

CLINICAL MANAGEMENT

extra

Older Adults, Falls, and Skin Integrity



Catherine Cheung, MD, FRCPC • Geriatrician • Women's College Hospital • Toronto, Ontario, Canada

The author, staff, and planners, including spouses/partners (if any), in any position to control the content of this CME activity have disclosed that they have no financial relationships with, or financial interests in, any commercial companies pertaining to this educational activity.

To earn CME credit, you must read the CME article and complete the quiz online, answering at least 14 of the 20 questions correctly.

This continuing educational activity will expire for physicians on January 31, 2018, and for nurses on January 31, 2019.

All tests are now online only; take the test at <http://cme.lww.com> for physicians and www.nursingcenter.com for nurses. Complete CE/CME information is on the last page of this article.

GENERAL PURPOSE:

To provide an overview of the assessment and management of risk factors for falls in older adults.

TARGET AUDIENCE:

This continuing education activity is intended for physicians, physician assistants, nurse practitioners, and nurses with an interest in skin and wound care.

LEARNING OBJECTIVES/OUTCOMES

After participating in this educational activity, the participant should be better able to:

1. Outline the components of an evidence-based falls assessment and identify risk factors for falls.
2. Specify strategies to reduce falls in older adults, especially as related to maintaining skin integrity.

ABSTRACT

Older adult patients may present to skin and wound care clinicians with skin injuries as a result of falls. In addition, chronic wounds associated with the patient's conditions may also increase his/her falls risk. Hence, appropriate assessment and management of the risk of falls in older adult patients are key elements of patient-centered care.

KEYWORDS: falls risk, older adults, skin integrity, chronic wounds

ADV SKIN WOUND CARE 2017;30:40-6.

CLINICAL SCENARIO

An 86-year-old female patient, Mrs B., returns for a follow-up visit at the wound clinic. She has had venous ulcers for the past

10 years in varying degrees of severity, depending on whether she wears her compression stockings. In addition to swollen, weeping legs and venous ulcerations, Mrs B. presents with a skin tear on her right arm and bruising on the right side of her face. She reports that she fell in her apartment 3 days ago when making breakfast in the kitchen. What should the clinician do?

BACKGROUND

According to the National Council on Aging and the US Centers for Disease Control and Prevention, one-fourth of people older than 65 years in the United States fall each year.¹ The financial toll for older adult falls will increase as the population ages, potentially reaching an estimated \$67.7 billion by 2020.¹ In Canada, an estimated 20% to 30% of older adults fall annually.² Outcomes of these falls range from soft-tissue and bone injuries, to subdural and subarachnoid hemorrhages, to the loss of independence and functioning, which may lead to long-term-care admission.³ In addition, the fear of falling may decrease self-confidence and result in self-imposed functional limitations.

A comprehensive falls assessment in older adult patients includes consideration of biological/intrinsic, behavioral, environmental, social, and economic components. Based on this

assessment, a management plan can be designed to minimize the risk of falling, injury, hospitalization, and institutionalization.

EVIDENCE-BASED FALLS ASSESSMENT

Numerous risk factors have been identified that predispose older adult patients to falling. The easiest differentiation is between “intrinsic” (to the patient) and “extrinsic” factors, and the key to an evidence-based falls assessment is to quickly identify risk factors that can be reduced or modified. The Public Health Agency of Canada’s 2014 *Seniors’ Falls in Canada: Second Report* identified a host of possible risk factors for falls in the older adult population (Table 1).²

Although this list of risk factors may appear overwhelming, an anatomical “top-down approach” in the clinical setting may help identify key modifiable issues during the history taking and physical examination. In the clinical scenario at the beginning of this article, the patient’s daughter reports that her mother has missed a number of medication doses and seems to be falling behind on bill payments for her apartment. Collateral history from family members may identify the onset of progressive memory impairment, decline in executive function (eg, planning a meal or a trip), or functional decline. Other areas of cognition may be

