AMDA Clinical Practice Guideline:

Managing Common Infections in the Assisted Living Setting

Infections are a significant source of illness and even death in assisted living facilities. It is estimated that between 1.6 million and 3.8 million infections occur annually among residents of long term care facilities including ALFs. Furthermore, infections account for up to half of all resident transfers from long term care facilities to hospitals; and they result in an estimated 150,000 to 300,000 hospital admissions annually.

Even when infections don't require residents to be transferred to the hospital, these illnesses still are dangerous and costly. The cost of antibiotic therapy alone in long term care facilities ranges from $38 million to $137 million annually. And outbreaks are always a concern. In fact, outbreaks of infectious diseases are common in long term care and other communal living settings.

Infectious diseases are particularly dangerous for elderly individuals, many of whom already are frail and have comorbid conditions such as lung or heart disease. Older adults residing in ALFs are particularly prone to developing infection because of factors that result in impaired immune defenses and in increased risk of exposure to microbes (see Table 1). In such settings, infections can be acquired through endogenous (within the body) or exogenous (outside the body) sources. Indwelling devices, such as intravenous lines and urinary catheters, are common causes of infections. Exogenous infections usually are transmitted by direct contact (eg, by hands), although airborne and other forms of transmission also may occur. Poor hygiene (eg, oral) also can be a source of infection.

This guideline focuses on the four most common types of infections in long term care settings: urinary tract, respiratory, gastrointestinal, and skin infections.

Recognition

Because frail elderly residents are at above-average risk of death and complications from infectious diseases, prompt recognition, assessment, and treatment of infections are imperative.

Step 1. Does the resident have a change of condition that suggests the presence of an infection? Infection

Table 1.
Susceptibility Factors for Infection Among Older Adults Residing in Long Term Care Facilities

Factors that result in impaired host defenses

- Age-related decline in immune function
- Comorbidities (eg, cancer, diabetes)
- Protein-energy malnutrition and volume depletion
- Peripheral vascular disease
- Medication use (eg, antibiotics, chemotherapy, steroids)
- Poor skin condition or impaired skin integrity
- Kidney stones and impaired bladder emptying (eg, benign prostatic hyperplasia)

Factors that result in increased risk of exposure to microbes

- Inability to follow appropriate
- Swallowing problems
- Use of indwelling devices,
- Low rate of immunization
- Inadequate staff handwashing
- Recent hospitalization
- Infectious conditions among respiratory infections

Table 2.
Condition Changes That May Indicate the Presence of Infection

Condition Changes That May Indicate the Presence of Infection

- Change in
  - Ability to perform activities of daily living
  - Intake of food or fluids
  - Mental status (eg, increasing confusion or lethargy)
  - Physical appearance
  - Skin temperature, color
  - Sleep pattern
  - Urine characteristics
  - Vital signs
  - Wound characteristics (eg, erythema, pus)
- Dizziness
- Puffy, red eyes; excessive tearing
- Fall or deterioration in balance or gait
- Fever or hypothermia
- Generalized pain
- Increased coughing, shortness of breath, lung sounds
- New onset of diarrhea or incontinence
- Sore throat
- Suprapubic or flank pain

may present with localized symptoms or with generalized, nonspecific ones. Table 2 lists condition changes that may indicate infection in an ALF resident.

Caregivers and/or family members who assist and/or spend time with residents should be encouraged to promptly notify the duty nurse of any condition change that is suggestive of infection. The nurse, in turn, should assess the problem in a timely fashion. This initial assessment may depend on the specificity of the observations or symptoms that suggest the presence of infection. For example, if the resident complains of painful urination, it is reasonable to consider a possible urinary tract infection.

Before contacting the resident's primary care physician, the nurse should gather relevant information such as vital signs and medications. The nurse should be prepared to describe the resident's symptoms and signs as accurately and completely as possible.

It is important to note that as many as one-third of elderly residents with acute infections may present without a robust febrile response. Basal body temperature in the frail elderly may not be the so-called "normal" value of 98.6° F (37° C). Therefore, absence of a fever should not be considered an adequate reason to rule out the presence of infection in the ALF if other indicators are present. Acute infection should be considered a possibility whenever a frail, elderly resident experiences an acute change in condition, regardless of whether a fever is present.

Methods for taking a resident's temperature should be individualized. It is not easy to obtain an accurate temperature in a frail elderly resident, and no single means will work in all residents. Taking an oral temperature may not be feasible in residents who have dementia or are otherwise unable to hold the thermometer in the mouth for the required time period. Axillary temperature often is inaccurate.

