

# Long-Term Care Settings

Published: June 2024

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.

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# 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)

## Learning Objectives

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

1. The basic principles of ethics and how it influences IPAC practices and decision-making in long-term care homes (LTCH)
2. The benefits and risks associated with communal gatherings of residents
3. How the normal aging process influences the risk of infections in a LTC population and the infection prevention and control (IPAC) strategies needed to reduce the risk
4. Special considerations for IPAC programs in LTC populations

## Basic Principles

- LTCHs include a range of setting types (e.g., nursing homes, assisted living facilities) that provide care and support for individuals unable to live independently and/or have chronic health conditions.
- LTCHs provide a home to residents, creating unique IPAC challenges:
  - Age-related risk of infections
  - Varying medical complexities
  - Psychosocial needs of residents must be balanced with IPAC considerations
- LTCHs may also offer personal care services such as podiatry, dental, salon and vision services.



# Ethical Principles

# Ethical Principles in LTCHs (1/5)

## 1. Beneficence

- Engage in practices and care activities that focus on the welfare of the resident.

## 2. Non-maleficence

- Avoid practices and care activities that do harm to the resident.
- Provide care with the aim of keeping the resident in the home and avoiding transfers to hospital.
- Avoid unnecessary tests or treatment if result is unlikely to improve well-being and/or survival.

## Ethical Principles in LTCHs (2/5)

### 3. Futility of treatment

- Avoid treatment that is inconsistent with the wishes/goals of the resident.
- Avoid treatment that would offer no benefit.
- The physician has a role as an educator to provide information and treatment options to residents and families and to support informed-decision making.

### 4. Confidentiality

- Residents have the right to absolute confidentiality.
- Follow all laws regarding privacy and disclosure of information to public health authorities.



## Ethical Principles in LTCHs (3/5)

### 5. Autonomy and informed consent

- The resident has the right be educated on the benefits and limitations of testing and treatment options, and the right to refuse testing and treatment (self-determination).
- Surrogate decision makers should be involved if:
  - The resident does not have the capacity to make decisions and their wishes are unknown.
  - If the resident requests surrogate decision maker involvement, even if the resident is capable of making decisions on their own.
- The resident's decisions are not to be honoured if:
  - The resident makes an unlawful request.
  - The resident makes a request or decision that jeopardizes the health and safety of others.

## Ethical Principles in LTCHs (4/5)

### 6. Physician-resident relationship

- The relationship between a physician (and other care-providers) and the resident should be based on trust, fidelity, confidentiality and an intent to protect the resident from harm.

### 7. Truth telling

- Clear, honest and neutral language should be used to communicate information to the resident to ensure comprehension and to support decision-making.

### 8. Justice

- Resources and the provision of treatment should be allocated equitably.
- Decisions should be made objectively.

## Ethical Principles in LTCHs (5/5)

### 9. Non-abandonment

- Once a relationship has been established, the physician and other health care providers should not abandon the resident without proper notice and support with making alternative care arrangements.
- Conflicts between the physician, other health care providers and resident can be escalated to an appropriate authority (e.g., an ethics committee or appropriate governmental agency).

### 10. Limited Resources

- When faced with limited healthcare resources, decisions for allocation of resources/treatment should be made with equity and objectivity in mind.

## Other Ethical Considerations

- Residents may have advanced directives
  - Legally recognized written instructions that addresses the provision of care when the resident is not capable to make decisions
  - Engage surrogate decision makers in discussions and decisions
- The resident has the right to restrict sharing of personal health information
  - Sharing is permitted for:
    - Treatment purposes, to support the provision of care or prevention (e.g., IPAC measures implemented during an outbreak such as Contact Precautions)
    - Healthcare operations to support necessary communication between two facilities (e.g., transferring a resident with a transmissible infection to another facility)

