

DiPiro's Pharmacotherapy: A Pathophysiologic Approach, 12th Edition >

Chapter e24: Geriatrics: Medication Use in Older Adults

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CHAPTER SUMMARY FROM THE PHARMACOTHERAPY HANDBOOK

For the Chapter in the Schwinghammer Handbook, please go to [Appendix 2, Geriatric Assessment and Pharmacotherapy](#).

KEY CONCEPTS

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- 1 Improving and maintaining functional status is a cornerstone of care for older adults.
- 2 Adverse drug reactions in older adults are common and cause considerable morbidity.
- 3 Inappropriate prescribing is a major concern and is guided by the Beers criteria.
- 4 Polypharmacy can be defined in various ways and is a common occurrence in older adults.
- 5 Underutilization of medications also occurs and can be improved by using the START criteria.
- 6 Pharmacists can play a major role in optimizing drug therapy and preventing adverse consequences of medications in older adults.
- 7 Deprescribing should be considered to reduce medications in older adults.
- 8 Practitioners may consider targeting high-risk older adults to implement comprehensive management strategies.

BEYOND THE BOOK

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Read the current American Geriatrics Society Beers Criteria^{®13} and discuss the impact of the recommendations on medication use in older adults.

INTRODUCTION

1 Pharmacotherapy for older adults can cure or palliate disease as well as enhance health-related quality of life (HRQOL). HRQOL considerations for older adults include focusing on improvements in physical functioning (eg, activities of daily living), psychological functioning (eg, cognition, depression), social functioning (eg, social activities, support systems), and overall health (eg, general health perception).¹ Despite the benefits of pharmacotherapy, HRQOL can be compromised by drug-related problems. The clinical response to a medication in an older adult is the result of the interaction of a number of complex processes, including pharmacokinetics, pharmacodynamics, concurrent medications, comorbidities, and frailty.

Age-related changes in physiology can affect drug pharmacokinetics and pharmacodynamics.² When applying general knowledge of pharmacokinetic and pharmacodynamic alterations in an older adult in the clinical setting, it is necessary to consider the patient's overall condition, age, diseases, frailty status, and concurrent medications. Prevention of drug-related problems in older adults requires that health professionals become knowledgeable about a number of age-specific issues. To address these knowledge needs, this chapter discusses the epidemiology of adverse consequences of medications in older adults and an approach to optimizing medication use through the provision of a comprehensive geriatric assessment.

ADVERSE CONSEQUENCES OF MEDICATION USE

Although medications used by older adults can lead to improvement in HRQOL, adverse outcomes caused by drug-related problems are considerable.³ Adverse drug reactions (ADRs) and negative consequences of drug therapy are major threats to the HRQOL of outpatient older adults and account for a significant portion of healthcare expenditures.⁴ Estimates are that more than \$520 billion was spent in 2016 for prescription-associated morbidity and mortality from nonoptimized medications.⁴

ADVERSE DRUG REACTIONS

2 ADRs are a major public health problem for older adults in all settings. ADRs are defined as “a response to a drug that is noxious and unintended and occurs at doses normally used in man for the prophylaxis, diagnosis or therapy of disease, or for modification of physiological function” and exclude therapeutic failure and adverse drug withdrawal events.⁵ Approximately 9% of hospitalizations in older adults are caused by ADRs, while 16% of older adults experience a significant ADR while hospitalized.^{6,7} Moreover, ADRs occur frequently in community-dwelling older adults (10%-35% yearly). Transitions of care are often high-risk times for adverse drug-related events.^{8,9} For example, one study found that 19% of older adults experienced an adverse drug event within 45 days of hospital discharge.⁸ Some medication classes, such as anticoagulants, antidiabetic agents, and opioids, are especially problematic for causing serious ADRs in older adults and are high priority targets to improve patient safety.^{5,10} The use of potentially inappropriate medications (eg, Beers criteria drugs) only causes a small proportion of ADRs.^{6,8,10} Number of medications is a consistent risk factor for ADRs.⁶

Inappropriate Prescribing

3 Inappropriate prescribing is defined broadly as prescribing medications outside the bounds of accepted medical standards. However, inappropriate prescribing is challenging to define and operationalize. Furthermore, “appropriateness” of prescribing is viewed differently in people with multiple chronic conditions (ie, multimorbidity) or in those who are frail.¹¹ Inappropriate prescribing is associated with adverse drug events, functional decline, quality of life, healthcare utilization, and increased healthcare costs.¹²

