Common Geriatric Syndromes and Special Problems

Rebecca B. Sleeper

Seventh of a series

This geriatric primer continues our series addressing fundamental issues related to the care of the elderly, focusing not only on concerns related to medication, but also on the social welfare of seniors in our communities. As consultant pharmacists are well aware, managing the use of medications in the elderly is a complex process. The elderly are the highest consumers of medications and have a greater burden of medical conditions.

Despite these compelling facts, the unique needs of the elderly frequently are not given adequate attention. In light of this, the series is targeted at several audiences: the new pharmacy practitioner, those with experience in other practice settings who want to enhance their knowledge about medication use in the elderly, and experienced practitioners who would like a review of key subject areas.

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Series Editor

Geriatric syndromes are common problems that affect older adults. They are often thought of as causes of morbidity in one or more functional domains, but they can simultaneously be a consequence of morbidity as well. This primer will cover 12 problems commonly considered to be geriatric syndromes and highlight the potential for outcomes in one area to affect those in another. The syndromes included are: losses in activities of daily living, cognitive dysfunction, delirium versus dementia, depression, dizziness, osteoporosis, falls, sensory loss, nutrition and weight loss, pain, substance abuse, urinary incontinence, and constipation. Each syndrome is briefly discussed, followed by strategies for assessment and intervention by the pharmacist in a community setting.

Key words: Drug therapy, Elderly, Geriatric syndrome, Pharmacist.

Abbreviations: AD = Alzheimer’s disease, ADLs = Activities of daily living, CAM = Confusion Assessment Method, CBC = Complete blood count, CNS = Central nervous system, IADL = Instrumental activities of daily living, MMSE = Mini-Mental State Examination.

Introduction

Geriatric syndromes are common problems that are associated with morbidity and mortality in older patients. These syndromes are clusters of age-related changes, medical conditions, symptoms, and medication effects that are associated with functional decline and adverse health outcomes. Geriatric syndromes are common problems that affect one or more of the four domains (Figure 1) and result in losses of function. However, identifying and treating outcomes require a fundamental understanding of how health is related to

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function. Textbook approaches to treating medical conditions usually involve the relationship between disease-state interventions and their outcomes on the targeted conditions. However, to understand geriatric syndromes, one must not only consider the relationship between an intervention and its direct outcome in a single disease, but also its indirect outcomes with respect to the four functional domains. The complexity of approaching a geriatric syndrome lies in the fact that it can be both a cause and a consequence of problems in other domains. This concept of geriatric syndromes as both cause and consequence of functional decline is the common thread that will tie together the discussion of each of the geriatric syndromes throughout this monograph. Some of the geriatric syndromes that will be addressed include:

1. Losses in activities of daily living (ADLs)
2. Cognitive dysfunction: delirium versus dementia
3. Depression
4. Dizziness
5. Osteoporosis
6. Falls
7. Sensory loss
8. Nutrition and weight loss
9. Pain
10. Substance abuse
11. Urinary incontinence
12. Constipation

**Losses in Activities of Daily Living**

A discussion of geriatric syndromes must begin with a discussion of ADLs. There are basic ADLs and more complex, or instrumental, ADLs (IADLs). ADLs are basic day-to-day, self-care activities, and IADLs are more sophisticated activities that involve the sequencing of several steps and require more advanced problem solving and decision making skills. Examples of both categories of activities are listed in Table 1.

Deficits in ADLs should not be accepted as a part of normal aging. Instead, impairments often arise as a result of injury, comorbidity, or underlying pathology. There are multiple factors from each of the four functional domains that can precipitate losses in the ability to perform ADLs. Medication side effects are a particularly important cause for pharmacists to consider. Almost any medication can impair ADL or IADL functions, and those that do so in any of the four domains may have direct effects on the ability to perform activities. Table 2 lists examples of these medications. Indirect medication

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**Figure 1. Four Domains and Their Respective Influences on Function**

<table>
<thead>
<tr>
<th>Memory</th>
<th>Insight/interpretation</th>
<th>Orientation/level of consciousness</th>
<th>Gait/balance</th>
<th>Muscle strength</th>
<th>Coordination</th>
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<tr>
<td></td>
<td></td>
<td>Cognitive function</td>
<td>Motor function</td>
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<td>Reflexes</td>
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<td>Voluntary control of body functions</td>
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<td>Appetite</td>
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<td>Sleep/wake</td>
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<td>Personality</td>
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<table>
<thead>
<tr>
<th>Memory</th>
<th>Insight/interpretation</th>
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<th>Gait/balance</th>
<th>Muscle strength</th>
<th>Coordination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attention/concentration</td>
<td>Cognitive function</td>
<td>Motor function</td>
<td>Reflexes</td>
<td>Voluntary control of body functions</td>
<td></td>
</tr>
<tr>
<td>Problem-solving/decision making</td>
<td>Sensory function</td>
<td>Psychosocial function</td>
<td>Appetite</td>
<td>Sleep/wake</td>
<td>Personality</td>
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effects also should be considered. For instance, evidence-based therapies for heart failure such as ACE inhibitors and beta-blockers may not be initially considered among the medications that affect the motor-function domain. However, physical deconditioning and decreased endurance for physical activity may certainly be a consequence of heart-failure progression if not adequately treated. This can, in turn, affect the ability to efficiently or comfortably complete ADLs or IADLs.¹

Recognizing the Problem

Health care providers can make observations that suggest difficulties in ADLs. Aside from obvious indicators such as the use of assistive devices to walk, hear, or see, in the community setting the pharmacist might look for the following:

- Can patients come and go from the pharmacy by themselves or must someone else come on their behalf?
- Can the individual complete the transaction of obtaining a prescription without assistance?
- How well can patients read the print on the prescription label? Can they display understanding of medication counseling through open-ended questions?
- Are there signs of difficulties with medication self-administration suggested by poor medication adherence, such as erratic refill activity?
- Is the patient purchasing prescription or nonprescription products used to treat various medical condi-

