



Skin and Soft-Tissue Infections in Long-Term Care

ABSTRACT

Skin and soft-tissue infections (SSTIs) occur frequently in the elderly as skin integrity becomes more compromised with advancing age. SSTIs are the third most common infection in nursing home residents nationally, with a prevalence rate that varies between 1% and 9%. Cellulitis and decubitus ulcer infection are two of the most common types of SSTI in this national population. During a 12-month period, July 2009 through June 2010, Pennsylvania nursing homes reported a total of 5,881 SSTI events, or a rate of 0.26 per 1,000 resident days. Consistent with national data findings, these reports reflect that cellulitis and decubitus ulcer infections were the most predominant among the specific etiologies. This article focuses on evidence-based practices for maintaining overall skin integrity as well as strategies for pressure ulcer prevention. Barriers that impede skin integrity maintenance are also addressed. (Pa Patient Saf Advis 2011 Mar;8[1]:34-8.)

INTRODUCTION

Skin and soft-tissue infections (SSTIs) are the third most common infection in long-term care facility (LTCF) residents, with a reported prevalence of 1% to 9% and an incidence rate of 0.9 to 2.1 cases per 1,000 resident-days.¹ Cellulitis and infected pressure/decubitus ulcers are two of the most common types of SSTIs in the nursing home population.²

SSTIs result when breaks in skin or mucosa occur as a consequence of trauma, the presence of moisture, pressure, or the use of medical devices. Wounds may become secondarily infected with endogenous pathogens from the resident's own skin or exogenously by the hands of healthcare workers or other residents or by contact with contaminated objects in the environment.²

Cellulitis

Cellulitis is an acute spreading infection of the skin, which primarily involves the subcutaneous tissue. It can occur at the site of a previous skin break such as a cut, laceration, puncture wound, and pressure ulcer, or it may arise spontaneously. Cellulitis is characterized by redness, pain, edema, and tender lymph nodes and may include such systemic findings as fever, malaise, and delirium. Elderly residents have a high risk of developing bacteremia from cellulitis, which is associated with high morbidity and mortality.³ Thrombophlebitis may result from cellulitis of the lower extremities. Cellulitis often spreads rapidly in residents with chronic-dependent edema.

Pressure Ulcers

Pressure ulcers (also known as decubitus ulcers or bedsores) are localized areas of tissue necrosis involving the skin and underlying structures (e.g., subcutaneous tissues, muscles, bones). Pressure ulcers occur most commonly on lower body parts, such as the sacrum, coccyx, ischial tuberosities, and greater trochanter. Approximately 20% to 25% of LTCF residents experience pressure ulcers, which are typically associated with extended length of stay and increased mortality.⁴ Reddy et al. cites that 2.5 million pressure ulcers are treated each year in the United States, at an approximately \$11 billion expense.⁵ Infections occur in up to 65% of pressure ulcers and may lead to osteomyelitis and sepsis, requiring costly and aggressive therapy.⁶

The Centers for Medicare and Medicaid Services (CMS) established the reduction of pressure ulcers as a goal in nursing homes and mandated that each state's quality improvement organization address pressure ulcers in long-term care. LTCFs are required to comply with federal guidelines for the treatment of pressure ulcers in order to receive payments from Medicare and Medicaid. CMS provides guidance to state and federal surveyors (Federal Tag 314) evaluating pressure ulcer care in LTCFs. The regulation states that the facility is to take the following actions: (1) ensure that a resident who enters a facility without pressure ulcers does not develop pressure ulcers unless the individual's clinical condition demonstrates that pressure ulcers were unavoidable, (2) promote the prevention of pressure ulcer development, (3) promote the healing of pressure ulcers that are present (including the prevention of infection), and (4) prevent the development of additional pressure ulcers.⁷

PENNSYLVANIA DATA

Twelve months' worth of preliminary data on SSTIs from Pennsylvania nursing homes reflect a rate of 0.26 infections per 1,000 resident days, which is lower than the

national average. The most likely reason for the lower rate is the unique set of criteria that was developed in Pennsylvania for the purpose of mandatory reporting.⁸ The criteria do not include infections such as conjunctivitis, ear infections, and herpes zoster, which are included in national data. The criteria also narrow the risk of reporting noninfected decubitus ulcers as infections and hospital/ambulatory-surgery-associated surgical-site infections as SSTIs. The following subtypes compose the events: cellulitis, decubitus ulcer, vascular or diabetic ulcer, device-associated events, burn-associated events, and other/unspecified (see the Table for sums and rates of these infection types). Consistent with national findings, these reports reflect that cellulitis and decubitus ulcer infections were the most predominant among the specific etiologies.