The most widely used explicit criteria are those that include lists of drugs to avoid, or potentially inappropriate medications (PIMs), because the risks of their use likely outweighs any potential benefit. The American Geriatrics Society (AGS) Beers Criteria[®] (US-based) and Screening Tool of Older People's Prescriptions (STOPP; European-based) are two common, explicit-based approaches to identify PIM.^{13,14} These criteria share some content but also have unique characteristics that are outlined in [Table e24-1](#). Studies conducted in the United States using the Beers criteria have found that up to 29% to 43% of community-dwelling older adults are taking at least one PIM.^{15,16} An Irish study found that 46% of older patients used at least one PIM per the STOPP criteria at hospital admission, and a similar extent of use was found in community dwelling older adults.^{17,18} A systematic review that examined PIM use by a number of different criteria found that 43% of residents of long-term care facilities were using at least one PIM.¹⁹

TABLE e24-1

Comparison of American Geriatrics Society Beers Criteria and STOPP Criteria

Criteria	Organization	Number of Criteria
Beers	Criteria are organized into five tables:	
	1. PIMs for all older adults, organized according to organ system and therapeutic category	34
	2. PIMs for some older adults due to drug-disease or drug-syndrome interactions that might exacerbate disease/syndromes (eg, syncope, delirium, dementia, history of falls or fractures, history of gastrointestinal ulcers, urinary incontinence, benign prostatic hyperplasia, heart failure)	10
	3. PIMs to be used with caution (eg, aspirin for primary prevention, dabigatran/rivaroxaban-gastrointestinal bleeding in people >75 years)	6
	4. Potentially clinically important drug-drug interactions that should be avoided (eg, opioids, lithium, phenytoin, warfarin, avoid total of ≥ 3 CNS active drugs to reduce falls risk)	17
	5. Medications that should be avoided or have dosage reduced with varying levels of kidney function	13
STOPP	1. Organized according to physiological system (11 sections) and include: drugs to avoid, drug-drug, dosing considerations for reduced renal function, and drug-disease interactions	78
	2. A section focused on general concepts that are not medication specific and include: drug prescribed without evidence-based clinical indication, drug prescribed without recommended duration, and therapeutic duplication	3

Data from References 13 and 14.

Assessing the appropriateness of prescribing is complex in older adults with frailty and/or multimorbidity. Many guidelines for disease management focus on a single disease and therefore may have limited relevance to older adults with multimorbidity.²⁰ Applying disease management guidelines in patients with multimorbidity may contribute to medication burden. Older adults with multimorbidity have varied health outcome priorities and care preferences, which often shift from prevention to symptom relief and maximizing quality of life.²⁰ A medication used to treat one condition may worsen or interact with control of another condition. Thus, a medication that was once appropriate and beneficial may no longer be providing benefit or align with goals of care. Periodic assessment for opportunities for deprescribing is warranted.

Polypharmacy

4 The term polypharmacy broadly refers to the situation where more medications are prescribed or taken than are clinically appropriate in the context of a patient's comorbidities and healthcare goals. Polypharmacy has been defined in various ways, but traditionally it has been defined as exceeding an arbitrary number of medications. The most common definition for polypharmacy is the use of five or more medications.²¹ While this definition is easy to employ, it does not take medication appropriateness into account.^{21,22} For example, an older adult may take 15 medications, and thus have polypharmacy, but all medications may be clinically necessary and appropriate and align with their goals of care. A more clinically relevant concept is distinguishing between appropriate and inappropriate (ie, unnecessary) polypharmacy.²¹ Making this distinction is more difficult and time intensive as it as this necessitates a full medication review and assessment.