Table 1.
FACTORS ASSOCIATED WITH AN INCREASED RISK OF FALLING AMONG OLDER ADULTS

Biological/Intrinsic	Behavioral	Social and Economic	Environmental
<ul style="list-style-type: none"> • Impaired mobility • Balance deficit • Gait deficit • Muscle weakness • Advanced age • Chronic illness/disability: <ul style="list-style-type: none"> • Cognitive impairment • Stroke • Parkinson disease • Diabetes • Arthritis • Heart disease • Incontinence • Foot disorders • Visual impairment • Acute illness 	<ul style="list-style-type: none"> • History of falls • Fear of falling • Polypharmacy • Use of: <ul style="list-style-type: none"> • Antipsychotics • Sedative/hypnotics • Antidepressants • Excessive alcohol • Risk-taking behaviors • Lack of exercise • Inappropriate footwear/clothing • Inappropriate assistive devices use • Poor nutrition or hydration • Lack of sleep 	<ul style="list-style-type: none"> • Low income • Lower level of education • Illiteracy/language barriers • Poor living conditions • Living alone • Lack of support networks and social interaction • Lack of transportation • Cultural/ethnicity 	<ul style="list-style-type: none"> • Poor building design and/or maintenance • Inadequate building codes • Stairs • Home hazards • Lack of: <ul style="list-style-type: none"> • Handrails • Curb ramps • Rest areas • Grab bars • Good lighting or sharp contrasts • Slippery or uneven surfaces • Obstacles and tripping hazards

Source: Public Health Agency of Canada. Seniors Falls in Canada, A Second Report. Ottawa, ON, Canada; 2014.

affected as well, including attention, language, visual-spatial function, mood, and thought process and content.

Studies have shown that older adults with cognitive impairment have at least a 2-fold increase in the risk of falling, compared with older adults without cognitive issues.⁴ A full neurological examination is mandatory to identify the presence of focal neurological signs that may indicate the presence of structural abnormalities, including subdural hematoma, tumor, abscess, or stroke. Standardized cognitive testing blood work (including complete blood count, basic electrolyte panel, thyroid stimulating hormone, calcium, fasting blood sugars, vitamin B₁₂ level, and others depending on clinical context) and brain imaging may be necessary to work up causes of cognitive impairment, make a diagnosis (eg, vascular dementia, Lewy Body Dementia, Alzheimer dementia, and so on), develop a treatment plan, and link to community services that support patients and their families.

Other neurodegenerative disorders can also predispose older adults to falls, especially movement disorders. The prototypical movement disorder may be idiopathic Parkinson disease, characterized by tremor, rigidity, akinesia, and postural instability. Patients may become stooped and develop festinating gait, leaning forward to try and “catch up” to their center of gravity. Not surprisingly, a large number of patients with Parkinson disease fall: up to 70% of patients fall yearly, and up to 13% fall at least weekly.⁵⁻⁹ Again, a full neurologic assessment is required to identify not only motor symptoms, but also autonomic dysfunction (such as postural hypotension), associated cognitive and mood disorders, dysphagia, and sleep disturbances (such as rapid-eye-movement sleep behavior disorder).

All of these manifestations of Parkinson disease can contribute to falls risk, and each may require an individualized treatment plan to mitigate this risk.

At the level of the peripheral nervous system, deficits in motor, sensory and autonomic function can also increase falls risk.¹⁰ For example, a patient presenting with diabetes and falls should always be screened for peripheral neuropathy using an evidence-based protocol.¹¹

FROM CENTRAL NERVOUS SYSTEM TO MUSCLE TO BONE TO JOINT

At the level of bone and muscle are 2 “geriatric giant” diagnoses that frequently coexist and contribute significantly to increased falls risk. Age-related reduction in muscle “quality and quantity” is known as sarcopenia, and the corresponding diagnosis related to bone quality and quantity is known as osteoporosis.¹² In fact, some researchers have proposed a clinical syndrome termed “dysmotility syndrome” to encompass osteoporosis, sarcopenia, and obesity, which greatly increase an older adult’s risk of falls and fractures.¹² Most people are familiar with the term

osteoporosis—a disease with well-established definitions; easily understood (although imperfect) imaging techniques (bone mineral density); treatment algorithms; and fracture-risk scores (eg, FRAX¹³). Sarcopenia, however, is still a much less-recognized condition because of lack of consensus on diagnostic criteria,¹⁴ lack of an easily measured modality, and paucity of treatment options. Nevertheless, recognition of these factors is essential to a comprehensive assessment for falls risk.

