

Infections in Older People

Objectives

When you complete this module you will be able to:

1. Explain how natural changes that occur with aging increase vulnerability to infection in older adults.
2. Identify common sources of infection in nursing homes.
3. Differentiate between asymptomatic and acute gastrointestinal and urinary infections.
4. Explain how to assess an older adult for infection.
5. List options for preventing and minimizing post-herpetic neuralgia.
6. Name the vaccines recommended for preventing infection in older adults and healthcare staff.

Introduction

A 73 year old woman is admitted for viral pneumonia. She is in stage three (severe) COPD and developed complications after two days of having influenza. This woman hoped to avoid falling sick by receiving both the pneumococcal and the yearly influenza vaccines. Despite using two or three different inhalers during this episode, her poor arterial blood gases in the ED necessitate admission for oxygen therapy and non-invasive positive pressure ventilation. She is started on Tamiflu® and given a broad-spectrum antibiotic to prevent secondary bacterial pneumonia. The anticipated hospital stay for this patient is at least six days.

An 80 year old, previously healthy man is wheeled into the ED. He is admitted for gastroenteritis. He presents with a low-grade fever, diarrhea, abdominal cramps and vomiting. While at a family reunion, the patient's entire family was exposed to salmonella in some food. The rest of the family is being treated on an outpatient basis for GI symptoms. This older man has symptoms of dehydration, electrolyte imbalance, and delirium. Since he has been unable to take his usual medications, he is now medically unstable. He is given intravenous fluid and electrolyte replacement and hooked up to cardiac monitoring.

An 82 year old man is admitted to the hospital to receive intravenous antibiotics for cellulitis of the left lower leg. He is a diabetic and has neuropathy manifesting as loss

of sensation in his feet and lower legs. He also has cataracts that impair his vision. This man lives alone. He is incapable of doing routine skin inspections on his own.

These cases involve infections among the geriatric population and bring up the following questions:

Is compliance with vaccine recommendations a waste of time?

Is diarrhea and vomiting always an emergency in an older person?

What isolation precautions are required for cellulitis?

Study of gerontology is important for all nurses simply because so many patients are older people, those over 65 years of age. The life expectancy at the turn of the century was 73 for males and 79 for females.¹ From 2004 to 2030, the number of those over 65 is expected to jump from 36.3 million to 70 million, practically doubling.^{2;3} About two-thirds of these people will be challenged by compromised health and functional limitations.²

Statisticians project that there will be a lack of geriatricians to serve the needs of this elderly population in the coming years. At present, there is only one geriatrician per 5,000 older people.^{4;5} However, there are several strategies in place to fill the need:

- Academic geriatricians have developed core principles that are being integrated into other disciplines and specialties.
- Researchers are developing a separate group of assessment tools and parameters that apply to older people.
- The American Nurses Association offers gerontological nurse certification.
- The National Institute on Aging collaborates and shares research findings on senescence, the progressive deterioration of body systems associated with aging.⁶
- Educators have clarified the task by defining healthcare goals for older people to be:
 - 1) Management of overlapping chronic conditions and diseases.
 - 2) Balancing of risks and benefits of treatment options.
 - 3) Measurement of success in terms of quality of life.^{3;4}

Infectious diseases are the cause of death in a third of people 65 years of age and older.⁷ This course weaves knowledge from gerontology and immunology into an overview of common infections in older people. It draws practical applications for nursing care that will be useful in a variety of settings.

The Immune Status of Older People

Our understanding of immunology is rapidly changing and expanding. In the past, this specialty applied mainly to desensitization of allergies and to immunization against infectious diseases. Today, we apply immunological research findings to cancer, autoimmunity and aging as well. The immune system is complex and works in a network with the brain, the nervous system, the endocrine glands, and individual psychology. The immune system is capable of working in a variety of ways. It has plasticity. Researchers have identified redundant and compensatory capabilities that are used in response to problems that come from assault, infection, cancer and aging.

Types of immunity relevant to this course on infections are:

- Acquired active immunity: The buildup of antibodies (either cell-mediated or humoral) that results from responding to an infection or an immunization.
- Acquired passive immunity: the administration of pre-existing antibodies within a serum derived from an outside source.

