

# Prevention and Control of Infectious and Communicable Diseases

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Long-Term Care Certification in Infection Prevention (LTC-CIP) Preparation Series

## Sources

- Content of this module was informed and used with permission from the Association for Professionals in Infection Control and Epidemiology resources:
  - APIC LTC-CIP™ Learning System
  - APIC Text Online

Association for Professionals in Infection Control and Epidemiology (APIC). APIC LTC-CIP™ learning system, book 1. Washington, DC: APIC; 2023.

Association for Professionals in Infection Control and Epidemiology (APIC). APIC text online [Internet]. Washington, DC: APIC; 2023 [cited 2024 Feb 14]. Available from: <https://text.apic.org/>

# Exam Content

1. Long-Term Care Settings (15 items)
2. Management and Communication of the Infection Prevention Program (16 items)
3. Identification of Infectious Diseases (18 items)
4. Surveillance and Epidemiologic Investigation (24 items)
- 5. Prevention and Control of Infectious and Communicable Diseases (24 items)**
6. Environment of Care (18 items)
7. Cleaning, Disinfection, Sterilization of Medical Devices and Equipment (15 items)
8. Antimicrobial Stewardship (11 items)
9. Employee/Occupational Health (9 items)

# Objectives

In this review session, the main topics that will be covered are:

1. Standard and transmission-based precautions (i.e., Routine Practices and Additional Precautions)
2. The regulatory requirements that pertain to personal protective equipment and food handling practices



# Hand Hygiene

# Hand Hygiene Programs

Hand hygiene is the most important strategy to reduce the spread of healthcare acquired infections (HAIs)

- **Elements of a Hand Hygiene Program:**
  - Staff education on when and how to perform hand hygiene
  - Ongoing monitoring and feedback on hand hygiene practice
  - Environmental Support e.g., alcohol-based hand rub (ABHR) placement at point of care
  - Leadership Support
  - Resident engagement
  - Skin care

# Hand Hygiene – Items for Consideration

- What is the recommended alcohol concentration of ABHR listed in the study guide and APIC Text?
- Where should ABHR be located?
- What are the indications for hand washing with soap and water?
- What are the indications for alcohol based hand rub?
- How can staff minimize contact dermatitis associated to hand rubs?



## How to Clean Hands: Two methods

- Alcohol-based hand rub is the preferred method for cleaning hands. It is better than washing hands with soap and water (even with antibacterial soap) when hands are not visibly soiled
- Hand washing with soap and running water: must be done when hands are visibly soiled



## Technique Matters

- To clean hands properly
  - Rub all parts of the hands with alcohol based hand rubs or soap and running water
  - Pay attention to finger tips, between fingers, back of hand and base of thumbs
- It is important that skin on hands remain intact to maintain health care worker comfort and reduce the spread of organisms
- Clean hands for a minimum of 15 seconds
- Dry hands thoroughly
- Apply setting-approved moisturizer routinely

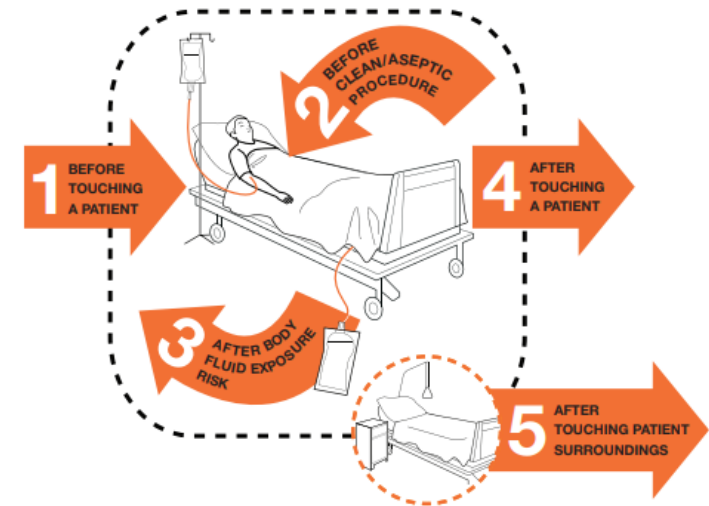
## Hand Hygiene: Other considerations

- Keep nails short and clean
- Remove rings and bracelets
- Do not wear artificial nails
- Remove chipped nail polish
- Make sure sleeves are pushed up and do not get wet