Arthritic conditions (affecting not only joints, but also ligaments, tendons, and bones) affect approximately 16.6% of the Canadian population.¹⁵ This is the third most chronic condition in Canada, after chronic back problems and hypertension. In the United States, an estimated 52.5 million adults (22.7%) annually from 2010 to 2012 received a diagnosis of some form of arthritis, rheumatoid arthritis, gout, lupus, or fibromyalgia.¹⁶

Many patients with arthritis require help with daily activities because of pain and functional disabilities, and having arthritis (in the legs especially) has been shown to increase falls risk.¹⁷ Management of common arthritic conditions may include analgesics, anti-inflammatory agents, disease-modifying agents, physical therapies, exercise regimens (that include strength and mobility enhancement), and weight-loss programs.

Cardiovascular disorders are contributors to falls risk, especially when the falls are related to presyncope or syncopal attacks. Disorders such as orthostatic hypotension (due to medications, autonomic instability, and so on), carotid sinus syndrome, or vasovagal syndrome need to be identified and managed in order to reduce falls risk.

In addition to chronic conditions, an injurious fall in an older adult patient may also indicate the presence of an acute condition. A key tenet in geriatric medicine is the recognition that common conditions may present atypically in a patient, because of alterations in physiology that occur with normal aging. For example, a urinary tract infection may not cause dysuria or fever, but present as increased confusion or a propensity to fall in an older adult. Therefore, a comprehensive medical assessment is essential to rule out an acute, reversible condition, such as bladder, respiratory, or even wound infection.

THE PRESCRIBING CASCADE

A key component of a falls risk assessment is the medication review, specifically to consider the drug-drug, drug-disease, and drug-age interactions that lead to perturbations in balance, equilibrium, and hypotension. The use of 4 or more medications increases an older adult’s risk of falling,¹⁸ and in particular, the strongest links to falling include the use of benzodiazepines, selective serotonin reuptake inhibitors, tricyclic antidepressants, neuroleptics, and anticonvulsants.^{19,20}

A careful risk-benefit ratio analysis will determine whether some of the patient's medications need to be continued or can be gradually discontinued. The American Geriatrics Society has updated a widely used guideline for potentially inappropriate medications in older adults,²¹ called the Beers Criteria. This clinical tool divides commonly used medications by organ system and lists those that are potentially inappropriate because risks generally outweigh the benefits. Under the condition of "history of falls or fractures," potentially inappropriate medications listed include anticonvulsants (with the comment to avoid these unless used for seizures), antipsychotics, benzodiazepines, nonbenzodiazepine hypnotics (eg, eszopiclone, zaleplon, zolpidem), tricyclic antidepressants, and selective serotonin reuptake inhibitors.

Another helpful clinical tool is the STOPP/START toolkit.²² This resource recommends which potentially inappropriate medications should be stopped in an older adult patient and which ones may be beneficial in certain circumstances. The tool kit has been validated in a number of different patient populations, including primary care²³ and older adult day hospitals.²⁴ For older adult patients prone to falls, defined as more than 1 fall in the past 3 months, potentially inappropriate medications include benzodiazepines, neuroleptics, first-generation antihistamines, vasodilator drugs known to cause hypotension in those with persistent postural hypotension, and long-term opiates.

In addition to prescription medications, older adults may experience more adverse effects from psychoactive substances,

such as alcohol. As a person ages, the volume of distribution of alcohol decreases as the total amount of body water decreases (it is replaced by fat volume). Thus, blood ethanol concentrations are relatively higher in an older adult compared with a younger adult.²⁵ The net effect is an increased effect of alcohol on an older adult's awareness, balance, and gait.

A particularly dangerous phenomenon to be aware of in prescribing medications for the older adult population is known as the "prescribing cascade." This happens when medications are prescribed to counteract the adverse effects of another medication. For example, an older adult is prescribed an angiotensin-converting enzyme inhibitor, develops a cough, and then is prescribed cough suppressants or antibiotics for the cough. The underlying problem is not addressed (the adverse reaction of the angiotensin-converting enzyme inhibitor), and the patient can have adverse effects to the cough suppressant or antibiotic. The most common medications implicated in the prescribing cascade are summarized in Table 2.²⁶

To avoid initiation of a prescribing cascade, it is imperative that prescribers and patients are aware of the potential adverse effects of the administered medications. Patients need to inform their prescriber if they develop these effects. Dose reduction, using alternate medications, or discontinuing the medication altogether may be required. It is very rare that the use of one medication to counteract the adverse effect of another medication would be clinically appropriate in older adults.