The other/unspecified category includes reportable SSTIs that do not fit under the subtypes and those for which the etiology was not declared.

MAINTAINING SKIN INTEGRITY: EVIDENCE-BASED BEST PRACTICES

Maintaining skin integrity (intact skin) in institutionalized residents is one of the most fundamental and critical goals of nursing practice. Measures to prevent,

restore, or heal skin breakdown are vital to providing quality care. For provision of optimal skin care, LTCFs can develop a formal skin breakdown and ulcer prevention program that would include the following strategies:⁹

- Conduct skin breakdown risk assessments for all residents
- Reassess risk on a regular basis
- Inspect skin daily
- Optimize nutrition and hydration
- Manage moisture
- Minimize pressure

The application of these measures has demonstrated significant and sustainable reductions in the incidence and prevalence of skin breakdown, particularly in the studies conducted on residents at risk for pressure ulcers. In 2003, the National Nursing Home Improvement Collaborative recruited 52 nursing homes in 39 states to implement recommended practices to reduce pressure ulcer incidence and prevalence. The number of new healthcare-associated stage III to IV pressure ulcers declined 69% over a 10-month period.¹⁰ The New Jersey Hospital Association's Pressure Ulcer Collaborative was developed in 2005 to apply best practices and preventive techniques to reduce the occurrence of pressure ulcers in patients throughout various care settings. The

collaborative, which comprises 150 hospitals, nursing homes, and home care agencies, reported a 70% reduction in the incidence of new pressure ulcers over a 12-month period.¹¹ In 2003, staff and administrators of a 151-bed skilled nursing facility in the Midwest began an initiative to reduce the incidence of facility-acquired pressure ulcers. A goal of zero facility-acquired pressure ulcers in nursing home residents was achieved by the sixth month of the facility's initiative; this was maintained at zero or close to zero every month for four years.¹²

Conduct Risk Assessments for All Residents

The most important component of skin breakdown and pressure ulcer prevention is risk assessment. A comprehensive assessment will evaluate the resident's extrinsic risk factors, the skin condition, and other causal factors that place the resident at risk. Factors that predispose the resident to general skin breakdown and place him or her at risk for SSTIs such as cellulitis and pressure ulcers include immobility, pressure, friction, shear, moisture, incontinence, steroids, malnutrition, sensory deficiency, vascular compromise, and infection.⁴ The assessment will need to identify which risk factors can be modified or eliminated.

The Braden Scale is a common tool used to identify at-risk residents and includes assessment of six domains: activity, dietary intake, friction, mobility, sensory perception, and skin moisture.¹³ Residents with a score of less than or equal to 18 have the highest risk of developing a pressure ulcer.

Reassess Residents on a Regular Basis

The National Pressure Ulcer Advisory Panel (NPUAP) recommends using a standardized pressure ulcer risk assessment tool to assess pressure ulcer risks at admission, weekly for the first four weeks after admission for each resident at risk, then

Table. Rate of Nursing Home Skin and Soft-Tissue Infections Reported to the Pennsylvania Patient Safety Authority, July 2009 through June 2010

SKIN AND SOFT-TISSUE INFECTION TYPE	INFECTIONS	INFECTIONS PER 100,000 RESIDENT DAYS* (95% CONFIDENCE INTERVAL)
Cellulitis	2,849	12.68 (12.21 - 13.14)
Decubitus ulcer	419	1.86 (1.69 - 2.04)
Vascular or diabetic ulcer	288	1.28 (1.13 - 1.43)
Device-associated	200	0.89 (0.77 - 1.01)
Burn-associated	10	0.04 (0.02 - 0.07)
Other/unspecified	2,115	9.41 (9.07 - 9.81)

* Rates represented in infections per 100,000 resident days for readability.



quarterly or whenever there is a change in cognition or functional ability.¹⁴ This frequent assessment of risk allows staff the opportunity to adjust the prevention strategies according to the resident's needs. While this tool is primarily used to assess pressure ulcer risks, it is also applicable to general skin breakdown, which can result in cellulitis with or without decubitus ulcer development.

