



AADNS Staff Educator

Common Infections in Nursing Facilities

This learning activity should enable you to:

1. Describe special risks of nursing facility residents in regard to urinary tract infections, pneumonia, influenza, scabies, tuberculosis, vaginitis, herpes zoster, HIV, AIDS, antibiotic-resistant infections
2. Describe the atypical ways that infections can appear in older residents
3. List at least eight possible signs of infection



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Initial Knowledge Check

1. Which of the following is a contagious infection caused by a mite?
 - a. MRSA
 - b. Prostatitis
 - c. Scabies
 - d. Furuncle
2. True or false? Older adults may not have a rise in temperature when they experience an infection.
 - a. True
 - b. False
3. What is a contraindication for a resident to receive an influenza vaccine?
 - a. Beginning of flu season
 - b. Vaccination within past three years
 - c. Egg allergy
 - d. Aspirin allergy
4. What is the most common resident infection in the nursing facility?
 - a. Pneumonia
 - b. Urinary tract infection
 - c. MRSA
 - d. Scabies
5. What can the initial symptoms of HIV resemble?
 - a. Urinary tract infection
 - b. Tuberculosis
 - c. Hives
 - d. Influenza
6. True or false? Most cases of tuberculosis in the elderly are due to new infections contracted from people in the community.
 - a. True
 - b. False
7. Which of the following can be associated with late-stage HIV infection?
 - a. Paranoia
 - b. Mania
 - c. Dementia
 - d. Manic-depressive disorders
8. What is recommended for older adults who may have reduced antibody response to vaccines?
 - a. Vaccines should not be administered to people over age 85.
 - b. Vaccines should be administered, unless there are contraindications.
 - c. Vaccines should be administered at lower dosages.
 - d. Influenza should be the only vaccine administered.
9. What is the cause of most cases of urinary tract infection (UTI) in women?
 - a. *Proteus*
 - b. *E. coli*
 - c. *Staphylococcus*
 - d. *Klebsiella*
10. True or false? Overuse of antibiotics has caused new strains of bacteria to develop that are resistant to antibiotics.
 - a. True
 - b. False

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Infections are a significant risk to residents of nursing facilities—not a surprising fact, considering the characteristics of this population. A majority of residents are of advanced age and have experienced some decline in the immune system’s function. These factors reduce their ability to resist infections and mask changes in other body systems that make them more vulnerable to infections. Many residents, regardless of age, have conditions that compromise body function and increase the risk for infection. Living in a healthcare facility naturally increases exposure to infection-causing pathogens.

The high risk is compounded by the uncharacteristic symptoms that older residents may display when they develop an infection. Temperature elevations may not be as high as in younger people, reported pain may not be related to the severity of the infection, and the usual symptoms that one would expect with common infections (e.g., coughing with pneumonia, lower-right-quadrant abdominal pain with appendicitis) may be absent. (Awareness of the resident’s normal body temperature helps staff recognize the presence of fever. For instance, 99°F (37°C) in a resident whose normal temperature is 96.8°F (35°C) can indicate that an infection is present, despite the absence of what one would expect of a “high fever.”) Confusion often accompanies infections, and this symptom may be attributed to other conditions. The box to the right lists possible signs of infection.

Possible Signs of Infection

- Delirium
- Fever
- Chills
- Hypotension
- Increased pulse
- Increased respiration
- Flank pain
- Hematuria, pyuria
- Dysuria, burning
- Urinary frequency
- Incontinence
- Cough
- Chest discomfort
- Purulent sputum
- Rhinorrhea
- Nasal congestion
- Headache
- Malaise
- Anorexia
- Weight loss
- Vomiting
- Diarrhea
- Mucus or blood in stool
- Purulent drainage
- Pain or swelling over joint
- > 10,000 WBCs in blood
- > 100,000 bacteria/ml in urine
- Decreased ABGs
- Positive blood, sputum, CSF, or wound culture

The complexity of infections in residents demands that staff be knowledgeable of the variable symptoms and work diligently to prevent them. Common infections that residents may experience include:

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Urinary Tract Infections

Urinary tract infections (UTIs) are frequently experienced by residents. Factors that contribute to UTIs include inadequate hygienic practices, improper cleansing after bowel elimination, low fluid intake, excessive fluid loss, and hormonal changes that reduce the body's resistance. People who are in a debilitated state or have neurogenic bladders, arteriosclerosis, or diabetes are at high risk of developing UTIs. A very strong likelihood of developing a UTI results from catheterization and the presence of an indwelling urinary catheter. Organisms primarily responsible for UTIs are *Escherichia coli* in women and *Proteus* species in men.

Early signs and symptoms of UTI include burning, urgency, and temperature elevation. Incontinence can result from UTI, as can delirium, particularly in older residents. As incontinence and altered cognition can arise from many other conditions, careful assessment is essential. As a UTI progresses, hematuria and urinary retention can occur. A urinalysis can confirm the diagnosis of UTI.

The aim of treatment is to establish adequate urinary drainage and control the infection through antibiotic therapy. The resident's fluid intake and output should be carefully monitored. Forcing fluids is advisable pending physician approval and providing that the resident's cardiac status does not contraindicate this action. Observation for new symptoms, bladder distention, skin irritation, and other unusual signs should be part of the care plan.

Severe UTIs leading to septicemia occur more frequently among older than among younger people, as do recurrent UTIs. Urosepsis (septicemia secondary to UTI) is a common

complication of indwelling catheters, emphasizing the importance of selective use of catheters in older adults.

Cranberry juice has long been promoted as a means to reducing UTIs; research now supports this belief. A study conducted at the Harvard Medical School demonstrated a reduction in the frequency of bacteria and white blood cells in the urine of women who regularly consumed cranberry juice (Goodine, 2002). Staff should offer residents cranberry juice (preferably the low-sugar type) between meals; this will not only help reduce the risk for UTI but can enhance fluid intake.

Prostatitis is the most common UTI among older men; most forms of prostatitis are bacterial in origin. *Acute bacterial prostatitis* is characterized by the systemic symptoms of fever, chills, and malaise, whereas these symptoms are uncommon with chronic bacterial prostatitis. Both types of prostatitis will present urinary symptoms of frequency, nocturia, dysuria, varying degrees of bladder obstruction secondary to an edematous, enlarged prostate, and lower-back and perineal pain. A simple urinalysis can identify the pathogen responsible for acute bacterial prostatitis; with the chronic form, a special process may be used to collect a clean-catch urine sample, with prostatic secretions obtained by massaging the prostate during the procedure. Acute prostatitis usually responds well to antibiotic therapy; chronic prostatitis responds less well to antibiotics and is more difficult to treat.

Pneumonia

Pneumonia is a serious threat to nursing facility residents and is one of the leading causes of death. A variety of factors

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contribute to the high incidence of pneumonia:

Advanced age of residents: Age-related changes can cause residents to develop pneumonia. These changes include poor chest expansion and shallow breathing; reduced sensitivity of pharyngeal reflexes, which promotes aspiration of foreign material; and weaker immunity.

Debilitated state: Many residents are admitted to facilities because of health conditions that cause them to be dependent and debilitated. Reduced mobility heightens the risk for pneumonia.

Respiratory disease: COPD and other respiratory conditions are not uncommon diagnoses among residents. These conditions can promote mucus formation and bronchial obstruction.

Pneumococcal pneumonia caused by *Streptococcus pneumoniae* is the most common type of pneumonia in the elderly. Other pneumonias are caused by Gram-negative bacilli (*Klebsiella pneumoniae*),

Legionella pneumophila, anaerobic bacteria, and influenza (*Haemophilus influenzae*).