# World Health Organization (WHO) 5 Moments of Hand Hygiene

- Before touching a patient/resident
- Before a clean/aseptic procedure
- After any contact with blood or other body fluids—even if gloves are worn
- After touching a patient/resident
- After contact patient/resident surroundings
- **In Ontario it's the 4 Moments - Moments 4 and 5 have been combined into one**

## Your 5 Moments for Hand Hygiene



<b>1</b>	<b>BEFORE TOUCHING A PATIENT</b>	<b>WHEN?</b> Clean your hands before touching a patient when approaching him/her. <b>WHY?</b> To protect the patient against harmful germs carried on your hands.
<b>2</b>	<b>BEFORE CLEAN/ASEPTIC PROCEDURE</b>	<b>WHEN?</b> Clean your hands immediately before performing a clean/aseptic procedure. <b>WHY?</b> To protect the patient against harmful germs, including the patient's own, from entering his/her body.
<b>3</b>	<b>AFTER BODY FLUID EXPOSURE RISK</b>	<b>WHEN?</b> Clean your hands immediately after an exposure risk to body fluids (and after glove removal). <b>WHY?</b> To protect yourself and the health-care environment from harmful patient germs.
<b>4</b>	<b>AFTER TOUCHING A PATIENT</b>	<b>WHEN?</b> Clean your hands after touching a patient and her/his immediate surroundings, when leaving the patient's side. <b>WHY?</b> To protect yourself and the health-care environment from harmful patient germs.
<b>5</b>	<b>AFTER TOUCHING PATIENT SURROUNDINGS</b>	<b>WHEN?</b> Clean your hands after touching any object or furniture in the patient's immediate surroundings, when leaving – even if the patient has not been touched. <b>WHY?</b> To protect yourself and the health-care environment from harmful patient germs.



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## Two Different Environments

- To conduct appropriate hand hygiene (HH), there are two important environments that must be considered.
- Health Care Environment
  - Environment beyond the patient's immediate area
  - In a single room this is outside the room, in a multi-bed room this is everything outside of the patient's bed area
- Patient Environment
  - This is the patient's area
  - In a single room this is everything in the patient's room. In a multi-bed room this is everything in immediate proximity to the patient

## Point of Care Hand Hygiene – The Right Way, in the Right Place

- Point of care refers to the place where three elements occur together:
  - the patient
  - the health care provider
  - care involving contact is taking place
- Busy health care providers need access to hand hygiene products where patient/patient environment contact is taking place
- This enables health care providers to quickly and easily fulfill the 5 Moments for Hand Hygiene
- Providing alcohol-based hand rub at the point-of-care (e.g., within arm's reach) is an important system support to improve hand hygiene

## Hand Hygiene and Glove Use

- The use of gloves does not replace the need to clean hands
- Discard gloves after each procedure and clean your hands
- Wear gloves only when indicated, otherwise they become a major risk for transmission of organisms

## Measuring Hand Hygiene Compliance

- Auditing hand hygiene compliance by health care providers provides a benchmark for improvement
- The results of audits will help identify the most appropriate interventions for hand hygiene education, training and promotion
- The results of the audits should be shared with front-line health care providers and management to better understand barriers and facilitators to hand hygiene practice

# Methods of Measuring Hand Hygiene Compliance

1. Direct observation of hand hygiene practices
  - Gold standard for auditing
  - Done by trained observers using a standardized and validated audit tool
  - Provides real time feedback
  - Time consuming and could introduce bias (Hawthorne Effect)
2. Product volume monitoring
  - Monitor the volume of hand hygiene products (ABHR, soap, hand lotion) per 1000 resident days
  - No observation of hand hygiene technique
  - Can't separate use of product by residents vs. health care providers (or visitors and caregivers)
3. Automated monitoring
  - Use of hand hygiene sensing devices to monitor hand hygiene practices of care providers
  - Simple identification of HH opportunities - entry and exit
  - Expensive but time-efficient