The use of multiple medications is common and increasing among older adults.²² In a nationwide survey of community-dwelling older adults, the

percentage of the population using five or more medications increased from 30% in 2005 to 36% in 2011. Increased use of dietary supplements, such as herbal products, vitamins, and minerals, adds to the increase in polypharmacy. Approximately 64% of older adults used at least one dietary supplement.²³ Furthermore, the use of unnecessary medications is also common, with 55% to 59% of older outpatients using an unnecessary medication.²⁴ At hospital discharge, 44% of patients were taking one or more unnecessary medications, with 25% of patients starting the medication(s) during hospitalization.²⁵ Polypharmacy has been strongly associated with ADRs, risk of geriatric syndromes (eg, falls, cognitive impairment; see [Chapter e25](#), “Geriatrics: Assessing Health and Delivering Healthcare to Older Adults”), nonadherence, diminished functional status, and increased healthcare costs.^{21,26}

Underuse

5 Underuse is defined as the omission of drug therapy that is indicated for the treatment or prevention of a disease or condition.²⁷ The percentage of community-dwelling older adults with underuse ranges from 20% to 70%, with higher prevalence among nursing home residents and hospitalized patients.^{27,28} The most frequently underused medications in older adults include cardiovascular, anticoagulant, and anti-osteoporotic agents.²⁷

Underuse in older populations can occur in the context of “*appropriate*” or “*inappropriate*” decision-making. At times, medications are purposely not used for treatment or prevention. This may be true when life expectancy has been considered carefully (particularly when the time to benefit may exceed the expected time of survival), previous intolerance to a similar medication has been documented, risks outweigh clinical or functional benefits, or when outcomes are not consistent with patient preferences.²⁹ One study found that healthcare providers had justifiable reasons for underprescribing in 65% of reviewed cases.³⁰ In instances of potentially “*inappropriate*” underprescribing, decision-making may be based on chronological age alone without recognizing the heterogeneity of medical frailty, functional status, and pharmacotherapy needs of older adults. The fear of contributing to polypharmacy itself may also precipitate underprescribing.²⁹ Confounding the ability to optimize prescribing trends is the relative absence of data regarding efficacy and safety of medications in older adults.³¹ While the literature cites limited and conflicting root causes of underutilization, associative factors include multimorbidity, polypharmacy, dementia, frailty, and social determinants of health.^{27,32} Institutionalization stands as a particularly important predictor of underprescribing, particularly in older patients.²⁸

The potential impact of underprescribing must be carefully considered. While few studies have directly studied health outcomes associated with underprescribing, there is concern that the criteria used to identify underutilized medications may underestimate harms.³¹ Current lines of evidence paint a clear correlation between underprescribing and elevated risk for adverse drug events (ADEs), geriatric syndromes (eg, falls, delirium), increased mortality, and increased hospital admissions and costs to the healthcare system.^{28,32} Among nursing home residents with advanced dementia, comfort-promoting medications are largely underused. In nearly one-third of these patients, such medications are used only in the last week of life.³³

According to a Cochrane polypharmacy review article, there is little evidence to support any single intervention to effectively alter clinical outcomes in the context of underprescribing. Clinical studies have demonstrated some interventions that appear to improve underprescribing trends, although the studies are frequently limited by small sample sizes, poor quality, and heterogeneity.³⁴ Examples include the use of the comprehensive geriatric assessment, use of clinical pharmacists, physician education, as well as use of the Screening Tool to Alert doctors to Right Treatment (START) criteria.^{27,28}

Nonadherence

Even when medication therapy is optimized, patients may not receive the full benefit of therapy if they are nonadherent to medication regimens (see also [Chapter e5](#), “Medication Adherence”). While there is no clear consensus on definition, medication adherence is broadly construed as the extent to which a patient’s medication-taking behaviors correspond with recommendations from a healthcare provider.^{35,36} Nonadherence is typically defined as taking less than 80% of prescribed doses of a medication but can also describe delayed prescription fills, reduction of dose strength, reduction of administration frequency, or additional dosing.^{37,38} Nonadherence can be further differentiated as intentional versus nonintentional and occurs via noninitiation, suboptimal implementation, or nonpersistence.³⁷ Nonadherence has been closely linked to treatment efficacy, disease progression, and inappropriate up-titration (with subsequent risk of interactions and adverse drug reactions).³⁶ Optimized adherence has been linked to avoidance of

disease-specific outcomes, increased quality-of-life measures, decreased mortality, and a reduction of healthcare costs, while nonadherence has been linked to at least 10% of hospital admissions.³⁹

The prevalence of nonadherence in older adults varies considerably in clinical practice (6%-55%) but frequently registers much higher than in randomized clinical trials required for drug approval.³⁷ The ability to consistently and reliably identify trends in nonadherent populations is often limited, stemming in large part by inconsistent or unreliable assessment tools. Strategies including drug concentration monitoring, objective measures of disease activity (hemoglobin A1C or blood pressure), pill counts, and patient reporting (which remains the most convenient and frequently used assessment tool).^{36-38,40}