Table 2.
EXAMPLES OF MEDICATIONS IN A PRESCRIBING CASCADE

Drug	Adverse Drug Reaction	Drugs Used to Treat Adverse Effects
Angiotensin converting enzyme inhibitors	Dry cough, fatigue, dizziness	Cough suppressant and/or antibiotic
Cholinesterase inhibitor	Incontinence, diarrhea, nausea, vomiting, abdominal pain, insomnia, syncope	Anticholinergics (eg, oxybutynin, diphenhydramine, doxepin, atropine)
Nonsteroidal anti-inflammatory drugs (NSAIDs)	Headache, dizziness, peptic ulcers, hypertension, allergic reactions, liver failure	Antihypertensives, H2 blockers (ranitidine, famotidine), proton pump inhibitors (lansoprazole, omeprazole)
Antiepileptic drugs (phenobarbital, carbamazepine, gabapentin)	Dizziness, blurred vision, stomach upset, nausea, drowsiness, poor coordination, rash	Metoclopramide, domperidone
Thiazide diuretics (chlorthalidone, hydrochlorothiazide)	Hyperuricemia, hypokalemia, impaired glucose tolerance, dizziness, blurred vision, itching, stomach upset	Allopurinol, colchicine, NSAIDs
Metoclopramide	Drowsiness, dizziness, headache, insomnia, nausea, vomiting, diarrhea, restlessness, extrapyramidal symptoms (involuntary movements)	Benzotropine, antihistamine, benzodiazepines, propranolol, clonidine, amantadine

Source: Kalisch L, Caughey GE, Roughead EE, Gilbert AL. The prescribing cascade. *Aust Prescr* 2011;34:162-6.

ENVIRONMENTAL FACTORS

Environmental hazards are any objects or physical circumstances in the environment that increase a person's risk of falling. An environmental assessment may suggest modifications, such as removing cords and throw rugs, installing grab bars and raised toilet seats, and so on, which can reduce the risk of falls.²⁷ These assessments are usually performed by an occupational therapist and have been shown to reduce falls risk, especially if combined with other strategies to mitigate falls risk.²⁸

SPECIFIC STRATEGIES TO REDUCE FALLS IN OLDER ADULTS

In a primary care setting, falls may not be detected routinely unless (a) clinicians ask about them specifically, or (b) an injury has occurred that has been brought to medical attention. Primary care physicians should ask older adult patients, at least on a yearly basis, about any falls and evaluate them for difficulties with balance or gait.¹⁸

A well-validated and simple tool for assessing gait and balance is called the "Get Up and Go Test".²⁹ For the timed version, the patient gets up from a chair without using his/her arms, walks 3 m, turns around, and comes back to sit down while being timed. An older adult who takes more than 12 seconds to perform this task is at high risk of falling. If the patient does poorly on this test, a complete falls assessment may be warranted by a clinician with appropriate skills and experience, which may necessitate referral to a specialist.

During a falls assessment, both modifiable and nonmodifiable risk factors may be identified (eg, postural hypotension may be reduced by decreasing antihypertensive medications, but visual impairment from advanced macular degeneration may be permanent). Nevertheless, knowledge of all risk factors is important for planning purposes, and modification of the environment is critical to reduce falls risk.

INTERVENTIONS TO PREVENT FALLS

Most recommendations to prevent falls are multifactorial and may include the following:

- mobility training and advice on the appropriate use of assistive devices
- medication review and adjustment as necessary, especially focusing on psychotropic medications
- exercise programs
- environmental modification
- treatment of cardiovascular disorders

FALLS PREVENTION EXERCISE PROGRAMS

Some evidence in the literature supports exercise programs in older adults to reduce falls risk.³⁰ More intensive physical activity

interventions were also more likely to reduce the risk of falling. The strongest evidence exists for balance exercises (including Tai Chi Chuan); there is less evidence for resistance and aerobic training. The optimal type, duration, and intensity of exercise programs are not yet clear, but what is clear is that exercise needs to be sustained for sustained benefit.

