assesses infection risks of design, construction, and renovation that impact patient care settings and	Core	

environments where air, water, supplies, medications, or food contamination could occur		
D. Participates in risk assessments to mitigate construction-related infection risks	Optional	
E. Provides recommendations to optimize infection prevention as part of the design, construction, and renovation process of the environment	Core	
F. Collaborates with staff on the evaluation, monitoring, and optimization of environmental cleaning, disinfection practices, and utilization of supplemental technologies	Core	
G. Collaborates with others to select and evaluate high-level disinfection and sterilization products and processes for appropriate cleaning, transport, high-level disinfection, and sterilization practices	Core	
H. Identifies and evaluates critical steps of cleaning, high-level disinfection, and sterilization	Core	
I. Partners with colleagues (including sterile processing and endoscopy) on assessing and mitigating infection prevention risks, plans for recalls of sterilized instruments, and tracking of medical devices that undergo high-level disinfection	Core	
J. Uses guidelines, such as those of the Association for the Advancement of Medical Instrumentation (AAMI), for cleaning, disinfection, and sterilization	Core	

Job Function 8: Provides guidance for occupational safety of workers around communicable diseases		
Hours (time-based and hybrid programs only):		
Competencies	Core or optional	Performance level achieved (0–4) (competency-based and hybrid programs only)
A. Assesses risk of occupational exposure to infectious diseases, provides recommendations, and reviews and educates others on occupational safety measures regarding communicable diseases (e.g., tuberculosis exposure and Bloodborne pathogen plans)	Core	
B. Collaborates regarding counseling, follow-up, and work restriction recommendations related to communicable diseases or exposures	Core	

C. Coordinates with occupational health to evaluate infection prevention-related data and provide recommendations	Core	
D. Collaborates with occupational health, human resources, and leadership on policies for health care personnel employee screening and vaccination requirements to mitigate transmission risks to patients, coworkers, and communities	Core	
E. Provides consultation and recommendations for sick policy and work restrictions for employees with communicable diseases	Optional	

Job Function 9: Conducts continuing education, performance improvement, and ongoing evaluation of research for prevention

Hours (time-based and hybrid programs only):

Competencies	Core or optional	Performance level achieved (0-4) (competency-based and hybrid programs only)
A. Demonstrates effective use of industry terminology and current issues or hot topics within the field	Core	
B. Analyzes, shares, and implements new research, guidelines, and best practices in the field as needed	Core	
C. Incorporates changes in best practices in plans appropriately as they are released and facilitates organization-wide adoption	Core	
D. Provides infection prevention and control (IPC) education to various audiences (as needed) and amends material and methods accordingly to evaluate the effectiveness of the education provided and learner outcomes	Core	
E. Facilitates effective education of patients, families, and others regarding prevention and control measures (e.g., written materials, signage, videos)	Core	
F. Implements strategies to engage patients, family, and others aimed at preventing infection	Core	
G. Improves patient care through infection prevention practice using performance improvement methodology	Core	
H. Acts as a principal investigator or participating author in a study that advances IPC	Optional	

Related Technical Instruction

Infection Preventionist

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Instructions for Use:

Registered apprenticeships must include at least 144 hours of related technical instruction (RTI). Courses offered by accredited colleges and universities may be assigned a credit hour determination rather than a contact hour determination. In general, an academic credit unit is the equivalent of 15 clock hours of instruction.

Development and Use of This RTI Outline: Employers and academic institutions may approach RTI in markedly different ways. Our goal was not to identify the single best way to provide RTI or to identify a single provider whose content we deemed to be superior. Instead, our goal was to survey numerous education providers, including employers, institutions of higher education, high schools, private continuing education providers, labor organizations, professional associations and, in some cases, municipalities that provide worker training, to identify topics or courses common among those providers that align with the job functions included in this work process schedule. Those common topics or courses are reflected in the RTI outline provided below, which may be useful in developing your RTI program or communicating your needs to an educational partner.