## Personal Protective Equipment

## Personal Protective Equipment (PPE) (1/2)

- Key component of Standard Precautions and Transmission based Precautions (in Canada it's known as "Routine Practices and Additional Precautions")
- Protection of skin, clothing, eyes, mucous membrane and airway from contamination with infectious agents and chemicals
- PPE use is based on risk assessment – consider type of activity, level of exposure to infectious agents and resident characteristics
- Staff must receive appropriate training and education on PPE donning and doffing, as well as proper disposal of PPE
- LTCH must have a process for evaluating PPE use, availability, accessibility and storage

## Personal Protective Equipment (2/2)

- Important Standards related to PPE in health care
  - Blood-borne Pathogen Standard required practices:
    - Safe handling and disposal of needles, employee vaccination, cleaning and disinfection
    - Annual review of exposure and infection control plan
    - Provision and maintenance of appropriate PPE supplies
  - If respirator are used by a worker a Respiratory Protection Program is required which must include but is not limited to the following:
    - employers must provide appropriate respirators and train staff in the proper selection, use, care and maintenance of the respirator
    - employees must pass appropriate fit-test according to occupation health and safety legislation
    - fit-test records must be maintained

## Types of PPE

- Gloves
- Gowns
- Eye Protection (including face shield and goggles)
- Masks
  - Surgical/Medical
  - N95 Respirator
  - Cartridge and Powered Air Purifying (PAPR) Respirators
- New or different PPE recommendations may be required depending on disease conditions and events (e.g. Ebola, COVID)

# Discussion/Knowledge Check





## Standard Precautions and Transmission-based Precautions

## Types of Precautions - Exam terminology

- **Standard Precautions** (Routine Practices in Canada)
  - Minimum set of infection control measures required to prevent transmission of microorganisms.
  - To be used for all residents in every health care setting even in the absence of a suspected or confirmed infectious process.
  - Based on a point-of-care risk assessment
- **Isolation Precautions/Transmission-Based precautions** (Additional Precautions in Canada)
  - Infection control measures used in addition to Standard Precautions