Some evidence suggests that rectal temperature may be more accurate than either the oral or axillary method in ALF residents. Some individuals, however, may be unwilling or unable to cooperate with this method; and it is not advised in residents who have suspected or confirmed diarrhea.

It also is important to note here that just as infection may be present in the frail elderly without a fever, the presence of a fever does not always indicate infection.

Step 2. Is the resident at risk for

developing an infection? Table 3 lists several common risk factors for infection in the long term care setting.

Step 3. Perform a history and physical examination and order appropriate laboratory tests. Appropriate clinical evaluation, including diagnostic testing, should be done promptly in all residents with suspected symptomatic infection, unless an advance directive or the expressed wishes of a resident or family member explicitly limits such interventions.

Table 4 lists suggested elements of the diagnostic workup for the most common categories of infection in the ALF or other long term care setting. Note that additional laboratory tests may be more appropriate for outbreaks of infection than for isolated cases.

Step 4. Assess whether the resident's condition warrants transfer to a hospital. Avoid hospitalization of ALF residents to the extent possible. In addition to cost considerations, residents generally benefit from treatment in familiar surroundings. Among the elderly, hospitalization can increase discomfort and confusion. Hospitalization also is associated with an increased risk of deconditioning, pressure ulcers, and colonization with resistant organisms.

Transfer to a hospital may be appropriate—if it is consistent with the resident's advance directive—when any of the following condition exists:

- The resident is clinically unstable, and the resident or family desires aggressive intervention.
- Critical diagnostic tests are not available in the facility or on an outpatient basis.
- The scope or intensity of the required treatment is beyond the facility's capacity.
- Specific control measures are not available in the facility.

Step 5. Assess whether the resident's condition warrants implementation of heightened infection control precautions. The U.S. Centers for Disease Control and Prevention (CDC) recommends applying a two-tiered system of infection precautions, as follows:

- Standard precautions should be applied to all residents. They are designed to reduce the risk of transmission of infectious agents in moist body secretions. Standard precautions emphasize handwashing, gloves (when touching body fluids), masks, eye protection, and gowns (when splashing of body fluids is likely) as well as avoidance of needlesticks and other sharps injuries.
- Transmission-based precautions should be used for residents with documented or suspected transmissible infectious diseases. Transmission-based precautions include the following elements:
  - Precautions for airborne infections (eg, varicella, tuberculosis)
  - Precautions for infections that spread by droplets (eg, influenza, streptococcal pneumonia)
  - Precautions for infections that spread by person-to-person contact (eg, MRSA, *Salmonella* diarrhea)

While the CDEC guideline was developed for hospitals, some of its recommendations are applicable to ALFs as well.

Isolation of residents with infections is problematic in most ALFs, where social interaction and independent and free mobility are common. In fact, isolation may not be practical; and it may even have negative social implications. Strict adherence to hygiene practices and the use of gloves in the presence of infectious secretions often can prevent the need for isolation. Residents who have poor hygiene practices or who are coughing uncontrollably may need to be isolated to prevent transmission of the infection to other residents, facility staff, and visitors. Each ALF should adapt the aspects of the CDC isolation system that apply to its own needs.

Residents with symptomatic *C. difficile* colitis may be managed without isolation, provided that

Table 3.
Common Risk Factors for Infections in the ALF or Other Long Term Care Setting

Common risk factors for infection in the long term care setting can be identified using the mnemonic SICK.

Skin (eg, impaired skin condition or integrity)

Iatrogenic (eg, antibiotics, chemotherapy, feeding tubes, steroids, urinary catheters, venous lines)

Comorbid conditions (eg, chronic obstructive pulmonary disease [COPD], diabetes, malnutrition, neoplasm, swallowing problems)

Kidney stones, dehydration, enlarged prostate

Avoid hospitalization of ALF residents to the extent possible. In addition to cost considerations, residents generally benefit from treatment in familiar surroundings.

