NEW YORK

Infection Control Continuing Education

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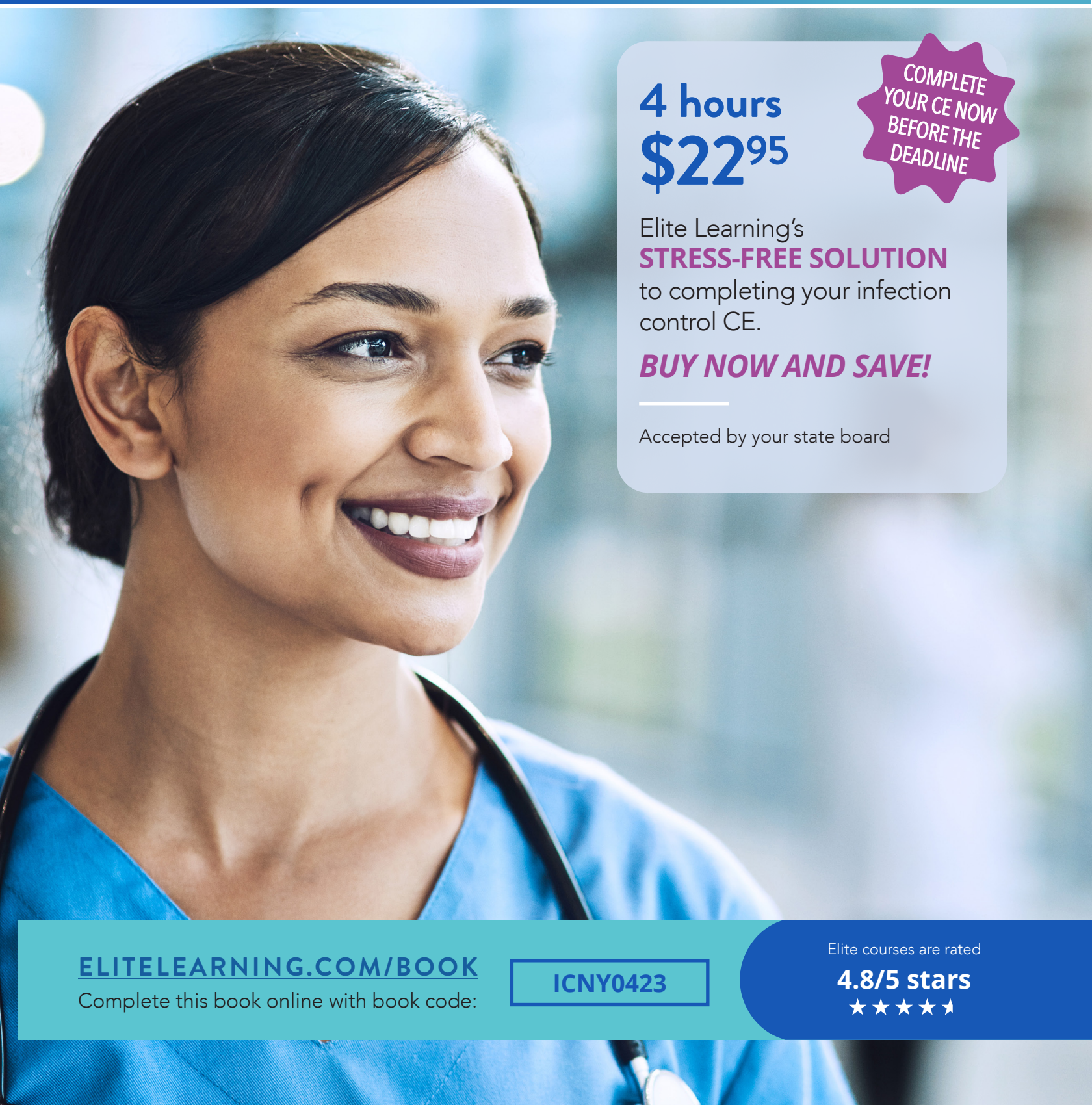

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FREQUENTLY ASKED QUESTIONS

What are the requirements for license renewal?

Licenses Expire	Contact Hours
Every four years on your date of birth	4 (All hours are allowed through home-study)

How much will it cost?

Course Title	Contact Hours	Price
Infection Control for New York Health Care Professionals	4	$22.95

How do I complete this course and receive my certificate of completion?

See the following page for step by step instructions to complete and receive your certificate.

Are you a New York board-approved provider?

Colibri Healthcare, LLC's course has been approved by the New York State Education Department, Provider No. IC163.

Are my credit hours reported to the New York Department of Health?

No. The board performs random audits at which time proof of continuing education must be provided.

What information do I need to provide for course completion and certificate issuance?

Please provide your license number on the test sheet to receive course credit. Your state may require additional information such as date of birth and/or last 4 of Social Security number; please provide these, if applicable.

Is my information secure?

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Important information for licensees:

Always check your state's board website to determine the number of hours required for renewal, mandatory topics (as these are subject to change), and the amount that may be completed through home-study. Also, make sure that you notify the board of any changes of address. It is important that your most current address is on file.

Licensing board contact information:

New York State Education Department | Office of Professions, Registration Unit | State Education Building, 2nd Floor
Albany, New York 12234 | Phone (518) 474-3817 | Fax (518) 474-3004
Website: https://www.op.nysed.gov/

HOW TO COMPLETE THIS BOOK FOR CREDIT

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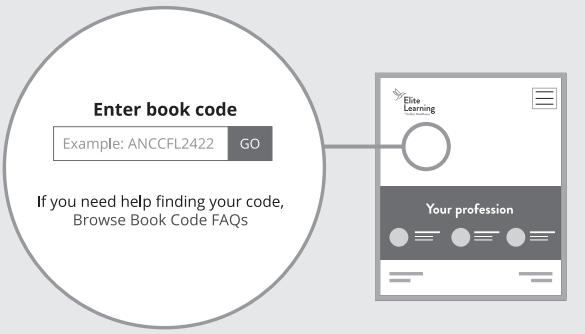
- If you already have an account created, sign in with your username and password. If you don't have an account, you'll be able to create one now.
- Follow the online instructions to complete your final exam. Once you finish your purchase, you'll receive access to your completion certificate.



By mail

- Fill out the final examination answer sheet and mandatory evaluation found in the back of this booklet. Please include a check or credit card information and e-mail address. Mail to Elite, **PO Box 37, Ormond Beach, FL 32175**.
- Completions will be processed within 2 business days from the date it is received and certificates will be e-mailed to the address provided.
- Submissions without a valid e-mail will be mailed to the address provided.

By fax

- Fill out the final examination answer sheet and mandatory evaluation found in the back of this booklet. Please include credit card information and e-mail address. Fax to **(386) 673-3563**.
- All completions will be processed within 2 business days of receipt and certificates e-mailed to the address provided.
- Submissions without a valid e-mail will be mailed to the address provided.

Infection Control for New York Health Care Professionals

4 Contact Hours

Release Date: November 9, 2020 **Expiration Date: December 31, 2024**

Faculty

Deborah Converse, MA, NBCT,has been a National Board Certified educator, trainer, and assessor for 20 years and has written courses for state and national recertification in the healthcare field for 10 years. She has served on State Board of Education writing teams in Florida and Hawaii to develop state educational standards and comprehensive exams, along with assisting with student training and evaluation at the university level. As a trainer and evaluator, Ms. Converse developed mentoring programs to enhance skills for best practice within healthcare and educational organizations.

Adrianne E. Avillion, DEd, RN, is an accomplished nursing professional development specialist and healthcare author. She earned a doctoral degree in adult education and an MS in nursing from Penn State University, and a BSN from Bloomsburg University. Dr. Avillion has held a variety of nursing positions as a staff nurse in critical care and physical medicine and rehabilitation settings, as well as numerous leadership roles in professional development. She has published extensively and is a frequent presenter at conferences and conventions devoted to the specialty of continuing education and nursing professional development. Dr. Avillion owns and is the CEO of Strategic Nursing Professional Development, a business that specializes in continuing education for healthcare professionals and consulting services in nursing professional development.

Reviewer

Stephani M. Hunt, MSN, RN, WCC, OMS, ONC, received her baccalaureate in nursing degree from Northeastern University, Boston, and her master's degree in nursing with an education focus from Framingham State University. She is wound care certified, an ostomy management specialist, and is a certified orthopedic nurse. Ms. Hunt has worked as a medical-surgical clinical nurse educator, coordinating orientation for new staff, providing ongoing staff education, and responding to real-time staff educational needs. She is currently working as an inpatient wound and ostomy specialist in Manchester, New Hampshire.

Audience

This course is for New York licensed, registered, or certified health care professionals to ensure that they understand how blood borne pathogens may be transmitted in the work environment.

Purpose statement

This course was written for healthcare professionals in New York state to "Assure that licensed, registered, or certified health professionals understand how bloodborne pathogens may be transmitted in the work environment: patient to healthcare worker, healthcare worker to patient, and patient to patient" (New York State Department of Health [NYSDOH], 2018a).

This includes the following:

- Apply current scientifically accepted infection prevention and control principles as appropriate for the specific work environment.
- Minimize opportunity for transmission of pathogens to patients and healthcare workers.
- Familiarize professionals with the law requiring this training and the professional misconduct charges that may be applicable for not complying with the law.

Learning objectives

- Provide examples of scientifically accepted practices for infection prevention and control of airborne, droplet, and bloodborne pathogens.
- Examine the types of healthcare acquired infectious disease and transmission to apply workplace practices to prevent the spread of infection.
- Choose work practice controls designed to eliminate transmission of bloodborne pathogens when using sharp instruments and select indicated post-exposure prophylaxis.
- Interpret indicators and situations that require the selection of barriers and personal protective equipment to prevent exposure and transmission of potentially infectious material.
- Determine the health professional's responsibility for providing a safe patient care environment in healthcare settings, including leadership roles, according to New York law.
- Examine the New York State Sepsis Improvement Initiative to interpret early signs and symptoms of sepsis.
- Analyze healthcare-associated disease transmission specific to Tier 1-3 organisms and demonstrate work practices, barriers, and PPE equipment for effective infection control.

How to receive credit

- Read the entire course online or in print which requires a 4-hour commitment of time.
- Complete the self-assessment quiz questions which are at the end of the course or integrated throughout the course. These questions are NOT GRADED. The correct answer is shown after you answer the question. If the incorrect answer is selected, the rationale for the correct answer is provided. These questions help to affirm what you have learned from the course.
- Depending on your state requirements you will then be asked to complete either:
  - An affirmation that you have completed the educational activity.
  - A mandatory test (a passing score of 70 percent is required). Test questions link content to learning objectives as a method to enhance individualized learning and material retention.
- If requested, provide required personal information and payment information.
- Complete the MANDATORY Course Evaluation.
- Print your Certificate of Completion.

CE Broker reporting

Colibri Healthcare, LLC, provider # 50-4007, reports course completion results within 1 business day to CE Broker. If you are licensed in Arkansas, District of Columbia, Florida, Georgia, Kentucky, Michigan, Mississippi, New Mexico, North Dakota, South Carolina, or West Virginia, your successful completion results will be automatically reported for you.

Accreditations and approvals

Colibri Healthcare, LLC is accredited as a provider of nursing continuing professional development by the American Nurses Credentialing Center's Commission on Accreditation.

Individual state nursing approvals

Colibri Healthcare, LLC is accredited as a provider of nursing continuing professional development by the American Nurses Credentialing Center's Commission on Accreditation. In addition to states that accept courses offered by ANCC Accredited Providers, Colibri Healthcare, LLC is an approved Provider of continuing education in nursing by: Alabama Board of Nursing, Provider #ABNP1418 (valid through February 5, 2025); Arkansas State Board of Nursing, Provider #50-4007; California Board of Registered Nursing, Provider #CEP17480 (valid through January 31, 2024); California Board of Vocational Nursing and Psychiatric Technicians (LVN Provider #V15058, PT Provider #V15020; valid through December 31, 2023); District of Columbia Board of Nursing, Provider #50-4007; Florida Board of Nursing, Provider #50-4007; Georgia Board of Nursing, Provider #50-4007; Kentucky Board of Nursing, Provider #7-0076 (valid through December 31, 2023; CE Broker Provider #50-4007); Michigan Board of Nursing, Provider #50-4007; Mississippi Board of Nursing, Provider #50-4007; New Mexico Board of Nursing, Provider #50-4007; North Dakota Board of Nursing, Provider #50-4007; South Carolina Board of Nursing, Provider #50-4007; and West Virginia Board of Registered Nurses, Provider #50-4007. This CE program satisfies the Massachusetts States Board's regulatory requirements as defined in 244 CMR5.00: Continuing Education.

Activity director

Lisa Simani, MS, APRN, ACNP

Dental accreditation

Colibri Healthcare, LLC is designated as a Nationally Approved PACE Program Provider for FAGD/MAGD credit. Approval does not imply acceptance by any regulatory authority or AGD endorsement. Current approval period is 1/1/2022 to 12/31/2025; Provider ID# 217536.

Colibri Healthcare, LLC is an ADA CERP Recognized Provider. ADA CERP is a service of the American Dental Association to assist dental professionals in identifying quality providers of continuing dental education. ADA CERP does not approve or endorse individual courses or instructors, nor does it imply acceptance of credit hours by boards of dentistry.

Disclosures

Resolution of conflict of interest
In accordance with the ANCC Standards for Commercial Support for continuing education, Colibri Healthcare, LLC implemented mechanisms prior to the planning and implementation of the continuing education activity, to identify and resolve conflicts of interest for all individuals in a position to control content of the course activity.

Sponsorship/commercial support and non-endorsement
It is the policy of Colibri Healthcare, LLC not to accept commercial support. Furthermore, commercial interests are prohibited from distributing or providing access to this activity to learners.

Disclaimer

The information provided in this activity is for continuing education purposes only and is not meant to substitute for the independent medical judgment of a healthcare provider relative to diagnostic and treatment options of a specific patient's medical condition.

Course verification

All individuals involved have disclosed that they have no significant financial or other conflicts of interest pertaining to this course. Likewise, and in compliance with California Assembly Bill No. 241, every reasonable effort has been made to ensure that the content in this course is balanced and unbiased.

Overview

This course covers the seven mandatory infection control training elements for New York State healthcare professionals. It reviews airborne, droplet, and bloodborne pathogens that may be transmitted in the work environment leading to healthcare/hospital-acquired infections (HAIs).

Infection prevention and control will be addressed to reduce indirect and direct contact with bloodborne, droplet, and airborne pathogens including multi-drug resistant Tier 1-3 organisms.

The course includes the 2018 updates to Element VII, covering sepsis, and follows the syllabus for infection control and prevention issued by the New York State Departments of Health and Education.

This course explores types of disease transmission and evidence-based controls, barriers, and workplace practices for infection prevention. Guidelines from the Centers for Disease Control and Prevention (CDC), the Occupational Safety and Health Administration (OSHA), and current New York State law will serve as the foundation for course content.

Introduction

In 2012, the New York State Department of Health developed the following statements to promote the health and safety of all; these remain unchanged in the latest 2018 update:

Mission: We protect, improve and promote the health, productivity, and well-being of all New Yorkers.

Vision: New Yorkers will be the healthiest people in the world – living in communities that promote health, protected from health threats, and having access to quality, evidence-based, cost-effective health services.

Values: Dedication to the Public Good, Innovation, Excellence, Integrity, Teamwork, and Efficiency (NYSDOH, 2018a).

As New York State and the rest of the world face the novel coronavirus pandemic, controlling the spread of infection to save lives has become a priority for the New York Department of Health. New York healthcare providers must be increasingly vigilant and prepared to face the threat of novel infectious diseases. New York State is especially vulnerable as a key point of entry to the United States for travelers from throughout the world.

Controlling healthcare-associated infections (HAIs) is essential to protect the lives of patients, staff, and the community. HAIs are defined in the 2020 update by the US Department of Health and Human Services, Office of Disease Prevention and Health Promotion (HHS, 2020a) as: A variety of infections that are caused by common and unusual bacteria, viruses, and fungi acquired during the course of receiving medical treatment. They are a major threat to patient health and often preventable. According to the CDC, on any given day, about one in 31 hospital patients has at least one healthcare-associated infection (CDC, 2019e).

The CDC 2018 National and State HAI Progress Report reported national and state data on HAIs in November 2019 for the following categories:

- Central line-associated bloodstream infections (CLABSIs).
- Catheter-associated urinary tract infections (CAUTIs).
- Ventilator-associated events (VAEs).
- Surgical site infections (SSIs).
- Methicillin-resistant Staphylococcus aureus (MRSA) bloodstream events.
- Clostridioides difficile (C. difficile) events, formerly known as Clostridium difficile (CDC, 2019e).

HEALTHCARE-ASSOCIATED INFECTION PREVALENCE STATISTICS

The CDC's annual *National and State Healthcare-Associated Infections Progress Report* (HAI Progress Report) provides national and state data to determine progress in preventing HAIs in a variety of healthcare settings. Among national acute care hospitals, the most recent report in 2018 provides the following statistics:

National highlights

- Overall, about 9% decrease in CLABSIs between 2017 and 2018.
  - Largest decrease in ICU (11%).
- Overall, about 8% decrease in CAUTIs between 2017 and 2018.
  - Largest decrease in ICU (10%).
- Overall, there was no significant change in VAEs between 2017 and 2018.
- Overall, there was no significant change in SSI related to the 10 select procedures tracked in the report between 2017 and 2018.
  - The 10 select procedures are Surgical Care Improvement Project (SCIP) procedures. See the complete 2019 updated CDC website at https://www.cdc.gov/nhsn/pdfs/ps-analysis-resources/nhsn-sir-guide.pdf for further details.
  - No significant changes in abdominal hysterectomy SSIs.
  - No significant changes in colon surgery SSIs.
- No significant changes in hospital onset MRSA bacteremia between 2017 and 2018.
- About 12% decrease in hospital onset C. difficile infections between 2017 and 2018.

State performance in 2018 compared to 2017, for acute care hospitals (ACHs):

- 20 states performed better on at least two infection types.
  - Ten states performed better on at least three infection types.
  - Three states performed better on at least four infection types.
- Two states performed worse on two infection types (Michigan and Nevada).
- No state performed worse on three or more infection types (CDC, 2019e).

The CDC's *Emerging Infections Programs* (EIP) is a national resource utilized for surveillance, prevention, and control of emerging infectious diseases. EIP is a network of state health departments and their collaborators in local health departments, academic institutions, other federal agencies, and public health and clinical laboratories; infection preventionists; and healthcare providers.