Chest pain, productive cough, fever, rapid respiration, and fatigue are classic symptoms of pneumonia; however, in older residents, these symptoms can be altered. Pleuritic (lung) pain may be less severe; lower normal body temperatures can cause fever to be present at lower temperatures than in younger people; weaker cough reflexes can prohibit coughing and the expulsion of mucus; rapid respirations may be missed; fatigue can be attributed to a variety of other common

problems. Cerebral hypoxia can occur with pneumonia and cause confusion, restlessness,

and behavioral changes. This suggests that pneumonia should be considered when there are sudden changes in cognition and behavior.

Antibiotic therapy, ensuring a good fluid intake, frequent monitoring of vital signs, and encouraging residents to frequently turn, deep-breathe, cough, and expel mucus are core aspects of the care of residents with pneumonia. Close observation and documentation are essential.

Due to the high risk of pneumonia, pneumococcal vaccines are recommended for older residents. The vaccine should not be administered while a resident has a fever. Concurrent administration with the influenza vaccine and some other vaccines is acceptable, providing that different injection sites are used. Common side effects are local redness, fever, myalgia, and malaise. Some individuals may experience arthritic flare-ups and, more rarely, paresthesias and other neuropathies. Despite the fact that the duration of protection from the vaccine is uncertain, the Centers for Disease Control and Prevention (CDC) recommends a single vaccination. Nurses should be sure to document the administration of the vaccine, along with the name of the manufacturer, lot number, and expiration date. CDC also advises that if there is doubt whether the vaccine has already been given, it is best to administer the vaccine rather than risk pneumonia. The revaccination of elders with pneumococcal vaccines has been shown to cause local site reactions lasting several days but there are no life-threatening effects.

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Influenza

Influenza can be a serious threat in nursing facilities because of its potential to spread to a number of residents and staff and the life-

threatening impact it can have on the resident population. Influenza A is the most frequent cause of serious illness and death in older residents; influenza B is less severe, although it can produce serious problems. Typically, influenza causes fever (this may not appear typically in older residents), muscle pain, sore throat, and nonproductive cough. Once it attacks, influenza affects the respiratory tract and depresses the clearance of mucous. Secondary bacterial infections and other complications increase the risk of older residents dying as a result of influenza. Residents with chronic respiratory, cardiac, or metabolic disease are at particularly high risk of developing secondary bacterial pneumonia. Non-pulmonary complications can include myositis, pericarditis, Guillain-Barré syndrome, encephalitis, and a temporary loss of smell or taste.

Influenza is acquired through inhalation of infected droplets, so it is important to reduce contact with people with known or suspected influenza. Prevention can be achieved by annual influenza vaccination, which is recommended for people over age 65. Although the elderly have lower antibody titers after vaccination than younger adults, vaccination can prevent severe complications associated with influenza, even if it does not prevent the disease itself. Approximately two weeks is needed for an antibody response to the vaccine; therefore, administration of the vaccine in October is recommended. Because the flu season can last through February, residents can be vaccinated after October. Daily vitamin and mineral supplements with

enhanced antioxidants have been shown to increase antibody titers in the elderly after influenza vaccination (suggesting that the relatively safe practice of administering supplements be considered). Immunity gradually declines in the months following vaccination, which supports the need for annual revaccination. The vaccine is contraindicated in people with a fever, egg allergy, and a history of Guillain-Barré syndrome. The blood level of carbamazepine, phenobarbital, phenytoin, theophylline, and warfarin can rise within one to four weeks after vaccination; therefore, residents using these drugs need to be closely monitored for toxic reactions. It is advisable for staff to be immunized, as part of an employee health program.

Scabies

Though not the life-threatening condition of other infections, scabies can present quite a challenge to nursing facilities, due to its highly contagious nature and its annoying symptoms. Scabies is caused by the *Sarcoptes scabiei*, a mite. On contact, the female “itch mite” burrows under the skin and lays eggs. In 8 to 17 days the larvae mature and travel to the skin surface to mate. After mating, the male dies on the skin surface and the female burrows back under the skin to lay eggs.