Aging occurs through changes in two key systems: the endocrine system and the immune system. It proceeds differently in different individuals according to which organs wear out the fastest and how chronic diseases such as diabetes and cardiovascular disease accelerate deterioration.^{1; 8} Aging is characterized by a decline in general vitality, a reduction in functional reserve, and the decreasing ability to respond to stressors.⁹ This alters the processes of inflammation and wound healing. It also alters how older people present clinically with illness and respond to treatments.^{8; 9}

Researchers document that older people benefit less from immunizations than younger people do.⁸ The reason for this is thymus involution that affects both cell-mediated and humoral immunity.^{6; 10} When the thymus shrinks with normal aging, it continues to produce the same number of T cells but they function differently than before.^{11; 12; 13; 14} The ratio between types of T cells changes. Fewer naïve T cells are available to respond to new antigens, and memory T cells from past and chronic antigens dominate the immune system's capacity. Consequently, older people become vulnerable to a host of problems:

- They become at greater risk for infection and malignancies.
- They experience reactivation of diseases such as shingles and tuberculosis.
- They develop autoimmune and cardiovascular diseases.
- They have slower tissue healing which makes them increasingly vulnerable to infection.

Other bodily changes that contribute to the vulnerability of older people to infection are:

- A breakdown of epithelial barriers opens them to skin and respiratory infections. Their skin becomes thin and easily traumatized.
- The cough reflex is diminished, increasing the risk of choking and aspiration. They are less able to clear out mucus because their respiratory muscles have weakened.
- Gastric acidity is reduced. Gastrointestinal motility slows down.
- Sensation, balance and gait are altered, putting older people at greater risk for accidents and falls.
- A decrease in bladder elasticity and prostatic hypertrophy, in the cases of men, result in less effective emptying of the bladder. This allows for bacterial colonization.
- Arterial and capillary blood flow reduction alters tissue hydration and nourishment. Edema becomes a frequent problem.^{8; 10; 11; 12; 15}

Nosocomial Infections

The population of older people, those over 65 years of age, makes up 60% of hospital patients, 90% of nursing home patients, and 80% of home care patients.⁶ These people are unavoidably exposed to infectious agents because of the settings they are in.

Infection plays a major role in the downward spiral of functional impairment and heightened vulnerability for the nearly two million Americans who reside in nursing homes.¹⁶ Nosocomial infections, those acquired due to residence in a healthcare facility, occur in one out of ten people over the age of seventy. These people average one to two infections per year.¹⁷ Furthermore, infection is the most likely reason for a resident to be transferred from a nursing home to an acute care hospital.¹²

Factors that contribute to the prevalence of nosocomial infections are:

- Debilitation/functional impairment and immobility.
One of the worst fears among elders is breaking a hip and being confined to bed. Immobility is often the beginning of the end of life.
- Impaired mental status.
Dementia, delirium and cognitive impairment are responsible for patients wandering and exposing others to infection. Patients may be noncompliant with infection control practices such as handwashing and covering sneezes. They may fiddle with their catheters and contaminate their hands on a consistent basis, unwittingly contaminating everything in their vicinity.
- Chronic oral infections and dry mouth.
The causes for this are many: chronic and acute diseases, radiation, chemotherapy, other medications such as anticholinergics, diabetes, dehydration, dental disease and lack of oral hygiene.
- Immunodeficiency.
This may be due to chemotherapy, radiation, steroid medications, stress, or malnutrition. HIV is an under-diagnosed and under-treated phenomenon in older people.⁶ Ten percent of people with AIDS are over 50 years old.^{11; 12} A weakened immune system allows reactivation of tuberculosis, herpes, cytomegalovirus, varicella zoster and other infectious agents.¹⁵
- Implants and invasive devices.
The risk of infection is greatly increased with the presence of intravenous lines, cardiac devices, orthopedic replacement parts, feeding tubes, urinary catheters, and dentures. A biofilm develops around these materials. It supports the growth of communities of bacteria that become resistant to antibodies.
- Use and abuse of antibiotics. Eight percent of nursing home patients receive systemic antibiotics.¹²
- Infection control practices are often compromised to balance psychosocial needs of nursing home residents.¹⁶
- Residents in congregate living situations are unavoidably exposed to viral infections. People living or working in the facility may be unknowingly infectious for one to two hours before symptoms of colds and influenza manifest.¹²