Licensure or certification requirements: While states do not currently license or certify IPs, many employers require employees to hold or be making progress toward receiving certification in infection prevention and control (CIC) from the Certification Board of Infection Control and Epidemiology (CBIC). Entry-level certification in infection prevention and control, known as Associate-IPC (a-IPC), can help prepare an entrant to the field who does not yet have the adequate education or training for the CIC. Finally, people who plan to work solely in long-term care settings may seek to attain the Long-Term Care Certification in Infection Prevention (LTC-CIP). Training to prepare people for certification is provided by the Association for Professionals in Infection Control and Epidemiology (APIC): <https://apic.org/education-and-events/certification/>.

Degree requirements for licensure or certification, if applicable: Not applicable

Associate-Infection Prevention and control (a-IPC): No specific educational requirements

Certification in Infection Prevention and Control (CIC): Completed postsecondary education in a health-related field including but not limited to medicine, nursing, laboratory technology, public health, or biology. Postsecondary includes public or private universities, colleges, community colleges, etc.

Long-Term Care Certification in Infection Prevention (LTC-CIP): Completed postsecondary education in a health-related field including but not limited to medicine, nursing, laboratory technology, public health, or biology. Postsecondary includes public or private universities, colleges, community colleges, etc. Further background on these certifications available to IPs can be found at <https://www.cbic.org/CBIC/Get-Certified.htm>.

Accreditation requirements of instructional provider for licensure or certification, if applicable:
None known

Anticipated changes in licensure or certification requirements, if known: None known

Examples of state licensure or certification requirements:

Colorado: People practicing in hospitals with more than 50 beds and who collect data on health care-associated infection (HAI) rates must become certified within six months of becoming eligible to test.

Nevada: A person who is designated as the infection control officer of a hospital (with 175 beds or more) must be certified as an IP by CBIC or a successor organization.

New Jersey: An infection control professional must have education or training in surveillance, prevention, and control of health care-associated infections; be certified in infection control within five years of beginning practice; and shall maintain certification through CBIC.

Examples of RTI providers for this occupation

Federal agencies: The Centers for Disease Control (CDC) provides a 19-hour, free, online training course for infection prevention and control in nursing homes. Nursing homes that participate in Medicaid and Medicare programs were required by 2019 to develop and implement an infection prevention and control training program, which may include using the CDC course to educate employees on effective infection control practices. More information can be found at <https://www.cms.gov/Medicare/Provider-Enrollment-and-Certification/SurveyCertificationGenInfo/Downloads/QSO19-10-NH.pdf>.

The CDC Nursing Home Infection Preventionist training course can be found at https://www.train.org/cdctrain/training_plan/3814.

The CDC's Project Firstline is intended to provide basic infection prevention and control training to frontline health care workers in short courses through a variety of media. While this is not designed to train IPs, it can serve as an introductory background resource about important issues in infection prevention. Learn more at <https://www.cdc.gov/infectioncontrol/projectfirstline/index.html>.

CDC Infection Control Training—States Targeting Reduction in Infections via Engagement (STRIVE) courses address both the technical and foundational elements of HAI prevention and can be taken in any order. For more information, see <https://www.cdc.gov/infectioncontrol/training/strive.html>.

The CDC's National Healthcare Safety Network (NHSN) the federal health care-associated infection tracking system utilized by IPs, provides training for new users and ongoing training for users of the

various components of the NHSN database. These are taken online on demand:

<https://www.cdc.gov/nhsn/training/newtonhsn.html>.

Professional associations and labor organizations: APIC provides training to people preparing to take the CIC and the LTC-CIP certification exams as well as a wide range of general trainings for IPs including in-person trainings, virtual trainings, bundled learning opportunities, and customized training for groups. Some sample offerings include the EPI Education Series Online: The Fundamentals of Infection Surveillance, Prevention and Control (EPI 101 and EPI 102); Basic Microbiology for Infection Preventionists; Basics of Construction and Renovation; Tech Tools: Basics of Microsoft Excel; Basic Statistics for Infection Preventionists; and the EPI in Long-Term Care Education Series Online. [See https://apic.org/education-and-events/overview/](https://apic.org/education-and-events/overview/).

