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# MEDICATION RECONCILIATION and Education for Older Adults

## USING THE 2015 AGS BEERS CRITERIA AS A GUIDE

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Polypharmacy, use of multiple medications to treat chronic comorbid conditions in older adults (persons over age 65), has been described in the literature as a potential cause for an increase in drug–drug interactions, injurious falls, hospitalization, and morbidity. Polypharmacy has been defined by some authors as more than five medications (Gnjidic et al., 2012). It is imperative to constantly and consistently reevaluate medications prescribed to older adults. Deprescribing, the process of identifying and discontinuing drugs that can potentially harm rather than benefit a patient, should be considered in all older adults on an individual basis (Brandt, 2016). The aging population of the United States and the increase in remaining life expectancy at age 65 have major implications for all sectors of healthcare including home healthcare. With this population comes medical complexity including cognitive impairment, and diagnoses such as congestive heart failure and diabetes. Multimorbidity results in use of multiple medications. Home healthcare clinicians need to be prepared to manage the complex needs of this population including medication management. Ongoing medication review and reconciliation is crucial for older adults particularly after a hospital or skilled nursing stay (Murtaugh et al., 2009).

The Beers Criteria was originally developed by Dr. Mark Beers in 1991 as a tool to identify medications that may be inappropriate for older adults. The updated criteria were recently completed by a 13-member interprofessional panel of experts in geriatric care (American Geriatrics Society [AGS], 2015). The panel used a modified Delphi method to systematically review and grade the evidence and reach a consensus on each existing and new criteria. The process followed an evidence-based approach using approved Institute of Medicine standards. The 2015 AGS Beers Criteria are applicable to all older adults with the exclusion of those in palliative or hospice care. The 2015 AGS Beers Criteria for Potentially Inappropriate Medications (PIM) Use in Older Adults is one of the most frequently consulted sources regarding the safety of medications for older adults. The criteria are widely used in geriatric clinical care, education, and research (AGS). The 2015 list also includes medications that may exacerbate a disease or syndrome, medications that may be inappropriate due to drug–drug interactions as well as medications that should be used with caution, and medications that should have dosages reduced due to varying degrees of kidney function.



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## Pharmacokinetics and Pharmacodynamics in the Older Adult

There are a number of physiologic changes that occur with aging that can affect both the pharmacokinetics and pharmacodynamics of medications. Pharmacokinetics involves the absorption, distribution, metabolism, and excretion of medications. In older adults, absorption from the gastrointestinal tract is not significantly affected. There may be delays in achieving peak drug levels, but there is no clinically significant decrease in total absorption. Decreased absorption from intramuscular injections or transdermal patches may occur due to decreased blood perfusion to muscles and skin, so it is important to monitor the clinical effects of the medication and adjust the dosage form if necessary. Distribution of medications in the body depends on whether the medication is water-soluble or lipid-soluble. With age, there is an increase in body fat. Therefore, the volume of distribution for lipid-soluble medications is increased in older adults. The clinical significance of this is that a lipid-soluble medication will accumulate in the body fat and when the medication is discontinued, will take longer to be totally eliminated from the body (Delafuente, 2008). Liver function may be decreased in older adults and some metabolic pathways can be decreased. For drugs metabolized to inactive metabolites, it is advised to start with the lowest possible dose when metabolism

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is decreased. Most significantly, renal function is generally decreased in older adults. Therefore, medications that are excreted unchanged in the urine will have a prolonged half-life. Medications excreted by the kidneys will often need to have dosage reductions in older adults. It is important to estimate creatinine clearance before initiating medications excreted by the kidneys.

Pharmacodynamics involves the interaction of the medication with the body, particularly cellular receptors. In older adults, changes in the numbers of receptors or the sensitivity of receptors can affect the outcome of the medication. For example, older adults are generally more sensitive to the central nervous system (CNS) effects of medications. This can be explained though pharmacodynamics changes.