Table 1. Examples of ADLs and IADLs

<table>
<thead>
<tr>
<th>ADLs</th>
<th>IADLs</th>
</tr>
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<tbody>
<tr>
<td>Ambulating</td>
<td>Cooking</td>
</tr>
<tr>
<td>Bathing</td>
<td>Driving</td>
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<tr>
<td>Dressing</td>
<td>Household chores</td>
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<tr>
<td>Drinking</td>
<td>Managing finances</td>
</tr>
<tr>
<td>Eating</td>
<td>Nurturing social relationships</td>
</tr>
<tr>
<td>Grooming</td>
<td>Reading</td>
</tr>
<tr>
<td>Speaking</td>
<td>Self-administration of medication</td>
</tr>
<tr>
<td>Toileting</td>
<td>Using a telephone</td>
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<tr>
<td>Transferring</td>
<td>Writing</td>
</tr>
</tbody>
</table>

Abbreviations: ADLs = Activities of daily living, IADLs = Instrumental activities of daily living

Interventions

- Provide appropriate equipment and assistive devices. Many pharmacies offer a variety of durable medical equipment and assistive devices that can help patients perform daily activities more independently. Patients can be counseled about the availability and use of adaptive equipment specific to their needs. These interventions will be particularly useful for patients with impairments in motor functions.
- Choose counseling strategies that accommodate special needs. Medication counseling should be oral as well as written. Counseling should include techniques such as open-ended questions to ensure patient understanding. Written medication information needs to be readable, either with large-font printouts (if available) or magnifying aids. If necessary for patients with cognitive impairment, permission can be obtained to provide counseling to a family member or caregiver.
- Recommend adherence tools that enhance the safety and accuracy of medication administration. Medication-adherence aids such as regimen organizers and visual or audible alerts may help some patients be more successful with self-administration of medication. The strategy or
device chosen may have to be tailored to an individual patient’s needs. It is strongly recommended that pharma-
cists familiarize themselves with several products and their relative pros and cons so that they can recommend the right adherence strategy, and they can provide detailed counseling about use.

- Intervene to help avoid, reduce, or eliminate med-
ications that exacerbate difficulties. For example, they can suggest that the physician consider gradual dose reduction and possible discontinuation of medications that can impair ADLs and discuss these options with the patient and/or caregiver.

- Intervene to optimize health outcomes. Drug-therapy recommendations that optimize the treatment of any existing chronic diseases may help prevent further functional decline. For instance, suggestions to improve blood glucose or lipid parameters in patients with diabetes and heart disease may help prevent outcomes such as stroke, which may be associated with significant functional impairments. A variety of therapeutic interventions might be made depending on the patient’s medical history or drug regimen.

**Cognitive Dysfunction: Delirium vs. Dementia**
The presence of cognitive dysfunction has a significant impact on every aspect of a patient’s life in both long-
term care and community settings. It is a cause of impairments of all four domains (Figure 1) and results in impairments in the performance of ADLs. Cognitive dysfunction can also be dangerous because it is often under-recognized or misinterpreted. There are two types of cognitive syndromes that will be discussed here: reversible and irreversible. Reversible cognitive dysfunction may involve drug-induced cognitive impairment or delirium. Irreversible cognitive dysfunction involves neu-
rological disorders such as Alzheimer’s disease (AD) or other dementias. It is important for health professionals to distinguish between the two if appropriate interven-
tions are to be initiated.

For example, delirium is a reversible cognitive impairment. It is a common form of atypical disease presentation and can result from illness or medication side effects.1-4 Table 3 lists various medical conditions and common medications that can precipitate delirium. Delirium can result in overmedication, injury, misdiag-

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**Table 2. Examples of Medications That Impair Functional Domain Performance**

<table>
<thead>
<tr>
<th>Domain</th>
<th>Medication or Medication Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cognitive</td>
<td>Benzodiazepines and other sedative hypnotics, narcotic analgesics, corticosteroids, anticonvulsants, centrally acting alpha-agonists, lithium, H2-antagonists, antiparkinsonian medications. Medications with anticholinergic properties: tricyclic antidepressants, muscle relaxants, antihistamines, some antiarrhythmics, digoxin, some antipsychotics, GI and bladder antispasmodics</td>
</tr>
<tr>
<td>Motor</td>
<td>Antipsychotics, anticonvulsants, benzodiazepines and other sedative hypnotics, antidepressants, metoclopramide, trimethobenzamide, narcotic analgesics, anticholinergic medications</td>
</tr>
<tr>
<td>Sensory</td>
<td>Anticholinergic medications, NSAIDs, salicylates, aminoglycosides</td>
</tr>
<tr>
<td>Psychosocial</td>
<td>Antidepressants, benzodiazepines and other sedative hypnotics, appetite and psychomotor stimulants, antipsychotics, mood stabilizers (particularly when matched to the wrong indication), anticholinergic medications, narcotic analgesics, corticosteroids</td>
</tr>
</tbody>
</table>

**Abbreviations:** GI = Gastrointestinal, NSAIDs = Nonsteroidal anti-inflammatory drugs.
Table 3. Causes of Delirium

<table>
<thead>
<tr>
<th>Medical Conditions</th>
<th>Medications</th>
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</thead>
<tbody>
<tr>
<td>Anemia/bleeding</td>
<td>Anticholinergic medications</td>
</tr>
<tr>
<td>Depression</td>
<td>Corticosteroids</td>
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<tr>
<td>Electrolyte abnormalities</td>
<td>Digoxin</td>
</tr>
<tr>
<td>Hypoxia</td>
<td>H₂-antagonists</td>
</tr>
<tr>
<td>Infection</td>
<td>Narcotic analgesics</td>
</tr>
<tr>
<td>Malignancy</td>
<td>Psychoactive medications</td>
</tr>
<tr>
<td>Metabolic disturbances</td>
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<tr>
<td>Pain</td>
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</table>

Recognizing the Problem

Delirium is a cluster of symptoms that include cognitive impairment, disorientation, inability to focus or maintain attention, disturbed psychomotor activity, or disturbed sleep/wake cycles. Often these symptoms appear suddenly. Because conditions like AD are not usually characterized by a sudden onset of a dramatic cognitive change, this characteristic is often cited as a distinguishing factor between dementia and delirium.