The body experiences an allergic reaction to the mites and their waste products, which is manifested through intense itching and excoriation of the skin. The rash is typically present in the interdigital webs, hands, wrists, elbows, abdominal folds, around the nipples, and on the genitalia, although older adults can also have a rash on the face, scalp, back, buttocks, and knees. Itching worsens at night. On close inspection of the rash, the burrow containing the mite can be seen; it appears as

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a linear ridge with a vesicle on one end. It is important that rashes be carefully inspected for this finding to avoid having the symptom attributed to another condition. Diagnosis is made by scraping the lesions with a scalpel and having the material examined under a microscope for evidence of mites, eggs, or their wastes. A burrow ink test or application of mineral oil on the lesions can be done to enhance visualization of the burrows. Even with a negative finding on the scrapings, the patient may be treated if symptoms are consistent with scabies.

Timely diagnosis and treatment are crucial, as this infection can quickly spread to other residents and staff. Medications such as Lindane may be ordered to kill the scabies, and oral antihistamines and topical corticosteroids may be used to control the itching. Other measures typically employed include these:

- Wearing of gowns and gloves for staff and visitors who have close contact with infected people, for the initial 24-hour period after treatment has begun
- Meticulous handwashing
- Laundry isolation during entire period of treatment; hot-water laundering or dry-cleaning of all linens and previously worn clothing; sealing items that cannot be laundered (e.g., shoes, coats) in plastic bags and not using these items for two weeks
- Disinfection of mattress surfaces; turning of mattresses onto the side that was not in contact with residents
- Disinfection of furniture surfaces (mites are able to live up to three days on a surface off the body)
- Notification by designated personnel of the health department (although it is usually not required to report isolated cases, the health department may want to investigate

and provide consultation for large outbreaks)

- Education of residents, visitors, and staff about the cause and nature of the infection, treatment, precautions, and prognosis
- Ongoing monitoring by the facility's infection-control nurse

Tuberculosis

Residents of nursing facilities, tend to have a high incidence of tuberculosis (TB). Rather than being new infections, most of the TB in older residents tends to be associated with a reactivation of earlier asymptomatic or inadequately treated cases from earlier life.

The diagnosis of TB can be delayed in older adults because symptoms can be missed. Infected residents may have anorexia, weight loss, and weakness as primary symptoms; these symptoms can be attributed to other problems and not associated with TB. Night sweats may not occur, because of reduced diaphoresis with advanced age. Likewise, fever may not be detected, because of alterations in body temperature in late life. These factors emphasize the importance of periodic evaluation for this disease.

Screening for TB is best done with Mantoux testing. A two-step Mantoux test is recommended for older residents because of the high incidence of false-negative results (i.e., if the result is negative after the first test, the test should be repeated in one week, which could cause a conversion if the infection were present, owing to the booster phenomenon associated with a waned response).

Treatment typically consists of medications, rest, and good nutrition. Side effects of

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medications commonly prescribed for TB have special implications for older residents:

- Streptomycin can cause damage to the peripheral and central nervous systems, demonstrated through hearing limitations and disequilibrium, which create safety risks.
- Para-aminosalicylic acid can cause gastrointestinal-tract irritation, anorexia, nausea, vomiting, and diarrhea, which can predispose elders to the risk of malnutrition. Changes in gastric secretions can cause the tablets to pass through the gastrointestinal system without dissolving, thereby preventing a therapeutic benefit; stools should be examined for undissolved tablets.
- Isoniazid, although not as toxic as the other drugs mentioned, can have toxic effects on the peripheral and central nervous systems.

Close monitoring of the effects of medications is essential.

The psychosocial impact on the resident of a TB diagnosis must be considered. Older adults may have memories of the days when people with TB were confined to sanitariums and may be fearful of what this diagnosis could mean to them. Family and friends may fear contracting the infection and avoid visiting the resident, thereby contributing to social isolation and psychological distress. Education of residents and their families is crucial to clarifying misconceptions and preventing unneeded distress.