While there are many studies exploring those risk factors associated with medication nonadherence, they are frequently outdated, exclude older adults, demonstrate limited generalizability, or do not elicit geriatric-specific causes. In comparison to their younger counterparts, older adults present with higher risk for nonadherence because they are more likely to have complex medication regimens, multiple prescribers, multimorbidity, and higher risks for cognitive impairment.^{31,36,39}

While the clinical impact of nonadherence is poorly quantified and understood, resolution of this “adherence gap” provides a strong opportunity to improve patient outcomes and improve system efficiency.^{37,41} Increasing the effectiveness of adherence interventions may have a greater impact on the health of the population than any improvement in specific medical treatments.⁴² There is a notable gap in the literature regarding high-quality, evidence-based interventions to improve adherence and clinical outcomes among patients.⁴³ Nonetheless, there are some common-sense approaches to help improve adherence. While it is difficult to provide justification for any single intervention, researchers/clinicians support (1) a clear understanding of patient beliefs, (2) good communication/education, (3) reduction of pill burden, (4) involvement of allied health professionals in clinical care, and (5) adequate follow-up.^{37,41}

COMPREHENSIVE GERIATRIC ASSESSMENT TO OPTIMIZE MEDICATION USE

Given that drug-related problems are common, costly, and clinically important, proactive strategies for prevention and management are essential. A number of reviews summarize the effectiveness of pharmacists in improving suboptimal prescribing and medication adherence and reducing ADRs in older adults.^{44,45} The following subsections provide an approach to comprehensive geriatric assessment that pharmacists in any practice setting can take to optimize medication use. These approaches may be especially relevant for those providing medication therapy management services under the Medicare Part D program, conducting medication reconciliation, or performing a medication regimen review in a nursing home facility.

History Taking

6 Challenges associated with completing medication histories in older adults may make obtaining information about nonprescription agents difficult. Possible barriers include (a) communication problems due to impaired hearing and vision, (b) underreporting (eg, due to health beliefs, cognitive impairment), (c) presence of multiple diseases or use of multiple medications, (d) reliance on a caregiver for the history, and (e) limited access to medical records to confirm findings. Despite these potential barriers, collecting information about nonprescription medications and dietary supplements is a vital component of a complete medication history, and its importance cannot be overstressed.

Asking older adults and caregivers about methods to organize medications is also important. Common strategies that older adults use to organize medications and increase adherence include (1) using a pill box, (2) laying out a whole day’s medications in the morning or at meal times, (3) putting medications in a visible place as a reminder, (4) creating and maintaining a checklist or calendar, and (5) using blister packing or pill packs.⁴⁰ Understanding past and current medication management strategies facilitates the pharmacist’s ability to design patient-specific solutions for any problems detected and prevents implementation of previously used but ineffective methods.

Patients and caregivers should be asked about potential risk factors for prescribing problems (eg, using multiple physicians and pharmacies) and issues that may lead to either nonintentional or intentional nonadherence (eg, impaired hearing, vision, or cognition; inability to open safety caps, pay for medicines, or swallow medications; recognition of adverse effects; and perception of health risk).⁴⁶ Several approaches to formally assess medication adherence have been reported.⁴⁷ A complete drug history should conclude with an inquiry about allergies and current or previous adverse effects, unwanted reactions, or other concerns the patient may have with his or her medications.⁴⁸ In addition, it is worthwhile to screen for geriatric

syndromes (eg, falls, urinary incontinence, cognitive impairment; see [Chapter e25](#), “Geriatrics: Assessing Health and Delivering Healthcare to Older Adults”) because of their association with medication use.⁴⁸