New York state statistics

The rate of infections acquired by patients while in New York hospitals was last reported in 2019 in the 12th annual report by the NYSDOH. The report, Hospital-Acquired Infections in New York State, 2018, was released in November 2019 and included data through June 2019. The report includes the most recent data from the six most common HAIs (NYSDOH, 2019b). They are the following:

1. SSIs following colon, coronary artery bypass graft, hip replacement, and hysterectomy procedures.
2. CLABSIs.
3. CAUTIs.
4. Clostridioides difficile infections (CDIs).
5. Carbapenem-resistant Enterobacteriaceae infections (CREs).
6. MRSA bloodstream infections (BSIs).

The NYSDOH report explains:

> *These HAIs do not represent all possible HAIs, but they were selected because they are common, may have severe complications, can be compared between facilities, and are largely preventable when healthcare providers use infection prevention steps recommended by the CDC (NYSDOH, 2019b).*

The NYSDOH HAI report gives a breakdown of infection rates for each hospital in the state and comparisons of current and past dates (NYSDOH, 2019b). Refer to the full consumer summary and technical reports on the websites listed separately on the reference page.

Table 1: Inpatient infections reported by New York state hospitals in 2018		
Type of infection	**Number**	**Rate**
Hospital onset Clostridioides difficile infections (CDIs).	5,057	4.8/10,000 patient days.
Surgical site infections (SSIs) following: • Colon surgery B. • Hip replacement or revision surgery. • Abdominal hysterectomy surgery. • Coronary artery bypass graft (CABG) – chest site N. • CABG – donor site N.	 798 338 186 148 32	 4.1/100 procedures. 1.0/100 procedures. 1.1/100 procedures. 1.4/100 procedures. 0.3/100 procedures.
Catheter-associated urinary tract infections (CAUTIs) in intensive-care units, and medical/surgical wards.	1,275	1.0/1,000 catheter days.
Central line-associated bloodstream infections (CLABSIs) in intensive-care units and medical and surgical wards B and step-down units N.	1,051	0.8/1,000-line days.
Hospital onset methicillin-resistant Staphylococcus aureus (MRSA) bloodstream infections C.	661	0.59/10,000 patient days.
Hospital onset carbapenem-resistant Klebsiella, E. coli, and Enterobacter (CRE) bloodstream infections N.	150	0.13/10,000 patient days.

Note. This table from the NYSDOH HAI report shows the New York prevalence rates for 2018 from most common to least common (NYSDOH, 2019c).

N = required by NYS, C = required by Centers for Medicare and Medicaid Services (CMS; these data are accessible through a data use agreement but cannot be used for public reporting or regulatory action), B = required by both NYS and CMS.

New York State HAI rates compared to the nation

It is important to compare and contrast HAI data for New York State with national HAI data to add perspective on the efficacy of infection control protocols and to determine areas needing improvement. The NYSDOH HAI report, reviewed November 1, 2019, includes comparison data from CDC annual reports as follows:

- Standardized infection ratio (SIR) is a summary statistic that can be used to track healthcare-associated infection (HAI) prevention progress over time; lower SIRs are better. The SIR compares the number of infections in a facility or state to the number of infections that were "predicted" to have occurred, based on previous years of reported data (CDC, 2019e).
- In this report, the SIR is most often used to compare each hospital's rate to the NYS standard. Sometimes the SIR is also used to compare NYS to the national standard. In both cases, the SIR is calculated by dividing the actual number of infections in the smaller group by the number of infections that would be statistically predicted if the standard population had the same risk distribution as the observed population (NYSDOH, 2019c).

Table 2: Trends in New York state and national standardized infection ratios		
Type of hospital-acquired infection	**2017 New York SIR^**	**2017 National SIR^**
Central line-associated bloodstream infections (CLABSIs).*	0.900	0.814
Catheter-associated urinary tract infections (CAUTI)	1.022	0.880
Colon surgical site infections (SSIs).*	0.973	0.906
Abdominal hysterectomy SSIs.*	1.026	0.890
MRSA bacteremia.	0.990	0.862
Clostridium difficile infections (CDI).*	0.755	0.804

^ Standardized Infection Ratio is compared to national 2015 baseline. The SIRs compare the observed number of infections reported to the National Healthcare Safety Network (NHSN) during 2017 to the predicted number of infections based on the 2015 referent period, adjusting for key risk factors.

* Data audited by New York State

Note: Based on information from the New York State Department of Health (2019c). The data above shows that New York State infection rates are higher than the national rates in all areas but CDI. The rate of change in NYS between 2015 and 2017 was similar to the rate of change nationally for CLABSI, CAUTI, CDI, and hysterectomy SSIs. NYS improved faster than the nation for colon SSIs, and slower for MRSA (NYSDOH, 2019c).

Nursing consideration: Review the New York State and national data above. Check with your facility to review data on the rate and type of hospital-acquired infections. Hint: You can find the rates for your facility in the Hospital-Acquired Infections in New York State, 2018 Part 2: Technical Report.

1. How do the infection rates compare or contrast with the state and national data in each HAIs category?
2. What infection control and prevention procedures are followed in your facility for specific HAIs?
3. How can you enhance your work practice and/or leadership role to reduce HAIs?

https://www.health.ny.gov/statistics/facilities/hospital/hospital_acquired_infections/2018/docs/hospital_acquired_infection_p2.pdf (See NYSDOH,2019c).

Interpretation of SIR comparison measures:

- An SIR of 1.0 means the observed number of infections is equal to the number of predicted infections.
- An SIR above 1.0 means that the infection rate is higher than that found in the standard population. The difference above 1.0 is the percentage by which the infection rate exceeds that of the standard population. For example, a hospital SIR of 1.12 indicates that the hospital performed 12% worse than the state average.
- An SIR below 1.0 means that the infection rate is lower than that of the standard population. The difference below 1.0 is the percentage by which the hospital performed better than the state average.

Section 239 of the New York state public health law – course work or training in infection control practices: health care provider infection control training

Section 239 was revised by NYSDOH:

In October 2017, legislation was passed requiring the inclusion of sepsis awareness and education into the training curriculum. Governor Andrew Cuomo signed into law amendments to Public Health Law § 239 and Education Law § 6505 requiring the addition of sepsis awareness and education training to the NYS-mandated Infection Control and Barrier Precautions coursework.

The Infection Control and Barrier Precaution law applies to the following professions: physicians, physician assistants, specialist assistants, optometrists, podiatrists, dentists, dental hygienists, registered professional nurses, licensed practical nurses, medical students, medical residents, and physician assistant students (NYSDOH, 2019a).

The New York State Department of Health: Infection control training syllabus additions

To meet the legal mandate, "Element VII: Sepsis Awareness and Training" was included in education programs as of July 1, 2018. The Infection Control Training Syllabus has been updated by adding "Element VII – Sepsis Awareness and Education." Element VII follows Elements I through VI and includes not only the outline but information to help learners utilize information about sepsis awareness in their healthcare practices. The added Element VII does the following:

- Defines sepsis.
- Reviews the scope of the sepsis problem.
- Addresses the NYS Sepsis Care Improvement Initiative and "Rory's Regulations".
- Reviews the causes of sepsis.
- Reviews principles of early recognition and treatment of sepsis.
- Reviews principles of patient education and prevention.

(NYSDOH, 2019a)

The core Elements, I-VII, of the NYSDOH Infection Control Syllabus will be outlined and expanded throughout the course. See NYSDOH (2018a) on the reference page for the complete syllabus website.

ELEMENT I

Healthcare professionals have the responsibility to practice infection control and monitor those medical and ancillary personnel for whom the professional is responsible.

Element I competencies in summary include the following:

- The benefits of following accepted practices of infection prevention and control.
- The professional's responsibility for infection prevention and control and consequences of failing to comply.
- The professional's responsibility to monitor infection prevention and control practices of others and intervene to assure compliance and safety.

Source and definition of standards of professional conduct

Healthcare professionals have the responsibility to implement work practices to avoid transmitting infectious agents in their workplace.

Standards of professional conduct and responsibility are drawn from the following official state sources:

I. Sources and Definition of Standards of Professional Conduct as They Apply to Infection Prevention and Control.
   - A. Rules of the Board of Regents, Part 29.2 (a)(13).
   - B. Part 92 of Title 10 (Health) of the Official Compilation of Codes, Rules and Regulations of New York.
   - C. Statements of relevant professional and national organizations.

II. Implications of Professional Conduct Standards.
   - A. Professional responsibility to adhere to infection control standards.
   - B. Professional responsibility for monitoring and overseeing the practice of others.
   - C. Consequences of failing to follow accepted standards of infection prevention and control.
     1. Increased risk of adverse health outcomes for patients and healthcare workers.
     2. Healthcare professionals may be subject to charges of professional misconduct:
        - a. Mechanisms for reporting misconduct.
        - b. Complaint investigation.
        - c. Possible outcomes.
          1) Disciplinary action.
          2) Revocation of professional license.
          3) Professional liability.

III. Methods of Compliance.
   Healthcare professionals have the responsibility to implement work practices to avoid transmitting infectious agents in their workplace:
   - A. Participation in required infection prevention and control training.
   - B. Adherence to accepted principles and practices of infection prevention and control (NYSDOH, 2018a).

The New York State Education Department Rules of the Board of Regents, Section 29.2(a) (13)1, states that unprofessional conduct includes the following 2018 updates:

29.1 General Provisions

13. Failing to use scientifically accepted infection prevention techniques appropriate to each profession for the cleaning and sterilization or disinfection of instruments, devices, materials and work surfaces, utilization of protective garb, use of covers for contamination-prone equipment and the handling of sharp instruments. Such techniques shall include but not be limited to the following:
    - Wearing of appropriate protective gloves at all times when touching blood, saliva, other body fluids or secretions, mucous membranes, non-intact skin, blood-soiled items or bodily fluid-soiled items, contaminated surfaces, and sterile body areas, and during instrument cleaning and decontamination procedures.
    - Discarding gloves used following treatment of a patient and changing to new gloves if torn or damaged during treatment of a patient.
    - Washing hands and donning new gloves prior to performing services for another patient; and washing hands and other skin surfaces immediately if contaminated with blood or other body fluids.
    - Wearing of appropriate masks, gowns or aprons, and protective eyewear or chin-length plastic face shields whenever splashing or spattering of blood or other body fluids is likely to occur.
    - Sterilizing equipment and devices that enter the patient's vascular system or other normally sterile areas of the body.
    - Sterilizing equipment and devices that touch intact mucous membranes but do not penetrate the patient's

body or using high-level disinfection for equipment and devices that cannot be sterilized prior to use for a patient.
- Using appropriate agents, including but not limited to detergents, for cleaning all equipment and devices prior to a sterilization or disinfection.
- Cleaning, using appropriate agents, including but not limited to detergents, equipment and devices that do not touch the patient or that only touch the intact skin of the patient.
- Maintaining equipment and devices used for sterilization according to the manufacturer's instructions.
- Adequately monitoring the performance of all personnel, licensed or unlicensed, for whom the licensee is responsible regarding infection control techniques.
- Placing disposable used syringes, needles, scalpel blades, and other sharp instruments in appropriate puncture-resistant containers for disposal; and placing reusable needles, scalpel blades, and other sharp instruments in appropriate puncture-resistant containers until appropriately cleaned and sterilized.
- Maintaining appropriate ventilation devices to minimize the need for emergency mouth-to-mouth resuscitation.
- Refraining from all direct patient care and handling of patient care equipment when the health care professional has exudative lesions or weeping dermatitis and the condition has not been medically evaluated and determined to be safe or capable of being safely protected against in providing direct patient care or in handling patient care equipment.
- Placing all specimens of blood and body fluids in well-constructed containers with secure lids to prevent leaking; and cleaning any spill of blood or other body fluid with an appropriate detergent and appropriate chemical germicide.

14. Failing to adhere to applicable practice guidelines, as determined by the commissioner, for the compounding of sterile drugs and products (New York State Education Department [NYSED], 2018).

Section 92-2.1- Required use of infection control practices

According to Part 92, Subchapter N of Title 10 of the Official Compilation of Codes, Rules, and Regulations of the State of New York:

The definition of unprofessional conduct shall include the failure to use scientifically accepted infection control practices to prevent transmission of disease pathogens from patient to patient, physician to patient, registered physician or specialist assistant to patient, employee to patient, and patient to employee, as appropriate to physicians, registered physician's assistants and specialist's assistants. Such practices shall include:

(a) Adherence to scientifically accepted standards for: handwashing; aseptic technique; use of gloves and other barriers for preventing bi-directional contact with blood and body fluids; thorough cleaning followed by sterilization or disinfection of medical devices; disposal of non-reusable materials and equipment; and cleaning between patients of objects that are visibly contaminated or subject to touch contamination with blood or body fluids.

(b) Use of scientifically accepted injury prevention techniques or engineering controls to reduce the opportunity for patient and employee exposures.

(c) Performance monitoring of all personnel, licensed or unlicensed, for whom the licensee is responsible regarding infection control techniques.

Implications of professional conduct standards and enforcement of infection control standards:

Individuals addressed in this legislation have the professional responsibility to adhere to infection control standards and monitor the practice of others. Consequences of failing to follow accepted standards of infection prevention and control not only increase the risk of adverse health outcomes for patients and health care personnel, but also make the individual subject to charges of professional misconduct. Misconduct may result in disciplinary action, revocation of professional license, and/or professional liability.

All licensed healthcare facilities are responsible under existing regulations for monitoring and enforcing proper use of infection control practices and universal precautions by healthcare personnel functioning under their jurisdiction. Failure to comply with this requirement will result in NYSDOH citation, potential fines, and other disciplinary action against the institution.

Any patient or employee complaint regarding lax infection control practices in a private medical or dental office will prompt an investigation by the NYSDOH. Substantiated lapses in infection control in a private practice setting may result in charges of professional misconduct against any licensed professional in the practice who was directly involved, was aware of the violation or who has responsibility for ensuring that office staff is adequately trained and follow patient protection measures. The NYSDOH continue to promulgate regulations and/or statutory amendments to implement these more stringent enforcement provisions.

Summaries of regents actions on professional misconduct and discipline: Nursing

A review of the month of January in 2020 revealed a number of sanctions, fines, and probations for violations of New York State law regarding misconduct by nurses. These violations were chosen because of their relevance to infection control, including failure of the licensees to do the following:

- Maintain accurate patient records (two cases).
- Follow the patient care plan and do proper tracheotomy care and maintain records.
- Follow a physician's order when administering medication.
- Document errors.
- Irrigate a patient and failing to change a dressing.
- Assess a patient who had fallen.
- (See http://www.op.nysed.gov/opd/jan20.html for further details on these violations.)

These dangerous actions are violations against the NYSDOH Infection Control Syllabus, NYS Professional Conduct Codes, Rules, and Regulations, OSHA guidelines, CDC recommendations, facility infection control, and the fundamental mission, vision, and values of the NYSDOH. In addition, they can lead to serious health consequences for patients, staff, the healthcare facility, and the community. The case violations for other dates can be viewed on the website (http://www.op.nysed.gov/opd/rasearch.htm).

Nursing consideration: Review the NYSDOH guidelines that govern the above violations. What systems of safeguards, supervision, reporting/record keeping, daily accountability, communication among shifts, work practice controls and training does your facility implement to encourage and support professional conduct? Do you think these systems can be improved? What is your role in promoting professional conduct and practice? What more can supervisors and administrators do to ensure professional conduct and practice? Share your information and reflections from the nursing considerations #1 and #2 with your colleagues to enhance infection control practice in your facility.

ELEMENT II

Modes and mechanisms of transmission of pathogenic organisms in the healthcare setting and strategies for prevention and control (NYSDOH, 2018a).

Element II competencies include:

- Describe how pathogenic organisms are spread in healthcare settings.
- Identify the factors influencing exposure to pathogenic organisms in healthcare settings.
- List strategies for preventing transmission of pathogenic organisms.
- Describe how infection-control concepts are applied in practice.

The infectious disease process

I. Overview of components of the infectious disease process.
   A. The "Chain of Infection" was described by the CDC in 2012 and is still used today:
      The traditional epidemiologic triad model holds that infectious diseases result from the interaction of agent, host, and environment. More specifically, transmission occurs when the agent leaves its reservoir or host through a portal of exit, is conveyed by some mode of transmission, and enters through an appropriate portal of entry to infect a susceptible host. This sequence is sometimes called the chain of infection. The prevention and control of infection involves blocking the links in the chain, thus disabling the progression and transmission of the infection to a new host.
   B. Mode of transmission: Contact with pathogen:
      1. Direct contact with blood, oral fluids, or other patient materials.
      2. Indirect contact with contaminated objects (e.g., instruments, equipment, or environmental surfaces).
      3. Droplet-contact of conjunctival, nasal, or oral mucosa (e.g., spatter) containing microorganisms generated from an infected person and propelled a short distance (e.g., by coughing, sneezing, or talking).
      4. Airborne-inhalation of microorganisms that can remain suspended in the air for long periods.
         a. Common vehicle (e.g., food, water, biologic substances, or fomites).
         b. Vector-borne – Vector-borne diseases are transmitted among their human, animal, or plant hosts by arthropods, usually insects. A broader definition of vector-borne disease recognizes that other animals can serve in the role of infectious disease vector by harboring pathogens that cause disease only in susceptible populations.
   C. Susceptible host: Susceptibility is influenced by genetics, level of immunity, constitutional factors, disease, malnutrition, and substance use.
   D. Factor influencing the outcome of exposures:
      1. Host factors:
         a. Natural barriers (e.g., intact skin, respiratory cilia, gastric acid and motility, flow of urine, tears, normal flora).
         b. Host immunity (e.g., inflammatory response, humoral immunity, cell-mediated immunity, immune memory).
      2. Pathogen or infectious agent factors:
         a. Infectivity – organism's ability to infect the host.
         b. Pathogenicity – ability of the organism to cause disease.
         c. Virulence – degree of pathology.
         d. Size of inoculum.
         e. Route of exposure.
         f. Duration of exposure.
      3. Environmental factors:
         a. Contamination of environment, fomites.
         b. Contamination of equipment.