Table 4.
Suggested Options for the Evaluation of the Most Common Categories of Infections in the ALF or Other Long Term Care Setting

Category of Suspected Infection	Symptoms	Physical Examination	Diagnostics Tests*	Chart/History
Gastrointestinal	Inquire about nausea, vomiting, abdominal pain, diarrhea, and loss of appetite Suspect infectious colitis, including possible *C. difficile* toxin, if patient has received antibiotics within past 30 days and has 3 or more watery or unformed stools within 24 hours, with or without abdominal pain**	Hydration status Abdominal tenderness Bowel sounds Occult blood in stool Rectal examination	*C. difficile* toxin assay Stool culture for enteric pathogens (eg, *Salmonella, Shigella*) Stool tests for occult blood, ova, and parasites if diarrhea persists Optional: Stool analysis for leukocytes Abdominal X-ray to rule out noninfectious causes	Antibiotic use Use of laxatives or other medications with laxative effects History of use of medications that affect intestinal flora (eg, H2 blockers) Other concurrent cases in the facility Food history Food intolerances Increased residual volume of tube feeding Prior bowel pattern
Respiratory	Labored breathing Elevated respiratory rate Congestion Productive cough	Respiratory rate and pattern Change in lung sounds Use of accessory muscles to breathe (labored breathing)	Chest X-ray Pulse oximetry (if possible) Sputum gram stain, sputum culture (optional; must be performed by appropriately trained staff)	Chronic aspiration Prior pneumonia Immunocompromised History of COPD, asthma, tuberculosis (TB) History of travel (eg, to rule out severe acute respiratory syndrome [SARS]) Recent chest X-ray results
Skin	Warm, cold, red, tender skin Rash Drainage Pain Other concurrent cases (scabies)	Changes in color, temperature, integrity, purulent drainage, or odor Streaking lymphangitis Staging for pressure Swelling Tenderness Induration	Skin scrapings for suspected scabies (if suspecton clinical grounds) Proper cultures (routine swabs and cultures are not helpful for chronic wounds) If bone is exposed or patient has a chronic nonhealing wound, rule out osteomyelitis	History of wounds, pressure ulcers, dermatitis, use of invasive devices (catheter, feeding tube, intravenous line)
Urinary tract	Frequency, urgency Dysuria Hesitancy Persistent malodorous Back pain Pyuria	Bladder distension Suprapubic tenderness Flank pain Males: Prostate, scrotum tenderness, abscess, swelling, pain	Urinalysis Urine culture and sensitivity if urinalysis is positive Assessment of post void residual volumes	Neurogenic bladder Urinary incontinence Prostatic hyperplasia Chronic bacterial prostatitis Surgery Prior catheter use Recurrent infections Kidney stones

*White blood cell count with differential, blood cultures, or both may be indicated if systemic infection is suspected.
**Bently, et al

they are continent, have a private bathroom, and are both cognitively able and willing to follow proper hygienic standards, including washing hands after using the toilet. Other gastrointestinal infections, such as *Salmonella* colitis or viral gastroenteritis, may require more stringent measures.

Treatment

Step 6. Treat the symptoms of infection. To the extent possible, treatment should be tailored to the resident's symptoms. For example, if the resident is dyspneic or hypoxic, it will be important to administer oxygen and treat as needed for wheezing or congestion. Provide supportive measures for the resident with a suspected or

confirmed infection. Comfort measures and interim treatment for a suspected infection may begin while assessment of the problem continues:

- Cover the resident with a blanket if he or she feels cold.
- If the resident is feverish, remove blankets or apply a cool cloth or ice packs to the forehead.
- Increase fluid intake, if feasible, to prevent volume depletion.

It is important to keep in mind that fever is the body's mechanism for fighting infection. As such, it may not always require treatment. Fever should be treated, however, if it is causing the resident discomfort, the resident is at risk for dehydration, and/or the resident shows signs of hemodynamic instability (eg, pulse rate greater than 100 BPM or hypotension).

When fever is present, administer a mild antifever medication (eg, acetaminophen) if a protocol or practitioner order exists. Check the resident's temperature within one hour of administering acetaminophen and every four to six hours thereafter. Encourage oral fluid intake or administer fluids parenterally to avoid dehydration. Strategies for increasing fluid intake include offering fluids at regular intervals; varying the types of fluids offered; and offering foods with a high fluid content, such as Jell-O and pudding.

Infection is associated with a catabolic state and anorexia, and infected residents may be at risk of weight loss. Carefully monitor the nutritional status of residents with infection, and initiate nutritional interventions (eg, increased food portions) without delay if indicated.

Manage the effects of the infection on the resident's comorbid conditions. For example, monitor blood glucose levels more frequently in residents with diabetes, and adjust the treatment regimen to account for the effects of infection.

Diarrhea in the ALF may be caused by viral gastroenteritis, medications, or antibiotic-related colitis—including C. difficile colitis. Monitor residents with diarrhea carefully for evidence of volume depletion and electrolyte imbalance. Limit the use of antidiarrheal medications to the extent possible because their use may prolong the duration of infection. Administering live yogurt culture by mouth may help to return bowel flora to normal.