Assessing and Monitoring Drug Therapy

The first step in assessing medication appropriateness is to compare the patient’s medical problem list with his or her drug list. This simple approach can identify the prescribing problems of overuse and underuse. A drug may be considered unnecessary if it does not have an indication per the problem list, is not effective, the risks associated with its use outweigh the benefits, or there is evidence of therapeutic duplication (ie, two drugs from the same class).¹⁴ Though no specific tool may be applicable to all patients, pharmacists may find explicit (criterion-based) or implicit (judgment-based) criteria helpful when evaluating medication regimens for PIM. Explicit measures such as the AGS Beers Criteria and the STOPP tool can be used to quickly identify drugs or medication classes considered harmful in older adults.^{13,14} An advantage of explicit criteria to identify potentially inappropriate prescribing is that these approaches require minimal clinical judgment to interpret and thus allow more consistent application. Similarly, three items from the implicit MAI (lack of indication, lack of efficacy, therapeutic duplication) may also aid in detecting unnecessary drug use.⁴⁹

The second step to evaluate medication appropriateness is to determine whether the patient has a chronic condition but is not receiving an evidence-based medication shown to improve outcomes (ie, potential prescribing omissions, underuse). The START criteria may help clinicians identify evidence-based drugs for specific conditions from which older adults would benefit.¹⁴ Next, certain laboratory test results and vital signs should be examined to monitor the efficacy and toxicity of each medication.⁵⁰

Finally, the pharmacist should assess the appropriateness of all remaining medications. A variety of approaches may be used.^{51,52} Many tools have been developed to identify potentially inappropriate prescribing, including both explicit- and implicit-based approaches.⁵³ The implicit-based approaches are judgment based and rely on the clinician’s experience to assess an individual patient’s medication regimen. Thus, these approaches are highly individualized and may not be applied consistently by different clinicians. The MAI is one implicit standardized measure of prescribing appropriateness that assesses 10 questions that should be asked about each medication with demonstrated validity and reliability ([Table e24-2](#)).⁴⁹ The MAI addresses the following elements of prescribing: indication, effectiveness, dose, correct directions, practical directions, drug-drug interactions, drug-disease interactions, duplication, duration, and cost. Clinical judgment is required for some criteria; however, the rating process is standardized because of operational definitions and explicit instructions for criteria that increase reliability among clinicians over the typical medication review process.

TABLE e24-2

Medication Appropriateness Index

Questions to ask about each individual medication:

1. Is there an indication for the medication?
2. Is the medication effective for the condition?
3. Is the dosage correct?
4. Are the directions correct?
5. Are the directions practical?
6. Are there clinically significant drug-drug interactions?
7. Are there clinically significant drug-disease interactions?
8. Is there unnecessary duplication with other medication(s)?
9. Is the duration of therapy acceptable?
10. Is this medication the least expensive alternative compared with others of equal utility?

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Both the MAI and the AGS Beers criteria address drug-drug and drug-disease interactions, two factors strongly associated with ADRs.^{13,49} Moreover, these tools cue providers to consider dosing appropriateness, which becomes especially important for renally cleared medications.¹³ Directions, therapy duration, and medication cost are other issues to consider during drug-regimen review that could influence adherence and lead to subsequent adverse consequences (Table e24-3).⁵⁴

TABLE e24-3

Examples of Clinically Important Drug-Disease Interactions Determined by Expert Panel Consensus

Disease	Drug
Heart failure	NSAIDs, COX2 inhibitors, thiazolidinediones, dronaderone
Heart failure with reduced ejection fraction	Nondihydropyridine calcium channel blockers
Syncope	Acetylcholinesterase inhibitors, peripheral nonselective α_1 -blockers, tertiary tricyclic antidepressants, antipsychotics
Delirium	Anticholinergics, antipsychotics, benzodiazepines, corticosteroids, H2-receptor antagonists, z-hypnotics
Cognitive impairment	Anticholinergics, antipsychotics, benzodiazepines, nonbenzodiazepine hypnotics (eg, zolpidem, zoleplon; also called the “z-hypnotics”)
History of falls	Antiepileptics, antipsychotics, benzodiazepines, antidepressants, z-hypnotics, opioids
Parkinson’s disease	Antipsychotics (except quetiapine, clozapine, pimavanserin), metoclopramide, prochlorperazine, promethazine
Peptic ulcer disease	Aspirin in doses of 325 mg/day or more, NSAIDs
Chronic kidney disease stage IV and higher	NSAIDs
Urinary incontinence in women	Peripheral α_1 -blockers

NSAIDs, nonsteroidal anti-inflammatory drugs; COX2, cyclooxygenase 2 inhibitors.

Data from Reference 13.