The Most Common Infections in Older People

Infections can occur in any tissue, including the lining of the heart, the blood vessels, or the joints. However, the major infections among older people are, in the order of their prevalence:

- Respiratory infections, particularly pneumonia and tuberculosis.
- Urinary infections, the most common cause of bacteremia and sepsis.
- Skin and soft tissue infections, ie. cellulitis, decubitus ulcers, and postoperative wound infections.
- Acute diverticulitis and cholecystitis. ^{7; 10; 12; 19}

Due to the conditions of congregate living in long-term care facilities, older people are also subjected to epidemics of:

- Colds and flus.
- Gastroenteritis.
- Scabies.
- Conjunctivitis.
- Hepatitis.

Many infectious agents can be responsible for these outbreaks. ^{16; 20}

Of particular significance are:

- Viral agents: Influenza A & B, parainfluenza, respiratory syncytial virus (RSV), rhinovirus, adenovirus, and norovirus.
- Bacterial agents: Salmonella, escherichia coli, mycobacterium tuberculosis, group A streptococcus, pertussis, streptococcus pneumoniae, and clostridium difficile.
- Parasitic agent: scabies.

Respiratory tract infections

Upper respiratory infections occur regularly in older people, more often in those residing in nursing homes. Almost everyone has at least one upper respiratory infection per year. Most are due to influenza or RSV. The primary concern is the threat of complicating pneumonia. It may be difficult to distinguish influenza from RSV at first although RSV is more likely to present with a profuse, watery nasal discharge and wheezing.²¹

The symptoms of influenza in older people are similar to those in younger people. However, there is this exception: a weak or absent febrile response occurs in one out of three elders.²¹ Also, older people frequently experience a post-viral syndrome involving persistent weakness that can last for many weeks.⁷ This makes it difficult for them to walk and resume their normal physical activities.

Classic influenza symptoms are:

- Facial flushing and hot, moist skin.
- Abrupt onset of fatigue, discomfort, muscular aches, fever and headache.
- Sore throat, nonproductive cough, and watery discharge from the eyes and nose.

The primary concern about influenza is the threat of complicating pneumonia. Compared to those in their twenties, older people have ten times the occurrence of pneumonia.¹² It is one of the leading causes of death in elders and the most common hospital-acquired infection.^{10; 12} Susceptibility to pneumonia is directly correlated with the degree of functional impairment accompanying acute illness.

Specific infectious agents involved in pneumonia are:

- Streptococcus pneumonia is estimated to cause up to 2/3 of community-acquired pneumonia.
- Gram-negative bacilli, haemophilus influenza, and staphylococcus aureus cause the majority of hospital-acquired pneumonia.^{7; 12; 15}

Typical symptoms of pneumonia are:

- General deterioration and marked fatigue.
- Productive cough.
- Chest pain.
- Fever.

Older people hospitalized for influenza may be given antiviral medication despite the general recommendation that these drugs only be started within the first 48 hours of symptoms.^{7; 21} An exception is made when tests show up antigen positive for influenza and the patient has a significant viral load. Antiviral medication is also given to shorten the duration and lessen complications of the illness in high risk patients.⁶ Antiviral medication may be given out as a prophylactic measure to contain a facility outbreak when over 10% of the residents are ill or the strain of influenza is identified as a new mutation.¹²

Antiviral medications have side effects that have to be considered. The frequency of dosing may be adjusted according to creatinine clearance in renal impaired patients.⁷ Since 2005, the CDC recommends that amantadine and rimantadine no longer be used because of severe central nervous system effects of nervousness, agitation, hallucinations and seizures.²¹ Antiviral medications that are still in use are:

- Zanamivir (Relenza®) that may cause bronchospasm.