The initial challenge for clinicians is to appropriately recognize that disease presentation is occurring, then determine the cause. While delirious, patients will be unable to provide history of their own; therefore, the initial intervention needs to be a thorough examination and workup. This may include physical assessment, laboratory assessment, and medication review. The evaluation includes level of consciousness; vital signs, such as blood pressure, heart rate, respiratory rate, and temperature; and any signs of injury. A quick and reliable instrument for assessing the presence of delirium is the CAM (Confusion Assessment Method). Using a nine-item questionnaire, the CAM evaluates the onset of mental status change, inattention, disorganized thinking, level-of-consciousness, disorientation, memory impairment, perceptual disturbances, psychomotor agitation or psychomotor retardation, and altered sleep-wake cycle. It is usually performed in conjunction with the Mini-Mental State Examination (MMSE). This latter assessment does not evaluate the severity of delirium, but has good sensitivity for detecting the presence of delirium and is widely used in both clinical and research settings. Laboratory assessment should include complete blood count (CBC), serum chemistry, and urinalysis. A review of chronic medical conditions or medications may prompt the evaluation of additional assessments such as EKGs, X-rays, or serum-drug concentrations. Medication review also can provide useful information. If the patient’s medical history is unknown, a medication list can provide insight into the chronic conditions for which the patient is receiving treatment. The presence of high-risk medication or medication dose should also be considered. Excessive dose is often related to medication toxicity, but suboptimal dose could also be indirectly related to delirium presentation because subtherapeutic treatment could exacerbate the condition. Medication combinations are also important—drug interactions or additive effects of duplicate therapies can increase the risk of adverse outcomes.

Interventions

- Patients with sudden onset changes in cognitive function should be assessed for delirium. The identification of any medications that can precipitate or exacerbate delirium should be reported to the physician for potential reduction or discontinuation.

- Treatment should be directed at the underlying cause and will be specific to the precipitating factor. While this is being initiated, supportive strategies to keep the patient calm, comfortable, and safe may be necessary. Ideally, these are nonpharmacologic interventions that might include ensuring a safe, quiet environment, minimizing aggravating stimuli such as noise and lots of people, keeping the patient comfortable, and providing familiar or reassuring people or objects.

- Be sensitive to the effects of “sensory stripping”; this includes removal of personal clothing for a hospital garment; removal of hearing aids, glasses, and dentures; restricting of mobility because of intravenous tubing and catheters, and leaving the patient alone in an unfamiliar place. These are interventions that are often performed for practical reasons, but can exacerbate delirium by leaving a patient feeling more confused, cold, and unable to see, hear, or move.

- If the acute use of a medication intervention is required to de-escalate a dangerous situation (i.e., acute physical aggression), low doses of either lorazepam or haloperidol are often employed. The choice of agent will
depend on the patient’s history, potential for alcohol as a contributing factor, or known past success or failure with either medication. A dose of 0.5 mg of either agent can be administered via a variety of routes.

- Careful counseling should be provided in the event that pharmacologic intervention is employed to control acute agitation associated with delirium. Medication cannot alleviate the need for nonpharmacological interventions; these will need to continue before and after medication takes effect. Consideration of medication onset-of-action is important to avoid premature administration of multiple doses.

- When recommending any medication intervention for this geriatric syndrome, consider that such intervention can also have consequences on other geriatric syndromes or medical conditions. Table 4 identifies risk and benefit factors that should be weighed when considering treatment.

**Irreversible Cognitive Impairment**

Irreversible cognitive impairment can be caused by a variety of neurologic conditions including AD, vascular disease, dementia with Lewy bodies, advanced Parkinson’s disease, and many others. An accurate diagnosis of the dementia variant is important to determine whether the patient is an appropriate candidate for medication interventions, for instance cholinesterase inhibitors or an N-methyl D-aspartate receptor-antagonist. Medications that are associated with cognitive impairment are not a direct cause of these irreversible disorders, but can certainly exacerbate symptoms in patients who have them. A list of medications that affect the cognitive function domain is shown in Table 4.

**Recognizing the Problem**

The classic signs and symptoms of dementia include confusion, disorientation, memory impairment, deficits in problem solving and other complex decision making, mood and personality changes, and the inability to perform ADLs or IADLs. These symptoms often occur as mild impairments that progress in severity over time; however, these signs may not be reported by the patient and may not be overtly obvious to an individual outside the individual’s close circle of family or friends. Therefore, there are both direct and indirect ways the pharmacist can recognize AD or other dementias. The presence of medications indicated for the treatment of AD, such as a cholinesterase inhibitor or memantine, suggests that a diagnosis has already been established. For patients in whom a diagnosis is not known, there are many indicators the pharmacist should consider. Many of these are neither sensitive nor specific to the detection of cognitive impairment but should merely be considered as prompts for further investigation. Pharmacists should consider the presence of medications (including nonprescription medications) that can cause or exacerbate cognitive impairment, signs of nonadherence or inaccurate medication self-administration, difficulty answering open-ended questions during medication counseling, or reliance on a family member or other individual for assistance with prescription transactions. Finally, the nonprescription purchase of ginkgo biloba or other supplements promoted for mental function suggests that cognitive dysfunction, whether present or not, is a concern for the patient. When cognitive dysfunction is suspected for one of these reasons, an evaluation of duration and severity of the behavior is needed. Specific tools, such as the MMSE, can be used. By itself, the MMSE cannot distinguish between reversible and irreversible forms of cognitive impairment. It also can be confounded by the presence of depression. For that reason, if cognitive impairment is identified with such an assessment, this information should be shared with the patient’s physician for an appropriate workup to determine possible causes. The optimal interventions cannot be implemented until the distinction has been made between reversible and irreversible cognitive impairment and other confounders such as depression have been ruled out.