Documenting Problems and Formulating a Therapeutic Plan

After conducting a comprehensive medication review, the clinician must document any drug-related problems identified, develop a therapeutic plan to resolve them, and establish age-appropriate therapeutic end points, keeping in mind a desirable outcome for a 40-year-old patient may not be reasonable for an 80-year-old one. Because many older adults suffer from multiple chronic conditions, adhering to numerous disease guidelines may complicate medication regimens; these documents typically address diseases independently. One conceptual model to improve prescribing rationales takes into account remaining life expectancy, time until therapeutic benefit, treatment target, medication regimen complexity, patient preference, and goals of care to help clinicians determine whether certain medications should be prescribed or continued.⁵⁵

Deprescribing

7 Deprescribing is the systematic process of dose reduction or medication discontinuation. This is an appropriate step when a medication’s risk exceeds its benefit, or medication’s expected benefits no longer align with current patient care goals, preferences, or life expectancy.⁵⁵ While there is a conceptual benefit to deprescribing high-risk medications, there are conflicting data with regard to clinical outcomes.^{56–58}

When a medication is determined to be appropriate for deprescribing, healthcare providers, patients, and caregivers should discuss the rationale,

risks, benefits, and approach to deprescribing each medication to allow for patient preference and shared decision-making.⁵⁷ If more than one medication has been identified for deprescribing, clinicians should prioritize the order and determine what approach they will take in the process.⁵⁷ Once it has been decided on how the medication will be withdrawn, the tapering plan or medication dosage reduction schedule and reason for withdrawal should be communicated to the patient and caregiver and documented within the health record.⁵⁷ Nonpharmacologic approaches should be used to help withdraw medications if appropriate and patients should be appropriately monitored for withdrawal reactions.⁵⁷

One of the risks of deprescribing is creating an adverse drug withdrawal event (ADWE), which is defined as signs and symptoms or signs caused by the removal of a drug. Manifestations of an ADWE may include physiological withdrawal reactions, an exacerbation of the underlying condition for which the medication was being used to treat, or new symptoms caused by abrupt withdrawal.⁵⁹ Data on the prevalence of ADWEs in older adults are limited. ADWEs in 38 of 124 male outpatients who had discontinued taking 238 medications.⁶⁰

To prevent ADWEs, it is important to have a plan for reducing the dose or stopping a medication. For instance, some medications may be stopped without any dosage reduction, while others need to be tapered.⁵⁹ The most common classes of medications associated with ADWEs are agents that affect the cardiovascular and central nervous systems.⁵⁹ To guide deprescribing, guidelines and algorithms are being developed to provide an evidence-based approach to medication withdrawal.⁶¹

Consulting the Prescriber Regarding Problems and Concerns

To promote continuity of care and a team-based management approach, the pharmacist or other healthcare professional should contact a patient's prescriber regarding concerns that have been detected and documented. When discussing the older patient, the importance of optimizing prescribing *before* implementing strategies to enhance adherence cannot be overstressed. Otherwise, adherence interventions, if effective, may result in harm to patients who suddenly become adherent with medication regimens that may have been titrated inappropriately over time. Similarly, in institutional settings, strategies to reduce medication errors may not improve patient outcomes if prescribing problems are not corrected first.

Counseling and Adherence Devices

When counseling older adults about their medications, it is important to think about general factors that may enhance adherence. Approaches to improving adherence include modifying medication schedules to fit patients' lifestyles, prescribing generic agents to reduce costs, or selecting preferred agents within the insurance formulary to minimize copays for branded medications. In addition, offering easy-to-open bottles, easy-to-swallow dosage forms, and larger type on direction and auxiliary labels may improve medication regimen adherence. When providing medications (particularly new medications or previously used medications that have changes in appearance or directions) to older adults or those with low health literacy, the pharmacist or other healthcare professional should provide both written and oral drug information.⁶²

Other strategies to improve adherence include recruiting active patient and caregiver involvement, stressing the importance of adherence and recommending adherence-enhancing aids if necessary (eg, special packaging, medication record, drug calendar, medication boxes, magnification for insulin syringes, dose-measuring devices, and spacers for metered-dose inhalers).⁶³ In institutional settings, it is prudent to discuss special considerations, such as medications that can be crushed and given via feeding tube and gradual dose reductions of psychoactive medications, with those healthcare professionals responsible for medication administration.