II. Methods to Prevent the Spread of Pathogenic Organisms in Healthcare Settings
   A. Standard precautions:
      1. Respiratory hygiene/cough etiquette.
      2. Safe injection practices (see Element III).
      3. Use of masks during spinal/epidural access procedures.
   B. For patients infected with organisms other than bloodborne pathogens:
      1. Early identification.
      2. Prompt isolation.
      3. Appropriate treatment.
   C. Control of routes of transmission:
      1. Hand hygiene.
      2. Use of appropriate barriers.
         a. Appropriate selection, donning, doffing, and disposal of personal protective equipment (PPE; see Element IV).
      3. Appropriate isolation/cohorting of patients infected with communicable diseases.
         a. Standard precautions for all patients.
         b. Transmission-based precautions for other pathogens (see previous explanations).
         c. Host support and protection.
            1) Vaccination.
            2) Pre-and post-exposure prophylaxis.
            3) Protecting skin and immune system integrity.
         d. Environmental control measures.
            1) Cleaning, disinfection, and sterilization of patient care equipment (see Element V).
            2) Environmental cleaning (housekeeping).
            3) Appropriate ventilation.
            4) Waste management.
            5) Linen and laundry management.
            6) Food services.
         e. Engineering and work practice controls (see Element III).
         f. Training and education of healthcare workers.

Pathogen or infectious agents

According to the CDC (2019a):

> Infectious agents transmitted during healthcare derive primarily from human sources, but inanimate environmental sources also are implicated in transmission. Human reservoirs can include patients and infections may be asymptomatic while in the incubation period of an infectious disease or may be present as a transient or chronic colonization. Most colonization with pathogenic microorganisms is found in the respiratory and gastrointestinal tracts. The endogenous flora of patients (e.g., bacteria residing in the respiratory or gastrointestinal tract) are also a source of healthcare-associated infections.

Susceptible host

Infection is the result of a complex interrelationship between a potential host and an infectious agent (CDC, 2020h).

Most of the factors that influence infection, and the occurrence and severity of disease are related to the host. Some persons exposed to pathogenic microorganisms never develop symptomatic disease, while others become severely ill and even die. Some individuals are prone to becoming transiently or permanently colonized but remain asymptomatic. Still others progress from colonization to symptomatic disease

either immediately following exposure, or after a period of asymptomatic colonization:

The immune state at the time of exposure to an infectious agent, interaction between pathogens, and virulence factors intrinsic to the agent are important predictors of an individual's outcome. Host factors such as extremes of age and underlying disease, human immunodeficiency virus/acquired immune deficiency syndrome (HIV/AIDS), malignancy, and transplants can increase susceptibility to infection as do a variety of medications that alter the normal flora (e.g., antimicrobial agents, gastric acid suppressants, corticosteroids, antirejection drugs, antineoplastic agents, and immunosuppressive drugs).

Surgical procedures and radiation therapy impair defenses of the skin and other involved organ systems. Indwelling devices such as urinary catheters, endotracheal tubes, central potential pathogens to bypass local defenses that would impede their invasion and allow surfaces for development of biofilms that may facilitate adherence of microorganisms. Some infections associated with invasive procedures result from transmission within the healthcare facility; others arise from the patient's endogenous flora (CDC,2020h).

Transmission risks and factors influencing exposures

Numerous factors influence differences in transmission risks, including host factors, environmental factors, and pathogen or infectious agent factors. These include the population characteristics (e.g., increased susceptibility to infections, type, and prevalence of indwelling devices), intensity of care, exposure to environmental sources, length of stay, and frequency of interaction between patients/residents with each other and with healthcare personnel. Pathogens or infectious agents vary in degree of infectivity, pathogenicity, the ability to cause disease or virulence, size of inoculums, route of exposure and duration of exposure. Some hosts are more naturally resistant to infection, having stronger immune systems and more secure barriers to infection, like healthy intact skin and mucous membranes (CDC, 2019a).

Nursing consideration: Describe the process of infection transmission from the pathogen leaving the reservoir or host through transmission to the susceptible host. What factors in your facility might influence transmission and what precautions could block the chain of transmission? How could you enhance your practice to block the chain?

Prevention strategies: Standard, transmission, and isolation precautions

According to recent reviews:
There are two tiers of Healthcare Infection Control Practices Advisory Committee (HICPAC)/CDC) precautions to prevent transmission of infectious agents: Standard Precautions and Transmission-Based Precautions:

- **Standard precautions**: Are intended to be applied to the care of all patients in all healthcare settings, regardless of the suspected or confirmed presence of an infectious agent.
- **Transmission-based precautions**: Are for patients who are known or suspected to be infected or colonized with infectious agents, including certain epidemiologically important pathogens, which require additional control measures to effectively prevent transmission (CDC, 2019d).

Standard precautions

Standard Precautions combine the major features of Universal Precautions (UP) and Body Substance Isolation (BSI) and are based on the principle that all blood, body fluids, secretions, excretions except sweat, non-intact skin, and mucous membranes may contain transmissible infectious agents:

These include hand hygiene; use of gloves, gown, mask, eye protection, or face shield, depending on the anticipated exposure; and safe injection practices. Also, equipment or items in the patient environment likely to have been contaminated with infectious body fluids must be handled in a manner to prevent transmission of infectious agents (e.g., wear gloves for direct contact, contain heavily soiled equipment, properly clean, and disinfect or sterilize reusable equipment before use on another patient).

The application of Standard Precautions during patient care is determined by the nature of the healthcare worker (HCW) and patient interaction, and the extent of anticipated blood, body fluid, or pathogen exposure. For some interactions (e.g., performing venipuncture), only gloves may be needed; during other interactions (e.g., intubation), use of gloves, gown, and face shield or mask and goggles is necessary.

An example of the importance of the use of Standard Precautions is intubation, especially under emergency circumstances when infectious agents may not be suspected, but later are identified (e.g., SARS-CoV, N. meningitides). (CDC, 2020h)

(See CDC, 2019d, on the reference page for further information from the CDC website.)

Hand hygiene

Handwashing and hand antisepsis substantially reduce potential pathogens on the hands and are considered a critical measure for reducing the risk of transmitting organisms to patients and health workers.

CDC 2020 updated hand hygiene guidelines are summarized below:

CDC recommends using alcohol-based hand rub (ABHR) with 60%-95% alcohol in healthcare settings. Unless hands are visibly soiled, an ABHR is preferred over soap and water in most clinical situations due to evidence of better compliance compared to soap and water. Hand rubs are generally less irritating to hands and are effective in the absence of a sink. Hands should be washed with soap and water for at least 20 seconds when visibly soiled, before eating, and after using the restroom.

Healthcare organizations that encounter severe shortages of ABHR (and have exhausted supply chain access to efficacious products) may consider local production of formulations as described by the temporary FDA Policy for Compounding of Certain Alcohol-Based Hand Sanitizer Products. Healthcare organizations should return to using a commercially produced, FDA-approved product when supplies become available.

CDC does not have a recommended alternative to hand rub products with greater than 60% ethanol or 70% isopropanol as active ingredients. Benzalkonium chloride, along with both ethanol and isopropanol, is deemed eligible by FDA for use in the formulation of healthcare personnel hand rubs, although benzalkonium chloride has less reliable activity against certain bacteria and viruses than either of the alcohols.

During routine patient care use an alcohol-based hand sanitizer:

- Immediately before touching a patient.
- Before performing an aseptic task (e.g., placing an indwelling device) or handling invasive medical devices.
- Before moving from work on a soiled bo
- dy site to a clean body site on the same patient.
- After touching a patient or the patient's immediate environment.

- After contact with blood, body fluids, or contaminated surfaces.
- Immediately after glove removal (CDC, 2020a).

Wash with Soap and Water:

- When hands are visibly soiled.
- After known or suspected exposure to spores (e.g., B. anthracis, C. difficile outbreaks).
- After caring for a person with known or suspected infectious diarrhea (CDC, 2020a).

Fingernail Care and Jewelry:

- Germs can live under artificial fingernails both before and after using an alcohol-based hand sanitizer and handwashing.
- It is recommended that healthcare providers do not wear artificial fingernails or extensions when having direct contact with patients at high risk (e.g., those in intensive-care units or operating rooms). Keep natural nail tips less than ¼ inch long.
- Some studies have shown that skin underneath rings contain more germs than comparable areas of skin on fingers without rings.
- Further studies are needed to determine if wearing rings results in an increased spread of potentially deadly germs (CDC, 2020a).

Hand hygiene for surgery: surgical hand antisepsis:

- Remove rings, watches, and bracelets before beginning the surgical hand scrub.
- Performing surgical hand antisepsis using either an antimicrobial soap or an alcohol-based hand sanitizer is recommended before donning sterile gloves when performing surgical procedures.
- Scrub hands and forearms for the length of time recommended by the manufacturer, usually 2-6 minutes; long scrub times (e.g., 10 minutes) are not necessary.
- Before applying the alcohol solution, prewash hands and forearms and dry hands and forearms completely.
- After application of the alcohol-based product as recommended, allow hands and forearms to dry thoroughly before donning sterile gloves.
- Double gloving is advised during invasive procedures, such as surgery, that pose an increased risk of blood exposure.
- Rapid multiplication of bacteria occurs under surgical gloves if hands are washed with a non-antimicrobial soap.
- Bacterial growth is slowed after preoperative scrubbing with an antiseptic agent.
- Reducing resident skin flora on the hands of the surgical team for the duration of a procedure reduces the risk of bacteria being released into the surgical field if gloves become punctured or torn during surgery (CDC, 2020a).

Safe injection practices

See Element III for further information (CDC, 2019d).

Infection control practices for special lumbar puncture procedures

Bacterial meningitis following myelogram and other spinal procedures (e.g., lumbar puncture, spinal and epidural anesthesia, intrathecal chemotherapy) has been reported previously. Face masks are effective in limiting the dispersal of oropharyngeal droplets and are recommended for the placement of central venous catheters. (CDC, 2019d)

Transmission-based precautions

There are three categories of Transmission-Based Precautions: Contact Precautions, Droplet Precautions, and Airborne Precautions. Transmission-Based Precautions are used when the route(s) of transmission is (are) not completely interrupted using Standard Precautions alone. For some diseases that have multiple routes of transmission (e.g., SARS), more than one Transmission-Based Precautions category may be used. When used either singly or in combination, they are always used in addition to Standard Precautions.

When Transmission-Based Precautions are indicated, efforts must be made to counteract possible adverse effects on patients (i.e., anxiety, depression and other mood disturbances, perceptions of stigma, reduced contact with clinical staff), and increases in preventable adverse events in order to improve acceptance by the patients and adherence by HCWs (CDC, 2019f),

Contact precautions

Contact Precautions are intended to prevent transmission of infectious agents, including epidemiologically important microorganisms, which are spread by direct or indirect contact with the patient or the patient's environment. Contact Precautions also apply where the presence of excessive wound drainage, fecal incontinence, or other discharges from the body suggest an increased potential for extensive environmental contamination and risk of transmission. A single-patient room is preferred for patients who require Contact Precautions.

Healthcare personnel caring for patients on Contact Precautions wear a gown and gloves for all interactions that may involve contact with the patient or potentially contaminated areas in the patient's environment. New CDC donning and doffing guidelines will be covered in detail in subsequent sections (CDC,2019f).

Droplet precautions

Droplet Precautions are intended to prevent transmission of pathogens spread through close respiratory or mucous membrane contact with respiratory secretions. Because these pathogens do not remain infectious over long distances in a healthcare facility, special air handling and ventilation are not required to prevent droplet transmission.

A single-patient room is preferred for patients who require Droplet Precautions. When a single-patient room is not available, consultation with infection control personnel is recommended to assess the various risks associated with other patient placement options (e.g., cohorting, keeping the patient with an existing roommate). Spatial separation of more than 3 feet and drawing the curtain between patient beds is especially important for patients in multi-bedrooms with infections transmitted by the droplet route. Healthcare personnel wear a mask for close contact with an infectious patient; the mask is generally donned upon room entry. Patients on Droplet Precautions who must be transported outside of the room should wear a mask if tolerated and follow Respiratory Hygiene/Cough Etiquette. (CDC, 2019f)

Respiratory Hygiene/Cough Etiquette

Respiratory Hygiene/Cough Etiquette is intended to be incorporated into infection control practices as a new component of Standard Precautions. The strategy is targeted at patients and accompanying family members and friends with undiagnosed transmissible respiratory infections and applies to any person with signs of illness, including cough, congestion, rhinorrhea, or increased production of respiratory secretions, when entering a healthcare facility.

The Elements of Respiratory Hygiene/Cough Etiquette include the following:

1. Education of healthcare facility staff, patients, and visitors.
2. Posted signs, in language(s) appropriate to the population served, with instructions to patients and accompanying family members or friends.
3. Source control measures (e.g., covering the mouth/nose with a tissue when coughing and prompt disposal of used tissues, using surgical masks on the coughing person when tolerated and appropriate).
4. Hand hygiene after contact with respiratory secretions.
5. Spatial separation, ideally more than 3 feet, of persons with respiratory infections in common waiting areas when possible.

(Updated July 2019; CDC, 2019g; https://www.cdc.govinfectioncontrol/pdf/guidelines/isolation-guidelines-H.pdf)

Airborne Precautions

Airborne Precautions prevent transmission of infectious agents that remain infectious over long distances when suspended in the air.

The preferred placement for patients who require Airborne Precautions is in an airborne infection isolation room (AIIR). An AIIR is a single-patient room that is equipped with special air handling and ventilation capacity that meet the American Institute of Architects/Facility Guidelines Institute (AIA/FGI) standards for AIIRs (i.e., monitored negative pressure relative to the surrounding area, 12 air exchanges per hour for new construction and renovation and six air exchanges per hour for existing facilities, air exhausted directly to the outside or recirculated through HEPA filtration before return).

In settings where Airborne Precautions cannot be implemented because of limited engineering resources (e.g., physician offices), masking the patient, placing the patient in a private room (e.g., office examination room) with the door closed, and providing N95 or higher level respirators or masks if respirators are not available for healthcare personnel will reduce the likelihood of airborne transmission until the patient is either transferred to a facility with an AIIR or returned to the home environment, as deemed medically appropriate.

Healthcare personnel caring for patients on Airborne Precautions wear a mask or respirator, depending on the disease-specific recommendations that is donned prior to room entry. Whenever possible, non-immune HCWs should not care for patients with vaccine-preventable airborne diseases (e.g., measles, chickenpox, and smallpox; see Table 3 below). (CDC, 2019f, 2019g)

Syndromic and empiric applications of transmission-based precautions

Diagnosis of many infections requires laboratory confirmation. Since laboratory tests, especially those that depend on culture techniques, often require 2 or more days for completion, Transmission-Based Precautions must be implemented while test results are pending based on the clinical presentation and likely pathogens (see Table 3 below). Infection control professionals are encouraged to modify or adapt this table according to local conditions. (CDC, 2019f)

Table 3: Diseases, syndrome, potential pathogen and recommended precautions

Disease	Clinical syndrome or condition†	Potential pathogens‡	Empiric precautions (always includes standard precautions)
Diarrhea	Acute diarrhea with a likely infectious cause in an incontinent or diapered patient.	Enteric pathogens§	Contact Precautions (pediatrics and adult).
Meningitis	Meningitis.	Neisseria meningitidis.	Droplet Precautions for first 24 hours of antimicrobial therapy; mask and face protection for intubation.
Meningitis	Meningitis.	Enteroviruses.	Contact Precautions for infants and children.
Meningitis	Meningitis.	M. tuberculosis.	Airborne Precautions if pulmonary infiltrate Airborne Precautions plus Contact Precautions if potentially infectious draining body fluid is present.
Rash or Exanthems, Generalized, Etiology Unknown	Petechial/ecchymotic with fever (general).	Neisseria meningitides.	Droplet Precautions for first 24 hours of antimicrobial therapy.
Rash or Exanthems, Generalized, Etiology Unknown	Petechial/ecchymotic with fever (general). If positive history of travel to an area with an ongoing outbreak of VHF in the 10 days before onset of fever.	Ebola, Lassa, Marburg viruses.	Droplet Precautions plus Contact Precautions, with face/eye protection, emphasizing safety sharps and barrier precautions when blood exposure likely. Use N95 or higher respiratory protection when aerosol-generating procedure. performed. Ebola Virus Disease for Health care Workers (2014). Update: Recommendations for Healthcare workers can be found at Ebola For Clinicians.
Rash or Exanthems, Generalized, Etiology Unknown	Vesicular.	Varicella-zoster, herpes simplex, variola (smallpox), vaccinia viruses.	Airborne plus Contact Precautions; Contact Precautions only if Herpes simplex, localized zoster in an immunocompetent host or vaccinia viruses most likely.
Rash or Exanthems, Generalized, Etiology Unknown	Maculopapular with cough, coryza, and fever.	Rubeola (measles) virus.	Airborne Precautions.
Respiratory Infections	Cough/fever/upper lobe pulmonary infiltrate in an HIV-negative patient or a patient at low risk for human immunodeficiency virus (HIV) infection.	M. tuberculosis, Respiratory viruses, S. pneumoniae, S. aureus (MSSA or MRSA).	Airborne Precautions plus Contact Precautions.

Table 3: Diseases, syndrome, potential pathogen and recommended precautions (continued)			
Disease	**Clinical syndrome or condition†**	**Potential pathogens‡**	**Empiric precautions (always includes standard precautions)**
Respiratory Infections	Cough/fever/pulmonary infiltrate in any lung location in an HIV-infected patient or a patient at high risk for HIV infection	M. tuberculosis, Respiratory viruses, S. pneumoniae, S. aureus (MSSA or MRSA).	Airborne Precautions plus Contact Precautions. Use eye/face protection if aerosol-generating procedure performed or contact with respiratory secretions anticipated. If tuberculosis is unlikely and there are no AIIRs and/or respirators available, use Droplet Precautions instead of Airborne Precautions Tuberculosis more likely in HIV-infected individual than in HIV-negative individual.
Respiratory Infections	Cough/fever/pulmonary infiltrate in any lung location in a patient with a history of recent travel (10-21 days) to countries with active outbreaks of SARS, avian influenza.	M. tuberculosis, severe acute respiratory syndrome virus (SARS- CoV), avian influenza.	Airborne plus Contact Precautions plus eye protection. If SARS and tuberculosis unlikely, use Droplet Precautions instead of Airborne Precautions.
Respiratory Infections	Respiratory infections, particularly bronchiolitis and pneumonia, in infants and young children.	Respiratory syncytial virus, parainfluenza virus, adenovirus, influenza virus, Human metapneumovirus.	Contact plus Droplet Precautions; Droplet Precautions may be discontinued when adenovirus and influenza have been ruled out.
DEDSkin or Wound Infection	Abscess or draining wound that cannot be covered.	Staphylococcus aureus (MSSA or MRSA), group A streptococcus.	Contact Precautions. Add Droplet Precautions for the first 24 hours of appropriate antimicrobial therapy if invasive Group A streptococcal disease is suspected.

From the CDC (2019c). The tables were changed for format clarity as included in the 2019 reviews of the content.

* Infection control professionals should modify or adapt this table according to local conditions. To ensure that appropriate empiric precautions are always implemented, hospitals must have systems in place to evaluate patients routinely according to these criteria as part of their preadmission and admission care.