# Ethical Considerations for Transmission-based Precautions

- The environment of a LTCH should be as unrestrictive as possible.
- Transmission-based Precautions may involve restrictive practices such as:
  - Cohorting well or unwell residents together
  - Restricting activities/meals to the resident's room
  - Restricting visitation, travel
- The use of Transmission-based Precautions should be balanced with the psychosocial needs of the residents and may require adaptation (compared to the stricter use of precautions in acute care).
  - E.g. While residents with multidrug resistant organism (MDRO) colonizations may be able to leave their rooms to participate in activities, those with infections (e.g., a draining wound that cannot be covered), may be isolated to their rooms

## Supporting Ethical Standards

- LTCHs may have ethics committees that can support ethical practices by:
  - Involvement in the development and implementation of policies and procedures
  - Serving as a resource for information sharing and answering ethics-related questions



## Communal Gatherings

## Communal Gatherings (1/2)

- IPAC precautions must balance infection prevention benefits and the psychosocial needs of residents.
  - Prolonged isolation increases depression and anxiety in LTC residents
- The nature of communal living contributes to an increase risk of infection through:
  - Shared equipment, entertainment, exercise and dining spaces
  - Outbreaks associated with contaminated food and/or water and
  - Higher exposure to infected residents, staff and visitors, or items they have come into contact with



## Communal Gatherings (2/2)

- The nature of communal living contributes to an increase risk of infection through:
  - Shortages of supplies or signage leading to decreased rates of compliance with IPAC protocols
  - Possible poor ventilation
- Communal activities should be deferred for residents with infections until symptoms resolve.

# Discussion/Knowledge Check





## Interdisciplinary Team

## Interdisciplinary Team (IDT)

- Cooperative team consisting of relevant professional disciplines needed to develop resident care plans.
  - May include a physician, the resident, family and health care workers (HCWs) from nursing, dietary and other areas as needed (e.g. social work, IPAC, and specialized care providers such as wound care specialists, physical therapist, etc.)
- The function of the IDT may be impacted by:
  - Staff turnover resulting in high levels of inexperienced staff
    - May create challenges ensuring IPAC practices are being followed
  - Staff shortages leading to low licensed-to-unlicensed care provider ratios



## Normal Aging Processes

# Aging and Infection Risk in an Elderly Population

- Elderly residents face challenges in fighting infections due to:
  - Age-related changes to their adaptive immune system
  - Malnutrition
  - Co-morbidities that also increase the risk of infection
  - Blunted febrile response
- Normal aging involves changes to:
  - Skin: thinning reduces barrier function and integrity
  - Gastrointestinal tract: decreased digestive enzymes, mucous production, motility
  - Pulmonary system:
    - Increased risk of aspiration due to decreased gag reflex and increased esophageal reflux
    - Decreased clearing of foreign material due to reduced ciliary system

# Age-related Changes to the Adaptive Immune System

- Blunted febrile response to infection
- Declining T-cell function due to changes (atrophy) of the thymus (where T-cells develop)
- Decreased B-cell function leading to a decrease in antibody-production
- Less robust response to vaccines due to B-cell and T-cell function
  - Residents should be kept up-to-date on all recommended immunizations (i.e. Influenza, Pneumococcal disease, Shingles, COVID-19, Pertussis (Tetanus/Diphtheria/Pertussis once and Tetanus/Pertussis every 10 years)).

# Malnutrition

- Results from the inadequate ingestion of proteins, calories and micronutrients can negatively affect the body's ability to fight infections
- Age-related factors that contribute to an increase risk of malnutrition include:
  - Mouth changes such as loss of teeth or decreased saliva production leading to a decreased desire/ability to eat
  - Reduced ability to absorb nutrients (such as vitamin B12, calcium, folic acid and protein) due to a decrease in pepsin production
- Malnutrition is associated with a decrease in cell-mediated immunity (e.g. T-cells that recognize and destroy infected cells).
- Infection may worsen the nutritional status of a resident by increasing energy expenditure (hypermetabolism) and decreasing food intake .



## Nutrient Considerations

- Adequate nutrition and supplementation are strategies to improve the ability to fight infections.
  - Vitamin E supplementation (200 mg per day) may reduce the risk of acute respiratory infections
- Multiple paths for ensuring nutritional needs are being met should be explored, combining food, specific supplements, multivitamins, and even the sun.
  - Multivitamin-mineral support is the best option pending additional research and may better meet the needs of residents who do not eat animal-based food products.