Step 7. Prescribe appropriate antibiotic therapy. Treatment with antibiotics is appropriate when the resident's physician determines on the basis of an evaluation that the most likely cause of the resident's symptoms is a bacterial infection. Consider the resident's general condition, prognosis, advance directives, and expressed resident or family preferences when determining whether to proceed with antibiotic treatment. For specific viral or fungal infections, antiviral or antifungal agents may be warranted.

Fever should be treated if it is causing the resident discomfort, the resident is at risk for dehydration, and/or the resident shows signs of hemodynamic instability (eg, pulse rate greater than 100 BPM or hypotension).

It is important to individualize the choice of antibiotic. The following factors should be considered when selecting an antibiotic:

- The severity of the resident's illness and the stability of his or her condition
- The nature and location of the infection
- The resident's medical history and coexisting conditions
- The resident's known drug allergies, if any, and history of adverse drug reactions
- Prior culture and sensitivity data for the resident
- The risk of interactions with other medications that the resident is taking
- The facility's drug sensitivity profile.
- The drug's cost and availability on a formulary, if relevant
- The ease of administering the drug (eg, single daily dose versus multiple doses)

Elderly ALF residents are at increased risk of drug-related adverse effects because of the physiologic effects of aging on kidney and liver function, the presence of comorbid conditions, and the use of multiple medications. The use of antibiotics increases the risk for potentially harmful drug interactions in addition to the adverse effects associated with antibiotics themselves.

The antibiotic agent selected should:

- Be active against the most likely pathogens
- Have as narrow a spectrum as possible
- Achieve therapeutic concentrations at the site of infection
- Be well tolerated
- Have low toxicity
- Be the least expensive effective treatment options

Doses and dose intervals should consider the resident's weight and the reduced renal function present in elderly individuals. A duration of treatment that is appropriate to effectively treat the infection should be specified up front. For certain antibiotics, drug levels and renal function must be monitored periodically.

Antibiotics should not be used to treat viral illnesses such as colds, influenza, and viral gastroenteritis;

asymptomatic bacteriuria; or bacterial colonization without clinical signs of infection.

It is ethically acceptable not to offer antibiotic treatments to a resident who is receiving palliative care. However, an antibiotic may be prescribed to a palliative care resident who has a bacterial infection to relieve discomfort or to protect the health of others.

Monitoring

Step 8. Monitor the resident's progress. Caregiving staff should closely monitor each resident who is being treated for an infection. Nursing staff should advise caregivers about what to look for as they work with residents and when to report their observations—as well as any changes anticipated in the resident's care plan.

A nurse should evaluate the resident who has an infection at least once during every shift while the resident is unstable or significantly symptomatic. The nurse also should document relevant findings. The evaluation should include the resident's general condition and a comparison of actual progress with expected progress as noted in the original care plan.

The resident's physician should be notified promptly if the resident's condition worsens. Allow approximately three days for antibiotics to show effectiveness. If the resident's condition shows no improvement after that time and hospitalization is a relevant option, reconsider the treatment strategy and whether the resident should be transferred to the hospital.

Nurses and other appropriate staff should provide the resident's physician with enough detailed information to allow him or her to determine the resident's progress and identify possible complications. It is helpful if the physician is available to assess the resident in a timely fashion.

Caregiving staff should understand that symptoms and abnormal test results related to an infection do not necessarily resolve quickly. For example, a fever may persist for several days after appropriate treatment for infection is begun.

Step 9. Take appropriate steps to contain an identified outbreak of the infection. An outbreak has been defined as "the occurrence of more cases of a particular infection than is normally expected, the occurrence of an unusual organism, or the occurrence of unusual antibiotic resistance patterns." An outbreak may be suspected if three or more cases of the same infection are identified within 24 hours in the same unit or other defined area without an adequate explanation. For certain types of infections, however, such as tuberculosis or salmonella, even a single new case should trigger an evaluation for an outbreak.

Each state health department has its own definition of what constitutes an outbreak of infection in that state and its own requirements for how quickly facilities must respond to and report outbreaks. Facility staff must be familiar with their state's requirements and should obtain guidance on managing an outbreak from state public health officials at the earliest opportunity.

The goal of a coordinated approach to an infectious disease outbreak is to protect individuals and the public from undue exposure to infection while mitigating the impact on the quality of life of the people directly and indirectly affected by the outbreak. It is important to use antibiotics only for as long as needed to resolve symptomatic infections or control active risk to others. It is usually not necessary to try to eradicate organisms entirely.