† Patients with the syndromes or conditions listed above may present with atypical signs or symptoms (e.g., neonates and adults with pertussis may not have paroxysmal or severe cough). The clinician's index of suspicion should be guided by the prevalence of specific conditions in the community, as well as clinical judgment.

‡ The organisms listed under the column "Potential Pathogens" are not intended to represent the complete, or even most likely, diagnoses, but rather possible etiologic agents that require additional precautions beyond Standard Precautions until they can be ruled out.

§ These pathogens include enterohemorrhagic Escherichia coli O157:H7, Shigella spp, hepatitis A virus, noroviruses, rotavirus, C. difficile.

The CDC (2019a) has many updated guidelines for isolation precautions and care of Covid-19 patients.

Discontinuation of transmission-based precautions

The following summary is from a CDC (2019d) update:

- For most infectious diseases, this duration reflects known patterns of persistence and shedding of infectious agents associated with the natural history of the infectious process and its treatment.
- For some diseases (e.g., pharyngeal or cutaneous diphtheria, respiratory syncytial virus [RSV]), Transmission-Based Precautions remain in effect until culture or antigen-detection test results document eradication of the pathogen and, for RSV, symptomatic disease is resolved.
- For other diseases, (e.g., M. tuberculosis) state laws and regulations, and healthcare facility policies, may dictate the duration of precautions.
- In immunocompromised patients, viral shedding can persist for many weeks to months and transmission to others may occur during that time; therefore, the duration of contact and/or droplet precautions may be prolonged for many weeks.
- The duration for patients who are colonized or infected with MDROs remains undefined. MRSA is the only MDRO for which effective decolonization regimens are available. Carriers of MRSA who have negative nasal cultures after therapy may resume shedding MRSA in the weeks that follow.
- For vancomycin resistant enterococci (VRE), the suggested discontinuation of contact precautions after three stool cultures obtained at weekly intervals proved negative, may fail to detect colonization that can persist for more than one year.
- Available data indicate that colonization with VRE, MRSA, and possibly multidrug-resistant Gram-negative bacteria (MDR-GNB), can persist for many months in the presence of severe underlying disease, invasive devices, and recurrent courses of antimicrobial agents.
- MDRO carriers may be colonized permanently and intervals free of hospitalizations, antimicrobial therapy, and invasive devices (e.g., 6 or 12 months) before re-culturing patients to document clearance may be used.

On July 17, 2020 the CDC made some changes to their guidance on discontinuing transmission and the disposition of patients with Covid-19 in healthcare facilities. Please view these in their entirety at (https://www.cdc.gov/coronavirus/2019-ncov/hcp/disposition-hospitalized-patients.html).

Protective environment

A Protective Environment (PE) is designed for allogeneic hematopoietic stem cell transplant (HSCT) patients to minimize fungal spore counts in the air and reduce the risk of invasive environmental fungal infections (CDC, 2019c).

Evidence-based practice! **Decontamination and reuse of filtering facepiece respirators - Updated April 30, 2020**
While disposable filtering facepiece respirators (FFRs), like N95s, are not approved for routine decontamination as conventional standards of care, FFR decontamination and reuse may be needed during times of shortage to ensure continued availability. Based on the limited research available, as of April 2020, ultraviolet germicidal irradiation, vaporous hydrogen peroxide, and moist heat have shown the most promise as potential methods to decontaminate FFRs. Whether and how a facility decides to implement specific crisis strategies is at the discretion of its administrators and should be based on present and projected risk mitigation needs and local, regional, and national availability of N95s.

Before using any decontamination method, it should be evaluated for its ability to retain (1) filtration performance, (2) fit characteristics achieved prior to decontamination, and (3) safety of the FFR for the wearer (e.g., by inactivating SARS-CoV2). See the CDC website https://www.cdc.gov/coronavirus/2019-ncov/hcp/ppe-strategy/decontamination-reuse-respirators.html for further details.

Case study 1

Mr. B. arrived at the ED with a fever, cough, several skin infections, and obvious chest congestion that he reports has worsened over the past 2 weeks.

He reported that he was a student at the local college, lived in a dorm with a roommate, and was a member of a soccer team. He had not been hospitalized previously, seemed to have no chronic health conditions, and reported he was normally in good health. Upon further discussion, Mr. B. reported that other team members had similar skin infections and had visited the college clinic.

Mr. B. was given oxacillin, but his symptoms remain unchanged. Lab work was conducted and within 48 hours a positive culture was returned for MRSA.

Self-Assessment Quiz Question #1

What infection control precautions should be implemented?
a. Airborne and contact.
b. Standard and contact.
c. Standard, airborne, and contact.
d. Standard, droplet, contact, and airborne.

Self-Assessment Quiz Question #2

What PPE is indicated?
a. Eye/face protection, gowns, and gloves.
b. Gloves, gown, face protection.
c. Eye/face protection, gowns, gloves, a fit-tested N95 or higher respirator during aerosol-producing procedures.
d. Double gloves, fit-tested N95 or higher respirator.

Self-Assessment Quiz Question #3

In this case, the onset of the MRSA infection is _____ onset.
a. Hospital.
b. Community.
c. Both hospital and community.
d. College clinic onset.

Drug resistant microorganisms

In hospitals and nonhospital healthcare environments like nursing homes, multi-drug resistant microorganisms (MDROs) require contact isolation, the transmission-based strategy of isolation recommended by the CDC (2019d).

Definitions

- Colonization Screening: When an emerging MDRO is identified, colonization screening is recommended by CDC as an essential component of the public health response. Colonization screening identifies unrecognized carriers so that infection control measures can be targeted to prevent the spread of antimicrobial resistance. The colonization screening recommendations apply to all healthcare facility types and might be recommended for community settings in some cases.
- Response Tiers: For each type of tier organisms the CDC gives specific, detailed strategies and "recommendations for the expected response, containment and control for each group." The CDC recommendations cover detailed strategies for each tier and should be reviewed in their entirety at:
  - Tier 1: Resistance mechanisms never or very rarely identified in the United States; pan-resistant organisms with the potential for wider spread in a region.
  - Tier 2: Mechanisms and organisms not regularly found in a region.
  - Tier 3: Mechanisms and organisms regularly found in a region but not endemic (CDC, 2019d).

The table below gives a summary of the recommendations by tier (CDC, 2019d).

Table 4: Summary of response recommendations for MDRO containment by tier			
Healthcare investigation			
Activity to be performed for Tier 1, Tier 2, and Tier 3 MDRO during healthcare investigation.	**Tier 1 Frequency**	**Tier 1 Frequency**	**Tier 1 Frequency**
Review the patient's health care exposures prior to and after the positive culture.	Always	Always	Always
Contact investigation			
Activity to be performed for Tier 1, Tier 2, and Tier 3 MDRO during contact investigation.	**Tier 1 Frequency**	**Tier 1 Frequency**	**Tier 1 Frequency**
Screening of healthcare roommates.	Always	Always	Always
Broader screening of healthcare contacts.	Always	Sometimes	Sometimes
Prospective lab surveillance.	Always	Always	Always
Retrospective lab surveillance.	Always	Always	Sometimes
Household contact screening.	Sometimes	Rarely	Rarely
Environmental sampling.	Sometimes	Rarely	Rarely
Healthcare personnel screening.	Sometimes	Rarely	Rarely
Evaluate potential spread to healthcare facilities that regularly share patients with the index healthcare facility.	Sometimes	Sometimes	Rarely
Infection control measures for tiers			
Activity to be performed for Tier 1, Tier 2, and Tier 3 MDRO for infection control.	**Tier 1 Frequency**	**Tier 1 Frequency**	**Tier 1 Frequency**
Prompt notification of healthcare providers and patient, and implementation of appropriate transmission-based precautions.	Always	Always	Always
Clear communication of patient status with transferring facilities.	Always	Always	Always
Onsite Infection Control Assessment with observations of practice, such as Epidemiology and Laboratory Capacity (ELC) Infection Control Assessment and Response (ICAR).	Always	Always	Sometimes

Nursing consideration: Think about the patient care area where you practice. Do you know the schedule, procedures, and products for cleaning and disinfecting bedrails, bedside tables, toilets, doorknobs, sinks, surfaces, and equipment in close proximity to the patient? What about other common areas frequented by patients, staff, and visitors? How can nursing and environmental control measures to prevent infection be enhanced in these areas? Are protocols, procedures, and products adequate to address Tier 1, 2, and 3 organisms to effectively block the "chain of infection" and all possible transmission?

Evidence-based practice! Interim US Guidance for Risk Assessment and Work Restrictions for Healthcare Personnel with Potential Exposure to COVID-19 (https://www.cdc.gov/coronavirus/2019-ncov/hcp/guidance-risk-assesment-hcp.html) The interim guidance was updated on May 29, 2020. Updates include the following:

- Any duration of exposure should be considered prolonged if the exposure occurred during the performance of an aerosol-generating procedure.
- The time period that should be used for contact tracing after exposure to asymptomatic individuals who test positive for SARS-CoV-2 was shortened.
- The time period was changed from 10 days before obtaining the specimen that tested positive for COVID-19 to 2 days to accommodate pragmatic and operational considerations for the implementation of case investigation and contact tracing programs.
- Recent data suggest that asymptomatic persons may have a lower viral burden at diagnosis than symptomatic persons. Thus, the longer contact elicitation window (10 days) may have limited impact in identifying new COVID-19 cases.
- The recommendation for the shorter contact elicitation window (2 days) will help focus case investigation and contact tracing resources toward activities most likely to interrupt ongoing transmission.
- This time period is also now in alignment with recommendations from the WHO, European CDC, and Public Health Canada.

Case study 2: MDROS

MDROs not normally seen in the region with any regularity but are present in the US and have been identified in two nearby facilities. Initial investigation of a patient admitted to your facility noted fever, abdominal pain, and a urinary tract infection (UTI), all of which increased rapidly and are not responding to antibiotics. That leads the physicians to suspect the case could be CRE due to the similarities with cases in two nearby states. Assess the following areas:

1. *What are the recommendations for response, containment, and control of this case?*
2. *What tier(s) category might this organism be?*

Answer the following questions according to the CDC recommendations:

Self-Assessment Quiz Question #4

What PPE is indicated?
What contact investigation would NOT always be warranted for this case? All of the following are correct EXCEPT:

a. Screening health care roommates.
b. Healthcare personnel screening.
c. Prospective lab surveillance.
d. Retrospective lab.

Self-Assessment Quiz Question #5

Clear communication of patient status with transferring facilities, such as the college clinic, is an example of:

a. Health investigation.
b. Contact investigation.
c. Infection control measures.
d. Community onset.

Self-Assessment Quiz Question #6

The activity of reviewing the patient's healthcare exposures prior to and after the positive culture is an example of:

a. Contact investigation.
b. Healthcare investigation.
c. Infection control.
d. Community tracing.

Self-Assessment Quiz Question #7

Colonization screening identifies _____ so that infection control measures can be targeted to prevent the spread of antimicrobial resistance.

a. Recognized cases.
b. Community onset.
c. Hospital onset.
d. Unrecognized carriers.

ELEMENT III

This is the third element from the syllabus (NYSDOH,2018a).

Use of engineering and work practice controls to reduce the opportunity for patient and healthcare worker exposure to potentially infectious material in all healthcare settings.

Element III competencies

- Define healthcare-associated disease transmission, engineering controls, safe injection practices, and work practice controls.
- Describe high-risk practices and procedures that increase the healthcare worker and patient exposure to potentially infectious material.
- Identify work practice controls designed to eliminate the transmission of bloodborne pathogens during use of sharp instruments (e.g., scalpel blades and their holders [if not disposable], lancets, lancet platforms/pens, puncture devices, injections).
- Identify where engineering or work practice controls can be utilized to prevent patient exposure to bloodborne pathogens.

I. High-Risk Practices and Procedures (By Exposure Type) Capable of Causing Healthcare Acquired Infection with Bloodborne Pathogens:
   A. Percutaneous exposures.
      1. Exposures occurring through handling/disassembly/disposal/reprocessing of contaminated needles and other sharp objects.
      2. Performing procedures where there is poor visualization, such as the following:
         a. Blind suturing.
         b. Non-dominant hand opposing or next to a sharp.
         c. Performing procedures where bone spicules or metal fragments are produced.
   B. Mucous membrane/non-intact skin exposures.
   C. Parenteral exposures:
      1. Injection with infectious material may occur during:
         a. Administration of parenteral medication.
         b. Sharing of blood monitoring devices (e.g., glucometers, hemoglobinometers, lancets, lancet platforms/pens).
         c. Infusion of contaminated blood products or fluids.

II. Safe Injection Practices and Procedures Designed to Prevent Disease Transmission from Patient to Patient and Healthcare Worker to Patient.
   A. Unsafe injection practices have resulted in one or more of the following:
      1. Transmission of bloodborne viruses, including hepatitis B and C viruses to patients.
      2. Notification of thousands of patients of possible exposure to bloodborne pathogens and recommendation that they be tested for hepatitis C virus, hepatitis B virus, and human immunodeficiency virus (HIV).
      3. Referral of providers to licensing boards for disciplinary action.
      4. Malpractice suits filed by patients.
   B. Pathogens including HCV, HBV, and human immunodeficiency virus (HIV) can be present in sufficient quantities to produce infection in the absence of visible blood.
      1. Bacteria and other microbes can be present without clouding or other visible evidence of contamination.
      2. The absence of visible blood or signs of contamination in a used syringe, IV tubing, multi- or single-dose medication vial, or blood glucose monitoring device does NOT mean the item is free from potentially infectious agents.
   C. Proper infection control technique requires that healthcare providers must do the following:
      1. Maintain aseptic technique throughout all aspects of injection preparation and administration:
         a. Medications should be drawn up in a designated "clean" medication area that is not adjacent to areas where potentially contaminated items are placed.
         b. Ensure proper hand hygiene before handling medications.

c. Never leave a needle or other device (e.g., "spikes") inserted into a medication vial septum or IV bag/bottle for multiple uses unattended. This provides a direct route for microorganisms to enter the vial and contaminate the fluid.
d. Medication vials should be discarded upon expiration or any time there are concerns regarding the sterility of the medication.

2. Never administer medications from the same syringe to more than one patient, even if the needle is changed.
3. Never use the same syringe or needle to administer IV medications to more than one patient, even if the medication is administered into the IV tubing, regardless of the distance from the IV insertion site.
   a. All of the infusion components from the infusate to the patient's catheter are a single interconnected unit.
   b. All of the components are directly or indirectly exposed to the patient's blood and cannot be used for another patient.
   c. Syringes and needles that intersect through any port in the IV system also become contaminated and cannot be used for another patient or used to re-enter a non-patient specific multidose medication vial.
   d. Separation from the patient's IV by distance, gravity and/or positive infusion pressure does not ensure that small amounts of blood are not present in these items.
4. Never enter a vial with a syringe or needle that has been used for a patient if the same medication vial might be used for another patient.
5. Never use peripheral capillary blood monitoring devices packaged as single- patient use on more than one patient:
   a. Restrict use of peripheral capillary blood sampling devices to individual patients.
   b. Never reuse lancets. Use single-use lancets that permanently retract upon puncture whenever possible.

III. Safe Injection Practices and Procedures Designed to Prevent Disease transmission from patient to healthcare worker.
   A. Refer to OSHA (2016) guidelines (https://www.osha.gov/SLTC/bloodbornepathogens/).

IV. Evaluation/Surveillance of Exposure Incidents.
   A. Identification of who is at risk for exposure.
   B. Identification of what devices cause exposure.
      1. ALL sharp devices can cause injury and disease transmission if not used and disposed of properly.
         a. Devices with higher disease transmission risk (hollow bore).
         b. Devices with higher injury rates ("butterfly"-type IV catheters, devices with recoil action).
         c. Blood glucose monitoring devices (lancet platforms/pens).
   C. Identification of areas/settings where exposures occur.
   D. Circumstances by which exposures occur.
   E. Post-exposure management (see Element VI).

V. Engineering Controls.
   A. Use safer devices whenever possible to prevent sharps injuries:
      1. Evaluate and select safer devices.
      2. Passive vs. active safety features. Active features require the HCW to actively engage the safety feature while a passive safety feature requires no activation and happens automatically, such as a retractable syringe needle.
      3. Mechanisms that provide continuous protection immediately, such as safe sharps devices/equipment, and following safe injection and disposal practices listed below.
      4. Integrated safety equipment vs. accessory devices:
         a. Properly educate and train all staff on safety devices.
         b. Consider eliminating traditional or non-safety alternatives whenever possible.
         c. Explore engineering controls available for specific areas/settings.
   B. Use puncture-resistant containers for the disposal and transport of needles and other sharp objects:
      1. Refer to published guidelines for the selection, evaluation, and use (e.g., placement) of sharps disposal containers.
         a. National Institute for Occupational Safety and Health (NIOSH) guidelines at the CDC (2016) website (https://www.cdc.gov/niosh/topics/bbp/disposal.html).
   C. Use splatter shields on medical equipment associated with risk prone procedures (e.g., locking centrifuge lids).

VI. Work Practice Controls
   A. General practices:
      1. Hand hygiene including the appropriate circumstances in which alcohol-based hand sanitizers and soap and water handwashing should be used (see Element II).
      2. Proper procedures for cleaning of blood and body fluid spills:
         a. Initial removal of bulk material followed by disinfection with an appropriate disinfectant.
      3. Proper handling/disposal of blood and body fluids, including contaminated patient care items.
      4. Proper selection, donning, doffing, and disposal of PPE as trained (see Element IV).
      5. Proper protection of work surfaces in direct proximity to patient procedure treatment area with appropriate barriers to prevent instruments from becoming contaminated with bloodborne pathogens.
      6. Preventing percutaneous exposures:
         a. Avoid unnecessary use of needles and other sharp objects.
         b. Use care in the handling and disposing of needles and other sharp objects:
   B. Modify procedures to avoid injury:
      1. Use forceps, suture holders, or other instruments for suturing.
      2. Avoid holding tissue with fingers when suturing or cutting.
      3. Avoid leaving exposed sharps of any kind on patient procedure/treatment work surfaces.
      4. Appropriately use safety devices whenever available:
         a. Always activate safety features.
         b. Never circumvent safety features.