# Types of Infections in Long-Term Care

- Residents of LTCHs may be at increased risk of certain infection types:
  - Urinary tract infections (UTIs)
  - Respiratory infections
    - E.g. Influenza virus infections
  - Skin and soft tissue infections
    - *Staphylococcus aureus* infections
  - Gastrointestinal infections
    - E.g. *Clostridioides difficile* (*C. difficile*) infections

# Urinary Tract Infections (UTIs)

- Asymptomatic bacteriuria is common in LTCH residents.
  - Residents should not be routinely screened and treated in the absence of signs/symptoms of a UTI.
- Residents may have typical or atypical signs/symptoms of a UTI.
  - Common UTI signs and symptoms include:
    - fever
    - flank pain
    - dysuria, increased urgency and frequency of urination
  - Additional UTI signs and symptoms include:
    - altered mental status
    - declining activities of daily living (ADL) scores
    - new onset of incontinence
  - Treatment is not indicated unless a standardized case definition is met
- The presence of an indwelling urinary catheter increases the risk of a UTI.

# Managing Urinary Catheters

- Alternatives to indwelling urinary catheters should be considered (listed from lowest to highest risk of causing a UTI):
  - External urinary devices
    - Suitable for use at night with incontinent male residents or male residents with urinary urgency
  - Intermittent catheterization
  - Suprapubic catheterization
- Outside of catheter use, the following may increase the risk of UTIs in residents:
  - Decrease in immune function
  - Comorbidities (e.g. chronic UTIs, diabetes)
  - Increase frequency of incontinence, poor hygiene

## Managing Urinary Leg Bags

- Leg bags improve mobility of residents but may pose a risk of infection due to:
  - Reflux of urine
  - Frequent opening of the collection system to empty
- Strategies to reduce the risk of infection associated with leg bags:
  - Use aseptic technique when handling the leg bags
  - Clean the connecting ports with alcohol before each use

## Additional Strategies to Reduce UTIs

- Surveillance for UTIs, using standardized case definitions, to determine if interventions are needed
- Education and training on proper technique and management of urinary catheters
- Use of bundles:
  - Aseptic insertion
  - External or intermittent catheterization
  - Reminders to assess need and remove as soon as possible

# Respiratory Infections (1/2)

- Residents commonly experience upper respiratory tract infections, bronchitis and pneumonia.
  - Common viruses encountered in LTC settings in the United States include:
    - Respiratory syncytial virus (RSV)
    - Influenza virus
    - Adenovirus
    - SARS-CoV-2 (COVID-19)
  - Common bacteria encountered in LTC settings in the United States include:
    - *Haemophilus influenzae*
    - Streptococci
    - Staphylococci
    - *Mycobacterium tuberculosis*
- Respiratory tract infections are the leading cause of death in LTCHs (0.3-2.5 infections/1000 resident days).

## Respiratory Infections (2/2)

- In general, residents are at an increased risk of respiratory infections because of:
  - Declined pulmonary function
  - Reduced cough reflex
  - Limited lung capacity
  - Diminished mucociliary motion
    - Refers to the function of ciliated respiratory epithelial cells which prevent microorganisms from penetrating deep into the lungs by moving them upwards towards the nose and mouth
  - Decreased gag reflex (may contribute to aspiration)
  - Comorbidities such as cardiopulmonary disease, cerebrovascular disease, or malignancy



# Pneumonia

- Residents may be predisposed to pneumonia due to:
  - Swallowing challenges leading to aspiration
  - Inability to clear airways
  - Insufficient oral care
- Symptoms often include fever, followed by new/increased cough and altered mental status
- Common causes of pneumonia include influenza virus, *Streptococcus* sp., RSV and SARS-CoV-2