- Oseltamivir (Tamiflu®) that may cause nausea and vomiting.²¹

Aside from antiviral medication, pneumonia treatment targets specific bacterial causes or provides protective broad-spectrum coverage against secondary infection associated with viral pneumonia.⁷

Tuberculosis is most prevalent among older people, with the exception of people with HIV.⁶ Ninety percent of those over 80 years of age were exposed to tuberculosis as young adults. They carry dormant bacteria that may not have been effectively treated in the past.^{6; 12} Increased vulnerability associated with aging allows for both reactivation of dormant infections and lowered resistance to initial/primary TB infection.

Symptoms of tuberculosis are:

- Coughing up of frothy, bright red blood.
- Fever and night sweats.
- An x-ray finding of fluid in the thoracic cavity.

Active cases of tuberculosis in older people are treated with several antibiotics, usually in combination, for six to twelve months.⁶ These drugs may include antitubercotics such as isoniazid and rifampin, along with aminoglycosides such as streptomycin or amikacin.

Urinary tract infections

Older people frequently have urinary tract infections because of the difficulty they have in emptying their bladders. Prostatic obstructions, vaginal atrophy, and changes in vaginal pH contribute to this. Approximately 30% of older women and 23% of older men have bacteriuria.^{6; 12; 22} The prevalence increases with age and the presence of a urinary catheter. One hundred percent of people who have a catheter in place for over a month have bacteriuria.⁶

The diagnosis of an acute urinary tract infection is made when three criteria are met:

- Bacteriuria indicated by a laboratory result of $\geq 10^5$ cfu/ml of a single pathogen.
- Pyuria indicated by a laboratory result of ≥ 10 WBCs/hpf.
- The presentation of some of these clinical symptoms:

Cloudy or malodorous urine.
Hematuria.

New or increased dysuria, ie. burning on urination, frequency, and/or urgency.

Flank or suprapubic tenderness. ^{7; 12; 23; 24}

Bacterial colonization in the bladder is common among older people but it is usually an asymptomatic phenomenon. Antibiotics are not advised because research shows they are not effective in correcting the condition.²² However, a quarter of older people with bacteriuria present with symptoms of acute urinary tract infection and require treatment. Other people who require treatment are those having genitourinary procedures for obstruction or stones, and those with a history of recurring symptomatic urinary infections.⁷ The antibiotics target specific organisms. E. coli is the agent usually identified although proteus, klebsiella, pseudomonas and enterococci are agents commonly found also.^{12; 15} In those with urinary catheters, polymicrobial agents are usually found and broad-spectrum antibiotics are used for treatment.²²

Skin and soft tissue infections

The most common of the skin and soft tissue infections occurring in older people are:

- Cellulitis.

Cellulitis is an acute inflammation of the connective tissue caused by a gram-positive bacterial infection: staphylococcus, streptococcus, or other bacteria. It usually occurs on the lower legs, arms, or hands, but can involve the face.

Both cellulitis and erysipelas are caused by the same group of bacteria and affect similar parts of the body. Cellulitis involves subcutaneous fat and has an orange peel appearance. Erysipelas involves the dermis and looks sharply demarcated.²⁵ These infections create a localized skin redness and warmth that slowly spreads, giving a tight, glossy appearance. Left untreated, cellulitis can progress to meningitis, lymphangitis, sepsis, and gangrene requiring amputation.²⁶

Antibiotics such as penicillins or cephalosporins are given intravenously for at least 10 to 14 days, and longer if leg ulcers or pressure sores are involved.^{25; 26} In a case of necrotizing fasciitis, a mixture of several antibiotics is given in addition to swift, deep debridement of necrotic tissue.²⁵

- Infections in body folds.

These infections can be caused by bacteria such as strep or staph, or fungus, particularly candida. They tend to be chronic. They are caused by

skin on skin friction, usually in the groin, under the arms, or beneath the breasts. Obesity and excessive perspiration put people at risk for these.

These infections are treated with either or both topical and oral drugs. Erythromycin, clindamycin, and fluconazole are frequently prescribed.²⁵

- Shingles.

Shingles occurs in approximately 1% of older people due to the decline in cellular immunity that naturally occurs with aging.⁷ The herpes zoster virus responsible for chickenpox becomes reactivated after lying dormant for decades.