The Agency for Healthcare Quality and Research (AHRQ) offers some training in quality improvement and communication, including education specific to central line-associated bloodstream infection (CLABSI) prevention. See <https://www.ahrq.gov/patient-safety/education/index.html>.

The American Health Care Association in partnership with the National Center for Assisted Living offers Infection Preventionist Specialist Training focused on training for infection control officers. See <https://educate.ahcancal.org/products/infection-preventionist-specialized-training-ipco>. The Association for Peri-Operative Nurses offers training specifically for infection control in ambulatory surgery settings. See <https://www.aorn.org/education/education-for-the-asc/asc-academy-prep-for-infection-prevention-certification>.

The Institute for Healthcare Improvement offers online courses in quality management and patient safety topics. See <https://www.ihl.org/education/ihl-open-school/Pages/Curriculum.aspx>.

The United Brotherhood of Carpenters New York City District of Carpenters provides training on best practices in infection control risk assessment (ICRA) for construction and renovations in health care facilities. See <https://www.nyccarpenterstrainingcenter.org/2020/04/02/icra-best-practices-awareness-class-information/>.

The American Society for Health Care Engineering offers training on best practices for ICRA for construction and renovation in health care. See <https://www.ashe.org/education/icra-elearning>.

Military: The US Armed Forces does not currently provide training for IPs. Often civilians are hired to provide this service, or nurses are put into infection control roles, frequently without specific training in infection prevention.

States/municipalities: Whereas there is a movement in states to require specified training for health care workers around pain management, opioids, child abuse, and human trafficking; few states require coursework in infection prevention and control that is not HIV/AIDS specific. One example is in New York, where nurses must complete course work or training in infection control at initial licensure and every four years thereafter.

Colleges and universities: Many colleges and universities offer coursework in microbiology and epidemiology, which is relevant to preparing to become an IP. APIC is pursuing partnerships with colleges and universities to create dedicated career pathway programs for IPs. In some cases, IPs receive degrees in nursing before transitioning to a career as an IP. Some colleges and universities offer specialized training in infection control, such as the following.

Virginia Commonwealth University's Virginia Infection Prevention Training Center:

<https://viptc.vcu.edu/>

University of California, Los Angeles's extension certificate in infection prevention and control:

<https://www.uclaextension.edu/health-care-counseling/health-care-counseling-general/certificate/infection-prevention-and-control>

Drexel University's online graduate certificate in infection prevention and control:

<https://www.online.drexel.edu/online-degrees/public-health-degrees/cert-infectious-disease-control/index.aspx>

University of South Florida University's undergraduate minor in infection prevention and control:

modeled after the national certification for the Associate—Infection Prevention and Control (a-IPC) exam administered by the Certification Board of Infection Control and Epidemiology (CBIC). This certification allows entry-level IPs to obtain national certification without prior work experience and is intended as a transition point to the full CIC. See

<https://health.usf.edu/publichealth/undergrad/minors>.

University of North Carolina, Chapel Hill—Statewide Program for Infection Prevention and

Epidemiology (SPICE): SPICE provides infection control courses for different types of health care facilities. SPICE courses meet the training requirements of NC Rule .0206 (<https://spice.unc.edu/wp-content/uploads/2022/09/0206-and-0207.pdf>). When you complete a SPICE course, you will receive a course completion certificate, not a certification. Courses include LTC, HAI, Surveillance and IPs/Environmentalist, Instrument for Reprocessing, and IPC Education for Nursing Home staff. See <https://spice.unc.edu/about/>.

Post University's online graduate certificate in infection prevention and control:

<https://post.edu/academics/undergraduate-degrees-certificates/infection-prevention-control-certificate/>.

University of Michigan's certificate in health care infection and prevention and control (CHIP):

<https://sph.umich.edu/infectioncontrol/about.html>.

University of Nevada, Las Vegas's certificate in infection prevention:

<https://www.unlv.edu/certificate/infection-prevention>.

University of Indiana's graduate certificate in infection prevention and control:

<https://fsph.iupui.edu/academics/certificates/epidemiology-infection-control-prevention.html>.