## Influenza (1/2)

- LTCHs have a high risk for seasonal influenza infections due to:
  - Close proximity of residents to each other
  - Frequent, close contact with HCWs
  - Visitor and family exposures
- Outbreaks have been associated with low vaccination rates in residents and staff
- IPAC Measures:
  - Droplet and Contact Precautions
  - Isolation of residents with signs and symptoms of infection
  - Laboratory confirmation and implementation of antiviral medications

## Influenza (2/2)

- Residents may have atypical signs and symptoms of infection
  - Typical signs/symptoms of infection
    - Fever and chills
    - Headache
    - Myalgia, malaise
    - Respiratory symptoms (e.g. dry cough, pharyngeal pain, nasal obstruction and discharge)
    - Influenza A-associated symptoms (e.g. diarrhea, vomiting, abdominal pain, chest pain, bleeding from nose/gums, pneumonia)
  - Atypical signs/symptoms of infection
    - Less pronounced fever
    - Less pronounced cough
    - Generalized complaints (mental status changes)

## Tuberculosis (TB)

- LTCHs are considered high-risk for TB.
- LTCHs are recommended to have regular TB screening programs for residents (i.e. on admission).
  - TB program should also include TB skin testing for exposed staff and residents when a case is detected (in accordance with local guidelines).
- Homes should develop a plan to transfer a resident with TB if they are not able to safely accommodate them.
  - Residents with active TB require Airborne Precautions which involves an airborne infection isolation room and access to fit-tested N95 respirators and fit-testing for staff.

## Skin and Soft Tissue Infections (1/2)

- Age-associated skin changes:
  - Thinning skin associated with decreased barrier function
  - Decreased skin elasticity affecting skin integrity
  - Reduction in sweat glands leading to a reduction of thermoregulation
  - Reduced number of sebaceous glands, leading to less oil production (which protects the skin from friction)
- Pressure ulcers are common in LTC residents
  - Occur in up to 20% of residents and contributes to mortality
  - When infected, pressure ulcers can contribute to the development of osteomyelitis and bacteremia

## Skin and Soft Tissue Infections (2/2)

- In addition to age-related skin changes, the following may increase the risk of risk of pressure ulcers in residents:
  - Immobility
  - Incontinence
  - Malnutrition
  - Moisture
  - Long-term steroid treatment
- Pressure ulcer colonization should be differentiated from infection to prevent unnecessary antibiotic therapy.
- Prevention strategies include daily skin inspections for breakdown, managing moisture on skin, minimizing pressure, optimizing nutrition and hydration.

# Gastroenteritis

- Outbreaks in LTCHs can be caused by gastrointestinal pathogens such as rotavirus, enterovirus, norovirus, *C. difficile*, *Campylobacter* sp., *Bacillus cereus* and *Escherichia coli*.
- Residents are at risk of gastroenteritis because of:
  - Shared bathrooms
  - Shared equipment
  - Common dining areas
  - General close proximity to other residents
  - Decreased gastric acid production
  - Dementia and cognitive impairment

## *Clostridoides difficile* infection (CDI)

- *C. difficile* is a toxin-producing spore former that causes an intestinal infection resulting in diarrhea (infections can be fatal).
- Residents commonly have risk factors for CDI such as older age and recent antimicrobial use.
- Spores may persist in the environment for prolonged periods of time.



## Strategies to Reduce the Risk of CDI

- Avoid high risk antimicrobials where possible (e.g clindamycin, fluoroquinolones and 3<sup>rd</sup> generation cephalosporins)
- Contact Precautions for suspect and confirmed cases
- Hand hygiene
- Environmental cleaning and disinfection
  - Use of a sporicidal disinfectant for suspected or confirmed cases of CDI

# Discussion/Knowledge Check





## IPAC Concerns Related to Special Populations

# Special Populations

- There may be special considerations for residents:
  - With cognitive impairment
  - With invasive medical devices
  - Requiring dialysis
  - Requiring palliative or hospice care

## Special Population: Cognitive Impairment

- Are at a higher risk of infection than other residents due to a possible inability to:
  - Comply with transmission-based precautions (e.g. remaining in room)
  - Comply with hygiene practices (e.g. hand hygiene, respiratory etiquette)
  - Communicate symptoms of infections leading to difficulties and delays in diagnosing infections
- Changes in mental or cognitive function may be a symptom of underlying infection.