Infection control practices for special lumbar puncture procedures

Bacterial meningitis following myelogram and other spinal procedures (e.g., lumbar puncture, spinal and epidural anesthesia, intrathecal chemotherapy) has been reported. According to the CDC (2016b):

Biosafety

It is important to adhere to proper biosafety guidelines while handling potentially infectious clinical specimens in order to maintain a safe working environment for patients, healthcare workers, and laboratorians. Infection may be transmitted from patient to staff and from staff to patient during the procedures described below. In addition to the agents that cause bacterial meningitis, the patient could have other bacterial or viral agents in either cerebrospinal fluid (CSF) or blood and both are a great hazard and potentially lethal. Of particular importance are the viruses causing hepatitis and acquired immunodeficiency syndrome. To decrease the risk of transmission of these agents, the recommendations below should be followed:

- Wear latex or nitrile gloves that are impermeable to liquids and change gloves between every patient.
- Dispose of syringes and needles in a puncture-resistant, autoclavable discard container. Do not attempt to re-cap, shear, or manipulate any needle.
- For transport to a microbiology laboratory, place the specimen in a container that can be securely sealed. Wipe any bottles with CSF or blood on the outside thoroughly with a disinfectant, such as a 70% alcohol swab.
    - Do not use povidone-iodine on the rubber septum of a Trans-Isolate(T-I) or blood culture bottle.
    - If (T-I) is not available, incubate CSF at 35-37°C with ~5% CO2 and store in an approved location if the laboratory is closed.
- Wash hands with antibacterial soap and water immediately after removing gloves.
- In the event of a needle-stick injury or other skin puncture or wound, wash the wound liberally with soap and water. Encourage bleeding.
- Report a needle-stick injury, any other skin puncture, or any contamination of the hands or body with CSF to the supervisor and appropriate health officials immediately as prophylactic treatment of the personnel performing the procedure may be indicated.

Consult the CDC (2016b) website for details on Preparation, Procedure, Collection, and Transport of Clinical Specimens (https://www.cdc.gov/meningitis/lab-manual/chpt05-collect-transport-specimens.html).

Nursing consideration: What policies, procedures, and precautions are in place in your facility to prevent exposure to bloodborne pathogens from sharp objects? What are the disposal procedures? Is there a policy in place to record accidents in this area? What is the rate of "sharps" exposure incidents at your facility? How could nursing practice be enhanced to protect patients and staff from accidental exposure due to sharp equipment? Is there a need for more training and channels to approach leadership/administration with concerns on any infection control work practice matters?

Precautions during aerosol-generating procedures

Procedures that can generate small particle aerosols (aerosol-generating procedures), such as bronchoscopy, endotracheal intubation, and open suctioning of the respiratory tract, have been associated with transmission of infectious agents to healthcare personnel, including M. tuberculosis, SARS-CoV, and N. meningitides. Protection of the eyes, nose, and mouth, in addition to gown and gloves, is recommended during performance of these procedures in accordance with standard precautions listed on the CDC website (2020b).

Exposure control plan and recordkeeping

The Occupational Safety and Health Administration (OSHA, 2020) provides information on basic requirements and forms that must be used to document injuries:

> Record all work-related needle-stick injuries and cuts from sharp objects that are contaminated with another person's blood or other potentially infectious material (as defined by 29 CFR 1910.1030). You must enter the case on the OSHA 300 Log as an injury. To protect the employee's privacy, you may not enter the employee's name on the OSHA 300 Log – see the requirements for privacy cases in paragraphs 1904.29(b)(6) through 1904.29(b)(9).

OSHA defines, "other potentially infectious material" as follows:

> Human bodily fluids, tissues, and organs, and other materials infected with the HIV or hepatitis B (HBV) virus, such as laboratory cultures or tissues from experimental animals.

Refer to the OSHA (2020), website listed on the reference page for further details on record keeping logs and types of exposure incidents to record.

Evaluation/surveillance of exposure incidents

According to the CDC (2019e), surveillance is defined as follows:

> Surveillance is an essential tool for case-finding of single patients or clusters of patients who are infected or colonized with epidemiologically important organisms (e.g., susceptible bacteria such as S. aureus, S. pyogenes [Group A streptococcus] or Enterobacter-Klebsiella spp; MRSA, VRE, and other MDROs; C. difficile; RSV; and the influenza virus) for which transmission-based precautions may be required. Surveillance is defined as the ongoing, systematic collection, analysis, interpretation, and dissemination of data regarding a health-related event for use in public health action to reduce morbidity and mortality and to improve health.

Surveillance of both process measures and the infection rates to which they are linked are important for evaluating the effectiveness of infection prevention efforts and identifying indications for change.

The essential elements of a surveillance system are the following:

1. Standardized definitions.
2. Identification of patient populations at risk for infection.
3. Statistical analysis (e.g., risk adjustment, calculation of rates using appropriate denominators, trend analysis using methods such as statistical process control charts).
4. Feedback of results to the primary caregivers.

Central line-associated bloodstream infections

According to Bell and O'Grady (2017), evidence-based guidelines have led to a significant reduction in the incidence of blood stream infections associated with central venous catheters (CVCs). Key points and updated information provided by these guidelines are summarized below:

> The combination of guideline implementation combined with newer technologies has the potential to further reduce morbidity and mortality from infections related to CVCs. There are two major definitions used to describe bloodstream infections related to CVCs: catheter-related bloodstream infection (CRBSI) and central line-associated bloodstream infection (CLABSI). CRBSI is a clinical definition based on clinical criteria related to a specific patient in which the diagnosis is being considered. This definition is more

often used for research and in some cases of clinical care, since it requires specialized microbiological techniques to specifically identify the catheter as the source of bacteremia that may not be available in all hospitals. In contrast, the diagnosis of CLABSI is a simplified definition based on surveillance criteria that identify bloodstream infections in patients with CVCs in which there is no other obvious secondary source for bacteremia.

Evidence-based strategies to reduce CLABSI: A primary bloodstream infection in a patient that had a central line within the 48-hour period before development is considered a CLABSI if the infection is not related to an alternative cause.

The following are clinical factors that may reduce the risk of CLABSI:

1. Catheter choice, catheter site selection, insertion technique, and catheter maintenance.
2. Handwashing with soap and water.
3. Sterile insertion with full barrier precautions (cap, mask, sterile gown, sterile gloves, and full sterile drape).
4. Use of 2% chlorhexidine solution with proper air drying before insertion.
5. Avoiding femoral site for catheterization.
6. Prompt removal of unnecessary catheters.

Use of novel technologies such as antibiotic or antiseptic impregnated catheters, suture-less securement devices, and disinfection caps should be added to the armamentarium of tools to further reduce CLABSI rates.

Note: From Bell, T. & O'Grady, N. P. (2017). Prevention of Central Line-Associated Bloodstream Infections. (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5666696/).

Catheter-associated urinary tract infections (CAUTI)

According to the revised CDC (2020g) mowwdule, these infections are defined as follows:

Urinary tract infections (UTIs) are the fifth most common type of healthcare-associated infection, with an estimated 62,700 UTIs in acute care hospitals in 2015. UTIs additionally account for more than 9.5% of infections reported by acute care hospitals. Virtually all healthcare-associated UTIs are caused by instrumentation of the urinary tract.

Approximately 12%-16% of adult hospital inpatients will have an indwelling urinary catheter (IUC) at some time during their hospitalization, and each day the indwelling urinary catheter remains, a patient has a 3%-7% increased risk of acquiring a catheter- associated urinary tract infection (CAUTI).

CAUTI can lead to such complications as prostatitis, epididymitis, and orchitis in males, and cystitis, pyelonephritis, Gram-negative bacteremia, endocarditis, vertebral osteomyelitis, septic arthritis, endophthalmitis, and meningitis in all patients. Complications associated with CAUTI cause discomfort to the patient, prolonged hospital stay, and increased cost and mortality. It has been estimated that each year, more than 13,000 deaths are associated with UTIs.

The most important risk factor for developing a catheter-associated UTI (CAUTI) is prolonged use of the urinary catheter. Therefore, catheters should only be used for appropriate indications and should be removed as soon as they are no longer needed.

(https://www.cdc.gov/nhsn/PDFs/pscManual/7pscCAUTIcurrent.pdf)

ELEMENT IV

Selection and use of barriers and/or PPE for preventing patient and healthcare worker contact with potentially infectious material. Competencies for this element include the following:

- Describe the circumstances that require the use of barriers and PPE to prevent patient or healthcare worker contact with potentially infectious material.
- Identify specific barriers or PPE for patient and healthcare worker protection from exposure to potentially infectious material.

Personal protective equipment (PPE)

Wearing gloves, gowns, masks, and eye protection can significantly reduce health risks for workers exposed to blood and other potentially infectious materials. Updated, detailed information on the selection and use of PPE in healthcare settings and the correct way to don and remove (doff) PPE is provided by the CDC (https://www.cdc.gov/coronavirus/2019-ncov/hcp/using-ppe.html).

The following information is a summary of the donning and doffing guidelines which are illustrated on the website.

How to put on (don) PPE gear

More than one donning method may be acceptable. Training and practice using your healthcare facility's procedure are critical. Below is one example of donning:

1. Identify and gather the proper PPE to don. Ensure choice of gown size is correct (based on training).
2. Perform hand hygiene using hand sanitizer.
3. Put on isolation gown. Tie all of the ties on the gown. Assistance may be needed by other healthcare personnel.
4. Put on NIOSH-approved N95 filtering facepiece respirator or higher (use a facemask if a respirator is not available). If the respirator has a nosepiece, it should be fitted to the nose with both hands, not bent or tented. Do not pinch the nosepiece with one hand. Respirator/facemask should be extended under chin. Both your mouth and nose should be protected. Do not wear respirator/facemask under your chin or store in scrubs pocket between patients.
   - Respirator: Respirator straps should be placed on crown of head (top strap) and base of neck (bottom strap). Perform a user-seal check each time you put on the respirator.
   - Facemask: Mask ties should be secured on crown of head (top tie) and base of neck (bottom tie). If mask has loops, hook them appropriately around your ears.
5. Put on face shield or goggles. Put on gloves. Gloves should cover the cuff (wrist) of gown.
6. Healthcare personnel may now enter patient's room (CDC, 2020h).

Nursing consideration: The CDC updated the use of PPE on June 9, 2020, added a statement about the importance of the selected respirator and eye protection not interfering with the correct fit or function of the other. Put on face shield or goggles. When wearing an N95 respirator or half facepiece elastomeric respirator, select the proper eye protection to ensure that the respirator does not interfere with the correct positioning of the eye protection, and the eye protection does not affect the fit or seal of the respirator. Face shields provide full face coverage. Goggles also provide excellent protection for eyes, but fogging is common.

How to take off (doff) PPE gear
More than one doffing method may be acceptable. Training and practice using your healthcare facility's procedure are critical. Below is one example of doffing:

1. Remove gloves. Ensure glove removal does not cause additional contamination of hands. Gloves can be removed using more than one technique (e.g., glove-in-glove or bird beak).
2. Remove gown. Untie all ties (or unsnap all buttons). Some gown ties can be broken rather than untied. Do so in a gentle manner, avoiding a forceful movement. Reach up to the shoulders and carefully pull gown down and away from the body. Rolling the gown down is an acceptable approach. Dispose in trash receptacle.
3. Healthcare personnel may now exit patient room.
4. Perform hand hygiene.
5. Remove face shield or goggles. Carefully remove face shield or goggles by grabbing the strap and pulling upwards and away from head. Do not touch the front of face shield or goggles.
6. Remove and discard respirator (or facemask if used instead of respirator). Do not touch the front of the respirator or facemask.
    - Respirator: Remove the bottom strap by touching only the strap and bring it carefully over the head. Grasp the top strap and bring it carefully over the head, and then pull the respirator away from the face without touching the front of the respirator.
    - Facemask: Carefully untie (or unhook from the ears) and pull away from face without touching the front.
7. Perform hand hygiene after removing the respirator/facemask and before putting it on again if your workplace is practicing reuse.
    - Facilities implementing reuse or extended use of PPE will need to adjust their donning and doffing procedures to accommodate those practices.
    - If implementing limited reuse: Facemasks should be carefully folded so that the outer surface is held inward and against itself to reduce contact with the outer surface during storage. Folded facemasks can be stored between uses in a clean, sealable paper bag or breathable container (CDC,2020h).

Face shields extending from chin to crown provide better face and eye protection from splashes and sprays; face shields that wrap around the sides may reduce splashes around the edge of the shield. Removal of a face shield, goggles, and mask can be performed safely after gloves have been removed, and hand hygiene performed. The front of a mask, goggles, and face shield are considered contaminated.

Facemasks

- Masks may be used in combination with goggles and facemasks to protect the mouth, nose, and eyes to provide more complete protection for the face.
- Two mask types are available for use in healthcare settings: surgical masks that are cleared by the FDA and required to have fluid-resistant properties, and procedure or isolation masks. No studies have been published that compare mask types to determine whether one mask type provides better protection than another. Since procedure/isolation masks are not regulated by the FDA, there may be more variability in quality and performance than with surgical masks. Masks come in various shapes (e.g., molded and non-molded), sizes, filtration efficiency, and method of attachment (e.g., ties, elastic, ear loops). Healthcare facilities may find that different types of masks are needed to meet individual healthcare personnel needs.
- Masks should not be confused with particulate respirators that are used to prevent inhalation of small particles that may contain infectious agents transmitted via the airborne route.
- Procedures that generate splashes or sprays of blood, body fluids, secretions, or excretions (e.g., endotracheal suctioning, bronchoscopy, invasive vascular procedures) require either a face shield (disposable or reusable) or mask and goggles (CDC,2020h).

Respirators

- Respiratory protection is broadly regulated by OSHA under the general industry standard for respiratory protection (29CFR1910.134), which requires that US employers in all employment settings implement a program to protect employees from inhalation of toxic materials. OSHA program components include medical clearance to wear a respirator; provision and use of appropriate respirators, including fit-tested NIOSH-certified N95 and higher particulate filtering respirators; education on respirator use and periodic re-evaluation of the respiratory protection program. When selecting particulate respirators, models with inherently good fit characteristics (i.e., those expected to provide protection factors of 10 or more to 95% of wearers) are preferred and could theoretically relieve the need for fit testing. A user-seal check (formerly called a "fit check") should be performed by the wearer of a respirator each time a respirator is donned to minimize air leakage around the facepiece.
- CDC (2020h) currently recommends N95 level or higher respirators for personnel exposed to patients with suspected or confirmed tuberculosis. Currently this is also true for other diseases that could be transmitted through the airborne route, including SARS262 and smallpox until inhalational transmission is better defined or healthcare-specific protective equipment more suitable for preventing infection are developed.
- Respirators are also currently recommended to be worn during the performance of aerosol-generating procedures (e.g., intubation, bronchoscopy, suctioning) on patients with SARS Co-V infection, avian influenza and pandemic influenza.
- Put on an N95 respirator (or equivalent or higher-level respirator) or facemask (if a respirator is not available) before entry into the patient's room or care area, if not already wearing one as part of extended use strategies to optimize PPE supply. Other respirators include other disposable filtering facepiece respirators, powered air-purifying respirators (PAPRs), or elastomeric respirators.
- N95 respirators or respirators that offer a higher level of protection should be used instead of a facemask when performing or present for an aerosol-generating procedure.
- If reusable respirators (e.g., powered air-purifying respirators] or elastomeric respirators) are used, they should be removed after exiting the patient's room or care area. They must be cleaned and disinfected according to manufacturer's reprocessing instructions prior to reuse.
- When the supply chain is restored, facilities with a respiratory protection program should return to use of respirators for patients with suspected or confirmed SARS-CoV-2 infection. Those healthcare personnel (HCP) that care for patients with pathogens for which a respirator is recommended should implement a respiratory protection program.
- Information on various types of respirators is available (https://www.osha.gov/bloodborne-pathogens).
- Respirators should be used in the context of a complete respiratory protection program including training and fit testing to ensure an adequate seal between the edges of the respirator and the wearer's face. Detailed CDC (2020c) information regarding respirator programs, including fit-test procedures, is available (https://www.cdc.gov/niosh/topics/respirators/) (CDC,2020h).

Eye protection: Goggles and face shields

- NIOSH states that eye protection must be comfortable, allow for sufficient peripheral vision, and must be adjustable to ensure a secure fit. It may be necessary to provide several

different types, styles, and sizes of protective equipment. Indirectly vented goggles with a manufacturer's anti-fog coating may provide the most reliable practical eye protection from splashes, sprays, and respiratory droplets from multiple angles. Many styles of goggles fit adequately over prescription glasses with minimal gaps. While effective as eye protection, goggles do not provide splash or spray protection to other parts of the face.

- Even if Droplet Precautions are not recommended for a specific respiratory tract pathogen, protection for the eyes, nose, and mouth by using a mask and goggles or face shield alone is necessary when it is likely that there will be a splash or spray of any respiratory secretions or other body fluids as defined in Standard Precautions.
- Personal eyeglasses and contact lenses are NOT considered adequate eye protection.
- Ensure that eye protection is compatible with the respirator so there is not interference with proper positioning of the eye protection or with the fit or seal of the respirator.
- Reusable eye protection (e.g., goggles) must be cleaned and disinfected according to manufacturer's reprocessing instructions prior to reuse.

Gloves

- Vinyl gloves have higher failure rates than latex or nitrile gloves when tested under simulated and actual clinical conditions.
- Change gloves during the care of a single patient to prevent cross-contamination of body site.
- Change gloves if the patient interaction involves touching portable computer keyboards or other equipment that is transported from room to room.
- Gloves must not be washed for subsequent reuse because microorganisms cannot be removed reliably from glove surfaces. The integrity of reused gloves cannot be ensured, and reuse has been associated with transmission of MRSA and Gram-negative bacilli.
- Gloves that fit snugly around the wrist are preferred for use with an isolation gown because they will cover the gown cuff and provide a more reliable continuous barrier for the arms, wrists, and hands.
- Hand hygiene following glove removal further ensures that the hands will not carry potentially infectious material that might have penetrated through unrecognized tears or that could contaminate the hands during glove removal.

Isolation gowns

- Isolation gowns and other protective apparel are mandated by the OSHA Bloodborne Pathogens Standard.
- Clinical and laboratory coats or jackets worn over personal clothing for comfort and/or purposes of identity are not considered PPE.
- When contact precautions are used (i.e., to prevent transmission of an infectious agent that is not interrupted by Standard Precautions alone and that is associated with environmental contamination), donning of both gown and gloves upon room entry is indicated to address unintentional contact with contaminated environmental surfaces
- Isolation gowns are always worn in combination with gloves, and with other PPE when indicated. Gowns are usually the first piece of PPE to be donned. Full coverage of the arms and body front, from neck to the mid-thigh or below, will ensure that clothing and exposed upper body areas are protected.
- The outer, "contaminated," side of the gown is turned inward and rolled into a bundle, and then discarded into a container designated for waste or linen to contain contamination.