Patients first notice abnormal sensations such as tingling, numbness, or burning on one side of their trunk and in a line. Though rare, two subtypes also occur. One affects the face and can leave deafness. The other involves internal organs.²⁵ Within a few days shingles creates a cluster of vesicles embedded in a rash. Plaques develop that turn into pustules. The shingles are infectious for up to two or three weeks, until crusted over.^{25; 27} Shingles is not contagious in that it can cause shingles in another person, but it can cause chickenpox in people who have had neither the disease nor the chickenpox vaccine before.²⁸

Shingles causes nerve damage and demyelination.²⁷ This causes pain that gradually disappears within three months in most cases. However, post-herpetic neuralgia (PHN), pain persisting over a year, affects 20 to 50% of people with shingles.^{7; 12; 29}

The standard treatment for shingle is an antiviral begun within 72 hours after the rash appears.^{7; 18; 25} Acyclovir, valacyclovir, or famciclovir shorten the duration of both shingles and PHN. However, the dosage may need adjustment for older adults with renal impairment. Corticosteroids are sometimes given along with the antiviral to reduce pain but they do not affect the development of PHN.^{7; 18}

Treatment of PHN may require experimentation. These are some of the options reputed to be effective for older people:

Antiepileptics.

Gabapentin (Neurontin®)

Pregabalin (Lyrica®)

Both of these have adverse effects of somnolence and dizziness but the effects wear off within two weeks after discontinuing.

Opioid analgesics.

Oxycodone (OxyContin®)

Tramadol (Ultram®)

Adverse effects may be exaggerated in elders: nausea, constipation, sedation, dizziness, and cognitive impairment.

Topical lidocaine: 5% patch.

This provides partial analgesia without anesthesia. However, it is not to be used on the face and may cause local skin irritation.

Capsaicin cream or lotion.

This stimulates release of substance P that creates analgesia and is 93% effective. Patients complain of an initial burning sensation though.

Transcutaneous electrical nerve stimulation (TENS) or implanted nerve stimulation devices.

18; 25; 29

- Onychomycosis.

Onychomycosis is a fungal nail infection, usually of the toenails, that may predispose a person to cellulitis because of cracks between the toes that allow bacteria to invade.²⁶ It appears as a nail disfigurement. The thickened nail plate is separated from the nail bed and has a yellowish brown color.

Onychomycosis is treated for three to six months with an oral antifungal such as terbinafine (Lamisil®) or itraconazole (Sporanox®) along with a topical urea gel or cream to enhance penetration of a topical antifungal.²⁵

Gastrointestinal infections

Diarrhea may be caused by outbreaks in nursing homes due to ineffective containment of bacteria, viruses or parasites. It may be a result of clostridium difficile which elders are at particularly high risk for developing in association with frequent or long-term use of antibiotics.^{12; 30; 31} The C. difficile bacteria create a pseudomembranous colitis. In recent years, overuse of antibiotics has resulted in the emergence of a resistant strain of C. difficile called NAP1. This mutation results in a much more toxic form of C. difficile, one that can lead to septicemia and death.³¹

Active C difficile infections usually resolve within a few days after discontinuing the offending antibiotic.⁶ Vancomycin (Vancocin®) or metronidazole (Flagyl®) is then given orally or intravenously with the dose adjusted according to renal function tests. Other antibiotics such as linezolid (Zyvox®) are given if vancomycin-resistant enterococcus is identified.^{6; 7} Further laboratory testing after this treatment is not recommended since many patients will continue to be colonized without having symptoms.⁶

Chronic infections

Weakened immunity and frailty put older people at risk for more than new infections and reactivation of dormant ones. It also means they are apt to harbor chronic infections. Some examples of these are:

- The mouths and throats of half of frail elders are colonized with aerobic gram-negative bacteria.¹⁰
- A quarter to a third of older people have bacteria colonized in their bladders.^{6; 10; 12; 22}

- The GI tracts of many older people are colonized with *C. difficile*:
7% of healthy elders
9% of nursing home residents who are not on antibiotics
16-56% of hospitalized elders.¹²
- Eighty-seven percent of women over 70 years of age harbor cytomegalovirus (CMV) that reactivates and replicates with inflammatory triggers.³²
- There is a high rate of chronic hepatitis C among older people. This ties into the prevalence of liver disease among older people who have HIV.³³
- Chronic or recurrent onychomycosis affects 18% of older people.²⁵