## Risk Assessment

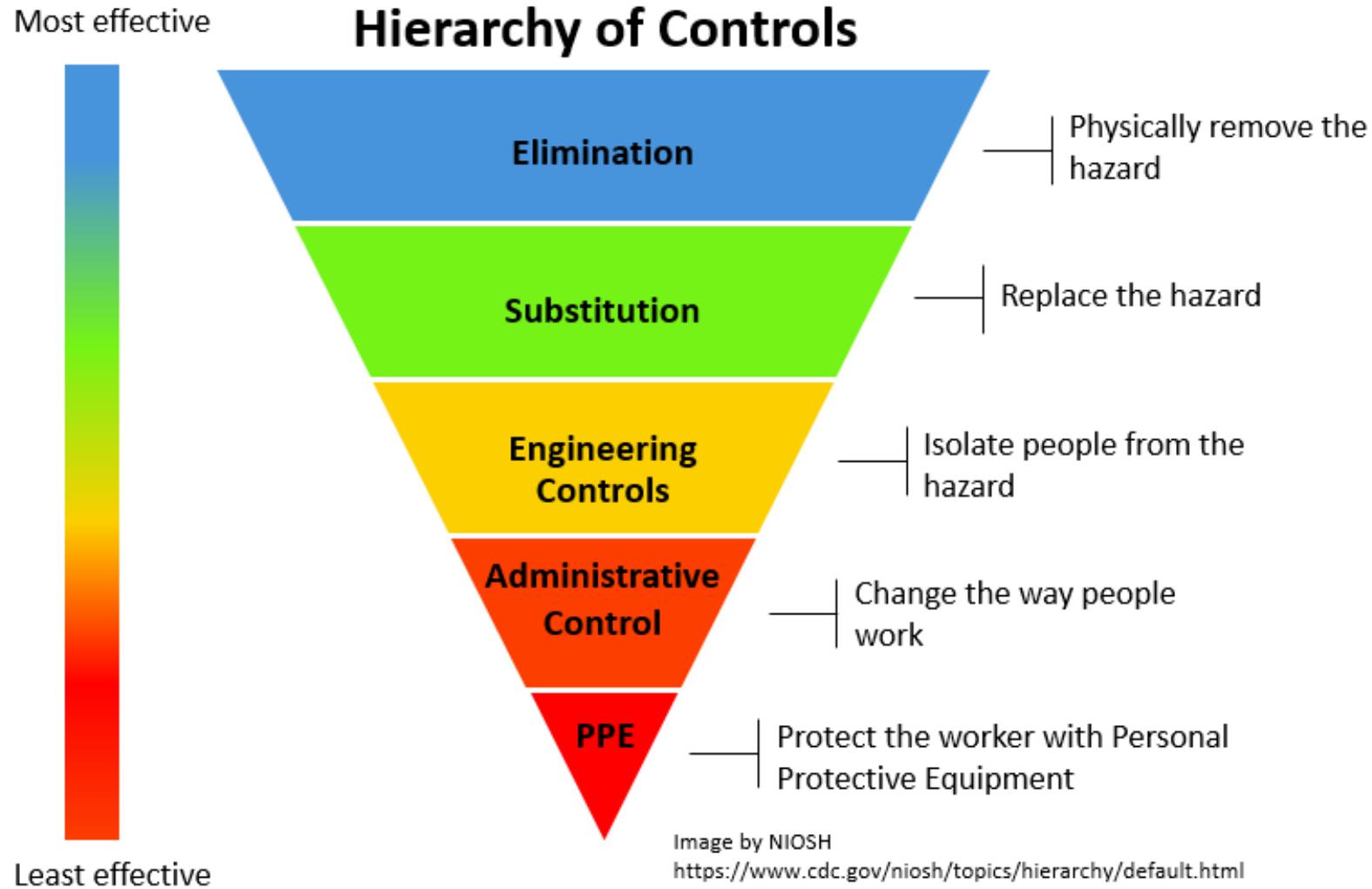
- A Point of Care Risk Assessment (PCRA) is an activity performed by every health care worker before every resident interaction to evaluate the likelihood of exposure to infectious diseases and choose the appropriate actions/PPE needed to minimize the risk of exposure:
  - from a specific interaction
  - with a specific resident
  - in a specific environment



# Components of Standard Precautions/Routine Precautions

- Risk assessment
- Hand hygiene
- PPE: gown, gloves, masks as per risk assessment
- Control of the environment: cleaning, engineering controls, sharps disposal, spacing
- Administrative controls: policies and procedures, education
- Respiratory hygiene including cough etiquette

# Hierarchy of Controls for Transmission-Based Precautions



## Supplies and Equipment for Transmission-Based Precautions

- Adequate supply of PPE that is stored in a clean environment or covered
- Visible signage posted outside the resident's room
- Easy access to alcohol based hand rubs, hand washing soaps and paper towels
- Dedicated or disposable non critical items (when feasible). If equipment is shared between residents, it must be disinfected between use
- Resident-owned equipment must be cleaned on a regular basis and kept inside the room

# Resident Placement and Transport for Transmission-Based Precautions

- In long-term care settings, resident placement should be handled on a case-by-case basis
- A private room is preferred
- Residents with same disease or organism can share the same room, except certain diseases e.g. *Clostridioides difficile*
- Cleaning should be done daily or when visibly soiled
- Limit resident transport outside the room to medically necessary purposes



# Categories Transmission-Based/Additional Precautions

- Contact Precautions
- Droplet Precautions
- Droplet/Contact Precautions
- Airborne Precautions

# Contact Precautions

- Used in addition to Standard Precautions to prevent transmission of diseases through contact with the resident or the resident's environment
- PPE: Gloves and gowns; single room preferred. Use of additional PPE is based on risk assessment.
- Clean room daily with approved hospital grade disinfectant
- Contact Precautions required for:
  - Methicillin resistant *Staphylococcus aureus* (MRSA)
  - Vancomycin resistant enterococci (VRE)
  - Carbapenemase producing Enterobacteriaceae (CPE)
  - Extended spectrum beta-lactamases (ESBL)
  - *Clostridioides difficile* (CDI)
  - *Candida auris* (C. auris)
  - Scabies/lice
  - Enteric illness

