Today’s long-term care (LTC) facilities have changed dramatically from the “old folks homes” of the past. Of the 1.8 million frail individuals who reside in nursing homes (predominantly age 65 and older), most carry medical histories that are resplendent with chronic diseases and complex medication and treatment plans (Jones, Dwyer, Bercovitz, & Strahan, 2009; Kaye, Harrington, & LaPlante, 2010). Not surprisingly, more than half of nursing home residents need extensive assistance to complete their activities of daily living (ADLs) (Jones et al., 2009) with 7 of 10 having a diagnosis of dementia (Mitchell, Teno, Miller, & Mor, 2005). Polypharmacy, inappropriate prescribing, and the risk for adverse drug reactions are commonly seen (Ferrario, 2008; Jones et al., 2009; Nguyen, Fouts, Kotabe, & Lo, 2006; Tamura et al., 2011; Verrue, Petrovic, Mehuys, Remon, & Vander Stichele, 2009).

PURPOSE

Management of medications for older adults in LTC facilities presents unique challenges and calls for a dynamic process of ongoing assessment, transitions, and shifting care (Unwin, Porvaznik, & Spoelhof, 2010). The purpose of this revised evidence-based guideline is to improve medication management practices for older adults who reside in LTC facilities. In this article, the term nursing home will be used interchangeably with LTC. Although the guideline is primarily directed to nurse practitioners (NPs), it also provides context for expectations and anticipated outcomes for other members of the interdisciplinary team including nurses, pharmacists, physicians, and physician assistants. The evidence-based practice guideline Improving Medication Management for Older Adult Clients Residing in Long-Term Care Facilities (Bergman-Evans, 2012), which is summarized in this article, is available for purchase from The University of Iowa Hartford Center of Geriatric Nursing Excellence at http://www.nursing.uiowa.edu/excellence/evidence-based-practice-guidelines.

DEFINITION OF KEY TERMS

- ADLs/functional health: The ability to bathe, dress, transfer, eat, toilet, and ambulate (Lawton & Brody, 1969).
- Adverse drug reaction (ADR): An unintended, unwanted, or
unpleasant clinical symptom that is caused by the use of a particular drug intended for prophylaxis, diagnosis, or treatment (Edwards & Aronson, 2000; World Health Organization, 2008).

- Inappropriate prescribing: Medications that have not been proven effective or that present a risk when certain diagnoses are present (American Geriatrics Society [AGS] 2012 Beers Criteria Update Expert Panel, 2012; Beers, 1997; Fick et al., 2003). In addition, for individuals with diagnoses such as dementia, depression, Parkinson’s disease, or psychosis, not receiving a recommended medication may be classified as inappropriate prescribing (Stefanacci, Cavallaro, Beers, & Fick, 2009).

- Periodic review: LTC residents must be seen by a health care provider at least once every 30 days for the first 90 days after admission, and at least once every 60 days thereafter (Centers for Medicare & Medicaid Services [CMS], 2011). During the periodic visit, the provider is expected to review the resident’s total program of care including medications and treatments.

- Pharmacist medication management review: Once per month, a licensed pharmacist must complete the Medication Regimen Review (CMS, 2011). This review is designed to promote positive outcomes and minimize adverse outcomes related to medications.

- Polypharmacy: The use of nine or more medications (Morris, Murphy, & Nonemaker, 1995; Tamura et al., 2011) and/or use of medications that are not clinically indicated (Fulton & Allen, 2005).

**RISK FACTORS FOR MEDICATION MISMANAGEMENT IN LTC**

The burden of chronic disease, polypharmacy, a high prevalence of dementia, care by multiple providers, multiple or recent transfers between long-term and acute care facilities, or unclear goals for treatment place older adults residing in LTC facilities at risk for medication mismanagement (Dezii, 2001; Doshi, Shaffer, & Briesacher, 2005; Gore & Mouzon, 2006; Health Care Association of New Jersey, 2007; Melikian, White, Vanderplas, Dezii, & Chang, 2002).

**DESCRIPTION OF THE PRACTICE**

Managing medications for residents in LTC is a challenge on many fronts. First, even when warranted by the chronic disease burden, the sheer number of medications administered is significant (Haque, 2009). For many residents, inappropriate medication may have been the cause for transition from the community to a LTC facility (Zuckerman et al., 2006). These factors call for ongoing attention to reducing redundancy and duplication of medications that are common and result in physiological and financial burdens (Fulton & Allen, 2005; Haque, 2009). NPs, physicians, and physician assistants acting in the role of primary provider with the assistance of the facility pharmacists and staff can use the mandated LTC periodic visits as an opportunity to improve medication regimens and, in turn, the functional health and quality of life for residents in their care.

**PRACTICE MODEL**

The emphasis on close reviews of medication regimens by CMS underscores the need for ongoing vigilance of medications taken by older adults in LTC facilities (Krechting, 2006). The Table outlines necessary information—outcomes, data sources, actions to take with variances, references needed, and timing—to institute the medication guideline for LTC. Findings from the health record and medication review, as well as findings from the history and physical examination, are recorded on the Long-Term Care Medication Outcomes Monitor (Figure). Monitoring medications begins with admission and is repeated at 4-month intervals or with an acute change in condition. Trends from the tool will help answer the questions regarding current medications, including whether a change should be made, continued as is, or discontinued (Bain et al., 2008).