Vaginitis

An easily missed infection in older women is vaginitis. Often, nursing facility staff do not consider that residents—who are older and not sexually active—could have vaginitis when symptoms appear. Altered cognition of some residents can prevent symptoms of vaginitis

from being reported. Reduced and more alkaline vaginal secretions and thinner, less elastic vaginal epithelium predispose older women to senile vaginitis.

Staff should be alert to symptoms, which could include vaginal soreness, itching,

burning, discharge, and a reddened appearance to the vagina. Bleeding can accompany advanced cases of vaginitis. Treatment usually consists of topical medications. Vaginal infections have responded well to vitamins A, B-complex, C, E, and β -carotene. An increased intake of yogurt with acidophilus, as well as garlic, can help fight fungal infections, as can the avoidance of fermented foods and refined sugars. Staff should ensure that residents practice good perineal hygiene to prevent the likelihood of infection.

Herpes Zoster (Shingles)

Herpes zoster, or shingles, is caused by the varicella virus—the same virus that that causes chickenpox. In adults, the virus that has been latent in the dorsal root ganglia becomes reactivated as a result of a weakening of the immune system. Advanced age, a debilitated condition, radiation, chemotherapy, and stress are among the factors that can weaken the immune system and contribute to this problem.

Typically, this infection is first evidenced by pain and itching of an area of the skin, followed within a few days by the formation of vesicles. The eruption of vesicles occurs over a nerve and follows the path of the sensory nerve. The chest and abdomen are the most common sites for shingles, although eruptions can occur anywhere on the body. Typically, treatment is symptomatic, consisting of



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analgesics, steroids, and topical preparations to dry the lesions. Some residents, particularly those of advanced age, experience postherpetic pain for months after the lesions disappear.

Boosting residents' immune systems is helpful to preventing shingles. If it is noted that a

resident has a recurrent problem with shingles or the lesions are widespread on the body, further evaluation for an underlying lymphoma or other immune deficiency should be considered and discussed with the physician.

HIV and AIDS

Increasing numbers of nursing facilities are admitting residents who are HIV positive or have AIDS. In addition to those residents who are known carriers of these infections, some residents may be infected without being aware that they are carriers. This can be especially true of older residents because of HIV and AIDS is associated with a younger population. Approximately 10% of all HIV cases occur in people over age 65.

Initial symptoms, which appear within the first few weeks of the person's being infected with the virus, resemble those of the flu, such as low-grade fever, headache, sore throat, fatigue, nausea, and a rash. These symptoms can last for several months and then the infected person can be asymptomatic for several years. The infected person's blood will test positive for the HIV antibody about two months after the infection is contracted. It should be noted that years after HIV has invaded the body, symptoms may reappear. These can include:

- Persistent fever

- Drenching night sweats
- Headaches
- Fatigue
- Chronic diarrhea
- Thrush
- Persistent vaginitis
- Herpes zoster
- Lymph node swelling
- Meningitis
- Palsies
- Pain
- Dementia

Infection with HIV needs to be considered when these symptoms are present. AIDS is diagnosed when people who are HIV positive develop decreased CD4+ lymphocyte count, an opportunistic infection (e.g., pneumonia, septicemia), an opportunistic cancer (e.g., Kaposi's sarcoma, invasive cervical cancer), wasting syndrome (loss of at least 10% of body weight), or dementia.

Infection-control measures must be strictly followed when caring for these residents. Their care plans should include measures to promote good nutrition, conserve energy, boost immunity, and provide emotional support.

Remember: Residents have the right to adequate and appropriate healthcare, which includes the prevention of avoidable infections. Ensure the following:

- Resident assessments include the identification of factors that could contribute to the development of infections.
- Care plans address residents' unique risks for infections with specific preventive interventions.
- Residents are monitored for signs of

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infections, recognizing that atypical signs could be displayed by older residents.