# Multi-Drug Resistant Organisms (MDROs) Control Strategies (1/2)

- Typical MDRO controls include:
  - Admission screening for risk factors
  - Computer alerts to identify previously infected or colonized residents
  - Signage at entrance of resident room
  - Appropriate location of hand-washing sinks and ABHR
  - Maintaining appropriate staffing levels and cohorting staff for residents with MDROs
  - Strict adherence to hand hygiene and contact precautions

## Multi-Drug Resistant Organisms (MDROs) Control Strategies (2/2)

- Decolonization: treating colonized residents to eliminate the MDRO. Success is limited and not recommended routinely
- Education: Include rates, trends, and prevention strategies in an easily understood format. Education should be structured in a way to promote a culture that supports desired behaviors, such as hand hygiene, standard/routine practices and reduction in device usage
- Resident transfers: Essential to notify receiving unit or setting of MDRO status



## Droplet Precautions

- Prevent transmission of diseases caused by large respiratory droplets generated by coughing, sneezing or talking
- Control strategies include:
  - Resident transport should be limited to medically necessary appointments
  - Residents should wear a mask when they leave the room
  - PPE: eye protection, mask
  - private room preferred
    - Gown and gloves may be required based on potential exposure to body fluids.
    - PPE should be changed in between patients
- Examples of organisms requiring Droplet precautions: mumps, *Neisseria meningitides*, group A streptococcal pneumonia

## Droplet Contact Precautions

- Respiratory viral infection also spread by the contact route
- Prevent transmission of diseases caused by large respiratory droplets and by contact
  - PPE: Facial protection, gown and gloves
  - single room preferred
  - Use PPE when within two metres or six feet from client
- Examples of organisms requiring Droplet Contact precautions:
  - Influenza
  - Respiratory syncytial virus (RSV)

# Airborne Precautions

- Prevent transmission of diseases spread through small particles (< five micrometres)
- Airborne precautions required for tuberculosis, varicella, small pox, measles, Mpox
- PPE: N95 respirators or higher; Fit testing for all health care workers that wear N95 respirators
- Airborne infection isolation room (AIIR)
- Tuberculosis (TB) is strictly Airborne spread, whereas other organisms maybe spread through different routes as well (i.e., Contact and Droplet)
- Some communicable diseases require a combination of Additional Precautions e.g. varicella requires Airborne plus Contact Precautions

## Enhanced Barrier Precautions (EBP)

- Precautions may be used for:
  - Infection or colonization with MDROs
  - A wound, regardless of MDRO colonization
  - Indwelling devices regardless of MDRO colonization
- Unlike contact precautions, residents are not restricted to their room or group activities as long as open wounds are covered
- EBP should be prioritized over Contact to maintain quality of life of residents



## Safe Medication Practices, Treatments and Immunization

## Safe Medication Practices

- Maintain aseptic technique during the preparation and administration of injected medication
- Wipe, with friction, the rubber vial diaphragm (stopper) with 70% alcohol
- Discard opened multi dose vials according to the manufacturer's instructions or within 28 days, whichever is shorter
- Discard the multidose vial immediately if sterility is questioned
- Avoid using multi-dose vials for injectable medications and vaccines

## Single Dose Vials

- Single dose vials are preferred
- Do not reuse single dose vials - enter once and then immediately discard
- Cleanse the access diaphragm of vials using friction and 70% alcohol
- Allow to dry before inserting a needle into the vial
- Always use a new sterile syringe and needle when entering a vial
- The leftover contents of single dose vials should never be combined or pooled

## Multi-Dose Vials (MDVs)

- All needles are single use only
- All syringes are single use only
- Never re-enter a vial with a used needle or used syringe
- Once medication is drawn up, the needle should be immediately withdrawn from the vial. A needle should never be left in a vial to be attached to a new syringe
- When multi-dose vials must be used, dedicate for a single resident whenever possible and mark the vial with the resident's name
- Discard opened multidose vials according to the manufacturer's instructions or within 28 days, whichever is shorter