**Outcome 1: Maintain Functional Status**

More than three quarters of nursing home residents require and receive assistance with four to six ADLs (Federal Interagency Forum on Aging-Related Statistics, 2012). A model for appropriate prescribing for residents late in life should focus on function and consider the following factors: remaining life expectancy, time until benefit, goals of care, and treatment targets (Holmes, Hayley, Alexander, & Sachs, 2006). Functional status decline, including a decrease in ADLs, have been found to be predictors of mortality in nursing home residents (Abicht-Swensen & Debner, 1999). Health care providers need to actively attempt to reduce nursing home residents’ number of medications to those drugs that are most likely to improve or maintain function (Ackerman & Meyer von Bremen, 1995; Haque, 2009).

**Minimum Data Set (MDS).** The MDS-ADL Scale is useful for measuring decline in vulnerable populations (Carpenter, Hastie, Morris, Fries, & Ankri, 2006) with moderate to moderate/high validity and reliability (Shin & Scherer, 2009). The MDS 3.0 is a comprehensive mandated assessment tool that assesses residents’ functional, medical, psychosocial, and cognitive status (CMS, 2012; Morris et al., 1990). The MDS-ADL Scale has 10 items, including bed mobility, transfer, walking in room and corridor, locomotion on and off unit, dressing, eating, toilet use, and personal hygiene. Higher scores denote greater dependence.

**Outcome 2: Decrease Polypharmacy**

The risk of polypharmacy is significant for residents in LTC. In gen-
eral, the fewer and more effective the therapies, the safer it will be for residents and those providing care (Garfinkel, Zur-Gil, & Ben-Israel, 2007; Tangalos & Zarowitz, 2006). LTC residents receive an average of seven to eight medications, with nearly one third of these individuals taking nine or more medications (Doshi et al., 2005). An increased number of prescribers has also been associated with more medications and a lower quality of drug regimen (Bergman, Olsson, Carlsten, Waern, & Fastbom, 2007). Because polypharmacy is widespread in U.S. nursing homes, there is a definite need for attention to its untoward effect on both quality of life and costs (Dwyer, Han, Woodwell, & Rechsteiner, 2010).

**Outcome 3: Avoid Adverse Drug Reactions (ADRs)**

Adverse reactions are the most frequent medication-related unfavorable events in U.S. nursing homes (Handler, Wright, Ruby, & Hanlon, 2006). A handful of drugs with narrow therapeutic windows—insulin, warfarin (Coumadin®), and digoxin (Lanoxin®, Digox®)—are commonly prescribed to older adults and have been found to be especially problematic related to severe adverse events (Budnitz et al., 2006; Greene, Williams, Pierson, Hansen, & Carey, 2010). Antidotes for high-risk medications, abnormal laboratory findings, and certain medication combinations are also areas of concern (Handler et al., 2008). Prioritization of medications

**TABLE**

MONITORING MEDICATION MANAGEMENT FOR OLDER ADULTS IN LONG-TERM CARE

<table>
<thead>
<tr>
<th>Outcomes and Variance Actions</th>
<th>Data Source and Reference</th>
<th>Review Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maintain functional status:</td>
<td>Data sources:</td>
<td>120 days (to correspond with alternate 60-day mandated health care provider visits)</td>
</tr>
</tbody>
</table>
| If declines are noted on either the MDS 3.0 self-performance in activities of daily living (ADLs) scale or the history and physical examination, review of the medication regimen with adjustment of dosages or discontinuation is warranted. | • MDS Self-Performance in ADL Scale  
• History and physical examination | |
| Decrease polypharmacy:       | Data source:             | 120 days (to correspond with alternate 60-day mandated health care provider visits) |
| If increases are identified in the number of routine or as-needed medications, or number of administration times exceeds three, risk/benefit profile will be reviewed and modifications will be made accordingly. | Medication administration record (MAR) (number of scheduled and as-needed medications; new medications) | |
| Avoid adverse drug reactions (ADRs): | Data sources: | 120 days (to correspond with alternate 60-day mandated health care provider visits) |
| If medications are identified as the cause of the ADR, alteration or discontinuation will be considered based on overall plan of care. | • Resident record (emergency department visits and hospitalizations; laboratory studies)  
• MAR (medications prescribed for side effects and adverse reactions; discontinued medications)  
• Monitoring (annual complete blood count and comprehensive metabolic profile; Cockcroft-Gault Score) | |
| Minimize inappropriate prescribing: | Data source: | As needed for medication initiation changes |
| Medications found to be in conflict with accepted prescribing guidelines will be discontinued or adjusted unless compelling evidence exists for continuance. | MAR | 120 days (to correspond with alternate 60-day mandated health care provider visits) |
• Stefanacci, Cavallaro, Beers, and Fick (2009) | |

Note. Data for all outcomes are recorded on the Long-Term Care Medication Outcomes Monitor; MDS = Minimum Data Set.
### Criteria Key

Y = Yes/met criteria; N = No/criteria not met; J = Justified variation.