To ensure completion of a risk assessment, Joint Commission recommends the following:¹⁵

- Include a visual cue on each admission documentation record for the completion of the skin and risk assessment.
- Use the same risk assessment tool throughout the facility for every point of entry as well as level of care.
- Use multiple methods to visually cue staff as to which residents are at risk. Some facilities place stickers on a resident's door or in the medical chart to allow for quick identification of at-risk residents.

Use of an eye-catching motto and logo has been successful in some LTCFs in decreasing the incidence of pressure ulcer development. For example, a comprehensive plan developed by Ascension Health to reduce pressure ulcers includes the "SKIN" (i.e., Surfaces, Keep the patient turning, Incontinence management, Nutrition) bundle,¹⁶ a graphic of which is available on the Authority's website. Again, this plan, while concentrating on pressure ulcer prevention, is also applicable to general skin integrity and prevention of skin breakdown.

Inspect Skin Daily

Skin integrity may deteriorate rapidly in institutionalized patients. Residents at risk of developing skin breakdown and subsequent pressure ulcers need a daily assessment of all skin surfaces with special attention given to the sacrum, ischium, trochanters, heels, elbows, and occiput.¹⁷

LTCFs can create tools that prompt daily skin inspection (e.g., during bathing, during repositioning), document the results, and initiate prevention strategies if necessary.¹⁸

Optimize Nutrition and Hydration

Nutritional factors (e.g., impaired intake, low body weight, weight loss, dehydration) may impair residents' skin integrity; these factors are included in standard risk assessment tools. If dietary intake is inadequate, nutritional supplements may be required. Unless contraindicated, nutritional goals for an at-risk resident include a protein intake of approximately 1.2 to 1.5 gm/kg body weight daily.¹⁹ Residents at high risk would benefit from a dietician consult. Educate staff about the need for ensuring optimal nutrition and hydration; for example, staff could offer water to a resident when he or she is repositioned.

Manage Moisture

Wet skin breaks down easily. Proper care can reduce the exposure of the skin to sources of moisture, including that which is produced by incontinence, perspiration, or wound drainage. Cleanse skin as soon as soiling occurs and at routine intervals. Use a mild cleansing agent to minimize irritation and dryness. Use moisture-absorbing underpads if moisture cannot be contained. Apply topical agents to the skin to act as a barrier and provide moisture.¹⁷

Opportunities to protect the skin can be built into daily activities, such as the following:¹⁷

- Create a protocol that includes repositioning, assessing for wet skin, applying barrier agents, and offering toileting and oral fluids every two hours.
- Provide a bundle of supplies at the bedside of each at-risk resident who is incontinent. The bundle may contain items such as underpads and premoistened disposable barrier

wipes so that staff can easily care for the resident's skin after each episode of incontinence.

Minimize Pressure

It is important to relieve pressure, especially over bony prominences. Two strategies that have proven effective in preventing the development of pressure ulcers are as follows:¹⁷

Turn/reposition resident every two hours.

Relieving the pressure on susceptible areas maintains circulation and prevents tissue ischemia. Avoid placing the resident on the trochanter unless the resident has both sacral and ischial pressure ulcers. Do not raise the head of the bed more than 30 degrees. Pillows may be used to reduce pressure and placed under the calves to raise the resident's heels off the bed surface. Some LTCFs post a "turn clock" on the doors to the rooms of high-risk residents. The clock reminds staff that at each two-hour interval, the patient is to be repositioned according to the position indicated on the clock. For example, from noon to 2 p.m., the patient is to be positioned on his or her back; from 2 to 4 p.m., on the right side, and so forth. Other strategies that can prompt staff to turn/reposition all at-risk residents are sounding staff beepers every two hours or developing a "turn team," which automatically meets and turns residents every two hours. Appropriate documentation in the medical chart includes noting that the resident was instructed about the importance of repositioning and encouraged to change positions frequently, as well as noting the frequency of repositioning.