**Interventions**

- Patients should be encouraged to seek evaluation by a primary care physician or neurologist, if possible, to rule out potential causes of reversible symptoms.
- For patients reluctant to seek medical attention, it may still be advisable to share concerns with their physician. As patients may not self-report symptoms of cognitive impairment, this may be a valuable prompt for the physician to perform a timely evaluation.
- Patients should be counseled about prescription medications that can impair cognition. Recommendations to reduce or discontinue the offending medication can be pursued, with the attending physician’s oversight.
### Table 4. Pharmacologic Interventions for Geriatric Syndromes and Their Possible Consequences

<table>
<thead>
<tr>
<th>Target Geriatric Syndrome</th>
<th>Medication Intervention</th>
<th>Possible Consequences of Medication Intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cognitive dysfunction</td>
<td>Cholinesterase inhibitors, NMDA-receptor antagonist</td>
<td>Urinary incontinence, dizziness</td>
</tr>
<tr>
<td>Constipation</td>
<td>Bulk forming agents, stimulants, nonabsorbable disaccharides, PEG solution, stool softeners</td>
<td>Increased gas, GI obstruction (if not well hydrated), laxative dependence, cramping</td>
</tr>
<tr>
<td>Delirium</td>
<td>Low-dose lorazepam or haloperidol</td>
<td>Cognitive dysfunction, sedation, falls, movement disorders</td>
</tr>
<tr>
<td>Depression</td>
<td>Antidepressants</td>
<td>Dizziness, falls (specific to side effect profile: cognitive impairment, constipation, appetite and sleep-wake changes)</td>
</tr>
<tr>
<td>Dizziness</td>
<td>Meclizine</td>
<td>Cognitive impairment, constipation, blurred vision, sedation</td>
</tr>
<tr>
<td>Falls</td>
<td>Medication reduction</td>
<td>Risk/benefit trade-offs may need to be made between risk of falls and the medication’s efficacy for another condition</td>
</tr>
<tr>
<td>Nutrition/weight loss</td>
<td>Appetite stimulants, antidepressants, megestrol acetate, multivitamins, high-calorie supplements</td>
<td>Mood/anxiety effects, possible edema/heart failure exacerbation or thromboembolism risk (megestrol)</td>
</tr>
<tr>
<td>Osteoporosis</td>
<td>Calcium/vitamin D, bisphosphonates, calcitonin, raloxefine, parathyroid hormone</td>
<td>Constipation, gastritis/esophagitis, hypocalcemia, thromboembolism</td>
</tr>
<tr>
<td>Pain</td>
<td>Acetaminophen, NSAIDs including COX-2 selective, narcotic analgesics</td>
<td>GI/renal side effects (NSAIDs)</td>
</tr>
<tr>
<td>Sensory loss</td>
<td>Glaucoma medications, vitamin supplementation (vision), gabapentin or tricyclic antidepressants (neuropathy)</td>
<td>Systemic effects on blood pressure, and heart rate, cognitive impairment, constipation, blurred vision, sedation</td>
</tr>
<tr>
<td>Substance abuse</td>
<td>Supervised reduction/withdrawal, naloxone</td>
<td>Withdrawal side effects, anxiety</td>
</tr>
<tr>
<td>Urinary incontinence</td>
<td>Topical estrogen, pseudoephedrine (stress), bladder antispasmodics (urge), alpha antagonists</td>
<td>Elevated BP and heart rate, cognitive impairment, constipation, blurred vision, sedation, orthostatic hypotension</td>
</tr>
</tbody>
</table>

Abbreviations: BP = Blood pressure, GI = Gastrointestinal, NMDA = N-methyl d-aspartate receptor-antagonist, NSAID = Nonsteroidal anti-inflammatory drug, PEG = Polyethylene glycol.
Pharmacists should stress to patients that medications should not be abruptly discontinued, as this may precipitate withdrawal symptoms.

- Recommendations should be made to the physician to obtain laboratory assessment for medications that require monitoring of serum chemistry, CBC, plasma concentration, or other parameters. This can help reverse or avoid cognitive impairment associated with medication toxicity or suboptimal treatment of an underlying medical condition.

- Patients should be counseled about nonprescription medications that contain anticholinergic/antihistaminic ingredients, such as diphenhydramine.

- When a diagnosis of AD has been established, patients and caregivers should be counseled about the proper dosing and titration of cholinesterase inhibitors and memantine. Recommendations to pursue timely titration schedules and achieve optimal therapeutic doses can help optimize the likelihood of response.

- For patients using cholinesterase inhibitors, pharmacists should be aware of pharmacodynamic interactions with anticholinergic medications and make recommendations to remove anticholinergic medications, if possible.

- Medication adherence and timely refill activity can be monitored to identify difficulty with medication self-administration. This may not only be important for medications used to treat the cognitive impairment, but also for any medication used to treat other medical conditions the patient may have. Adherence aids may be useful for some individuals to ensure more accurate medication-taking.

- When recommending any medication intervention for this geriatric syndrome, consider that such intervention can also have consequences on other geriatric syndromes or medical conditions. Table 4 identifies risk and benefit factors that should be weighed when considering treatment.

**Depression**

Depression affects a large number of patients older than age 65. Depression not only affects a patient’s mood, but also impedes functioning in all four domains and therefore has the potential to be a significant cause of disability and further decline. Because of the multiple factors associated with depression presentation in older adults it is often misinterpreted, leaving patients at risk for suboptimal treatment. Lack of appropriate diagnosis can result in depression being misinterpreted as dementia. Treating insomnia, weight loss, anxiety, or nonspecific somatic complaints as individual symptoms may be inadequate to address a broader affective disorder, and the patient may not achieve complete relief. In addition, the medication interventions for individual symptoms may carry side effect consequences that exacerbate the underlying condition. For instance, the treatment of insomnia with an anticholinergic over-the-counter preparation may exacerbate cognitive impairment that, in turn, may cause further functional dependence and social isolation. If this were the underlying cause this may ultimately worsen the depression.

**Recognizing the Problem**

Mood scales can be employed to screen for depression. These are interview-based scales that quantify the patient’s experience of various symptoms. For a patient who cannot provide self-report information, third-person scales such as the Cornell Scale for Depression in Dementia, allow a direct caregiver to report observed symptoms of depression. In addition, there are other clues for which the pharmacist can look. Multiple medications for anxiety, insomnia, and pain, particularly when used chronically, may trigger an evaluation. The mere presence of such medications on the regimen does not imply inappropriate medication use. However, as depression may be either a cause or a consequence of such symptoms, a screening evaluation may be prudent to ensure all the patient’s needs are being adequately addressed.