Occupational safety and health standards for PPE

The Occupational Safety and Health Standards (OSHA) Bloodborne Pathogens Standard (29 CFR 1910.1030) regarding bloodborne disease requires employers to provide appropriate personal protective equipment (PPE) and clothing free of charge to employees (OSHA, 2016).

Information on the OSHA Worker protections against occupational exposure to infectious diseases is available at their website (https://www.osha.gov/bloodborne-pathogens/worker-protections).

Additional respiratory protection

Due to Covid-19, the CDC has provided additional guidelines as follows:

Aerosol-generating procedures (AGPs)

- Some procedures performed on patients with suspected or confirmed SARS-CoV-2 infection could generate infectious aerosols. Procedures that pose such risk should be performed cautiously and avoided if possible.
- If performed, the following should occur:
  - HCP in the room should wear an N95 or equivalent or higher-level respirator, eye protection, gloves, and a gown.
  - The number of HCP present during the procedure should be limited to only those essential for patient care and procedure support. Visitors should not be present for the procedure.
  - AGPs should ideally take place in an AIIR.
  - Clean and disinfect procedure room surfaces promptly as described in the section on environmental infection control below.

Collection of diagnostic respiratory specimens

- When collecting diagnostic respiratory specimens (e.g., nasopharyngeal or nasal swabs) from a patient with possible SARS-CoV-2 infection, the following should occur:
  - Specimen collection should be performed in a normal examination room with the door closed.
  - HCP in the room should wear an N95 or equivalent or higher-level respirator (or facemask if a respirator is not available), eye protection, gloves, and a gown.
  - If respirators are not readily available, they should be prioritized for other procedures at higher risk for producing infectious aerosols (e.g., intubation), instead of for collecting diagnostic respiratory specimens. The number of HCP present during the procedure should be limited to only those essential for patient care and procedure support. Visitors should not be present for specimen collection.
  - Clean and disinfect procedure room surfaces promptly as described in the section on environmental infection control below (CDC, 2020b).

ELEMENT V

Creation and maintenance of a safe environment for patient care in all healthcare settings through application of infection control principles and practices for cleaning, disinfection, and sterilization (NYSDOH,2018a).

Element V competencies include the following:

- Define cleaning, disinfection, and sterilization.
- Differentiate between non-critical, semi-critical, and critical medical devices.
- Describe the three levels of disinfection.
- Recognize the correct application of reprocessing methods for assuring the safety and integrity of patient care equipment in preventing transmission of bloodborne pathogens.
- Recognize the professional's responsibility for maintaining a safe patient care environment in all healthcare settings.
- Recognize appropriate pre-cleaning, chemical disinfection, and sterilization of instruments and medical devices aimed at preventing transmission of bloodborne pathogens.

I. Universal Principles
   A. Instruments, medical devices, and equipment should be managed and reprocessed according to recommended/ appropriate methods regardless of a patient's diagnosis except for cases of suspected prion disease.
      1. Special procedures are required for handling brain, spinal, or nerve tissue from patients with known or suspected prion disease (e.g., Creutzfeldt-Jakob disease [CJD]).
      2. Consultation with infection control experts prior to performing procedures on such patients is warranted.
   B. Industry guidelines as well as equipment and chemical manufacturer recommendations should be used to develop and update reprocessing policies and procedures.
   C. Written instructions should be available for each instrument, medical device, and equipment reprocessed.

II. Potential for Contamination is Dependent Upon Several Factors
   A. Type of instrument, medical device, equipment, or environmental surface:
      1. Potential for external contamination (e.g., presence of hinges, crevices).
      2. Potential for internal contamination (e.g., presence of lumens).
      3. Physical composition, design, or configuration of the instrument, medical device, equipment, or environmental surface.
   B. Frequency of hand contact with instrument, medical device, equipment, or environmental surface.
   C. Potential for contamination with body substances or environmental sources of microorganisms.
   D. Level of contamination. Type and number of microorganisms and potential for cross- contamination.

III. Steps of Reprocessing
   A. Pre-cleaning:
      1. Removes soil, debris, lubricants from internal and external surfaces.
      2. To be done as soon as possible after use.
   B. Cleaning
      1. Manual (e.g., scrubbing with brushes).
      2. Mechanical (e.g., automated washers).
      3. Appropriate use and reprocessing of cleaning equipment (e.g., do not reuse disposable cleaning equipment).
      4. Frequency of solution changes.
   C. Disinfection – requires sufficient contact time with chemical solution.
   D. Sterilization – requires sufficient exposure time to heat, chemicals, or gases.

IV. Choice/Level of Reprocessing Sequence
   A. Based on intended use:
      1. Critical instruments and medical devices require sterilization, which is the use of a physical or chemical procedure to destroy all microbial life, including highly resistant bacterial endospores. An item that enters sterile tissue or the vascular system (e.g. intravenous catheters, needles for injections) must be sterile prior to contact with tissue.
      2. Semi-critical instruments and medical devices minimally require high-level disinfection. High-level disinfection kills all organisms, except high levels of bacterial spores, and is achieved using a chemical germicide cleared for marketing as a sterilant by the US Food and Drug Administration (FDA). An item that comes in contact with mucous membranes or non-intact skin minimally requires high-level disinfection (e.g., oral thermometers, vaginal specula).
      3. Non-critical instruments and medical devices minimally require cleaning and low-level disinfection. An item that contacts intact skin but not mucous membranes (e.g., blood pressure cuffs, oximeters). They require low level disinfection that kills some viruses and bacteria with a chemical germicide registered as a hospital disinfectant by the EPA.
   B. Manufacturer's recommendations must be followed.

V. Effectiveness of Reprocessing Instruments, Medical Devices, and Equipment (see the syllabus for supporting details for the summary below)
   A. Cleaning prior to disinfection.
   B. Disinfection.
   C. Sterilization.

VI. Recognizing Potential Sources of Cross-Contamination in the Healthcare Environment
   A. Surfaces or equipment that require cleaning between patient procedures/treatments.
   B. Practices that contribute to hand contamination and the potential for cross-contamination.
   C. Consequences of reuse of single-use/disposable instruments, medical devices or equipment.

VII. Factors That Contributed to Contamination in Reported Cases of Disease Transmission
   A. At any point in reprocessing or handling, breaks in infection control practices can compromise the integrity of instruments, medical devices, or equipment.
   B. Specific factors:
      1. Failure to reprocess or dispose of items between patients.
      2. Inadequate cleaning.
      3. Inadequate disinfection or sterilization.
      4. Contamination of disinfectant or rinse solutions.
      5. Improper packaging, storage, and handling.
      6. Inadequate/inaccurate record keeping of reprocessing requirements.

VIII. Expectations of Health Professionals to Differing Levels of Disinfection: Sterilization methods and agents based on the area of professional practice setting and scope of responsibilities.
   A. Professionals who practice in settings where handling, cleaning, and reprocessing equipment, instruments, or medical devices is performed elsewhere (e.g., in a dedicated Sterile Processing Department):
      1. Understand core concepts and principles:
         a. Standard and Universal Precautions (e.g., wearing of personal protective equipment).
         b. Cleaning, disinfection, and sterilization.
         c. Appropriate application of safe practices for handling instruments, medical devices, and equipment in the area of professional practice.

d. Designation and physical separation of patient care areas from cleaning and reprocessing areas is strongly recommended by NYSDOH (2018a).

2. Verify with those responsible for reprocessing what steps are necessary prior to reprocessing:
   a. Pre-cleaning.
   b. Soaking.

B. Professionals who have primary or supervisory responsibilities for equipment, instruments, or medical device reprocessing (e.g., Sterile Processing Department staff or clinics and physician practices where medical equipment is reprocessed onsite):

1. Understand core concepts and principles:
   a. Standard and Universal Precaution.
   b. Cleaning, disinfection, and sterilization described in Sections III and IV above.
   c. Appropriate application of safe practices for handling instruments, medical devices, and equipment in the area of professional practice.
   d. Designation and physical separation of patient care areas from cleaning and reprocessing areas is strongly recommended by NYSDOH (2018a).
2. Determine appropriate reprocessing practices taking into consideration the following:
   a. Selection of appropriate methods:
      1) Antimicrobial efficacy.
      2) Time constraints and requirements for various methods.
      3) Compatibility among equipment/materials.
      4) Toxicity.
      5) Residual effect.
      1. Antibacterial residual.
      2. Patient toxicity/allergy.
      6) Ease of use.
      7) Stability.
      8) Odor.
      9) Cost.
      10) Monitoring.
      1. Frequency.
      2. FDA requirements for reprocessing single-use devices.*

*Note: Though the #2 entry above is still in the NYSDOH (2018a) syllabus, there is no current documentation by the FDA that supports the use of reprocessing single-use devices. The most current statement by the FDA on this topic was written on 2/12/2018 as follows:

> The FDA has not regulated original equipment manufacturers (OEMs), third parties, and hospitals that engage in reprocessing single-use devices (SUDs) in the same manner. The public health risk presented by a reprocessed SUD varies. Some devices, which are low risk when used only one time, may present an increased risk to the patient upon reprocessing. Other SUDs are low risk when used for the first time and remain low risk after reprocessing, provided that the reprocessor conducts cleaning and sterilization/disinfection of the SUD in an appropriate manner. Other SUDs, however, cannot be reprocessed safely and should not be reprocessed and reused under any circumstances. FDA is proposing to prioritize its enforcement of premarket requirements for reprocessed SUDs on the basis of the risk that is likely to be posed by the reuse of the device (FDA, 2020).

ELEMENT VI

Prevention and Control of Infectious and Communicable Diseases in Healthcare Personnel:

- Recognize the role of occupational health strategies in protecting healthcare workers and patients.
- Recognize nonspecific disease findings that should prompt evaluation of healthcare workers.
- Identify occupational health strategies for preventing transmission of bloodborne pathogens and other communicable diseases in healthcare workers.
- Identify resources for evaluation of healthcare workers infected with HIV, HBV, and/or HCV.

Immunization and screening programs

According to the CDC, healthcare workers are at risk to acquire and spread vaccine-preventable illnesses including hepatitis B, influenza, measles, mumps, rubella (MMR), varicella, tetanus, diphtheria, pertussis (Tdap), and meningococcal disease.

The most current CDC (2016) recommendations for vaccines for healthcare workers are listed on the website (https://www.cdc.gov/vaccines/adults/rec-vac/hcw.html).

The NYSDOH (2018) requires the same immunizations as recommended by the CDC.

Tuberculosis screening and control

The CDC (2019i) issued new guidelines for preventing transmission of Mycobacterium tuberculosis in healthcare settings. The entire document includes information on the following and can be directly obtained from the CDC:

- Baseline TB screening and testing.
- Annual screening, testing, and education.
- Post-exposure screening and testing.

A TB infection-control program in a healthcare setting should be based on a three-level hierarchy of control measures and include the following:

1. Administrative controls.
2. Environmental controls.
3. Use of respiratory protective equipment.

(http://www.cdc.gov/tb/topic/infectioncontrol/)

Maintenance of records, data management, and confidentiality

Maintaining records of work-related medical evaluations, screening tests, immunizations, exposures, and post-exposure management can monitor the health status of healthcare workers. Such records must be kept in accordance with all applicable state and federal laws. Examples of laws that might apply include the Privacy Rule of the Health Insurance Portability and Accountability Act (HIPAA) of 1996, 45 CFR 160, 162, and 164 (HHS, 2020b), and the OSHA Occupational Exposure to Bloodborne Pathogens Final Rule 29 CFR 1910.1030 (OSHA, 2016).

Symptoms requiring immediate evaluation (NYSDOH, 2018a)

Symptoms requiring immediate evaluation by a licensed medical professional and possible restriction from patient care activities:

- Fever.
- Cough.
- Rash.
- Vesicular lesions.
- Draining wounds.
- Vomiting.
- Diarrhea.

Management strategies for potentially communicable conditions:

- Appropriate evaluation and treatment.
- Limiting contact with susceptible patients.
- Furlough until noninfectious.

Preventing transmission of bloodborne pathogens

HIV, HBV, and HCV are three of the most common bloodborne pathogens from which healthcare workers are at risk. Today, simultaneous infection from multiple diseases, multi-drug resistant organisms, including HIV, hepatitis B or C, methicillin-resistant Staphylococcus aureus (MRSA), and co-morbidities associated with diabetes increases the risk of occupational exposure to healthcare workers (CDC, 2019h).

Healthcare workers are potentially exposed to these diseases in one of two ways:

1. A percutaneous injury in which a healthcare worker is injured by a sharps object.
2. A mucocutaneous exposure incident with contact of a mucous membrane or non-intact skin with blood, tissue, or other potentially infectious bodily fluids (CDC, 2019h).

When PPE is not readily available or accessible, employees are less likely to wear it. This puts them at risk of exposure to blood and body fluids and vulnerability to bloodborne pathogens.

Following a specific exposure, the risk of infection varies depending on factors such as the following:

- The pathogen involved.
- The type and severity of exposure.
- The amount of blood involved in the exposure.
- The amount of pathogen in the patient's blood at the time of exposure (CDC, 2017).

Although most exposures do not result in infection, the exposed person should be evaluated immediately by a qualified healthcare professional in case treatment is needed.

Post-Exposure management and prophylaxis

Healthcare workers may face the risk of exposure to infection from pathogens despite the use of precautions, engineering controls, and safe work practices. Human immunodeficiency virus (HIV), hepatitis B virus (HBV), and hepatitis C virus are the three most common pathogens of concern, according to the CDC, due to exposure to blood and other bodily fluids (CDC, 2016a).

The National Occupational Research Agenda (NORA) works within the CDC on innovative research projects for workplace safety based on CDC content.

The Stop Sticks Campaign, a NORA program, works to bring awareness to healthcare workers concerning the risks of exposure to bloodborne pathogens due to needle sticks or injury from sharp objects. The campaign includes guidelines and resources that address post-exposure practices including the following steps:

Step one: Immediate care to the exposure site

1. Wash puncture and small wounds with soap and water for 15 minutes.
2. Be aware of wash station locations in your facility based on what shift you are working.
3. Apply direct pressure to lacerations to control bleeding and seek medical attention.
4. Flush mucous membranes with water:
   a. Mouth: Rinse several times with water.
   b. Eyes:
      1) Remove contact lenses.
      2) If eye wash station available, flush eyes for 15 minutes.
      3) If eye wash station not available, have a peer flush exposed eyes with 500 mL lactated ringers or normal saline.
5. If unable to do the above, then flush under the sink with water (preferably tepid) for 15 minutes or as tolerated. Keep the eyes open and rotate the eyeballs in all directions to remove contamination from around the eyes. Help may be needed to hold the eyelids open.

Step two: Evaluate exposure and report

1. Seek medical care to determine risk associated with exposure.
2. Report blood and body fluid exposure immediately as it poses a risk of infection transmission.
3. Reporting as soon as possible will assist obtaining a test from the source.
4. Remember to complete an incident report (where applicable) so that a root cause investigation may occur that can result in preventing similar type incidents to others.

Step three: Give post-exposure prophylaxis (PEP) for exposures posing risk of infection transmission

1. HBV.
   a. Give PEP as soon as possible, preferably within 24 hours.
   b. PEP can be given to pregnant women.
2. HCV – PEP not recommended.
3. HIV.
   a. Initiate PEP as soon as possible, within hours of exposure.
   b. Offer pregnancy testing to all women of childbearing age even if they are not known to be pregnant.
   c. Seek expert consultation if viral resistance is suspected.
   d. Administer PEP for 4 weeks if tolerated.

Step four:

1. HBV exposures.
   a. Conduct a test for anti-HB 1 to 2 months after the last dose of the vaccine if only a vaccine is given.
   b. Follow-up is not indicated if the exposed person is immune to HBV or has received HBIG PEP.
2. HCV exposures.
   a. Perform testing for anti-HCV and ALT 4 to 6 months after exposure.
   b. Perform HCV RNA testing at 4 to 6 weeks if an earlier diagnosis of HCV infection is desired.
   c. Confirm repeatedly reactive anti-HCV enzyme immunoassays (EIAs) with supplemental tests.
3. HIV exposures.
   a. Evaluate exposed persons taking PEP within 72 hours after exposure and monitor them for drug toxicity for at least 2 weeks.
   b. Perform HIV antibody testing for at least 6 months post-exposure (e.g., at baselines of 6 weeks, 3 months, and 6 months).
   c. Perform HIV antibody testing for illness compatible with an acute retroviral syndrome.
   d. Advise exposed persons to use precautions to prevent secondary transmission during the follow-up period (CDC, 2019h).

New York State Department of Health Policy Statement and Guidelines to Prevent Transmission of Bloodborne Pathogens from Infected Health Care Personnel through Medical/Dental Procedures. (NYSDOH, 2019f).

Based on evaluation of all available medical and scientific data, the NYSDOH believes the following HIV- and HBV-related policies best safeguard New York's citizens and protect the viability of our healthcare system:

- The most effective means of preventing HIV and HBV transmission in healthcare settings is through strict adherence to standard barrier precautions and established infection control practices that decrease the opportunity of direct exposure to blood and body fluids for both workers and patients.
- Voluntary testing without fear of disclosure or discrimination is the best means of encouraging people at risk for HIV or HBV to seek counseling and testing.
- Mandatory screening of New York HCP for bloodborne pathogens is not recommended. Such a program would cost

millions of dollars and would not produce any appreciable gain in public safety. Negative antibody tests for HIV, HBV, and HCV do not rule out the presence of infection since it can take some time for measurable antibodies to appear.

- All patients and healthcare workers who have been potentially exposed to bloodborne pathogens should be strongly counseled to seek testing so they may benefit from medical management. Healthcare workers should also seek screening for bloodborne diseases per CDC recommendations as part of their own health care (CDC,2020e).
- Bloodborne pathogen infection alone does not justify limiting a healthcare worker's professional duties. Limitations, if any, should be determined on a case-by-case basis after consideration of the factors that influence transmission risk, including inability or unwillingness to comply with infection prevention and control standards or functional impairment that interferes with job performance.
- After a needle-stick exposure to an infected patient, a healthcare worker's risk of infection depends on the pathogen involved, the immune status of the worker, the severity of the needle-stick injury, and the availability and use of appropriate post-exposure prophylaxis.
- Healthcare workers are not required to inform patients or employers that they have a bloodborne pathogen infection. Such disclosure might serve as a deterrent to workers seeking voluntary testing and medical evaluation. Strict adherence to Standard Precautions is an effective means of preventing transmission of bloodborne pathogens.