Support surfaces and pressure reduction.

Specialized support surfaces (e.g., mattresses, beds, cushions) help reduce or eliminate the pressure that can lead to ulcer formation. Pressure-reducing surfaces can be classified as static or dynamic. Static-support surfaces include air, water, gel, or foam mattresses or overlays. Dynamic-support surfaces (e.g., alternating-pressure air mattress) require a motor

or pump and electricity to operate. LTCFs can rent or buy specialty pressure-redistribution devices for high-risk residents.

ELIMINATING BARRIERS TO SKIN BREAKDOWN AND PRESSURE ULCER PREVENTION PROGRAMS

Results of a study by Xakellis et al. suggest that failing to address barriers to skin breakdown and pressure ulcer implementation plans can result in less-than-optimal long-term clinical outcomes.²⁰ Barriers to the successful implementation of these programs include organizational factors, lack of education and training, lack of resources, and complexity of program design and wording.

Organizational Factors

Instituting a facilitywide program to prevent skin breakdown and pressure ulcers requires systemwide support. Form a multidisciplinary team to develop the program and include facility executives. For example, during implementation at the Ottawa Hospital, the vice president of patient services addressed efforts with the hospital board members and executives while other staff (e.g., educators, managers) advanced the activity with their peers.²¹ Successful hospitals have created and enabled skin care champions who encourage staff ownership and buy-in of change at all levels.²² Many such champions develop expert knowledge in skin care management and are often consulted by their peers.

Communication is a vital component to success and extends to every level of care. Input should be solicited from staff through all stages in the implementation

program. Lancellot describes how communication failure has been reduced by designating a clinical nurse specialist to channel communication regarding pressure ulcer prevention throughout the facility.²³

Lack of Education and Training

Providing continuous learning opportunities is essential to ensure that prevention efforts are maintained. Develop educational material that targets all disciplines, nonprofessional staff, and residents. Offer short, frequent, focused education to staff at multiple times. NPUAP recommends including information about the following:¹⁷

- Etiology and risk factors for pressure ulcers
- The risk assessment tool and how to use it
- How to perform skin assessment
- Use of support surfaces
- Nutritional support
- Program for bowel and bladder management
- How to develop and implement individualized programs of skin care
- Demonstration of positioning to decrease risk of tissue breakdown

Lack of Resources

The beginning stages of a skin breakdown prevention and pressure ulcer initiative are time and resource intensive. The team will need uninterrupted time from other responsibilities, which helps to send a clear message of leadership support. The organization will have to dedicate resources to the goal of preventing these conditions. An option for nursing homes

is to provide nurses trained in wound care management, who can devote their time and expertise to assist with maintenance of skin integrity.

Complexity of Program Design and Wording

The complexity of the design and wording of prevention policies were perceived to strongly influence the degree of implementation for specific guidelines in a 2007 study by Thomason et al.²² Include clear simple concepts in prevention policies, with precise wording and quantifiable objectives. To accomplish this, establish a workgroup to define measurement criteria, goals, and definitions, and develop a toolkit that contains best practices, implementation techniques, and documentation tools.

CONCLUSION

An SSTI is painful, expensive, and unnecessary, as well as associated with an increase in morbidity and mortality. Maintenance of skin integrity is an ongoing process in LTCFs and is vitally important to preserve the resident's long-term health and well-being. A preventive approach includes identifying high-risk residents and initiating a prevention plan. Programs can be designed to promote best practice in maintaining the resident's skin integrity and ensure the consistency of clinical practices related to the prevention and management of skin breakdown. Finally, successful implementation includes identifying the barriers to change such as organizational factors, lack of education/training, lack of resources, and complexity of program design and wording.

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