## The Role of the Home Healthcare Clinician

Home healthcare clinicians are an integral part of the intraprofessional team for reviewing, reconciling, educating, and monitoring medications prescribed to older adults in the home or community setting. This article will focus on the use of the 2015 AGS Beers Criteria for Potentially Inappropriate Medication Use in Older Adults as a guideline for home healthcare clinicians when evaluating medications in a community setting. Using a case study example, the article will outline the steps in utilizing the criteria as an evaluation tool for medication review, and as a tool for shared decision making for clinicians and their patients.

## Case Study Example

Glen is an 88-year-old male recently discharged from the hospital for pneumonia and heart failure. His past medical history includes: Type 2 diabetes, peripheral neuropathy, mild dementia, heart failure, stage III kidney disease, coronary artery disease, and a myocardial infarction with stenting in 2011. This was his fifth hospitalization in the last 8 months. He has also fallen five times over the last 3 months, without serious injury. Jane has been the home healthcare nurse for Glen for the past 2 years. She has an excellent rapport with Glen and his wife, Michele. Due to Glen's recent memory problems, Michele is now managing his medications. Glen sees many specialists including a nephrologist, cardiologist, and neurologist along with his primary care provider. Michele reports that since Glen has returned from the hospital, he has been sleeping a great deal and does not have much of an appetite. His blood glucose is also running low—as low as 46 mg/dL and he recently required a glucagon injection. Michele and Glen have questions about the new medications as well as the number of medications Glen is taking since his hospitalization. Glen is also complaining of generalized muscle aches, which began in the hospital. Michele has been giving him acetaminophen 325 mg two tablets every 4 hours. A prescription for acetaminophen/oxycodone 5/325 had been provided but was not filled as Glen and Michele do not want Glen to "get addicted." Glen said the acetaminophen/oxycodone helped in the hospital but made him "loopy."

**Glen's Medication List**

- Glyburide (Diabeta) 5 mg by mouth twice a day
- Insulin Glargine (Lantus) 16 units subcutaneous at bedtime
- Pantoprazole (Protonix) 40 mg by mouth daily (prescribed during hospitalization 2 months ago)
- Lisinopril (Lisinopril) 10 mg by mouth twice a day (increased from 10 mg this hospitalization)
- Metoprolol Tartrate (Lopressor) 50 mg by mouth twice a day (increased from 50 mg this hospitalization)
- Furosemide (Lasix) 80 mg by mouth twice a day (increased from 120 mg daily this hospitalization)
- Spironolactone (Aldactone) 25 mg by mouth daily (new medication added this hospitalization)
- Potassium Chloride 20 meq by mouth twice a day
- Aspirin 81 mg by mouth daily
- Lorazepam (Ativan) 0.5 mg by mouth twice a day (new this hospitalization).

**Medications that were not prescribed on discharge; however, Glen was taking prior to hospitalization:**

- Gabapentin (Neurontin) 300 mg by mouth at bedtime
- Sertraline (Zoloft) 50 mg by mouth daily

## Using the 2015 AGS Beers Criteria as a Guideline for Medication Reconciliation

Medication reconciliation is vitally important particularly following an acute care stay. Transition



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of care is a critical area of management for older adults. This is mainly due to lack of communication between patients, families, and providers. Vulnerability is attributed to three main factors: 1) numerous changes in medications during a hospital stay, 2) low health literacy and/or low ability to communicate among both patients and caregivers, and 3) poor transmission of information among providers (Kripalani et al., 2007). Because Jane has been Glen's home healthcare nurse and is familiar with his medications and medical history, this is an ideal situation for accurate medication reconciliation and also addressing risk/benefits of current medications with patient, family, and provider. The Beers Criteria can be a starting point for discussing medication appropriateness. The process begins with a review of the criteria and applying it to Glen's situation. The key principles for using the criteria can be found in Table 1. It is important to remember the list is "potentially inappropriate" and must be applied to each individual case. The risks/benefits of every medication should be reviewed by providers at each visit or with any change in condition. Figure 1 illustrates how to read the Beers Criteria.

**Step 1**: **Review the 2015 AGS Beers Criteria for PIM**. An example of the criteria is presented in Supplemental Table 1 (Supplemental Digital Content [SDC] 1, available at: http://links.lww.com/HHN/A36).