## Special Population: Invasive Medical Devices (1/3)

- Indwelling medical devices are common in residents
  - May be permanent or long-term (e.g. artificial hips, pacemakers, heart valves)
  - May be temporary or shorter-term (e.g. urinary catheters, vascular access devices)
- Infections may occur by:
  - Introduction of the microorganism at the time of insertion/implantation of the device
  - Hematogenous seeding of the device after it has been inserted
- The risk of infection may start outside of the LTCH (i.e. at a hospital where the device was inserted/implanted)
  - The Infection Preventionist must have awareness of the infection risks spanning the procedural life of the device (from insertion to resident recovery)

## Special Population: Invasive Medical Devices (2/3)

- Vascular access devices (VADs) are devices used to access the vascular system
  - Blood sampling, infusion therapy, administration of medication, hemodynamic monitoring and/or dialysis
- Types of VADs encountered in LTC include:
  - Central venous, midline and tunneled catheters
  - Peripheral vascular devices
  - Peripherally inserted central catheter (PICC) lines
  - Implanted ports

## Special Population: Invasive Medical Devices (3/3)

- VADs may be short-term (<3 weeks) or long-term (weeks to months)
- VADs are a risk for bloodstream infections (BSIs)
  - Can be bacteremia, viremia or fungemia
- Location of insertion and type of VAD affects the level of risk of a BSI
- Standard Precautions (Routine Practices) are required at all times and a risk assessment is required to determine what levels of personal protective equipment (PPE) are needed before care activities related to VADs.



## VAD Types (1/3)

- **Peripheral vascular devices** can be a cannula or catheter, usually inserted short-term into a vein of the upper extremity.
  - Used to draw blood or administer medication (commonly used for infusion therapy in LTC)
  - Associated with a low risk of infection
- **Central venous catheters** (CVC, also known as a central lines) are inserted in the neck, chest, groin or arm and the catheter ends near the heart.
  - Used to deliver fluids, blood or medications
  - Usually long-term (i.e. weeks to months)
  - BSIs associated with CVCs are called central line-associated BSIs (CLABSIs) and results in thousands of deaths annually in the United States

## VAD Types (2/3)

- **PICC lines** involve insertion of long catheters (up to 45 cm) into peripheral veins that end in the lower third of the superior vena cava or cavoatrial junction.
  - Considered a long-term central vascular access device
  - Can be used to administer vesicant (capable of causing tissue damage) infusion therapy such as chemotherapy infusions or parenteral nutrition
- **Midline catheters** require specialized imaging techniques for placement.
  - Longer than peripheral catheters
  - Require aseptic technique for insertion (i.e. sterile gloves, gown, medical mask)
  - Can remain in place up to 30 days

## VAD Types (3/3)

- **Tunneled catheters** are inserted into a chest or neck vein and under the skin surgically.
  - Cuffed are used when the catheter will be needed beyond 3 weeks
  - Non-cuffed are used in urgent situations (up to 3 weeks)
- **Ports** are surgically implanted and tunneled with the catheter tip ending in the inferior vena cava.
  - Can be placed in the chest and subclavian or internal jugular veins, in the upper arm, abdomen or femoral area
  - Lowest risk of BSI

# VAD-associated Infection Prevention Strategies (1/5)

- **Before insertion** strategies include:
  - Education, training and competencies
    - Best practices for insertion, care and maintenance techniques
    - Awareness of indications for use
    - Risk of BSIs
    - General IPAC strategies
  - Indications for use
    - Evidence-based and in alignment with LTC facility policies and procedures
    - Following practice guidelines
    - Following equipment manufacturer's instructions for use