Older adults with recurrent falls should be enrolled in falls prevention exercise and balance training programs. These programs typically involve an assessment by a clinician specially trained in falls assessment and treatment (eg, a geriatrician and physiotherapist). Subsequent visits may include a group exercise and educational component, referral for occupational therapy home safety assessments, and ongoing community programming after discharge from the falls prevention program.

VITAMIN D SUPPLEMENTS

A US Preventive Services Task Force review of interventions to prevent falling in older adults found that vitamin D supplementation reduced the risk of falling.³⁰ The daily doses of vitamin D in the reviewed studies had a median of approximately 800 IU. The only reported adverse effects in 3 of these studies were transient and asymptomatic hypercalciuria or hypercalcemia. Hence, vitamin D supplementation should be considered, especially in conjunction with an assessment of bone health and osteoporosis management.³¹

FALLS AND SKIN INTEGRITY

Approximately 1 in 5 falls may result in scrapes, bruises, or blisters. In an older adult, there are already normal aging changes in skin structure (including increased wrinkling, roughness, and laxity, as well as decreased elasticity) and skin function (including decreased surface contact between the dermis and epidermis, which predisposes to separation of the dermal-epidermal junction with lateral force).³² In addition, there is significant reduction in cutaneous blood flow, as well as dermal lymphatic drainage, which reduces the ability of the wound to clear itself of pathogens and also inhibits wound contraction. Wound healing is slower in older adults and may also be affected by concomitant diseases, including diabetes mellitus or dysvascular disease. Finally, exogenous factors such as nutritional status, dehydration, or smoking may also hinder healing of skin injuries.

A common injury from falling is a skin tear; shearing, friction, or blunt trauma forces cause separation of skin layers. Factors that increase the risk of skin tears in older adults include increased dryness of the skin (this can be further exacerbated by frequent washing with soap, which reduces intrinsic skin lubrication) and loss of independence to perform activities of daily living, because assistance from others for toileting, transferring, and bathing may result in inadvertent injuries. Resultant

wounds are described as partial or full thickness, depending on the level of skin separation; the International Skin Tear Advisory Panel's Classification System is frequently used to assess the degree of severity of the skin tear.³³

Treatment of skin tears should follow generally accepted principles described for wound bed preparation and healing and include proper wound cleansing, debridement as required, selection of an appropriate dressing, and monitoring until healing has been achieved.³³

To prevent recurrence, clinicians should ask the patient how the skin tear occurred and decide whether a more comprehensive assessment on falls risk is necessary.

DISCUSSION OF CASE SCENARIO

After asking Mrs B. a few more questions, it is clear that she has been falling on a fairly regular basis. She is taking 8 medications daily, including antihypertensive and psychotropic medications. After initiating appropriate treatment for the venous leg ulcerations and skin tear, Mrs B. consents to referral to a geriatric medicine clinic for a comprehensive falls assessment.

On her next visit to the wound care clinic, Mrs B. reports that she is now taking only 4 medications. She has an appointment for a home safety assessment by an occupational therapist and is enrolled in a 6-week falls prevention program. Her venous ulcerations and skin tears are healing well, and Mrs B.'s chances of falling again in the future are likely reduced.

SUMMARY

In summary, older adults should be asked about falls regularly, especially if they present with new skin tears. If they have suffered injurious falls or are falling frequently, a full falls assessment by a specialist, along with a multidisciplinary team, may be indicated so that risk factors may be modified and additional falls prevented.

PRACTICE PEARLS

- A comprehensive assessment and management plan can reduce an older adult's risk of falling, injury, hospitalization, and institutionalization.
- Multidisciplinary involvement from a geriatrician, occupational therapist, and physiotherapist may be required to reduce falls risk.
- Risk factors associated with increased falls in older adults include biological, behavioral, social/economic, and environmental causes.
- Medication review is a key component of falls assessment.
- Sarcopenia and osteoporosis management is another key component of managing falls risk.