Poor performance on the MMSE should also trigger a mood assessment, as depression can confound performance on cognitive tests. Finally, the presence of antidepressants on the prescription regimen is important. The presence of the medication suggests a diagnosis of depression has already been made, but the medication-indication match may not be enough to assume that depression is adequately treated. The antidepressant may improve mood symptoms by enhancing neurochemical activity, but drug therapy alone cannot address psychosocial factors that may precipitate episodes of depression. There is still an opportunity to assess adequate dose, patient perception of response, or presence/absence of nonpharmacological interventions and support.
Interventions

- Referral to the primary physician for thorough workup may be necessary if depression is suspected based on any of the assessment or screening activities.
- For patients reluctant to seek medical attention, it may still be advisable to share concerns with their physician. As patients may not self-report symptoms of depression, this may be a valuable prompt for the physician to perform a timely evaluation.
- Antidepressant therapy should be recommended with consideration of side effect profiles. Identifying medications that are employed at subtherapeutic doses are also important to avoid the exposure to side effects without the benefit of optimal efficacy.
- Recommendations for antidepressant therapy should be made with considerations of side effect profile. At therapeutic doses, antidepressants are all efficacious; however, side effect profiles vary.

Dizziness

Dizziness is a problematic symptom that is often a consequence of an underlying medical condition or medication side effect. Some causes of dizziness include cardiovascular disease, orthostatic hypotension, and medications that have pharmacological activity in the central nervous system (CNS). Dizziness can result in falls and related injuries, decreased ambulation from fear of falling, and treatment for dizziness without unearthing the underlying cause. Dizziness can also be a risk factor for the prescribing of anticholinergic medication, which may precipitate cognitive impairment and further effects on function. The use of anticholinergic medication such as meclizine may be appropriate for symptomatic control if the underlying cause is a vestibular disorder such as vertigo. However, if other possible causes are not adequately ruled out or treated prior to the initiation of anticholinergic medication, the patient may be at risk for experiencing side effects of an inappropriate medication. When assessing a patient experiencing dizziness, the presence of underlying causes must be evaluated. The patient must also be evaluated for any consequences of dizziness treatment (Table 4).

Recognizing the Problem

The Tinetti Performance-Oriented Mobility Assessment can be used to identify patients who are having difficulties with gait and balance. In addition, the pharmacist can perform blood pressure assessments, specifically orthostatic assessments, to identify blood pressure fluctuations that may be associated with symptoms. Drug regimen review can be performed to identify the presence of medications likely to cause dizziness. Increasing reliance on assistive devices to walk may also be a sign that an individual feels unsteady. A patient interview can also reveal specific information about when dizziness occurs, which factors are associated with worsening or improving symptoms, and whether there has been a history of falls.

Interventions

- The first step should be the evaluation of the medical history and drug regimen for underlying causes of dizziness. This may also include patient assessment measures such as orthostatic checks.
- Anticholinergic medications such as meclizine are only advisable if the underlying cause of dizziness is determined to be a vestibular disorder and other underlying causes have been ruled out. Patients who are already receiving such medication intervention should be interviewed about the effectiveness of this therapy for their symptoms and for the presence of any anticholinergic side effects.
- Patients should be counseled about the potential for side effects when using medications that can cause dizziness. This counseling should include recommendations to avoid driving or other activities that may be impaired by dizziness until it is known how the patient will respond to the medication. Avoiding the additive side effects by limiting or avoiding alcohol consumption is also advised.
- If medications that exacerbate dizziness are identified, recommendations can be made to reduce, discontinue, or replace them. If it is suspected that dizziness is related to an underlying medical condition, drug-therapy interventions may need to be directed at the underlying cause.
- If dizziness has been associated with falls, particularly if there is a known history of injury associated with falling, interventions to protect patients against osteoporosis and related fracture risk are also important.

Osteoporosis

Fractures are a significant cause of functional decline in older patients. Such injury can impede the ability to perform ADLs, even after the acute injury has healed.
For instance, 50% of patients who suffer a hip fracture will not regain their baseline level of function. There are two important areas of focus: fracture risk related to decreased bone density (osteoporosis), and fracture risk related to falls. Osteoporosis is associated with decreases in bone-mineral density greater than 2.5 standard deviations below that of a healthy female control (T-score). While osteoporosis is particularly prevalent in postmenopausal women, osteoporosis does occur in men as well.

**Recognizing the Problem**

Osteoporosis screening can involve several types of activities.\(^4\) With the availability of portable heel ultrasound assessment, bone-density screening can be performed in the community pharmacy setting. These machines do not replace a DEXA of the hip or spine as the gold standard evaluation, but as a screening tool the ultrasound machine can identify patients at risk who should be referred for further evaluation. Review of prescription profiles can also reveal important information. Of course, the presence of antiresorptive medications such as bisphosphonates indicate that the diagnosis of osteoporosis or osteopenia has already been made, but there may still be interventions the pharmacist can make to optimize the existing treatment, such as ensuring proper administration and compliance of medication and recommending adequate calcium and vitamin D intake. Similar interventions are important for patients for whom the presence or absence of an osteoporosis diagnosis is not known. Factors such as patient age, presence of chronic medications associated with decreased bone density, or presence of medications that can predispose patients to fall-related injury might prompt the pharmacist to probe further with a patient interview. A patient interview can reveal calcium intake (dietary or supplementation), extent of weight-bearing exercise, or any history of fall or related fracture.