Documenting Interventions and Monitoring Patient Progress

As with the identification of drug-related problems, all interventions provided to rectify issues must be documented. A thorough review of the older adult's medication profile must be repeated routinely and whenever a transition of care occurs (ie, moving from one level of care to another, such as discharge from an acute care setting to home or a nursing facility). During follow-up contact, minimum inquiry should include asking patients if there are questions or concerns regarding medicines and determining whether previously established therapeutic end points have been achieved.

Targeting High-Risk Older Adults

8 In busy practices, the approach outlined above may not be feasible for every patient. Therefore, practitioners may consider targeting patients at high risk for developing drug-related problems.

Studies have identified risk factors for preventable ADRs in older adults. These include higher number of medications, use of specific high-risk drug categories (eg, anticoagulants, antibiotics, angiotensin-converting enzyme inhibitors, nonsteroidal anti-inflammatory drugs, calcium channel blockers, beta blockers, opioids, oral antidiabetic agents), inappropriate medications, number of comorbidities, and female gender.⁶

CONCLUSION

The number of people age 65 years or older is increasing in the United States and around the world. Improving and maintaining the patient's functional status and managing the patient's comorbidities are hallmarks of clinical geriatrics. Adverse consequences of medication use are common in older adults and interprofessional approaches to care are used to improve medication use.

ABBREVIATIONS

ADL	activity of daily living
ADR	adverse drug reaction
ADWE	adverse drug withdrawal event
AGS	American Geriatrics Society
HRQOL	health-related quality of life
MAI	Medication Appropriateness Index
PIM	potentially inappropriate medication
START	Screening Tool to Alert doctors to Right Treatment
STOPP	Screening Tool of Older Persons' potentially inappropriate Prescriptions

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SELF-ASSESSMENT QUESTIONS

1. Which of the following contribute the clinical response to a medication in an older adult?
 - A. Pharmacokinetics
 - B. Pharmacodynamics
 - C. Comorbidities
 - D. Concurrent medications
 - E. All of the above
2. Which of the following explicit criteria are used to identify potentially inappropriate medications in older patients?
 - A. American Geriatrics Society Beers Criteria®
 - B. MAI criteria
 - C. START criteria
 - D. TIMER criteria
3. Which of the following is a common cutpoint to define polypharmacy?
 - A. 2
 - B. 5
 - C. 8
 - D. 15
4. Which of the following medications is most likely to be underused in an older adult?
 - A. Allopurinol

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- B. Atorvastatin
- C. Escitalopram
- D. Levothyroxine
5. In which of the following scenarios would it be most appropriate to omit a recommended treatment?
- A. Use of aspirin in a 68-year-old patient with hypertension, dyslipidemia, and diabetes
- B. Use of metoprolol succinate in a 70-year-old patient with atrial fibrillation and hypertension
- C. Use of rosuvastatin for CVD in a 90-year-old patient with cancer and 6 weeks of life expectancy
- D. Use of tiotropium in an 80-year-old patient with chronic obstructive pulmonary disease
6. JJ is an 87-year-old male with moderate neurocognitive disorder. His daughter visits every morning and gives him his medications. She also sets out his evening medications for him to be taken with dinner. Unfortunately, the daughter reports that she finds the evening medications untaken about 3 days/week. When asked, the patient said he tries, but that he just forgets to take his evening medications. What type of nonadherence is this patient exhibiting?
- A. Intentional nonadherence
- B. Unintentional nonadherence
7. Which of the following are barriers to obtaining a complete medication history in an older adult?
- A. Impaired hearing
- B. Underreporting
- C. Use of multiple medications
- D. Reliance on caregiver support
- E. All of the above
8. Which of the following items on the Medication Appropriateness Index would define a medication as unnecessary?
- A. Complex directions
- B. Frequently administered
- C. High cost
- D. Lack of indication
9. Which of the following is a potential risk of deprescribing?
- A. Adverse drug withdrawal event
- B. Inappropriate prescribing
- C. Polypharmacy
- D. Therapeutic failure
10. Which of the following approaches is/are helpful to improving medication adherence in older adults?