REFERENCES

1. National Council on Aging. Falls prevention facts. <https://www.ncoa.org/news/resources-for-reporters/get-the-facts/falls-prevention-facts>. Last accessed November 8, 2016.
2. Public Health Agency of Canada. Seniors Falls in Canada, A Second Report. Ottawa, ON, Canada; 2014.
3. Donald IP, Bulpitt CJ. The prognosis of falls in elderly people living at home. *Age Ageing* 1999;28:121-5.
4. Tinetti ME, Speechley M, Ginter SF. Risk factors for falls among elderly persons living in the community. *N Engl J Med* 1988;319:1701-7.
5. Stolze H, Klebe S, Zechlin C, Baecker C, Friege L, Deuschl G. Falls in frequent neurological diseases. *J Neurol* 2004;251:79-84.
6. Koller WC, Glatt S, Vetere-Overfield B, Hassanein R. Falls and Parkinson's disease. *Clin Neuropharmacol* 1989;12:98-105.
7. Gray P, Hildebrand K. Fall risk factors in Parkinson's disease. *J Neurosci Nurs* 2000;32:222-8.
8. Wood BH, Bilclough JA, Bowron A, Walker RW. Incidence and prediction of falls in Parkinson's disease: a prospective multidisciplinary study. *J Neurol Neurosurg Psychiatry* 2002;72:721-5.
9. Bloem BR, Grimbergen YA, Cramer M, Willemsen M, Zwiderman AH. Prospective assessment of falls in Parkinson's disease. *J Neurol* 2001;248:950-8.
10. Richardson JK, Ching C, Hurvitz EA. The relationship between electromyographically documented peripheral neuropathy and falls. *J Am Geriatr Soc* 1992;40:1008.
11. Canadian Diabetes Association Clinical Practice Guidelines Expert Committee: Canadian Diabetes Association 2013 Clinical Practice Guidelines for the Prevention and Management of Diabetes in Canada. *Can J Diabetes* 2013;37(Suppl 1):S1-S212.
12. Binkley N, Krueger D, Buehring B. What's in a name revisited: should osteoporosis and sarcopenia be considered components of "dysmobility syndrome"? *Osteoporos Int* 2013;24:2955-9.
13. Kanis JA, McCloskey EV, Johansson H, Oden A, Ström O, Borgström F. Development and use of FRAX in osteoporosis. *Osteoporos Int* 2010;21(Suppl 2):S407-13.
14. Cooper C, Dere W, Evans W, et al. Frailty and sarcopenia: definitions and outcome parameters. *Osteoporos Int* 2012;23:1839-48.
15. Arthritis Community Research and Evaluation Unit for the Arthritis Society. Arthritis in Canada, 2003. www.acreu.ca/pub/aic.html. Last accessed November 16, 2016.
16. Barbour KE, Helmick CG, Theis KA, et al. Prevalence of doctor-diagnosed arthritis and arthritis-attributable activity limitation—United States, 2010–2012. *Morb Mortal Wkly Rep* 2013;62(44):869-73.
17. Mitchell RJ, Watson WL, Milat A, Chung AZ, Lord S. Health and lifestyle risk factors for falls in a large population-based sample of older people in Australia. *J Safety Res* 2013;45:7-13.
18. Tinetti M. Preventing falls in elderly persons. *New Eng J Med* 2003;348:42-9.
19. Leipzig RM, Cumming RG, Tinetti ME. Drugs and falls in older people: a systematic review and meta-analysis. I. Psychotropic drugs. *J Am Geriatr Soc* 1999;47:30-9.
20. Thapa PB, Gideon P, Cost TW, Milam AB, Ray WA. Antidepressants and the risk of falls among nursing home residents. *N Engl J Med* 1998;339:875-82.
21. American Geriatrics Society 2015 Beers Criteria Update Expert Panel. American Geriatrics Society updated Beers Criteria for potentially inappropriate medication use in older adults. *J Am Geriatr Soc* 2015;63:2227-46.
22. Gallagher P, Ryan C, Byrne S, Kennedy J, O'Mahony D. STOPP (Screening tool of older person's prescriptions) and START (Screening tool to alert doctors to right treatment). Consensus validation. *Int J Clin Pharmacol Ther* 2008;46:72-83.
23. Cahir C, Fahey T, Teeling M, Teljeur C, Feely J, Bennett K. Potentially inappropriate prescribing and cost outcomes for older people: a national population study. *Br J Clin Pharmacol* 2010;69:543-52.
24. Martinez-Almazan E, Castella C, Albiol N, et al. Drug prescription suitability: application of the Screening Tool of Older Persons' Prescriptions/Screening Tool to Alert to Right Treatment (STOPP/START) criteria in a day-care geriatric hospital. *J Am Geriatr Soc* 2013;61:1622-4.
25. Gartner U, Schmier M, Bogusz M, Seitz HK. Blood alcohol concentrations after oral alcohol administration—effect of age and sex [in German]. *Z Gastroenterol* 1996;34:675-9.
26. Kalisch L, Caughey GE, Roughhead EE, Gilbert AL. The prescribing cascade. *Aust Prescr* 2011;34:162-6.
27. Lord S, Sherrington C, Menz H. Falls in Older People. Risk Factors and Strategies for Prevention. Cambridge, UK: Cambridge University Press; 2001.
28. Tse T. The environment and falls prevention: do environmental modifications make a difference? *Aust Occup Ther J* 2005;27:1-81.
29. Mathias S, Nayak US, Isaacs B. Balance in elderly patients: the "Get-Up and Go" test. *Arch Phys Med Rehabil* 1986;67:387-9.