The NYSDOH has identified measures that enhance public safety and guard against discrimination for bloodborne pathogen-infected HCP:

- **State-appointed review panels:**
- Pursuant to PHL§ 2760, the NYSDOH may convene a state advisory panel that provides guidance to bloodborne pathogen-infected healthcare workers who seek consultation. State panels function as an evaluation resource for practitioners who are not affiliated with institutions, or as a second opinion for workers affiliated with healthcare facilities who have been evaluated by their facilities.
- **Confidentiality of a healthcare worker's HIV status:** PHL§ 2782 protects the confidentiality of HIV-related information by limiting who may obtain the information and for what purpose. The Human Rights Law §296 prohibits discriminatory employment practices based on a person's disability. In accordance with the law, HIV-infected healthcare workers may not be required as a condition of employment to disclose their HIV status to patients. Similarly, healthcare facilities are under no general obligation under New York State law to disclose to patients the status of an infected healthcare worker in their employ.

- **Evaluating infected HCP, evaluation criteria:** A healthcare facility should base its evaluation of HCP on the premise that bloodborne pathogen infection alone is not sufficient justification to limit the professional duties of HCP. The determination of whether an individual HCP poses a significant risk to patients that warrants job modification, limitation, or restriction requires a case-by- case evaluation that considers the multiple factors that can influence risk. Periodic re- evaluation of HCP with bloodborne pathogen infection may be appropriate if physical or mental functioning changes.

Factors that may bear on the ability of HCP, including those with bloodborne infections, to provide quality healthcare include the following:

1. Physical or mental condition that may interfere with the worker's ability to perform assigned tasks or regular duties.
2. Lack of compliance with established guidelines to prevent transmission of disease and/or documentation or evidence of previous transmission of bloodborne pathogens.
3. Lack of appropriate infection prevention and control techniques as related to performance of procedures (e.g., poor hand hygiene practices or lack of attention to Standard Precautions).
4. Any health condition that would pose a significant risk to others.
    - NYSDOH Consultation: The NYSDOH is available to any individual, institution, or organization to discuss concerns about the management of employees with bloodborne pathogens. In addition, the NYSDOH will provide information, confidentially or anonymously (NYSDOH, 2019a).

CDC guidance for evaluating healthcare personnel for hepatitis B virus protection and for administering post-exposure management

The above titled report published by the CDC, and last reviewed March 12, 2020, contains CDC guidance that augments the recommendations of the Advisory Committee on Immunization Practices (ACIP) for evaluating hepatitis B protection among healthcare personnel (HCP) and administering post-exposure prophylaxis. The material in this report is from the National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention:

Specifying exposure-prone procedures

In general, three conditions are necessary for healthcare personnel to pose a risk for bloodborne virus transmission to patients. First, the healthcare provider must be sufficiently viremic (high enough viral load in the bloodstream). Second, the healthcare provider must have an injury, such as a puncture wound or non-intact skin, that allows exposure to his/her blood or other infectious body fluids. Third, the provider's blood or infectious body fluid must come in direct contact with a patient's wound, traumatized tissue, mucous membranes, or similar portal of entry during an exposure-prone procedure. The vast majority of HBV-infected healthcare personnel pose no risk for patients because they do not perform activities in which both the second and third conditions are met (Schillie et al., 2018).

Recommendations for Chronically HBV-Infected Healthcare Providers and Students:

The CDC recommends the following measures for the management of hepatitis B virus- infected healthcare providers and students:

Practice scope

Chronic HBV infection should not preclude the practice or study of medicine, surgery, dentistry, or allied health professions. Standard Precautions should be adhered to rigorously in all healthcare settings for the protection of both the patient and provider. The CDC discourages constraints that restrict chronically HBV-infected healthcare providers and students from the practice or study of medicine (Schillie et al., 2018).

Institutional policies and procedures

Hospitals, medical and dental schools, and other institutions should have written policies and procedures for the identification and management of HBV-infected healthcare providers, students, and school applicants.

Prevention of Hepatitis B virus infection in the United States: Recommendations of the Advisory Committee on Immunization Practices

This report updates and summarizes previously published recommendations from the ACIP and CDC regarding the prevention of HBV infection in the US (Schillie et al., 2018). The entire report is available (https://www.cdc.gov /mmwr/volumes/67/rr/pdfs/rr6701-H.PDF).

Persons at risk for occupational exposure to HBV

The Occupational Safety and Health Administration mandates that employers offer Hepatitis B vaccination to all employees who have occupational risk and that post-exposure prophylaxis be available following an exposure.

Post-exposure prophylaxis

This section provides recommendations for management of persons who are exposed to HBV through a distinct, identifiable exposure to blood or body fluids that contain blood, in occupational and nonoccupational settings.

Wounds and skin sites that have been in contact with blood or body fluids should be washed with soap and water; mucous membranes should be flushed with water. Using antiseptics (e.g., 2%-4% chlorhexidine) for wound care or expressing fluid by squeezing the wound further have not been shown to reduce the risk for HBV transmission; however, the use of antiseptics is not contraindicated. The application of caustic agents (e.g., bleach) or the injection of antiseptics or disinfectants into the wound is not recommended.

Occupational settings for vaccinated HCP

- For vaccinated HCP (who have written documentation of a complete Hepatitis B vaccine series) with subsequent documented anti-HBs ≥10 mIU/mL, testing the source patient for HBsAg is unnecessary. No post-exposure prophylaxis for HBV is necessary, regardless of the source patient's HBsAg status.
- For vaccinated HCP (who have written documentation of a complete Hepatitis B vaccine series) without previous anti-HBs testing, the HCP should be tested for anti-HBs and the source patient (if known) should be tested for HBsAg as soon as possible after the exposure. Anti-HBs testing should be performed using a method that allows detection of the protective concentration of anti-HBs (≥10 mIU/mL). Testing the source patient and the HCP should occur simultaneously; testing the source patient should not be delayed while waiting for the HCP anti-HBs test results, and likewise, testing the HCP should not be delayed while waiting for the source patient's HBsAg results.

There are additional sections of this CDC update (Shillie et al., 2018) that cover detailed protocol to follow based on test results for the HPC and the host patient as well as post-exposure for HCP that have not been vaccinated, have an incomplete series, or show no antibodies.

Case study 3

Ms. H. has a history of drug abuse and entered the ED for treatment of a broken wrist and head injury from a fall possibly from dehydration. The ED Nurse A is completing an IV when Ms. H jumps and jerks, causing the needle to slip. Nurse A suffers a needle stick to their hand and is now exposed to Ms. H's blood, and possible bloodborne pathogens due to her history of intervenous drug use.

1. *What bloodborne pathogens might be present due to the patient's history?*
2. *What immediate steps should Nurse A immediately take?*
3. *What post-exposure prophylaxis may be warranted and why?*

Self-Assessment Quiz Question #8

What is your assessment of the possible bloodborne pathogens she may have due to her drug history?

a. HIV, Hepatitis B and C.
b. HIV, Covid-19.
c. Hepatitis B, M Tuberculosis.
d. None of these.

Self-Assessment Quiz Question #9

Select the immediate steps you should take following a needle stick exposure.

a. Following policy and procedures, dispose of sharps and gloves, wash thoroughly with soap and water, especially the wound site.
b. Notify the managing nurse, ED manager, employee health manager, or Triage nurse of your injury according to facility policy. Evaluate need for post exposure prophylaxis.
c. Seek assistance to restrain the patient for the protection of all and alert your supervisor.
d. All Except C.

Self-Assessment Quiz Question #10

Choose the correct answer for determination of post exposure prophylaxis (PEP):

a. A should have baseline testing for Hepatitis B and C in immunizations are not up to date.
b. If Ms. H has positive results for HIV, PEP may be delayed for a few weeks to consider options.
c. If Ms. H has tested positive for Hepatitis B, and A has not been vaccinated or shows no antibodies, immunoglobulin and a Hepatitis B vaccine cycle may be initiated.
d. All Except b.

Correct answers will be given on page 30.

Sepsis awareness and education

This element of the NYSDOH training syllabus addresses the need for additional preparation to handle sepsis. The New York State Report on Sepsis Care Improvement Initiative: Hospital Quality Performance emphasizes the importance of rapid and early treatment (NYSDOH, 2017).

The sections below are from the NYSDOH syllabus (2018a) with additional information from the CDC and New York State law.

Element VII competencies include the following:

- Describe the scope of the sepsis problem and the NYS Sepsis Improvement Initiative.
- Recognize the signs and symptoms of sepsis to identify and treat at-risk patients, both adult and pediatric, as early as possible.
- Understand the need for rapid evaluation and management in adults and children if sepsis is suspected.
- Identify common sources of sepsis.
- Educate patients and families on methods for preventing infections and illnesses that can lead to sepsis, and on identifying the signs and symptoms of severe infections and when to seek care.

According to NYSDOH (2019d):
Sepsis is a life-threatening condition that requires early detection and timely, appropriate interventions to improve the chances of survival for patients of all ages. Sepsis is defined as a clinical syndrome in which patients have an infection that is accompanied by an extreme systemic response. Sepsis of sufficient severity that the function of major organ systems in the body (such as heart, kidney, brain, and others) is impaired is referred to as "severe sepsis." Patients with severe sepsis that have continued organ system impairment and/or low blood pressure that does not respond to treatment with adequate fluid replacement are considered to be in "septic shock."

I. Sepsis: Scope of the problem
Sepsis is a life-threatening medical emergency that requires early recognition and intervention. Sepsis can quickly progress from tissue damage to organ failure and even death. According to recent CDC updates (CDC, 2020d), these facts are recorded:
   - Each year, at least 1.7 million adults in America develop sepsis.
   - Nearly 270,000 Americans die as a result of sepsis.
   - One in three patients who die in a hospital have sepsis.

The NYSDOH May report (2019d) lists the scope of sepsis in New York State:
Severe sepsis and septic shock impact approximately 50,000 patients in NY each year, and on average almost 30% of patients died from this syndrome prior to the implementation of the New York State Sepsis Care Improvement Initiative. In addition, many more may experience lifelong impairments because of the broad impact that sepsis may have on organ and tissue function.

II. New York State Sepsis Improvement Initiative and Rory Staunton's Law (NYSDOH, 2018a and 2019e)
   A. Purpose
      1. To increase early recognition of suspected sepsis by all healthcare professionals by requiring such individuals to complete course work or training on sepsis;
      2. Stress the importance of timely initiation of evidence-based protocols to improve sepsis outcomes.

Early recognition of sepsis is the responsibility of all healthcare providers. According to the CDC (2020d):
Sepsis begins outside of the hospital for nearly 80% of patients. A CDC evaluation found seven in 10 patients with sepsis had recently used healthcare services or had chronic diseases requiring frequent medical care.

Public Health Law 239-a (NYSDOH, 2018a, 2019e)
This law identifies mandated course work or training in infection control practices and was amended in 2017 to include Element VII on sepsis awareness and education.

Rory's Regulations: 10 NYCRR 405.2, 405.4, 405.7
New York State regulations at 10 NYCRR §§ 405.2 and 405.4 require hospitals to do the following:

- Adopt evidence-based protocols to ensure early diagnosis and treatment of sepsis.
- Ensure hospital staff are trained to implement such sepsis protocols (NYSDOH, 2019e).

The Public Health and Health Planning Council and the Commissioner of Health amended sections 2800 and 2803 of the Public Health Law, Sections 405.2 and 405.4 of Title 10 (Health) of the Official Compilation of Codes, Rules and Regulations of the State of New York law (NYSDOH, 2019e). Section 4 reads, in part, "Sepsis protocols must include components specific to the identification, care, and treatment of adults and of children, and must clearly identify where and when components will differ for adults and for children."

Rory's Regulations is a law named in honor of a 12-year old boy who died after an infection from a laceration he received at school led to sepsis. This law requires hospitals to take the following measures:

- Implement an evidence-based process, which should include suitable training, resources, and equipment for healthcare providers, for quickly recognizing and treating sepsis in adults and children.
- Collect sepsis data to improve the quality of care and provide this data to the state annually.
- Implement Parent's Bill of Rights to ensure parents and primary care providers receive vital information about children's care (NYSDOH,2019e).

Public Health Law (PHL) 2803(i)(g) Patients' Rights 10NYCRR, Section 405.7 includes a Parent's Bill of Rights shown below:
As a parent, legal guardian or person with decision-making authority for a pediatric patient receiving care in this hospital, you have the right, consistent with the law, to the following:

1. To inform the hospital of the name of your child's primary care provider, if known, and have this information documented in your child's medical record.
2. To be assured our hospital will only admit pediatric patients to the extent consistent with our hospital's ability to provide qualified staff, space, and size appropriate equipment necessary for the unique needs of pediatric patients.
3. To allow at least one parent or guardian to remain with your child at all times, to the extent possible given your child's health and safety needs.
4. That all test results completed during your child's admission or emergency room visit be reviewed by a physician, physician assistant, or nurse practitioner who is familiar with your child's presenting condition.
5. For your child not to be discharged from our hospital or emergency room until any tests that could reasonably be expected to yield critical value results are reviewed by a physician, physician assistant, and/or nurse practitioner and communicated to you or other decision makers, and your child, if appropriate. Critical value results are results that suggest a life-threatening or otherwise significant condition that requires immediate medical attention.
6. For your child not to be discharged from our hospital or emergency room until you or your child, if appropriate, receive a written discharge plan, which will also be verbally communicated to you and your child or other medical decision makers. The written discharge plan will specifically identify any critical results of laboratory or other diagnostic

tests ordered during your child's stay and will identify any other tests that have not yet been concluded.
7. To be provided critical value results and the discharge plan for your child in a manner that reasonably ensures that you, your child (if appropriate), or other medical decision makers understand the health information provided in order to make appropriate health decisions.
8. For your child's primary care provider, if known, to be provided all laboratory results of this hospitalization or emergency room visit.
9. To request information about the diagnosis or possible diagnoses that were considered during this episode of care and complications that could develop as well as information about any contact that was made with your child's primary care provider.
10. To be provided, upon discharge of your child from the hospital or emergency department, with a phone number that you can call for advice in the event that complications or questions arise concerning your child's condition (NYSDOH,2019e).

III. Causes of Sepsis (NYSDOH, 2018a)
   A. Development of sepsis following infection.
      1. Any infection can trigger sepsis.
      2. There are populations at increased risk of developing sepsis:
      3. Extremes of age, chronic conditions, immune suppressed.
   B. Sepsis is more common and more dangerous in persons who are:
      1. Very young or very old.
      2. Immune system compromised.
      3. Already very ill, often in a hospital's intensive-care unit.
      4. Dealing with wounds or open injuries, such as burns.
      5. Dealing with the presence of invasive devices, such as IV catheters.
      6. Sites and sources of infections commonly associated with sepsis include: lung, urinary tract, skin, and gut (Mayo Clinic, 2018).

IV. Early Recognition of Sepsis (NYSDOH, 2018a)
   A. Manifestations of sepsis may be subtle and vary by types of infections and populations.
   B. Some people may have subtle sepsis presentations.
   C. Signs and symptoms that may be associated with sepsis in persons with confirmed or suspected infection can include the following:
      1. Altered mental state, shortness of breath, fever, clammy or sweaty skin, extreme pain or discomfort, high heart rate. Systolic blood pressure reading of less than or equal to 100 millimeters of mercury (mm Hg) and respiratory rate higher than or equal to 22 breaths a minute (Mayo Clinic, 2018).
      2. Signs and symptoms in children and the elderly: People over 65 years old are more susceptible to sepsis than any other age group. Symptoms of sepsis in older adults may be subtle and include: Rapid heart rate; rapid respiratory rate; a high white blood cell count; and fever. Fever is the most common presenting symptom in children, although very young children may have a lower temperature. Other symptoms may include sudden changes in temperature, heart, and respiration, very warm or cool to the touch, listlessness, irritability, difficulty eating, and decreased urination (New York University Langone Health [NYU], 2020).
      3. Severe forms of sepsis including septic shock.
      4. Septic shock occurs most often in the very old and the very young and in those with weakened immune systems. Risk factors for septic shock include the following:
         - Diabetes.
         - Wounds and injuries including burns.
         - Diseases of the genitourinary system, biliary system, or intestinal system.
         - Diseases that compromise the immune system.
         - Indwelling catheters or breathing tubes.
         - Leukemia.
         - Long-term use of antibiotics or corticosteroids.
         - Lymphoma.
         - Recent infection.
         - Recent surgery or medical procedure.
         - Recent or current use of steroid medicines.
         - Solid organ or bone marrow transplantation (Mayo Clinic, 2018).
   D. If a person presents with suspected or confirmed infection, healthcare professionals should assess for signs of and risk factors for sepsis.

V. Principles of Sepsis Treatment (NYDOH, 2018a)
   A. Prompt diagnosis and treatment are critical for optimal outcomes; there is increased morbidity/mortality with delayed recognition and response.
   B. Recommended diagnostic modalities include blood cultures and other testing to identify source and site of infection and organ dysfunction.
   C. Recommended treatment of sepsis includes administration of appropriate intravenous (IV) antimicrobial therapy, with source identification and de-escalation of antibiotics as soon as feasible.

VI. Patient Education and Prevention (NYSDOH, 2018)
   A. Preventing infection: Hand hygiene, wound care, and vaccination.
   B. Risk factors (high-risk patients). See above.
   C. Warning signs and symptoms of sepsis. See above.
   D. Seeking immediate care for worsening infection and signs and symptoms of sepsis.
   E. Giving relevant history and information to clinicians.

The June 2019 revision on sepsis by the NYSDOH includes the following protocol for hospitals:

The sepsis protocol (NYSDOH, 2019e)
Hospitals shall establish, monitor, review and update, when appropriate, a sepsis protocol based on current evidence.

i. Objectives: Protocol/s established by hospitals shall, (a) assist in rapid identification of patients with severe sepsis and septic shock; (b) specify an approach to stratifying patients into sepsis, severe sepsis, and septic shock based on appropriate clinical and laboratory findings; and (c) specify treatment approaches.
ii. Inclusion and Exclusion criteria: Protocols shall contain processes to rapidly identify individuals appropriate for treatment. Protocols can be tailored specific to populations like newborns and infants in NICU, pregnant women, etc. Protocols shall include explicit criteria defining those patients who should be excluded from protocols, such as patients with certain clinical conditions or those who have elected palliative care.
iii. Basic frame: A basic framework for both adult and pediatric protocols must address the following: (1) the physiologic measurements that will be used to guide resuscitation interventions; (2) the time frame goals for interventions such as fluid administration; (3) the need to obtain blood cultures and cultures from identified infection sources prior to antibiotic administration; (4) the goal for timely administration of broad-spectrum antibiotics; and (5) the criteria for ongoing treatment or transfer to more intensive level of care.
iv. Adult protocol – minimum requirements: Protocols for adult patients must include consideration of the following elements, based on evidence-based guidelines and target timeframes for critical interventions: (1) measurement of a blood lactate level; (2) collection of blood cultures; (3) administration of broad-spectrum antibiotics; (4) fluid administration; (5) fluid status assessment; and (6)

vasopressors and remeasurement of lactate for eligible patients.

v. Pediatric protocol – minimum requirements: Protocols for pediatric patients must include consideration of the following elements, based on evidence-based guidelines: (1) blood culture collection; (2) antibiotic administration; and (3) fluid administration and therapeutic endpoints.