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- A. Medication calendars
- B. Written and oral patient counseling
- C. Easy to open bottles
- D. Caregiver involvement
- E. All of the above
11. Which of the following characteristics could help identify an ambulatory older adult at risk for a drug-related problem?
- A. Hospitalization within the past 5 years
- B. Use of an anticholinergic medication
- C. Use of an antihypertensive medication
- D. Use of an as-needed medication
12. Which of the following conditions may be exacerbated by the use of an anticholinergic medication?
- A. Cognitive impairment
- B. Heart failure
- C. Hypertension
- D. Insomnia
13. Antipsychotics should be avoided in a patient with which of the following?
- A. Chronic obstructive pulmonary disease
- B. Chronic seizures
- C. History of falls
- D. Peptic ulcer disease
14. PK is an 87-year-old who presents to her provider with a new complaint of memory loss. Upon questioning, you find that she is taking lisinopril 20 mg PO daily, metformin 500 mg PO twice daily, aspirin 81 mg PO daily, and clonazepam 0.5 mg PO daily. Which of the following is most likely causing her cognitive impairment?
- A. Aspirin
- B. Clonazepam
- C. Lisinopril
- D. Metformin
15. In which of the following diseases should NSAIDs be avoided?
- A. Heart failure
- B. Chronic kidney disease
-

C. Peptic ulcer disease

D. All of the above

SELF-ASSESSMENT QUESTION-ANSWERS

1. **E.** The clinical response to a medication in an older adult is determined by many things such as the drug and patient's pharmacokinetics, pharmacodynamics, concurrent medications and morbidities, and frailty status.
2. **A.** The American Geriatrics Society Beers Criteria® provide an explicit list of medications that are potentially inappropriate in older adults. The MAI can be used to determine potentially inappropriate medications but are implicit in nature. The START criteria helps to prevent medication omissions, and the TIMER tool is designed to help pharmacists collect information.
3. **B.** The most common cutpoint to definite polypharmacy is five medications. Numeric cutpoints are arbitrarily chosen and do not take medication appropriateness into account.
4. **B.** In older adults, one of the most commonly underused classes of medications is the lipid-lowering agents, including the statins. Other commonly underused classes of medications include antihypertensives, anticoagulants, and bronchodilators.
5. **C.** Omission or underuse of a medication may be appropriate in a patient with limited life expectancy or when the expected benefit of a medication exceeds that of the remaining life expectancy. Underuse may also be appropriate if a patient is intolerant to a medication, when risks outweigh benefits, or the outcomes are no longer consistent with the patient's goals.
6. **B.** Medication adherence is the extent to which a patient's medication-taking behaviors correlate with prescribed treatments or recommendations. This patient would have unintentional nonadherence as they would like to take their medications, but their cognitive impairment prevents them from doing so.
7. **E.** There are many challenges to obtaining a completed medication history in an older adult and include reduced communication due to impaired hearing and vision, underreporting of all medications, presence of multiple diseases and use of multiple medications, reliance on a caregiver for the accurate information, and limited access to medical records to confirm findings.
8. **D.** Lack of indication is one component of the MAI that indicates that a medication is unnecessary. Other components of the MAI that define a medication as unnecessary include lack of efficacy and therapeutic duplication.
9. **A.** One of the risks of deprescribing is causing an adverse drug withdrawal event (ADWE), which is defined as signs and symptoms or signs caused by the removal of a drug. This can include an exacerbation of the underlying condition for which the medication was being used to treat or new symptoms caused by abrupt withdrawal.
10. **E.** A variety of approaches should be used to help improve medication adherence in older adults. See the "[Counseling and Adherence Devices](#)" section for more information.
11. **B.** In ambulatory care patients, those at high risk may be identified by use of high-risk medications, use of multiple medications or multiple providers, use of narrow therapeutic range medications, prior history on an ADR, and hospitalization within the past 6 months. See the "[Targeting High-Risk Older Adults](#)" section for more information.
12. **A.** Use of anticholinergic medications in an older adult may exacerbate cognitive impairment. For more information on drug-disease interactions, see [Table e24-3](#).
13. **C.** Antipsychotics may predispose a patient to falls. These agents should be avoided whenever possible in patients with a history of falling. For more information on drug-disease interactions, see [Table e24-3](#).
14. **B.** Benzodiazepines are associated with cognitive impairment. For more information on drug-disease interactions, see [Table e24-3](#).
15. **D.** NSAIDs have many drug-disease interactions including heart failure, CKD, and PUD. For more information on drug-disease interactions, see

Table e24-3.