No-cost online providers: Coursera offers courses in a number of areas relevant to infection prevention and control, including coursework in the prevention of the spread of infection in nursing homes (offered by the University of North Carolina at Chapel Hill) and stories of infection and COVID-19 training for health care workers (offered by Stanford University). EdX offers courses in infection

disease and epidemiology, such as epidemics I (offered by the University of Hong Kong), microbiology (offered by Southern New Hampshire University), and health care risk management (offered by Stanford University). These courses are not designed specifically for IPs but may be incorporated into comprehensive RTI programs.

Continuing Education or Specialty Education Providers

Association of Professionals in Infection Control and Epidemiology's (APIC's) EPI Intensive course:

This intensive training course covers essential training and competency-building in infection prevention and control (IPC) for health care professionals in acute care: <https://apic.org/course/epi-intensive-4-day-course/>.

APIC's Ambulatory Surgery Centers (ASCs) and Outpatient Clinics/Services Intensive course: This intensive course introduces the various roles and responsibilities of the IP working in ASCs and Outpatient Clinics/Services: <https://apic.org/course/ambulatory-surgery-centers/>.

APIC's Advancing Your Practice online series: This series is a package offering that includes four courses, such as Making the Business Case: Financial Acumen for the Infection Preventionist, Leadership and Management for Infection Prevention, Health Information Technology, and Research Education Series. These courses can also be taken individually: <https://apic.org/course/advancing-your-practice/>.

APIC's Making the Business Case: Financial Acumen for the Infection Preventionist course: <https://apic.org/course/financial-acumen-for-the-infection-preventionist/>.

APIC's Leadership and Management for Infection Prevention course: <https://apic.org/course/leadership-and-management-in-infection-prevention/>.

APIC's Health Information Technology course: <https://apic.org/course/health-information-technology/>.

APIC's Research Education Series course: <https://apic.org/course/research-webinar-series/>.

Post University's master of science in Nursing—specialization in infection prevention and control: <https://post.edu/academics/online-graduate-degrees/m-s-nursing/infection-prevention-and-control/>.

University of South Florida's master of public health program with a concentration in infection control: <https://health.usf.edu/publichealth/apply/online/online-mph-ic>.

Prerequisite knowledge, skills, or experience typically required by RTI providers for this occupation

A survey of the field by APIC in 2020 indicated that 82 percent of IPs are educated at the bachelor's degree level or higher, with 17 percent having education at the associate degree level or below. Infection prevention and control is an interdisciplinary field, and IPs may have experience working in another health care-related occupation before becoming an IP—typically nursing, public health, medical technology, or microbiology—but this is not a requirement for career entry. People pursuing a career in infection prevention must be detail-oriented, must be able to work collaboratively with others at all levels of education and position, must be able to read and interpret data and information in

scientific documents and apply logic, and must apply scientific evidence and practical situation-based reasoning to solving problems.

If RTI is being delivered by a college or university, the institution may have established prerequisites in mathematics, biology, and English that must be completed before a student may enroll in more advanced coursework in microbiology, statistics, infection control or epidemiology. APIC has resources including a Competency Model and Novice Roadmap that will help interested people evaluate their background and adjust their educational needs appropriately.

Organizational Structure and Function in Health Care Facilities

Hours: 10–20

Sample learning objectives

- Explain the nature of administrative hierarchies, decision making, chain-of-command, scope of practice, and funding streams that combine to create a unique working environment in hospitals, long-term care facilities, and outpatient health care facilities
- Describe where the infection prevention and control committee and department fall in the chain of command for the facility and how the functions of the department are authorized within the facility's administrative structure
- Articulate the roles of doctors, nurses, allied health providers, and health support staff in the clinical care setting, and discuss effective strategies for working with licensed care providers to develop and implement infection prevention protocols
- Discuss the various models used by health care facilities to engage staff in education and training, monitor and enforce compliance with hospital policies, and promote behaviors that improve infection prevention
- Describe the types of interactions that occur between hospitals and the various regulatory and oversight agency organizations that review, fund, or control their work
- Discuss the role of communications, public relations, and the media in managing health care facilities and maintaining trust of patients and communities. Explain the rules in place at most health care facilities about who can represent the facility in dealing with the press, and describe effective strategies communications professionals use for relaying accurate information that neither sensationalizes nor misrepresents the nature of risk
- Describe the importance of ethical practice and demonstrate the ability to make well-reasoned and ethically sound decisions when presented with challenging situations
- Demonstrate the ability to engage the appropriate professionals in conversations about risk mitigation and management
- Demonstrate the ability to discuss infection prevention and control through informal written communications (e.g., email or text)
- Participate in creation and review of reports for administrative meetings and regulatory requirements