- Signs of infection are identified and evaluated in a timely manner.
 - All staff consistently practice good infection prevention and control techniques.
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Antibiotic-Resistant Infections (MRSA and VRE)

Antibiotics have done wonders to control infections and spare lives, yet their use has had a significant downside: pathogens have become resistant to specific antibiotics. *Staphylococcus aureus* is one example. These bacteria, commonly found on the skin of healthy people, can cause serious infections when it enters the body. The fatality rate for this problem used to be quite high, until penicillin was introduced. Penicillin worked well for a while, but then these bacteria became resistant to penicillin. Methicillin was introduced in the 1960s and was effective in managing *Staphylococcus aureus* infections, but by the 1980s, resistance to this drug developed, and outbreaks of stubborn methicillin-resistant *Staphylococcus aureus* (MRSA) infections appeared. MRSA infection spreads through nasopharyngeal secretions and the hands, so it can easily affect large numbers of residents. For a time, Vanomycin

was effective against MRSA, but resistance to this antibiotic led to the need for new drugs. Linezolid (Zyvox) and the combination of quinupristin with dalbapristin (Synercid) have since offered treatment options.

A significant nosocomial infection appeared in the 1990s from strains of Vanomycin-resistant *Enterococcus* (VRE). VRE infections tend to be resistant to most of the drugs previously used to treat such infections; further, it is believed that genes present in VRE can be transferred to other Gram-positive microorganisms, such as *Staphylococcus aureus*. Residents at risk for VRE infection are those who are severely ill, debilitated, immunosuppressed, or have had major surgical procedures, an indwelling urinary or central venous catheter, or antibiotic therapy. At present, Zyvox and Synercid are the only drugs effective against VRE.

The significant problems arising from antibiotic-resistant infections emphasize the need to avoid antibiotic overuse. One means to ensuring antibiotics are not overused is to prevent infections from developing so that there is no need to use these drugs. All staff should strictly adhere to infection-control practices.

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Knowledge Check

1. What can be a complication of late-stage HIV infection?
 - a. Cirrhosis
 - b. Tuberculosis
 - c. Dementia
2. Why may temperatures of 99°F or higher not occur when older residents have an infection?
 - a. Older adults become hypothermic with infections.
 - b. Depressed immune responses prevent normal response to infection.
 - c. Normal body temperatures are often lower in older adults; thus, temperatures of 99 could indicate fever.
 - d. All of the above.
3. What is the most common infection in nursing facilities?
 - a. Pneumonia
 - b. Influenza
 - c. MRSA
 - d. Urinary tract infection
4. Mr. James is newly admitted to your facility. Neither he nor his family knows if he has ever had a pneumococcal vaccine. What is the best action to take?
 - a. Ask the doctor to order antibiotics as a preventive measure.
 - b. Recommend the vaccine be given.
 - c. Administer the vaccine only if he shows signs of respiratory infection.
 - d. Do not give the vaccine if in doubt.
5. What usually causes tuberculosis in older residents?
 - a. Infection transferred from staff
 - b. Reactivation of an earlier infection
 - c. Poor nutritional status
 - d. Complications from other infections
6. What causes scabies?
 - a. Virus
 - b. Blood-borne pathogen
 - c. Mite
 - d. Any of the above
7. Which of the following would be a contraindication for administering an influenza vaccine?
 - a. Egg allergy
 - b. Febrile condition
 - c. History of Guillain-Barré syndrome
 - d. All of the above
8. What can initial symptoms of HIV infection resemble?
 - a. Gastroenteritis
 - b. Influenza
 - c. Septic arthritis
 - d. UTI
9. What causes most cases of UTI in females?
 - a. *Proteus*
 - b. *Staphylococcus aureus*
 - c. *Escherichia coli*
 - d. *Klebsiella*

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10. MRSA infections arose due to which of the following?

- a. The pathogen becoming resistant to the antibiotic used to treat it
- b. New strains of bacteria entering from foreign countries
- c. Reactivations of earlier infections
- d. Latent viruses within residents becoming active

Initial Knowledge Check Answers

1. c 2. b 3. c 4. b 5. d
6. b 7. c 8. b 9. b 10. a

Knowledge Check Answers

1. c 2. c 3. d 4. b 5. b
6. c 7. d 8. b 9. c 10. a