**Step 2: Glen's medications that are on the 2015 AGS Beers Criteria List:**

a. Glyburide
b. Lorazepam
c. Pantoprazole

**Step 3: Addressing each medication individually for Glen (Table 2)**

**Step 4: Using the 2015 AGS Beers Criteria as guide for monitoring of adverse effects and condition changes**

The Beers Criteria also address drug–disease and drug–syndrome PIMs. The nonbenzodiazepines, benzodiazepine receptor agonist hypnotics (e.g., zolpidem) have been added to the "avoid" list in older adults. Opioids have been added to the list of CNS medications that should be avoided in individuals with a history of falls or fractures. Antipsychotics are to be avoided as first-line treatment for behavior disturbances associated with dementia because of conflicting evidence on their effectiveness and potential of adverse effects. The drug–disease and drug–syndrome table can be found in Supplemental Table 2 (SDC 2, available at: http://links.lww.com/HHN/A37).

Glen has a history of cognitive impairment and falls. The oxycodone/acetaminophen prescribed to him may not be appropriate, assuming acetaminophen is effective for his pain. He did report oxycodone/acetaminophen made him feel "loopy" in the hospital. An accurate pain assessment is imperative for evaluation and plan. He has a history of neuropathy for which he was taking gabapentin. Gabapentin is listed in Supplemental Table 2 (SDC 2: http://links.lww.com/HHN/A37) as a PIM for individuals with history of falls, and Glen does have a history of falls. This medication was discontinued in the hospital. The nurse should discuss with the provider the pain assessment, the omission, and rationale for discontinuation of the gabapentin and pain management plan. If the gabapentin is resumed, then close monitoring for adverse CNS effects is required. Explicit education about side effects should be provided to Glen and Michele. Sertraline is also listed in Supplemental

**Table 1. Key Principles to Guide Optimal Use of the American Geriatrics Society (AGS) 2015 Beers Criteria**

| |
|---|
| 1. Medications in the AGS 2015 Beers Criteria are potentially inappropriate, not definitely inappropriate. |
| 2. Read the rationale and recommendations statements for each criterion. The caveats and guidance listed there are important. |
| 3. Understand why medications are included in the AGS 2015 Beers Criteria and adjust your approach to those medications accordingly. |
| 4. Optimal application of the AGS 2015 Beers Criteria involves identifying potentially inappropriate medications and where appropriate offering safer nonpharmacological and pharmacological therapies. |
| 5. The AGS 2015 Beers Criteria should be a starting point for a comprehensive process of identifying and improving medication appropriateness and safety. |
| 6. Access to medications included in the AGS 2015 Beers Criteria should not be excessively restricted by prior authorization and/or health plan coverage policies. |
| 7. The AGS 2015 Beers Criteria are not equally applicable to all countries. |

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Table 2 (SDC 2: http://links.lww.com/HHN/A37) due to its risk for inappropriate secretion of antidiuretic hormone syndrome. This medication was discontinued in the hospital and the omission and rationale should be discussed with provider. A discussion with Glen and Michele and assessment of depressive symptoms and the effectiveness of the medication is warranted. If the medication is resumed, monitoring for adverse effects and education as with gabapentin is crucial.

It is important to remember that medication reconciliation protocols vary by health system and adherence is also variable. Some health systems and home healthcare agencies have linking electronic health records that give real-time access to current medication lists. The process also varies by provider. Providers must update the list routinely for changes and this does not always occur. Patients and family members tend to not seek clarification about medication changes due to insufficient knowledge, lack of opportunities, forgetfulness, and lack of insight of possible repercussions. It is not until medication problems occur that they realize the ramifications associated with not seeking clarification (Manias et al., 2014). Home healthcare clinicians often have continuity with patients, and medication reconciliation is a routine portion of posthospital visits. Patient and caregiver education on the importance of medication reconciliation and communication with providers in the outpatient and inpatient setting is imperative in avoiding medication misadventures. Because Glen has multiple providers, his wife may be the only constant in his care so she needs to understand the significance of medication reconciliation.