Microbiology for Infection Prevention and Control

Hours: 20–30

Sample learning objectives

- List and define the components of the microbial world and distinguish between bacteria, viruses, fungi, and parasites
- List and define culture-based and non-culture-based methods for identifying various microorganisms, including the appropriate tests for specific organisms, availability and turnaround time, and advantages and disadvantages of various methods
- Identify and describe appropriate human specimens for laboratory testing, including appropriate specimen sources for various disease entities, indications for testing, and how specimens should be collected
- Define metrics that are appropriate to monitor specimen quality, including contamination rates and time intervals from collection to processing
- Describe metrics for identifying rates of inappropriate specimen submission (diagnostic stewardship)
- Discuss methods for identifying common organisms and antimicrobial resistance patterns in a facility or community through the use of antibiograms
- Discuss methods for identifying inappropriate use of antibiotics (antimicrobial stewardship)
- Identify common opportunities to improve antibiotic use in health care and best practices to improve antibiotic use
- Discuss methods to recognize novel organisms or resistance patterns and the appropriate communication about these organisms
- Identify available resources to guide reporting of communicable diseases to the appropriate authorities
- Describe conditions for microbial growth in humans and the environment

Epidemiology and Statistics for Infection Prevention and Control

Hours: 40–60

Sample learning objectives

- Identify and list types of research designs and which designs are appropriate for specific types of research questions
- Identify appropriate statistical tests for various types of study designs and data
- Demonstrate understanding of sample size and power needed to test a research hypothesis
- Communicate the understanding of the statistical significance and the impact of chance on a given result
- Demonstrate capability to use common software programs that may be used for data collection and statistical analysis
- Discuss the importance of ethical conduct of research and identify procedures used to protect human subjects in research
- Demonstrate the ability to synthesize knowledge from data, experience, and published research
- Identify known risk factors for HAI, and consider diverse risk factors and social determinants of health when conducting HAI research

Health Care–Associated Infections and the Protection of Patients in Health Care Settings

Hours: 40–60

Sample learning objectives

- Describe the principles of infection prevention, including the chain of infection and modes of transmission for infectious diseases
- Discuss the impact of HAIs and iatrogenic disease on life expectancy, successful patient outcomes, health care costs, and legal liability
- Define and demonstrate the ability to accurately employ standard and transmission-based precautions to protect against microbial transmission
- Describe the various practices and strategies employed in health care settings to protect patients from disease transmission and methods for assessing the effectiveness of those strategies
- Demonstrate the ability to observe health care practices (e.g., hand hygiene, adherence to standard and transmission-based precautions, central line insertion, urinary catheter insertion and maintenance) that impact patient infection risk
- Demonstrate the ability to perform surveillance and risk assessments to identify potential sources of disease transmission and to recommend actions or devices that will effectively reduce the risk of disease transmission where opportunities for improvement are identified
- Demonstrate the ability to collect information from patients, patient records, or other sources to trace the risks for infection, identify populations at risk of infection, and advise on mitigation strategies
- Describe the types of microbial infections most likely to spread in health care facilities and the strategies used to minimize introduction and spread of disease
- Discuss the types of microbial infections common among high-risk patient populations based on their underlying medical conditions or comorbidities, socioeconomic status, and behavioral choices (social, nutritional, sexual, substance abuse, etc.)
- Discuss the infectious disease challenges created by the abuse and misuse of antibiotics and explain strategies for protecting patients and workers from multidrug resistant microorganisms