Hour-1 surviving sepsis campaign (SSC) bundle of care

Prevention and early recognition of sepsis are of paramount importance until novel emerging drugs (or interventions) are demonstrated to be effective. Early application of the optimal treatments and improved compliance with sepsis bundles are prerequisites for improving patients' outcomes (Kim & Park, 2019).

There is considerable research concerning 3- and 6-hour bundles for sepsis treatment following the 2016 guidelines of the surviving sepsis campaign (SSC). Numerous studies have noted that patients have a better outcome when treatment can begin within the first hour (Kim & Park, 2019).

Healthcare professionals must stay current on evidence-based research and continuous training to inform their practice for the early recognition of sepsis, different presentation in children and the elderly, parent/patient rights, and early treatment protocols.

Evidence-based strategies to reduce CLABSI: Below is the 2018 recommendation for a 1-hour bundle following the 2016 SSC guidelines:

The five key elements of a 1-hour bundle:

1. Measure lactate level. Remeasure if initial lactate is >2 mmol/L.
2. Obtain blood cultures prior to administration of antibiotics.
3. Administer broad-spectrum antibiotics.
4. Begin rapid administration of 30 mL/kg crystalloid for hypotension or lactate ≥4 mmol/L.
5. Apply vasopressors if patient is hypotensive during or after fluid resuscitation to maintain mean arterial pressure (MAP) ≥65 mm Hg.

(Kim & Park, 2019)

See: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6304323/

Conclusion

As this course is written and patients face complications from the novel coronavirus, the requirements and procedures for infection control in the State of New York continue to evolve. This course is intended to compliment and supplement all education, training, policy, and workplace protocols that are changing in all areas of healthcare, to address the pandemic and emerging pathogens.

Infectious agents do not remain static, often mutating, spreading, and accelerating around the globe. Now more than ever, healthcare professionals must commit to their professional responsibility to stay current with education and training to apply evidence-based best practice for infection prevention and control.

Standard precautions, including hand, respiratory, and cough hygiene, with proper implementation of PPE, must be a priority in all cases to prevent the spread of infection. It is impossible to anticipate all interactions with patients that may lead to direct or indirect contact with infectious agents, so infection prevention and control precautions must be in place at all times.

Glossary of terms

The following terms are taken directly from the New York State Department of Health, Hospital-Acquired Infections in New York State Part 2: Technical Report (NYSDOH, 2019c).

Catheter-associated urinary tract infection (CAUTI): A CAUTI is an infection of the bladder or kidneys associated with the use of a urinary catheter.

Carbapenem: There are four antibiotics considered last resort: ertapenem, meropenem, doripenem, and imipenem.

Carbapenem-resistant Enterobacteriaceae (CRE): Bacteria resistant to carbapenems.

Central line-associated bloodstream infection (CLABSI): A bloodstream infection that travels through a central line or umbilical catheter into the blood.

Central line-associated bloodstream infection (CLABSI) rate: Divide the total number of central line-associated bloodstream infections by the number of central line days. That result is then multiplied by 1,000.

Central line days (device days): The total number of days a central line is used.

Clostridioides difficile: A bacterium that naturally resides in the bowels of some people without symptoms of infection, but which can cause infections in some situations. Overgrowth of C. difficile in the bowel may occur after a patient takes antibiotics, which can kill good bacteria in the bowel. Symptoms range from mild to severe diarrhea; in some instances, death can occur.

Community onset (CO): Documented infection occurring within 3 days of hospital admission.

Community onset – not my hospital (CO-NMH): Documented infection occurring within 3 days of hospital admission and more than 4 weeks after discharge from the same hospital.

Community onset – possibly my hospital (CO-PMH): Documented infection occurring within 3 days of readmission to the same hospital when a discharge from the same hospital occurred within the last 4 weeks.

Confidence interval (CI): The confidence interval is the range around a measurement that conveys how precise the measurement is. A 95% CI means that we can be 95% confident that the true measurement falls within the interval. If hospital A reports one infection out of 20 procedures (i.e., 5%, with 95% CI: 0% to 25%), and hospital B reports 10 infections out of 200 procedures (i.e., 5% with 95% CI: 2% to 9%), we can see that both hospitals have the same rate, but we are less confident that the rate is truly 5% at hospital A because it was based on only one infection.

COVID-19: COVID-19 is caused by infection with a new coronavirus (called SARS-CoV-2). Because some of the symptoms of the flu and COVID-19 are similar, it may be hard to tell the difference between them based on symptoms alone, and testing may be needed to help confirm a diagnosis. Patients have experienced symptoms of mild to severe respiratory illness including fever, cough, and shortness of breath (CDC, 2020f).

Deep incisional SSI: A surgical site infection that involves the deep soft tissues (e.g., fascial and muscle layers) of the incision.

Device utilization ratio: This ratio is obtained by dividing the number of device days by the number of patient days. It is calculated for central line utilization and urinary catheter utilization.

Hospital-acquired infection (HAI): An infection that occurs after being in a hospital after having medical or surgical treatments.

Hospital Onset (HO): Documented infection occurring after the third day of hospital admission.

Infection control/prevention processes: Routine measures to prevent infections that can be used in all healthcare settings.

Infectious disease: According to the WHO (2020): Infectious diseases are caused by pathogenic microorganisms, such as bacteria, viruses, parasites or fungi; the diseases can be spread directly or indirectly, from one person to another. Zoonotic diseases are infectious diseases of animals that can cause disease when transmitted to humans.

Infection preventionist (IP): Health professional that has special training in infection prevention and monitoring.

Methicillin-resistant Staphylococcus aureus (MRSA): Staphylococcus aureus (SA) is a common bacterium normally found on the skin or in the nose of 20% to 30% of healthy individuals. When SA is resistant to the antibiotics, oxacillin, cefoxitin, or methicillin, it is defined as MRSA for surveillance purposes.

Multidrug-resistant organisms (MDROs): An infection caused by germs that are resistant to multiple classes of antimicrobials. In some cases, the germs have become so resistant that no available antibiotics are effective against them (CDC,2019b). MDROs are categorized into three tiers according to the CDC (2019d):

Tier 1 organisms:

- Organisms for which no current treatment options exist (pan-resistant) and that have the potential to spread more widely within a region.
- Organisms and resistance mechanisms that have never (or very rarely) been identified in the United States and for which experience is extremely limited and a more extensive evaluation is needed to define the risk for transmission.

Tier 2 organisms:

- Organisms in this group include MDROs that are primarily associated with healthcare settings and are not commonly identified in the region. These organisms might be found more commonly in other areas of the United States. Examples include CREs with the less common carbapenemases (e.g., New Delhi Metallo-β-lactamase [NDM]) and carbapenemase-producing Pseudomonas spp). In many areas of the United States, carbapenem-resistant Enterobacteriaceae producing Klebsiella pneumoniae carbapen-emase (KPC-CRE) meet the Tier 2 criteria.

Tier 3 organisms:

- Organisms in this group include MDROs targeted by the facility or region that have been identified regularly but are not considered to be endemic. These organisms might be found more commonly in other areas of the United States. Information is available about how transmission of these organisms occurs and the groups primarily at risk. Examples include KPC-CRE and Acinetobacter baumannii with plasmid-mediated oxacillinases with carbap-enemase activity (e.g., OXA-23, OXA-24/40, OXA-58).

National Healthcare Safety Network (NHSN): This is a secure, Internet-based national data reporting system that NYS hospitals must use to report HAIs. The NHSN is managed by the CDC's Division of Healthcare Quality Promotion.

Organ/space SSI: A surgical site infection, excluding the skin incision, fascia, or muscle layers, that is opened or manipulated during the operative procedure.

Post discharge surveillance: This is the process IPs use to seek out infections after patients have been discharged from the hospital, including re-admissions, emergency department visits, and contacting the patient's doctor.

Raw rate: Raw rates are not adjusted to account for differences in the patient populations and are calculated as follows (NYSDOH, 2019c):

- **Bloodstream infections**: The number of infections (the numerator) divided by the number of line days (the denominator) then multiplied by 1000 to give the number of infections per 1000-line days.
- **Surgical site infections**: The number of infections (the numerator) divided by the number of procedures (the denominator) then multiplied by 100 to give the number of infections per 100 operative procedures.
- **Admission Prevalent infection**: The number of infections (the numerator) divided by the number of admissions (the denominator) then multiplied by 100 to give the number of infections per 100 admissions.
- **Hospital onset infection**: The number of infections (the numerator) divided by the number of patient days (the denominator) then multiplied by 10,000 to give the number of infections per 10,000 patient days.
- **Risk adjustment**: Risk adjustment accounts for differences in patient populations and allows hospitals to be compared. A hospital that performs a large number of complex procedures on very sick patients would be expected to have a higher infection rate than a hospital that performs more routine procedures on healthier patients. The risk-adjusted rate is based on a comparison of the actual (observed) rate and the rate that would be predicted if, statewide, the patients had the same distribution of risk factors as the hospital.

SPARCS: The Statewide Planning and Research Cooperative System (SPARCS) is a comprehensive data reporting system initially created to collect information on discharges from hospitals. SPARCS currently collects patient level detail on patient characteristics, diagnoses and treatments, services, and charges for every hospital discharge, ambulatory surgery procedure, and emergency department admission in NYS.

Superficial incisional SSI: A surgical site infection that involves only skin and soft tissue layers of the incision and meets NHSN criteria as described in the NHSN Patient Safety Protocol.

Surgical site infection (SSI): An infection that occurs after the operation in the part of the body where the surgery took place (incision).

Validation: A way of making sure the HAI data reported to NYS are complete and accurate. Complete reporting of HAIs, total numbers of surgical procedures performed, central line days, and patient information to assign risk scores must all be validated. The accuracy of reporting is evaluated by visiting hospitals and reviewing patient records.

Resources

The full text of Section 239 of the New York State Public Health Law, which specifies course work or training in infection control practices for specific professions and students, can be viewed at the following: http://www.health.state.ny.us/regulations/public_health_law/section/239/

The full New York Department of Health Infection Control Training guidelines may be reviewed at the New York State Department of Health website: https://www.health.ny.gov/professionals/diseases/reporting/communicable/infection/hcp_training.htm#info_for_providers

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Self-Assessment Answers and Rationales

These answers and rationales are provided for the self-assessment questions located throughout the content.
For the final exam questions, please refer to the next page.

1. The correct answer is D.
***Rationale**: Standard precautions are always followed, and due to the fever, cough, and skin infections, all are warranted based on guidelines from the CDC, Appendix A, Table 3.*

2. The correct answer is C.
***Rationale**: Due to possible airborne and droplet transmission, and lab results, CDC guidelines and Appendix A Table 3 explain the need for these PPE precautions.*

3. The correct answer is B.
***Rationale**: The time frame of diagnosis within 48 hours and the patient's report of symptoms for 2 weeks that were shared with others in close contact at school, are evidence of community onset.*

4. The correct answer is B.
***Rationale**: Due to community onset, and the use of PPE precautions, personnel screening is not always warranted according to CDC recommendations shown on Table 4, Summary of Response.*

5. The correct answer is C.
***Rationale**: Table 4, Summary of Response includes actions to stop community spread, which include communication with neighboring facilities.*

6. The correct answer is D.
***Rationale**: Table 4, Summary of Response, shows the levels of action to investigate possible infections beginning with initial investigation and broadened after lab and diagnostic work.*

7. The correct answer is D.
***Rationale**: By definition, "Colonization screening identifies unrecognized carriers so that infection control measures can be targeted to prevent the spread of antimicrobial resistance."*

8. The correct answer is A.
***Rationale**: These are the three most common possible diseases to suspect when reviewing the patient's history of drug use.*

9. The correct answer is D.
***Rationale**: These steps follow the Stop Sticks Campaign and CDC recommendation which do not contain patient restraint in this case.*

10. The correct answer is A.
***Rationale**: Testing is indicated if immunizations are not complete or up to date.*

INFECTION CONTROL FOR NEW YORK HEALTH CARE PROFESSIONALS

Final Examination Questions

Select the best answer for each question and mark your answers on the Final Examination Answer Sheet found on page 37, or complete your test online at **EliteLearning.com/Book**

1. The definition of _____ shall include the failure to use scientifically accepted infection control practices to prevent transmission of disease.
   a. Unprofessional conduct.
   b. Negligence.
   c. Malpractice.
   d. Criminal intent.
2. Hand-washing and hand antisepsis substantially reduces potential pathogens on the hands and is considered the_____ measure for reducing the risk of transmitting organisms to patients and health workers.
   a. Least critical.
   b. Unproven.
   c. Single most critical.
   d. Unscientific.
3. The most important risk factor for developing a catheter-associated UTI (CAUTI) is _____.
   a. Poor hand hygiene.
   b. Patient health.
   c. Kinked tubing.
   d. Prolonged use of the urinary catheter.
4. Removal of a face shield, goggles and mask can be performed safely_____ gloves have been removed, and hand hygiene performed.
   a. After.
   b. Before.
   c. Whether or not.
   d. Only when latex.
5. CDC currently recommends N95 or higher level respirators for personnel exposed to patients with suspected or confirmed tuberculosis and other diseases that could be transmitted through the _____ route.
   a. Blood borne.
   b. Droplet.
   c. Airborne.
   d. Direct.
6. _____ are usually the first piece of PPE to be donned.
   a. Gloves.
   b. Gowns.
   c. Masks.
   d. Respirators.
7. Sterilization- requires sufficient exposure time to _____.
   a. Chemicals, or gases only.
   b. Heat and steam only.
   c. Steam and chemicals.
   d. Heat, chemicals, or gases.
8. Hepatitis B virus (HBV), hepatitis C virus (HCV) and human immunodeficiency virus (HIV) are the three _____ blood borne pathogens.
   a. Most common.
   b. Most transmitted.
   c. Most controlled.
   d. Least common.
9. According to the NYSDOH Policy Statement, voluntary testing without fear of disclosure or discrimination is _____ means of encouraging people at risk for HIV or HBV to seek counseling and testing.
   a. Not an effective.
   b. An adequate.
   c. An unproen.
   d. The best.
10. Revised sepsis protocols and current research emphasize the critical need for:
    a. Rapid identification and treatment.
    b. The same protocol for adults and children.
    c. Treatment within 6 hours.
    d. Hyperalumentation.

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By mail

- Fill out the final examination answer sheet and mandatory evaluation found in the back of this booklet. Please include a check or credit card information and e-mail address. Mail to Elite, **PO Box 37, Ormond Beach, FL 32175**.
- Completions will be processed within 2 business days from the date it is received and certificates will be e-mailed to the address provided.
- Submissions without a valid e-mail will be mailed to the address provided.

By fax

- Fill out the final examination answer sheet and mandatory evaluation found in the back of this booklet. Please include credit card information and e-mail address. Fax to **(386) 673-3563**.
- All completions will be processed within 2 business days of receipt and certificates e-mailed to the address provided.
- Submissions without a valid e-mail will be mailed to the address provided.

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Questions? Call us toll-free at 1-888-857-6920

New York Health Professionals
CE Correspondence Package
Final Examination Answer Sheet

Using the spaces provided below, please PRINT the information below in CAPITAL LETTERS. All information below must be filled in completely. The cost of our test is $22.95. Upon completion, please return this sheet, along with payment and mail to the address above. If paying by check or Money Order, please make payable to Elite. For faster service, we offer this test online with instant grading and certificate issuance. Please visit **EliteLearning.com/Book** to complete your test online.

Please PRINT NEATLY in the areas below using black or blue pen only:

First Name | M.I. | Last Name

Mailing Address

Suite / Floor / Apartment Number | City (do not abbreviate) | State

Zip Code | Telephone Number (Please include area code) | New York License # (Please provide to receive course credit)

E-Mail Address (include to receive processing confirmation and instant certificate access)

Payment Method

☐ Check / M.O. Enclosed for $22.95
☐ Visa / Mastercard / AMEX / Discover

Visa / Mastercard / AMEX / Discover Number | Credit Card Expiration Date

Cardholder Signature: _____

Shade circles like this: ●
Not like this: ⊠ ∅

Please refer to page 31 for the Final Exam Questions.
Unanswered questions will be scored as incorrect.

	A	B	C	D
1	○	○	○	○
2	○	○	○	○
3	○	○	○	○
4	○	○	○	○
5	○	○	○	○

	A	B	C	D
6	○	○	○	○
7	○	○	○	○
8	○	○	○	○
9	○	○	○	○
10	○	○	○	○

For Internal Use Only - Do Not Mark In This Area

ICNY0423 5864089752

Test Expiration Date: 12/31/2024

COURSE EVALUATION

We value your opinion! Please take a moment to fill out this evaluation form so that we can better serve you in the future. Any comments would be greatly appreciated.

Fill in the circles below the numbers with 0 being the worst and 10 being the best.	EXCELLENT										POOR
How likely is it that you would recommend Elite Learning	10 ○	9 ○	8 ○	7 ○	6 ○	5 ○	4 ○	3 ○	2 ○	1 ○	0 ○
The course material was presented in a clear, concise and well-organized format	10 ○	9 ○	8 ○	7 ○	6 ○	5 ○	4 ○	3 ○	2 ○	1 ○	0 ○
I would rate this course	10 ○	9 ○	8 ○	7 ○	6 ○	5 ○	4 ○	3 ○	2 ○	1 ○	0 ○
The content of this course met my expectations	10 ○	9 ○	8 ○	7 ○	6 ○	5 ○	4 ○	3 ○	2 ○	1 ○	0 ○

Please circle yes or no for the following questions.		
The material presented met the course's stated objectives	YES	NO
I found this course a good value for my money	YES	NO

Please list any recommendations that you may have for this course: _____

_____

Please list any course subjects you would like to see in the future: _____

_____

Comments: _____

_____

❑ I agree to allow Elite Learning to use my above comments.

Did you remember:

1) To clearly print your name and address on the answer sheet?
2) To fill out your license number on the answer sheet?
3) To include your payment or credit card information?
4) A $25.00 fee will be added for all checks that are returned for insufficient funds.

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