**Interventions**

- Patients identified as “at risk” based on pharmacist screening can be referred to their physician for evaluation, diagnosis, and possible medication initiation. Drug-therapy interventions can be made to reduce or eliminate medications associated with decreased bone density and to initiate calcium supplementation or antiresorptive therapy. This is important for all patients with risk factors, but particularly so for those individuals with a history of fracture who are not receiving osteoporosis treatment.
- Pharmacists can counsel both men and women about calcium and vitamin D supplementation. All persons 65 years of age or older should ingest 1,000-1,500 mg elemental calcium per day. Because the absorption of calcium carbonate is theoretically affected by increases in gastric pH associated with advancing age or the use of acid-reducing medications, patients should be advised to split their daily calcium intake into two to three daily doses of no more than 500-600 mg, or they can consider alternate products such as calcium citrate, which is not pH dependent for absorption.
- Recommendations for daily vitamin D intake have been increasing, from 400-600 IU to 800-1,000 IU per day. In some cases vitamin D levels may be assessed to determine the optimal replacement dose.
- Recommendations for bisphosphonates, calcitriol, or parathyroid hormone may be options for both men and women. Raloxifene is an additional option that can be recommended in postmenopausal women.
- Pharmacists can provide careful counseling about safe self-administration of osteoporosis medications, particularly bisphosphonates. Additional evaluation of adherence through a patient interview or review of refill activity can suggest whether there may be an adherence or self-administration concern. The physician may also benefit from shared knowledge about any medication-adherence observations.

**Falls**

Falls may occur in as many as 30% of community-dwelling individuals older than 65 years of age. When considering the population older than 85 years of age, the incidence increases to 50%. Fall-related injury is a leading cause of pain, nursing facility placement, and mortality. While fractures related to osteoporosis can occur without a precipitating fall—in fact, sometimes the osteoporotic fracture is actually the cause of a fall—the risk of fractures is compounded for an individual with both fall risk and decreased bone density. Therefore, interventions to decrease the risk of falls and fractures are very important in older patients.\(^5,6\)
Recognizing the Problem
There are assessments the pharmacist can use to identify the risk of falling. A patient interview can reveal risk factors, particularly a history of previous falls—a significant risk factor for recurrent falls. Patients who require mobility aids such as walkers or canes might be good candidates for fall-risk evaluation as they already have underlying difficulties with ambulation. Review of the prescription regimen can reveal the presence of medications with a high risk of inducing falls or provide clues about chronic medical conditions that can increase fall risk.

Often, the causes of falls involve multiple factors, so pharmacist intervention to reduce problematic medication may not be the only intervention the individual will require to reduce the risk of falling. However, the pharmacist can:

- Recommend periodic gradual dose-reduction attempts for medications with a high risk for inducing falls. This should be done with physician oversight, and patients should be counseled not to abruptly discontinue medications.
- Recommend regular monitoring of serum-drug concentrations of medications where such monitoring is indicated. Other drug-therapy interventions to optimize chronic disease control may prevent adverse health outcomes that could increase the risk of falls or their injurious consequences. Examples would be to control blood pressure or blood glucose or recommend regular international normalized ratio and adherence monitoring in a patient undergoing anticoagulation therapy.
- Provide patient counseling about home modifications and preventive measures, such as eliminating tripping hazards, ensuring adequate lighting, or installing grab-bars in bathrooms.
- Patients at high risk for falls may benefit from personal alarm systems worn as a medallion around their neck. This can allow them to call for help in the event of a fall if they cannot access a telephone.

Sensory Loss
Sensory impairments can be a consequence of multiple medical conditions. Causes include vision difficulties, such as from cataracts, glaucoma, or macular degeneration; peripheral neuropathy; and medications.17-20 Impairment of sensory function can impede ADLs and, specifically, impair accurate medication self-administra-

In addition, many medications can affect sensory function (Table 2). Sensory impairments are closely linked to impairments in ADLs, as the performance of these activities require the ability to see, hear, taste, smell, or feel. Therefore, the consequences of sensory impairments affect all four functional domains.

Recognizing the Problem
There are important assessments and interventions pharmacists can make for the patient experiencing sensory losses. The Snellen eye chart can be used to identify visual impairment. Additional assessments are similar to those recommended earlier in this monograph in the ADL section.

Interventions
- Review the prescription profile for medication that can potentially exacerbate altered vision or peripheral neuropathy, or affect taste.
- Offer both oral or written counseling, or provide large-print materials or magnifiers.
- Ensure patients can recognize medications by name and indication and not just shape, color, and size.
- Verify that patients can perform the appropriate administration technique for their medications, particularly those that require devices such as inhalers or syringes.
- Offer counseling in an area that is as private as possible with a minimum of background noise.
- Stay informed about assistive devices for hearing impairment and refer patients for hearing evaluation when appropriate.
- Recognize that some individuals’ ability to interact with automated telephone systems may be compromised and provide alternative mechanisms for them to refill prescriptions and ask questions.

Nutrition and Weight Loss
Adequate nutrition is linked to physical reserve and health maintenance. The ability to withstand illness, fight infection, and prevent functional decline is compromised when nutrition is poor. Unfortunately, the ability to maintain nutrition is compromised with deficits in any of the four domains. Causes of poor nutrition include poor appetite, depression, altered taste and smell, lack of access to quality nutrition, and poor dentition. Poor
nutrition can lead to unintended weight loss, vitamin deficiencies, anemias, and decreased immune function.\textsuperscript{21,22}

**Recognizing the Problem**

Measures such as weight, albumin, body-mass index, and anthropometric measures such as arm circumference can be monitored over time for signs of wasting.\textsuperscript{22} The percentage of food consumed at each meal can be monitored for signs of appetite. Health professionals such as speech therapists can assess the safety of swallowing. Laboratory monitoring of the chemistry panel and CBC can identify dehydration, electrolyte disturbances, or anemia. The presence of medications that are associated with cognitive or motor impairment can blunt the ability for patients to feed themselves. In the home setting, adequate supply of food and safe food preparation skills can be assessed. Patients can be interviewed to determine how many meals they eat per day and how they obtain food.\textsuperscript{22}