Occupational Health and Safety

Hours: 5–10

Sample learning objectives

- Discuss the types of infectious diseases that may impact workers in various health care settings and how those diseases are typically transmitted to health care personnel
- Describe the common diseases for which health care personnel are screened upon employment, annually, and upon exposure
- Explain which vaccines health care personnel are required or encouraged to have and strategies for managing exposures among vaccinated and unvaccinated health care personnel
- Identify strategies to support health care worker skin integrity that may be impacted by frequent hand hygiene or exposure to gloves
- Describe the process for conducting a risk assessment and implementing mitigation strategies based on previous exposure incidents
- Demonstrate the ability to identify and evaluate the effectiveness of risk mitigation strategies employed by employers to protect worker health
- Discuss the role of state and federal agencies in regulating and protecting human, animal, and environmental health and explain the purpose and history of key laws and regulations with which employers, producers, and manufacturers must comply
- Describe and demonstrate the ability to use appropriate tools, equipment, clothing, masks, respirators, and containers to protect workers from exposure to infectious disease

Training in IPC Health Care Providers in Infection Prevention and Control

Hours: 10–20

Sample learning objectives

- Describe the chain of infection, the types of pathogens or infectious agents commonly found in health care environments, reservoirs for infectious disease agents, ports of entry and exit of infectious disease agents, modes of disease transmission, and risk factors that create susceptible hosts in the health care environment
- Describe the various factors that influence or determine the outcome of exposures to infectious disease agents, including natural barriers, host immunity, infectivity, and environmental factors
- Describe and demonstrate effective strategies for preventing the spread of disease in the health care environment, including standard and transmission-based precautions, controlling routes of transmission, use of appropriate barriers and protective clothing, susceptible host support and protection techniques, environmental control measures, work practice controls, and education and training of patients and workers

- Describe strategies for preventing parenteral exposure; engaging in safe injection, suturing, and surgical techniques; and safely collecting and handling body tissue and fluid samples
- Demonstrate the ability to conduct appropriate surveillance and evaluation of an exposure accident
- Describe and demonstrate appropriate use of engineering and work practice controls to prevent transmission of disease
- Discuss the importance of antibiotic stewardship to reduce and control the development of multidrug resistant microorganisms

Environment of Care

Hours: 10-20

Sample learning objectives

- List the infectious disease agents most commonly transmitted through the environment, as well as strategies for monitoring and eliminating the presence of pathogens
- Demonstrate the ability to identify appropriate disinfectants for low-level environmental disinfection (using Environmental Protection Agency lists for various pathogens) and the use of adjunctive touch-free environmental modalities (UV light, hydrogen peroxide, vapor, etc.)
- Demonstrate understanding of environmental monitoring options for cleanliness (adenosine triphosphate /fluorescent marking)
- List important elements for linen and laundry handling and maintenance
- Participate in environmental rounding activities with facilities and environmental services staff
- Participate in facility water management program, including water testing, analysis of results, and recommendation of mitigation strategies as needed
- Become familiar with the facility utilities management plan, the emergency preparedness plan, and protocols for system or facilities failures, and employ strategies to protect patients and staff from infection in the setting of leaks, power failures, influx of infectious patients, or other emergencies
- Demonstrate knowledge of heating, ventilation, and air-conditioning requirements for all types of patient care areas and how these are met routinely when weather changes and if utilities are disrupted
- Participate in ICRA's for construction and renovations, including recognizing design elements that can impact infection risk and mitigation strategies during construction, renovation, and commissioning of these spaces
- Conduct rounding on construction or renovation projects to ensure appropriate containment and cleanliness of the site and paths of ingress and egress

Sterilization and Disinfection

Hours: 20–30

Sample learning objectives

- Explain the Spaulding classification for disinfection and sterilization and describe the types of patient care equipment in each category
- Identify manufacturers' instructions for specific equipment and observe management of those items from use through reprocessing to ensure that instructions are correctly followed
- Identify high-risk instruments and create an ongoing monitoring process to ensure appropriate high-level disinfection or sterilization
- Explain the differences between high-level disinfection and sterilization, and the methods available for each, including which types of processes are used for which types of equipment
- Assess sterilization and disinfection logs for completeness and appropriateness
- Identify the recall process for any instruments or equipment found to be inappropriate for use once distributed and the procedures for notification when equipment has been used before recall
- Identify the procedure for managing patients with suspected or confirmed Creutzfeldt-Jacobs disease and for the instruments and equipment used for the care of these patients
- Explain the procedures for managing equipment that uses or contacts water to prevent contamination with microorganisms that could be harmful to patients (e.g., dental water lines, heater coolers for cardiac surgery, humidifiers, and ventilators)