## Resident Immunization Programs

- Standing order programs have documented improved vaccination rates among adults
- Standing orders programs authorize nurses and pharmacists to administer vaccinations according to an institution or physician approved protocol without a physician's exam
- Advisory Committee on Immunizations (ACIP) recommends influenza and pneumococcal vaccination for LTC residents



## Resident Immunization

- Residents of long-term care homes, should receive all routine immunizations, as appropriate:
  - influenza
  - pneumococcal
  - herpes zoster
  - Shingles vaccine (zoster)
  - Tdap (tetanus, diphtheria, and pertussis) or Td (tetanus and diphtheria)
  - COVID-19

# Discussion/Knowledge Check





## Infection Prevention & Control in Specific Practice Settings

## Podiatry Services

- Clients expect and require safe care regardless of where foot care is performed
- Challenges with foot care in long-term care (LTC) may be due to gaps in:
  - Reprocessing of equipment
  - Treatment spaces dedicated to podiatry
  - Adherence to proper infection prevention and control (IPAC) policies and procedures
  - Mechanisms for reporting infections
  - Separation of clean and contaminated podiatry equipment
  - Environmental cleaning and disinfection between patients

# Reusable Foot Care Equipment/Devices

## Critical medical equipment

- Potential to enter or does enter sterile tissues, including the vascular system (e.g. callus shaver, probe, nail elevator)
- Presents a high risk of infection if the equipment is contaminated with any organism
- Reprocessing critical equipment/devices involves cleaning followed by sterilization, and is discussed in more detail in the Cleaning, Disinfection, Sterilization of Medical Devices and Equipment section of this course

## Dental Services

- Infection Risks: Potential exposure to blood and oral and nasal secretions
  - Aerosolization from water lines, ultrasonic scaler units, and residents' mouths
  - Potential for percutaneous sharps exposure due to handling of dental instruments
- Treat every resident and instrument as potentially infectious
- Hand hygiene – before treatment, between resident appointments, after glove removal, before leaving treatment areas
- Requirement for instrument cleaning, disinfecting, and sterilizing to occur according to categories of patient care items (critical, semicritical and noncritical)

## Behavioural Health

- Unique behavioural traits may pose an obstacle to traditional IPAC methods (e.g., cognitive impairment)
- Carefully consider IPAC precautions in this setting due to therapeutic benefits of group therapy, skills building and sense of belonging
- Engaging the resident in his/her own physical health care is essential. This can be done through:
  - Treating them as partners in their care
  - Educating on behaviours that could reduce disease transmission
  - Providing guidelines and education for personal, hand and respiratory hygiene



# Public Health

- Emphasis on disease prevention
- Collaborations at local, provincial (state), national, and global levels
- Issues of public health concern examples - food safety, acute and chronic disease prevention, oral health, access to healthcare
- Themes: protect and promote health, prevent communicable and chronic diseases, improve health and access to health services



## Food Safety

# Hazard Analysis and Critical Control Points (HACCP) Guidelines

- HACCP food safety management system that addresses food safety by analyzing and controlling biological, chemical, and physical hazards related to preparing, producing, handling, and consuming food products
- HACCP is guided by the following principles:
  - Conduct a hazard analysis
  - Determine the critical control points (CCPs)
  - Establish critical limits, monitoring procedures, corrective actions, verification procedures and record-keeping and documentation procedures

## Prerequisite Programs for HACCP (1/3)

- Prerequisite programs are the practices and conditions needed prior to and during the implementation of HACCP and which are essential to food safety
- Prerequisite requirements to obtaining HACCP certification include:
  - Facilities: should be designed, constructed and maintained according to sanitary design principles that minimize cross contamination
  - Suppliers: have good manufacturing and food safety programs
  - Specifications: all ingredients, products and packaging materials subject to safety requirements
  - Production Equipment: built, designed and maintained in a sanitary condition
  - Cleaning and Sanitation: policies and procedures to govern cleaning and sanitation in the facility