**Interventions**

- Patients should be referred to resources that can provide transportation, prepared meals, or other assistance if IADL impairment affects food access.
- Regular oral exams and dental appointments to ensure the health of teeth and oral mucosa, proper fit of dentures, and ability to chew and swallow.
- To the extent possible, food should be palatable, visually appetizing, the proper temperature, and accommodate likes and dislikes.
- Ensure proper hydration, ideally 1,000 to 2,000 mL of water or other liquid per day. If necessary, the consistency of liquids may need to be altered for patients with impaired swallowing.
- Multivitamins or high-calorie supplements may be considered if intake at meals is poor. However, take care not to blunt the appetite by providing a high-calorie supplement prior to mealtimes.
- Mood screening should be performed to identify patients with appetite loss resulting from depression. Treatment of depression with an antidepressant is indicated in this situation. Care should be taken to avoid antidepressants that may exacerbate anorexia, such as fluoxetine. For severely depressed patients, short-term methylphenidate may provide a more rapid response, but should not be used long term as it too can cause anorexia, as well as other stimulant side effects.
- Pharmacologic intervention with agents such as megestrol acetate, mirtazapine, mannitol, or cyproheptadine may be employed in some circumstances. Unfortunately, all of these options carry side effect concerns, and it is unclear how weight gain achieved with medication therapy affects long-term health outcomes.

**Pain**

There are multiple causes of pain that can affect older patients.\textsuperscript{23} Some of the more common ones are osteoarthritis, rheumatoid arthritis, peripheral neuropathy, and fractures.\textsuperscript{24} Pain can be a cause of delirium, insomnia, immobility, and loss of ADLs and IADLs. Whether acute or chronic, pain has a significant effect on quality of life. It is often under-recognized, particularly in patients with cognitive or speech impairments who cannot articulate their symptoms. Pain can present atypically as delirium, depression, irritability, insomnia, or agitation, and frequently is undertreated.\textsuperscript{25} The side effects of analgesic medication are problematic in elderly patients, and this can lead to the reluctance to treat pain aggressively, and because symptoms can be misattributed to other conditions, patients may receive interventions for mood, behavior, insomnia, or appetite that do not adequately address underlying pain. Therefore, the consequences of both treated and untreated pain include sedation, cognitive changes, dizziness, impairments in ADLs and IADLs, difficulty with ambulation, behavioral changes, and isolation.

**Recognizing the Problem**

Older patients who are cognitively intact can tell their health care provider when they have pain. A simple pain scale can be used to quantify the pain and monitor the effects of analgesic therapy. However, health care providers need to specifically ask older people about pain. Many older people may be stoic and may not report pain or under-report the pain intensity. Specific questioning about “discomfort,” “soreness,” “aching,” or other pain descriptors may elicit positive responses when “pain” is denied. Such questioning is also important in individuals with mild-to-moderate cognitive impairment. Although they may not self-report pain, such individuals can still respond to questions about pain, and simple scales like the “faces scale” are useful in this population. Recognizing pain in individuals with advanced cognitive
impairment can be more difficult. Signs of pain in these patients may be grimacing, unusual vocal, or aggressive behavior, increased body movement, fluctuating vitals signs, changes in sleep or appetite, depression, and worsening cognition.\textsuperscript{24}

**Interventions**

- The World Health Organization recommendations for pain management can be applied for the treatment of mild, moderate, or severe pain.
- Scheduled acetaminophen not to exceed 4 grams per day is considered a first-line intervention for mild pain.
- NSAID analgesics can be used effectively for mild pain or inflammation; however, routine monitoring for GI and renal toxicities is imperative. While COX-2 selective agents may be relatively safer, the same monitoring must be performed.
- For moderate pain, combination products containing acetaminophen with other analgesics such as tramadol or hydrocodone can be effective. However, monitoring for nausea and cognitive effects should occur. Propoxyphene- and pentazocine-containing products should be avoided as they confer little additional analgesic benefit but have the side effects of narcotic analgesics. The total daily intake of acetaminophen should be monitored carefully when combination products are employed.
- For severe pain, narcotic analgesics such as morphine may be necessary. When dosed appropriately and monitored carefully, these agents are valuable and should not be withheld because of fears of toxicity. However, the narcotic agent meperidine should be avoided because of the potential toxicity of its primary metabolite.
- Care should be taken when considering dosage form. If practical, oral absorption is most reliable and flexible. Transdermal administration of medications such as fentanyl can be problematic because heat and moisture can affect skin permeability and absorption rates. The 72-hour dosing interval does not provide the flexibility to quickly increase or decrease the dose in reaction to uncontrolled pain or excessive side effects.
- A bowel regimen to prevent constipation should be recommended for individuals requiring narcotic therapy.

**Substance Abuse**

Substance abuse may also be a concern in older individuals.\textsuperscript{25} The consequences of alcohol abuse or illicit substance use may be heightened in an individual with age-related changes in pharmacodynamic sensitivity to CNS effects, either directly or by interacting with medication. In addition, the use of many prescription medications may constitute substance abuse if they are used for their CNS-altering effects in a manner inconsistent with their therapeutic intent. Careful distinctions should be made between concepts of medication dependence and addiction, as the pharmacist’s interventions may differ in each scenario. Dependence occurs when adaptive changes in physiology alter the pharmacodynamic response to medication. Cessation of administration may or may not be appropriate and can precipitate symptoms of withdrawal. Chronic use of inappropriate medication may also be a consequence of an inaccurate diagnosis of the underlying cause of the patient’s symptoms. For instance, the chronic use of sedative hypnotics for insomnia, or benzodiazepines for anxiety, may be a result of the failure to recognize and adequately treat depression, pain, or other underlying medical condition. If a patient is suspected of inappropriately using a medication on a chronic basis, interventions must be carefully coordinated with all members of the patient’s health care team.

**Recognizing the Problem**

Pharmacists can identify chronic use of medications associated with dependence. Communication with both the patient and the prescriber is important to the appropriateness of chronic use so that legitimate therapy is not unnecessarily interrupted.

**Interventions**

- Patients should receive careful counseling about the compounding of CNS effects or other adverse reactions when alcohol or other substances are combined with prescription medication.
- Pharmacists should avoid recommending abrupt withdrawal of chronic medications. If inappropriate medication use is suspected, interventions should be coordinated with other caregivers.