New to the 2015 AGS Beers Criteria are drug–drug interactions (excluding anti-infective) that are highly associated with harmful outcomes in older adults (Hines & Murphy, 2011). The list is selective and not comprehensive, and should be considered a reminder to assess drug–drug

**Figure 1. How to Read the Beers Criteria**

| Therapeutic Category/ Drugs | Rationale | Recommendation | Quality of Evidence | Strength of Evidence |
|---|---|---|---|---|
| Alpha-1 blockers<br>Doxazosin<br>Prazosin<br>Terazosin | High risk of orthostatic hypotension; not recommended as routine treatment for hypertension; alternative agents have superior risk–benefit profile. | Avoid use as an antihypertensive | Moderate | Strong |

Read this to understand why drug is considered potentially inappropriate in older adults, e.g., frequent adverse events, risk/benefit profile, other guideline recommendations

Read this to understand in what circumstances the drug is considered a potentially inappropriate medication. In this example, use of an alpha1-blocker for routine treatment of hypertension is considered potentially inappropriate. Use for other conditions such as lower urinary tract symptoms in men is *not* considered potentially inappropriate according to this criterion. However, this does not automatically make the medication appropriate; usual clinical judgment applies

Quality of evidence on which recommendation is based. The Beers panel rated evidence based on a structured process

Strength of recommendation. The Beers panel decided this based on the anticipated balance of risks and benefits from the medication

Steinman, M. A., Beizer, J. L., DuBeau, C. E., Laird, R. D., Lundebjerg, N. E., & Mulhausen, P. (2015). How to Use the American Geriatrics Society 2015 Beers Criteria: A guide for Patients, Clinicians, Health Systems, and Payors. *Journal of the American Geriatrics Society, 63*(12), e1-e7. Used with permission.



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**Table 2. Glen's Medications on the Beers List**

| Medication | Assessment | Plan | Evaluation | Patient and Caregiver Education |
|---|---|---|---|---|
| Glyburide<br><br>Risk for prolonged hypoglycemia | Has there been evidence of hypoglycemia?<br><br>Has there been a change in appetite or nutritional intake?<br><br>What are the frequency and times blood sugars are being monitored?<br><br>Are there recent changes in kidney function? | Discuss with healthcare provider the recent blood glucose readings and the potential adverse effects of glyburide<br><br>Discuss the current dose of insulin and need for any changes | Continue to monitor blood glucose<br><br>Continue to monitor nutritional intake and need for further medication adjustments | Educate about the Beers Criteria and the glyburide<br><br>Educate on the frequency of blood glucose monitoring with specific parameters established with provider<br><br>Review emergency plan for hypoglycemia |
| Lorazepam<br><br>Increases risk of cognitive impairment, delirium, falls, fractures, and motor vehicle crashes in older adults | What is the indication for medication?<br><br>What are the potential adverse effects of this medication?<br><br>Is Glen experiencing any adverse effects? (sleeping, change in mental status [delirium], falls) | Discuss with provider the indication for the medication and report any adverse effects or potential adverse effects<br><br>Inform provider medication is new since hospitalization | If medication is to be discontinued, should be tapered<br><br>If medication is continued, monitor closely for adverse effects | Educate Glen and Michele on the potential adverse effects of the medication and include in discussion |
| Pantoprazole<br><br>Risk for *Clostridium difficile* infection, bone loss, and infection<br><br>Avoid use >8 weeks unless for patients at high risk<br><br>New medication started in acute care 2 months ago | What is the indication for this medication?<br><br>Is Glen experiencing any adverse effects? | Discuss with provider indication for medication | If medication is continued—need to review with provider in established timeline (already on this medication for 8 weeks) | Educate Glen and Michele on potential adverse effects and include in discussion |

interactions. In Glen's case, the use of spironolactone, lisinopril, and potassium has the potential for hyperkalemia and should be monitored closely by routine chemistries. The use of gabapentin and sertraline, if restarted, has the potential for a drug–drug interaction.