## VAD-associated Infection Prevention Strategies (2/5)

- **At insertion** strategies include:
  - Following IPAC practices
    - Limiting unnecessary personnel during insertion but a second trained HCW should be present to ensure best practices are being followed (and stop procedure if necessary)
  - Hand hygiene
    - Hand hygiene is required before insertion and any care activities involving the site
    - Sterile gloves are recommended for placement of VADs except peripheral intravenous (IV) catheters
      - Non-sterile gloves are acceptable for peripheral IV catheter insertion if no direct contact occurs after skin antisepsis has occurred
  - Site selection
    - Avoid femoral area if possible

## VAD-associated Infection Prevention Strategies (3/5)

- **At insertion** strategies include (continued):
  - Standardized catheter carts/kits
    - All supplies and personal protective equipment are available together to minimize disruptions, to maintain the sterile field and to ensure a standardized approach to insertion
  - Ultrasound guidance
    - Recommended for placement of certain VADs and is associated with a lower infection rate
  - Sterile barrier precautions
    - Sterile gloves, long-sleeve sterile surgical gown, medical mask, cap and sterile full body drape may be recommended depending on VAD-type (e.g., central line insertion)
  - Skin preparation
    - Antiseptic agent should be allowed to dry completely
    - Options for antisepsis include 70% alcohol, iodine, >0.5% chlorhexidine

# VAD-associated Infection Prevention Strategies (4/5)

- **After insertion** strategies include:
  - Staffing
    - Appropriate nurse : patient ratio
  - Catheter hub disinfection
    - To prevent colonization, hubs should be disinfected prior to every access for a minimum of 5 seconds
  - Removal of non-essential catheters
    - Daily review of the need for VADs and prompt removal if indicated
  - VAD dressings
    - Dressing changes should occur regularly with antisepsis and PPE as indicated for the type of VAD
      - At a frequency of every two days for sterile gauze dressings
      - Every seven days for sterile transparent, semipermeable dressings
      - Sooner if dressings are wet or not intact

# VAD-associated Infection Prevention Strategies (5/5)

- **After insertion** strategies include:
  - Add-on devices
    - Minimize the use of extension sets, needleless connectors and secondary sets to reduce risk of secondary infections
    - Closed systems (continuous infusions) require fewer changes than open systems (intermittent infusions)
  - Skin decolonization
    - Daily bathing with chlorhexidine may be recommended
  - Antimicrobial ointments
    - Avoid the use of topical ointments unless specifically recommended (i.e. with hemodialysis) to reduce the risk of fungal infections and antimicrobial resistance
  - BSI surveillance
    - VAD-associated BSI surveillance is recommended (and is legally required in some areas)



## Special Population: Dialysis (1/2)

- Dialysis is the removal of electrolytes, fluids and toxins from a person's blood.
- Residents receiving dialysis are at risk for access site infections, bacteremia, peritonitis and infection with bloodborne pathogens.
  - Often already at risk of infection due to underlying conditions (e.g. diabetes, hypertension, cardiovascular disease)
  - Other risks of dialysis include adverse reactions such as pyrogen, allergic or chemical reactions

## Special Population: Dialysis (2/2)

- Prevention of dialysis-associated infections in LTC:
  - Aseptic technique during dialysis procedures
  - Cleaning and disinfection of equipment
  - Education and training of staff on best practices
  - Education and training of residents on their role in prevention (i.e., health maintenance)
  - Surveillance of those receiving dialysis for infections

## Special Population: Respite, Palliative or Hospice Care

- Respite, Palliative or Hospice care may be provided in LTCHs and should balance IPAC practices with maintaining the quality of life for the resident.
  - Curative treatments are stopped but treatments to manage pain may still occur and may still involve catheters and VAD use.
- IPAC practices may be adapted:
  - Use of PPE may focus on protecting the HCW instead of the resident, if they understand and agree to the risks.
  - Avoid unnecessary testing (e.g. health care-associated infection (HAI) surveillance if it might cause pain or discomfort).
  - Wounds and infection treatment may focus on comfort, drainage and odour control as opposed to healing.
  - Consider adapting pet visitation policies to allow for visits if otherwise restricted.

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Ontario Agency for Health Protection and Promotion (Public Health Ontario); Long-term care settings. Toronto, ON: King's Printer for Ontario; 2024.

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