**Urinary Incontinence**

Urinary incontinence is a consequence of several age-related problems. There are several types of incontinence that include stress incontinence, urge incontinence, or overflow incontinence, which are associated with physiologic changes in bladder control. However, there are also
many functional reasons why an individual would have difficulty maintaining bladder control, such as immobility. In addition, any medication that either increases urine output or impairs ADLs can also worsen incontinence, particularly functional incontinence. It must also be noted that medications used to treat one type of incontinence have the potential to cause or exacerbate other types of urinary incontinence or other medical conditions such as cognitive impairment.

Recognizing the Problem
There are multiple factors the pharmacist can look for to identify urinary incontinence or problems associated with its treatment. Drug regimen review may reveal the presence of medication that might exacerbate symptoms. The pharmacist can look for regular purchases of incontinence products (or in some cases the purchase of feminine hygiene products in a postmenopausal woman). For patients in whom incontinence is suspected but no medication therapy has been prescribed, private consultation can be offered. For patients who are already receiving medication therapy for incontinence, assessing whether the medication is appropriately selected based on the type of incontinence is important for two reasons. First it increases the likelihood of successful symptom relief. Second, it reduces the likelihood of unnecessary side effects, such as dry mouth, sedation, constipation, or cognitive impairment. Some medication side effects might be considered acceptable if the patient feels the efficacy for urinary symptoms is significant; however, side effects from a medication that is not appropriately matched to the type of urinary incontinence are problematic. Patients or their caregivers are in the best position to report whether they feel medication has been helpful.

Interventions
- A physician referral for evaluation, diagnosis, and possible medication initiation should be encouraged if the incontinence has not been evaluated.
- Pharmacists should familiarize themselves with incontinence undergarments and be prepared to counsel patients about their use.
- Nondrug therapies such as scheduled toileting every two hours can be recommended to minimize wetting episodes.
- Recommendations for pharmacologic therapy can be made if the type of incontinence has been established.
- If drug regimen review or patient interview reveals medications that exacerbate incontinence or seem inappropriately matched to the type of incontinence, recommendations can be made to the physician for reduction, discontinuation, or replacement. For some medications, a change in administration time can also be helpful (for instance, ensuring loop diuretics are not administered before bedtime).

Constipation
Constipation is an uncomfortable symptom that affects quality of life. It can be acute or chronic, and an individual’s interpretation of the severity of constipation can vary. Increasing age alone should not be considered a cause of constipation; however, it is a common concern among elderly patients as it can be caused or exacerbated by underlying medical conditions, medications, diet, and lifestyle factors. Immobility, malnutrition, dehydration, narcotic analgesics, and anticholinergic medications are all common causes of constipation.

Recognizing the Problem
Patients may report constipation when they are seeking a recommendation for a nonprescription treatment option. If there is a comfortable rapport between the patient and pharmacist, direct discussion is the best way to learn the frequency and severity of constipation symptoms. However, some individuals may not feel comfortable discussing their symptoms. Therefore, the pharmacist may also need to use clues from the patient profile or prescription record to identify individuals at risk. The presence of known medical conditions or medications associated with constipation or frequent purchase of nonprescription laxatives and stool softeners indicates constipation may be experienced to some degree.

Interventions
- For occasional, acute symptoms, treatment can be recommended with stimulant or osmotic laxative that can provide relief within 8 to 10 hours. For more immediate relief, glycerin suppositories or phosphosoda enemas can work within minutes.
- For patients complaining of straining or stools that are hard and lumpy, the addition of a stool softener such
as docusate sodium may relieve discomfort.

- For patients experiencing chronic constipation, many factors may need to be addressed. Nonpharmacological interventions include adequate dietary intake of fiber-rich foods, physical activity, and hydration. Between 1,000 and 2,000 mL of water is a recommended target for daily fluid consumption.

- The prescription profile should be reviewed to identify any medical conditions or medications that could be exacerbating constipation. Sometimes it will not be possible to modify these, but often the pharmacist can make drug-therapy interventions to alleviate constipation without compromising disease control.

- For patients requiring chronic opioid analgesia, it may be necessary to ensure that the patient is receiving an appropriate bowel regimen with a laxative such as senna. As these are often nonprescription, it may not be obvious from the prescription profile review whether this is part of the patient’s drug regimen or not and should be discussed during the counseling encounter.

- For patients receiving other classes of constipating medications, it must be determined whether the medication is absolutely necessary or if there is an alternate medication that could be used. The more information to which the pharmacist has access regarding medical history, medications the patient has tried in the past, and how well the current regimen is achieving therapeutic goals, the easier this will be. A patient interview can provide some of this information, or consultation with the patient’s prescriber may be necessary.

- If despite the identification of constipating risk factors there are simply no reasonable modifications that can be made, or if modifications have not resulted in elimination of symptoms, chronic constipation therapy may be indicated. Bulk-forming laxatives are often a first-line intervention. Adequate hydration is very important with this therapy.

- If additional intervention is required, nonabsorbable disaccharides or polyethylene glycol may be employed next. Ideally the chronic use of stimulant laxatives should be avoided.

- When stimulants are employed on a regular basis, their use can be minimized with intermittent scheduling, such as “every third day if no bowel movement.” Such a regimen may be particularly advantageous in a patient with cognitive impairment who cannot articulate complaints of constipation.

- Long-time remedies such as mineral oil administered orally should be avoided, especially in individuals with swallowing problems or who are bed-bound as a result of aspiration pneumonia.

Conclusions

Geriatric syndromes are common problems in older patients that cause morbidity and mortality. These syndromes are clusters of age-related changes, medical conditions, symptoms, and medication effects that are associated with decline in one or more of the functional domains. Geriatric syndromes have two important characteristics: they are problems that arise as consequences of impairments in one of the functional domains, and they also are problems that are likely to be a cause of impairments in these domains. Therefore, the approach to caring for an individual with geriatric syndromes is complex, and the pharmacist must consider two types of interventions: interventions to treat the underlying cause of the syndrome, and interventions to prevent or resolve the consequences of the syndrome on other aspects of function. When recommending any medication intervention, consider that such intervention can also have consequences on other geriatric syndromes or medical conditions, as shown in Table 4, and risk versus benefit must be weighed when considering treatment.

References