Antiviral medications are not recommended for older adults with asymptomatic chronic viral infections such as cytomegalovirus.³² Exercise and possibly mineral and nutritional supplementation are considered safer interventions.^{33; 34}

Finding and Assessing Infections

Infection is often masked in older people because of the interplay between multiple chronic conditions and the necessity of poly-pharmacy. Inflammatory processes due to autoimmunity and the likelihood of dehydration make differential diagnoses challenging.^{6; 12} There are few diseases in the elderly that have a primary immunological cause. Laboratory testing for immune function are seldom done for elders because the results and interpretation are unclear.¹⁰ However, standard tests are usually done to confirm the diagnosis when infection is suspected. These tests include:

- Blood cultures.
- CBC.
- Urinalysis with culture.
- Chest x-ray.
- Renal function tests.
- Stool tests for antigens and toxins.
- Stool cultures.
- The 2-step Mantoux TB skin test. ^{6; 7; 30}

This course emphasizes the point that infection in older people requires a different set of markers and parameters than used with younger people. Specific symptoms ordinarily used to identify infections in younger people may be muted in an older person. Systemic symptoms of a localized infection may be exaggerated. These show up as:

- Changes in functional ability.

Some aspects of a functional decline may be subtle or inconsistent. They may not be noticed by the individual but are noticed by those around the person. Sometimes a fall or other accident is the signal. Weakness, fatigue, dizziness and hypotension are then spotted. The patient's appetite may have waned, leading to gradual weight loss. The elder may have a faster heart or respiratory rate, or complain of being chilled frequently.^{7; 10; 12} Infection always exacerbates underlying chronic diseases such as congestive heart failure or chronic obstructive pulmonary disease.²¹

- Changes in mental status.

Cognitive impairment or acute confusion/delirium may be the first sign of infection in an older person. One out of two elders present this symptom of infection.⁷ In those with dementia, infection may trigger confusion that is not communicated by the person but observed by others. In these cases, physical symptoms of infection may not be verbalized either, making it doubly important for others to monitor behavior changes.¹²

- Urinary incontinence.

Urinary incontinence may be the first indicator of infection and may or may not be due to an acute urinary tract infection. However, routine screening for urinary tract infection is not recommended, even in catheterized or diabetic patients.²² Patients are tested prior to transurethral resection though, in order to determine appropriate antimicrobial treatment.

- Fever.

It is estimated that up to a third of older people have a diminished febrile response to infection.¹² The guidelines on interpreting temperature as an indicator of infection point to a 2° F deviation from the individual's baseline.^{6; 7; 10; 12} This baseline is usually 1° F lower than it is in younger people. If an older person spikes a fever over 101° F, this signals a life-threatening crisis.⁷

Preventing Infections

Nurses can best prevent and control infections in older adults by:

- Handwashing.
- Screening for specific infections.
- Using isolation precautions for suspected and confirmed infections.
- Incorporating measures that prevent infections into routine care.
- Advocating for and complying with immunizations guidelines.^{7; 12; 20; 25}

Screening is done upon admission of patients to a healthcare facility, on transfer from a nursing home to a hospital, and when a reservoir of infection needs to be found.

Screening is done on the patient, the patient's family and/or caregiver, and staff members for:

- Tuberculosis:
The two-step Mantoux skin test is done on admission and then every one to two years.¹²
- Methicillin-resistant staphylococcus aureus (MRSA):
A nasopharyngeal or skin wound swabbing identifies carriers. If positive, topical mupirocin is applied for two weeks to decrease shedding.^{7, 25}

Isolation precautions will change as infection is confirmed or ruled out, and as a disease progresses through phases. Sometimes the extent of manifestation determines the types of isolation required. There are four types of isolation precautions. More than one type may be needed at any time.^{16; 30}

1) Standard precautions.