Also new to the 2015 criteria are drugs to be avoided or for which the dose should be adjusted in individuals with a specific degree of kidney impairment. This list was adapted from published consensus guidelines developed by an expert group including two AGS Beers Criteria panelists (Hanlon et al., 2009). The AGS Beers panel reviewed the evidence and selected medications from these earlier consensus guidelines for inclusion, added additional medications, including several anticoagulants, and included spironolactone and triamterene, which were in the 2012 Beers Criteria. Glen is on spironolactone and has stage III kidney disease, so close monitoring of chemistries is needed to watch for worsening kidney function and the high potential for adverse effects.

## The Significant Role of the Pharmacist

In all care settings, pharmacists have an important role in educating other healthcare professionals about the Beers Criteria and how to use them in clinical practice. In the hospital setting, computerized physician order entry systems with clinical decision support can be configured to flag the Beers medications. If a prescriber enters an order for a Beers medication for a patient >65 years old, the system will alert the prescriber with information about why this medication may not be recommended for this patient and possible alternatives. Beers medications can also



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be imbedded into dispensing, so the pharmacist is alerted to high-risk medications. The pharmacist would then contact the prescriber and offer alternative medications on formulary. If a Beers medication is truly indicated for the patient, the pharmacist can inform the prescriber about appropriate dosing guidelines and monitoring parameters.

Community pharmacy computer systems can also imbed Beers medications to alert pharmacists of potentially inappropriate medications for patients >65 years old. To complete the entry of the prescription, the pharmacist would have to document that he or she either contacted the prescriber or reviewed the patient profile to override the alert. Because community pharmacists generally do not have access to laboratory values or past medical history, it is easier for them to monitor the "medications to avoid" list rather than the medications that should be avoided in specific disease states.

Community pharmacists, because of their accessibility, can also be a resource to their patients about the implications of medications on the Beers list. It is important to stress to patients that they should not abruptly discontinue their medications just because it is on the Beers list. Rather, they should discuss it with their provider. The pharmacist can also offer to call the patient's provider to alert him or her about the Beers medication in question. AGS has developed patient education material to assist healthcare professionals when discussing Beers medications with their patients available at: http://geriatricscareonline.org/toc/ags-patient-handouts/H001/

Another role for the pharmacist in the community is working with Medicare Part D prescription plans. It has come to the attention of AGS that many Part D plans have placed some Beers medications on prior authorization lists or they do not cover them at all (Berger, 2014; McCormick, 2014). The pharmacist can either call the prescriber for an alternative medication or can facilitate getting prior approval when the medication is appropriate for the patient. This seems to be common with some of the CNS depressants such as the benzodiazepines, the nonbenzodiazepine hypnotics, and skeletal muscle relaxants.

## Shared Decision Making

The Beers Criteria can be a starting point to not only discuss medication risks/benefits, but also to open a discussion about quality of life and care preferences for patients. Medication education requires active engagement of patients and caregivers for shared decision making. Glen has multiple medical comorbidities as well as multiple hospitalizations and frequent falls over the last several months. Both he and Michele have voiced their concerns regarding the number of medications that have been prescribed. Patient-centered care revolves around the wishes and needs of the patient. Frequently, adverse medication effects occur in patients, and caregivers aren't always able to make the connection until prompted by healthcare professionals. Jane has a rapport with Glen and Michele. She can ask what they understand about Glen's current condition and what their goals are for treatment.

Remember the criteria deal with only a small portion of the many types of prescribing issues that older adults face—that is, medications that are providing them limited benefit or causing bothersome adverse effects, problems with medication adherence, medication costs that make it difficult to afford medications, and management of complex regimens. So, although the Beers Criteria is a useful tool, we need to stay attentive to these other types of problems as well.

Home healthcare clinicians act as liaisons between patients and providers during transitions of care. The broad base of knowledge they possess, and their expertise and experience in all matters of direct patient care is what makes them so well suited to ensure safety during transitions of care and ongoing home healthcare. This expertise and experience combined with the longitudinal nature of their interactions with a home healthcare patient are why it is important to be knowledgeable about the Beers Criteria. A clear understanding of the 2015 AGS Beers Criteria and its application can play a vital role in the care and medication management of older adults in the home setting. ⌂

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