## Prerequisite Programs for HACCP (2/3)

- Personal and hand hygiene requirements
- Training: employees should receive documented training on the elements of HACCP
- Chemical Control: non-food chemicals must be segregated and used according to written policies and procedures
- Receiving, shipping and storage: raw material must be stored properly with respect to temperature and humidity
- Traceability and Recall: all raw materials should be traceable
- Pest Control: programs should be in place to control pests

## Prerequisite Programs for HACCP (3/3)

- Food Storage:
  - Foods need to be protected from contamination during storage, preparation, holding and display
  - Raw, unfrozen animal foods must be separated from raw, unfrozen ready to eat foods (e.g., fruit and vegetables) as well as cooked ready to eat foods
  - No raw foods are to be stored above cooked or ready to eat foods
  - Foods must be used in a first in, first out (FIFO) systematic method
  - Foods must be stored at the proper temperature range
  - Temperature logs must be kept for all food storage areas

# Common Causes of Foodborne Illness

- Norovirus
- *Salmonella*
- *Clostridium perfringens*
- *Campylobacter*
- *Listeria monocytogenes*

# Steps in a Food-Borne Outbreak Investigation

- Detect a possible outbreak
- Find cases
- Generate hypotheses about outbreak sources
- Test hypotheses
- Confirm the outbreak source
- Stop/control the outbreak
- Decide the outbreak is over
- Note: The steps are described in order, but investigations are dynamic and several steps may happen at the same time



# Discussion/Knowledge Check





# Disasters and Bioterrorism

# Disaster Planning

- Collaborate with public health agencies in planning community responses to biological agents, (e.g., anthrax, influenza)
- **Terms**
  - **Pandemic:** global outbreaks of disease in humans that exceed expected rates or morbidity and mortality
  - **Epidemic:** increased occurrence of disease above the usual or expected frequency
  - **Endemic:** usual or expected occurrence of disease

# Pandemic Phases

## WHO's Six Phases of a Pandemic

- Phase 1 – Low risk of human cases
- Phase 2 – Higher risk of human cases
- Phase 3 – No or very limited human-to-human transmission
- Phase 4 - Evidence of increased human-to-human transmission
- Phase 5 – Evidence of significant human-to-human transmission
- Phase 6 – Efficient and sustained human-to-human transmission

# IPAC Responsibilities During Disasters

- Maintain sterile supply chain
- Water supply (and resuming after disruption)
  - Drinking water, food preparation, bathing/cleaning, hand hygiene
- Waste disposal
  - Bedpans and urinals
  - Garbage and sharps and other medical waste
- Maintaining necessary PPE supplies
- Education and training on IPAC practices

## Bioterrorism (1/2)

Bioterrorism is the intentional use of a biological agent (*Bacillus anthracis*, *Vibrio cholerae*) or derivative of such an agent (botulinum toxin) to inflict harm or death onto a civilian population

### Identifying the Risk Level of Agents:

1. Ability to be dispersed in aerosols
2. Ability to deliver with simple technology
3. Ability to affect a large number of the population (delivered up-wind)
4. Ability to spread infection, disease, panic and fear

## Bioterrorism (2/2)

### Agents

- Avian influenza, Inhalation anthrax, Botulism, Brucellosis, pneumonic plague, Q fever, Ricin, SARS, smallpox, *Staphylococcus sp. enterotoxin B*, Pneumonic tularemia, Venezuelan equine encephalitis, viral hemorrhagic fevers
- Consider: incubation periods, signs and symptoms, diagnostic assay, lethality

# Infection Prevention Procedures: Bioterrorism

- Investigation to determine IPAC measures following a potential bioterrorism event should consider:
  1. How soon the release is detected (i.e., whether decontamination and prophylaxis are necessary)
  2. How soon the diagnosis is made
  3. How soon appropriate isolation was initiated (i.e., the number of potential contacts of an infected case)
  4. The size of the release (i.e., the number of affected individuals)
  5. The agent used (i.e., whether the agent is contagious)
- Use syndromic surveillance until agent is identified



# Discussion/Knowledge Check



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