This was previously known as universal precautions. It applies to the handling of blood, body fluids, and broken/cracked skin or mucous membranes. Use gloves, gowns, and face shields. Some of the infectious conditions that require standard precautions are:

Bacterial conjunctivitis
Candidiasis
Cellulitis
Colonization with multidrug resistant organisms
Cytomegalovirus
Gangrene
Gastroenteritis (most kinds)
Hepatitis
HIV
Minor bacterial infections of skin, wounds, or burns
Pneumonia
Urinary tract infections
Tuberculosis in an inactive phase.

2) Airborne precautions.

Use these measures if infectious particles are smaller than five microns. Put patients in private rooms with the door closed. Set up special ventilation and use masks. Take airborne precautions for these conditions:

Active tuberculosis with draining lesions.
Wide-spread shingles with open lesions.

3) Droplet precautions.

Use these measures when infectious particles are larger than five microns. Give patients private rooms. They may leave the door open. Wear a mask if coming within three feet of the patient. Take droplet precautions for:

- Influenza
- Rhinovirus
- Pertussis
- Adenovirus pneumonia.
- Mycoplasma pneumonia.

4) Contact precautions.

Use these measures to prevent transfer of infectious organisms draining from the respiratory system, gastrointestinal tract, skin, or wounds. Put patients in private rooms. Wear a gown. Take contact precautions for these conditions:

- Acute gastroenteritis (diarrhea from *C. difficile* or rotavirus)
- Viral conjunctivitis
- Shingles with open lesions
- Impetigo
- Active tuberculosis
- Symptomatic infection with MRSA
- Major bacterial infection of skin, pressure ulcers, wounds, or burns
- Respiratory syncytial virus (RSV)
- Scabies

Nurses have an opportunity to prevent infections in their routine patient care. Feet, mouth and skin are open to daily inspection during bathing and hygiene time. This is an ideal time for patient and family education regarding topics such as footwear, skin lotions, and denture appliances.

Oral inspection and hygiene may be difficult, especially if the patient is functionally dependent and/or cognitively impaired. Some patients refuse to open their mouths. They may have candidiasis, painful gums, mouth ulcers, or broken teeth.

An evidence-based resource on how to manage a variety of specific oral hygiene problems is available from the University of Iowa Gerontological Nursing Interventions Research Center @ <http://www.guidelines.gov>.³⁵

Immunization of older people has limited success in preventing infectious disease. However, it is highly recommended that older people receive the recommended immunizations because they are effective in preventing complications such as pneumonia, bacteremia, and post-herpetic neuralgia.^{7; 11; 21; 36; 38}

Some vaccines may still be given despite cautions and contraindications but, in general, these are conditions that require further guidance and special administration:

- Previous anaphylactic reactions to a vaccine or any of its components.
- Moderate to severe illness of any kind.
- Acute and chronic skin conditions.
- Immunosuppression.
- Blood disorders.³⁸

Recommended Vaccines

<u>Vaccine</u>	<u>Older People</u>	<u>Staff</u>
Yearly influenza	X Trivalent inactivated vaccine only	X
Shingles (Zostavax®) This can be given at the same time the influenza and pneumococcal vaccines are given. People with prior episodes of shingles can lower their risk of recurrence by receiving this vaccine.	X	
Hepatitis A & B	X Optional, depending on risk of exposure.	X
Pneumococcal	X	
Tetanus-diphtheria-pertussis	X TD booster	X Tdap

28; 36; 39

Conclusion

Nurses strive to maintain the highest quality of life for their older patients. This is measured in the functional abilities of their patients and in the patients' satisfaction with their lives. Infections are both a cause and a consequence of declining capacity. They go hand in hand with diminishing quality of life.

The practice of gerontological nursing necessitates a different set of goals than those set for the population as a whole. In the context of infectious disease, for example, total eradication of common and chronic infections is an unrealistic goal given the immune status of elders. However, preventing and reducing complications is an achievable goal.

Nursing care planned with this goal in mind will adjust assessments to reflect changes occurring with natural aging. It will incorporate patient education that emphasizes the importance of chronic disease management. It will include advocacy for measures known to lower risk factors. It will adjust anti-infective medications to compensate for renal impairment. It will promote the preventive application of vaccinations known to be effective and appropriate for the vulnerable elderly population.

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