Table 5 lists the steps involved in recognizing an outbreak. Table 6 lists the most common causes of infectious disease outbreaks in long term care facilities.

Step 10. Implement an immunization program for all facility residents. Influenza vaccine is advised yearly for all residents. Although vaccination is somewhat less effective in the elderly than in younger people, it has been estimated to reduce the risk of influenza-related

Table 5.
Steps Involved in Recognizing an Outbreak of Infectious Disease

1. Confirm the diagnosis in the index patient.
2. Develop a uniform case definition to be used in chart review and patient evaluation.
3. Using the case definition, perform a chart review and prospectively follow suspected new cases.
4. Plot an "epidemic" curve that includes a sufficient period before the index case to establish whether an outbreak truly exists.
5. Determine whether the outbreak is a "pseudo-outbreak" (i.e., positive lab results in the absence of clinical disease) that has been recognized as a result of a change in procedures or surveillance rather than a true increase in cases of the infection.
6. Review the relevant literature.
7. Inform appropriate administrative staff (e.g., director of nursing, all department heads, medical director, and attending practitioners) of isolation procedures, if required.
8. Seek assistance in managing the outbreak from the local health department, a local hospital, or the U.S. Centers for Disease Control and Prevention.

Table 6.
Most Common Causes of Infectious Disease Outbreaks in Long Term Care Facilities

Respiratory
- Influenza and influenza-like illnesses
- Other respiratory viruses (e.g., acute respiratory disease with or without fever)
- Tuberculosis

Gastrointestinal
- *C. difficile*
- Salmonellosis
- Viral gastroenteritis
- E. coli O157:H7 colitis

Other
- Scabies
- Conjunctivitis
- Group A streptococcal infections
- MRSA infections

hospitalizations and death in older people by up to 70%.

To increase the number of ALF residents who are vaccinated against influenza, the Centers for Medicare and Medicaid Services recommends that facilities use standing orders, with resident or caregiver consent, to administer annual flu vaccinations to current residents and new admissions during flu season. Facilities also may wish to consider engaging in community outreach by offering flu vaccine clinics for residents' families and other visitors to the ALF.

The 23-valent pneumococcal vaccine is recommended for all adults over 65 years old. It also is recommended for people at high risk for pneumococcal pneumonia, including those with diabetes and chronic cardiac, lung, and renal diseases. Residents who previously were vaccinated with the 14-valent vaccine should be revaccinated with the 23-valent one if they are age 65 or older or are at high risk.

The indications for revaccination with pneumococcal vaccine are controversial. The American College of Physicians recommends revaccination after six years for older residents who received pneumococcal vaccine before age 65; for high-risk residents with asplenia, nephritic syndrome, or renal failure; and for residents with renal transplants. Insufficient data are available currently about the value of revaccination every six years in health elderly people.

Recommendations for tetanus/diphtheria (Td) vaccination in older persons are the same as those for younger adults. More than half of tetanus cases occur in people aged 60 and older, and appropriate vaccination is 100% effective. All adults should complete a primary series of Td toxoid. If a resident had an incomplete series or has an uncertain history, the entire primary series should be given.

Step 11. Implement a facility-wide infection control program that conforms to federal and state regulations. Recommended components of an infection control program include the following:
- Surveillance for infections
- Hygiene practices to prevent transmission of infections
- Outbreak control procedures
- Resident health programs
- Employee health and education programs
- Monitoring of resident-care practices
- Monitoring of antibiotic use
- Reporting of diseases to public health authorities

Step 12. Monitor the management of infections in the facility. An effective infection control program should be based on an understanding of several factors, including:
- The types of organisms that most commonly cause infections in the facility
- Sources of infection
- Levels of employee compliance with hygiene practices such as handwashing
- Patterns of antiobiotic resistance

Equally important is the monitoring of outcomes from infections to determine whether they were appropriate and consistent with resident care plans.

Step 13. Monitor antibiotic use in the facility. Inappropriate antibiotic use can affect the success or failure of an infection control program. Reviewing the use of antibiotics encourages appropriate prescribing of those medications and may limit the development of antibiotic-resistant organisms within the facility.

The review of antibiotic use should be conducted by a multidisciplinary group. Data should be reviewed at regular intervals.

Summary

Infections are common and are a frequent source of illness and death in long term care facilities. The consistent application of sound management principles to treating residents and adhering to a comprehensive infection control program have been shown to reduce the impact of infection in ALFs and other long term care facilities. The processes and actions recommended in this guideline should help ALFs to systematically manage and improve the care of residents who develop infections. ALC

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