30. Michael YL, Whitlock EP, Lin JS, Fu R, O'Connor EA, Gold R. Primary care-relevant interventions to prevent falling in older adults: a systemic evidence review for the U.S. Preventive Services Task Force. *Ann Intern Med* 2010;153:815-25.
31. Papaioannou A, Morin S, Cheung AM, et al; Scientific Advisory Council of Osteoporosis Canada. 2010 Clinical practice guidelines for the diagnosis and management of osteoporosis in Canada. *CMAJ* 2010;182:1864-73.
32. Reddy M, Holroyd-Leduc J, Cheung C, Woo K. Geriatric principles in the practice of chronic wound care. In: Krasner D, Rodeheaver GT, Sibbald GT, eds. *Chronic Wound Care: A Clinical Source Book for Healthcare Professionals*. 4th ed. Malvern, PA: HMP Communications; 2007:664-5.
33. LeBlanc K, Baranoski S, Christensen D, et al. International Skin Tear Advisory Panel: A Tool Kit to Aid in the Prevention, Assessment, and Treatment of Skin Tears Using a Simplified Classification System. *Adv Skin Wound Care* 2013;26:459-76.

For more than 150 additional continuing education articles related to Skin and Wound Care topics, go to NursingCenter.com/CE.

CE CONNECTION

CONTINUING MEDICAL EDUCATION INFORMATION FOR PHYSICIANS

Lippincott Continuing Medical Education Institute, Inc. is accredited by the Accreditation Council for Continuing Medical Education to provide continuing medical education for physicians.

Lippincott Continuing Medical Education Institute, Inc. designates this journal-based CME activity for a maximum of 1 *AMA PRA Category 1 Credit™*. Physicians should only claim credit commensurate with the extent of their participation in the activity.

PROVIDER ACCREDITATION INFORMATION FOR NURSES

Lippincott Williams & Wilkins, publisher of the *Advances in Skin & Wound Care* journal, will award 1.0 contact hours for this continuing nursing education activity.

LWW is accredited as a provider of continuing nursing education by the American Nurses Credentialing Center's Commission on Accreditation.

This activity is also provider approved by the California Board of Registered Nursing, Provider Number CEP 11749 for 1.0 contact hours. LWW is also an approved provider by the District of Columbia, Georgia, and Florida CE Broker #50-1223. Your certificate is valid in all states.

OTHER HEALTH PROFESSIONALS

This activity provides ANCC credit for nurses and *AMA PRA Category 1 Credit™* for MDs and

DOs only. All other healthcare professionals participating in this activity will receive a certificate of participation that may be useful to your individual profession's CE requirements.

CONTINUING EDUCATION INSTRUCTIONS

- Read the article beginning on page 40. For nurses who wish to take the test for CE contact hours, visit www.nursingcenter.com. For physicians, who wish to take the test for CME credit, visit <http://cme.lww.com>.
- You will need to register your personal CE Planner account before taking online tests. Your planner will keep track of all your Lippincott Williams & Wilkins online CE activities for you.
- There is only one correct answer for each question. A passing score for this test is 13 correct answers. If you pass, you can print your certificate of earned contact hours or credit and access the answer key. Nurses who fail have the option of taking the test again at no additional cost. Only the first entry sent by physicians will be accepted for credit.

Registration Deadline: January 31, 2019 (nurses); January 31, 2018 (physicians).

PAYMENT AND DISCOUNTS

- The registration fee for this test is \$12.95 for nurses; \$22 for physicians.