Regulatory and Accreditation Requirements and Reputational Program Participation

Hours: 10–20

Sample learning objectives

- Review US federal reports on HAI, antibiotic resistance, and healthy people goals that are relevant to infection prevention and control
- Conduct a review of state public health sites, including specific requirements for reporting HAI by state and locality
- Review requirements for reporting communicable diseases by state and locality and demonstrate capability to report communicable diseases with all required information
- Identify the accreditation body for the facility, demonstrate familiarity with infection prevention and control accreditation standards, and participate in rounding and observations for compliance monitoring and regulatory readiness
- Explain how the public can access comparative performance data from Centers for Medicare and Medicaid Services websites and the elements for HAI reporting

- Recognize the pay-for-performance structure from the Centers for Medicare and Medicaid Services and some insurers and public advocacy groups and the impact that can have on institutions and assure that the infection indicators are available, timely, and routinely used to guide performance improvement initiatives
- Demonstrate capability to perform NHSN surveillance, including use of standardized HAI definitions, data entry into the NHSN system, and ability to pull reports from the NHSN system

Infection Prevention for Specialty Areas and Populations with Unique Needs

Hours: 10–20

Sample learning objectives

- List food storage and temperature requirements and employee practices associated with food safety, and participate in food and nutrition department rounding
- Observe food service in patient care units, including food temperature management, use of PPE, and management of clean and used dishes
- Demonstrate knowledge of water management, vaccination requirements, patient placement, and cleaning and disinfection requirements for dialysis patients
- List requirements for air temperature, pressure, humidity, and flow for operating rooms, endoscopy areas, invasive procedure rooms, and laboratories
- Demonstrate surgical hand hygiene procedures, set up of sterile field, and management of sterile supplies and equipment in operating rooms and procedure areas
- Identify best practices for the prevention of surgical site infections and infections associated with endoscopy and other invasive procedures
- Demonstrate knowledge of surgical and procedural specimen management
- Identify unique risk factors for infection among the very young (e.g., neonatal intensive care unit) patients, geriatric patients, and those with burns, cancer, organ transplants, or immunodeficiencies, and list strategies and best practices to prevent infection among these patient populations

Emergency Preparedness, Outbreak Response, and Exposure Management

Hours: 10–20

Sample learning objectives

- Demonstrate capacity to create definitions of outbreak cases and exposures and to create line lists of both cases and exposed people
- Identify internal and external stakeholders; participate in developing of a communication plan for each
- Coordinate placement of case patients with the clinical team and other stakeholders
- Determine the course of action for exposed health care personnel, patients, and visitors as indicated by the disease to which they were exposed
- Conduct surveillance for additional cases and exposures
- Participate in the investigation of potential sources of internal outbreaks, or assist public health with investigations of outbreaks from the community
- Create or participate in the creation and presentation of reports summarizing the current situation or the conclusion of the outbreak
- Demonstrate capacity to work with emergency preparedness stakeholders to plan for large-scale emergencies that may put patients, staff, or visitors at risk for infection
- Identify locations where a large influx of infected patients may be safely managed

Relevant military experience

Service members who worked in military health care settings may have unique training in infection control in tropical climates, in underdeveloped nations, and in maintaining infection control in facilities that are minimally equipped, including temporary clinical and surgical environments. However, the military does not have a military occupational specialty code for IPs and may hire civilians or task nurses with this role.

Diversity, equity, and inclusion

Because of their role in reducing HAIs, IPs can be critical in addressing racial/ethnic inequities related to these infections. A diverse workforce and cultural competence are important factors in addressing possible patient risk factors. Recruiting and retaining people from underrepresented populations is essential in addressing these factors.

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