Place the appropriate criteria key next to the outcome indicators for each monitoring period.

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Date Time 1</th>
<th>Date Time 2</th>
<th>Date Time 3</th>
<th>Date Time 4</th>
<th>Date Time 5</th>
<th>Date Time 6</th>
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<tbody>
<tr>
<td>Laboratory studies since last examination</td>
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<tr>
<td>New medications (List)</td>
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<tr>
<td>Discontinued medications (List)</td>
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</tbody>
</table>

**Outcome 1: Maintain Functional Status**  
Resident’s Activities of Daily Living (ADL) score will not decline related to medications

MDS ADL Self-Performance score

**Outcome 2: Decrease Polypharmacy**

1. Prescribed medications will be congruent with diagnoses with no duplications
2. 9 or fewer scheduled medications administered no more than 3 times daily

Total # routine medications  
# administration times  
Total # PRN medications

Medication doses appropriate for age and renal status of older adults

**Cockcroft-Gault Score**  
(for women, multiply result by 0.85)

**Creatinine Clearance formula**  
\[
(140 – \text{age}) \times \text{weight in kg} \\
72 \times \text{serum creatinine}
\]

**Outcome 3: Avoid Adverse Drug Events**

- No adverse drug reactions
- No hospitalizations or ED visits as a result of adverse drug reactions

List drugs ordered to treat side effects or adverse reactions

Monitoring parameters in place for high risk medications  
- Insulin/hypoglycemic agents (yes/no)  
- Digoxin (yes/no)  
- Warfarin (yes/no)  
- Opioid agents (yes/no)  
- Antipsychotic agents (yes/no)

ED visits/hospitalizations secondary to ADR (date)

**Outcome 4: Minimize Inappropriate Prescribing**

Review of medications reveals no conflict with Beers list, CMS criteria, and facility pharmacist recommendations (yes/no)

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Figure. Long-Term Care Medication Outcomes Monitor.  
Note. ADR = adverse drug reaction; DNR = do not resuscitate; PRN = as needed; ED = emergency department; CMS = Centers for Medicare & Medicaid Services.
to be discontinued should be based on older adults’ conditions and goals and are initiated in a step-wise manner, similar to starting low and going slow in reverse with gradually decreasing doses before stopping therapy (Steinman & Hanlon, 2010).

Physiological aging in conjunction with pathological changes from chronic disease increase older adults’ sensitivity to medications. Dosing guidelines should be considered before starting or adjusting renally eliminated medications (Hanlon et al., 2009; Planton & Edlund, 2010). The Cockcroft-Gault formula is a useful method for estimating creatinine clearance (renal function) based on age, weight, and serum creatinine levels (Kane, Ouslander, & Abrass, 1999). Using this calculation as an indicator, researchers found the prescription of potentially inappropriate medications to be common for older Veteran’s Affairs nursing home residents (Hanlon et al., 2011).

**Outcome 4: Decrease Inappropriate Prescribing**

Inappropriate medication use for nursing home residents increases health care costs for emergency department visits and avoidable hospitalization and can even result in death (Dedhiya, Hancock, Craig, Doebbeling, & Thomas, 2010; Lau, Kasper, Potter, Lyles, & Bennett, 2005). Over the past 15 years, research has found that potentially inappropriate medications continue to be used in 12% to 40% of older adults in community and nursing home settings, respectively (Gallagher, Barry, & O’Mahony, 2007; Raebel et al., 2007; Rigler, Jachna, Perera, Shireman, & Eng, 2005).

The two Beers lists can be used for improving medication management in older adults residing in LTC facilities. The first list is the original Beers List that focuses on potentially inappropriate medication use in older adults. This list was published in 1991 and revised in 1997, 2003, and 2012. The 2012 list contains updates for drugs to be avoided or used with caution in older adults (Fick & Semla, 2012). The 2012 AGS Beers Criteria contain 53 medications or classes that are divided into three categories: potentially inappropriate medication use, inappropriate medication use due to drug disease or drug syndrome interactions, and medications to be used with caution. The Beers criteria were adopted and used by CMS for nursing home regulation (Neafsey, 2005). The panel emphasized that the criteria are guidelines and cannot be substituted for professional judgment (Resnick & Pacala, 2012).

**IMPLICATIONS FOR GERONTOLOGICAL NURSING PRACTICE**

Interdisciplinary care planning leads to improved treatment regimens—especially related to medication initiation or changes in medications for older adults in LTC facilities. Although the provider ultimately chooses whether a medication is to be started, changed, or stopped, these decisions are better when the interdisciplinary team, especially nursing, provides input and context for the decision. Making sure that the right resident receives the right dose, of the right drug, at the right time, via the right route, and that the right documentation then follows is a formidable task for nursing staff in LTC facilities. Frail residents, complex regimens, frequent and multiple doses of the same medication, and high-risk drugs alone or in combination require significant nursing time and resources.

Function should be foremost on the minds of all who care for older adults. Although complete independence is seldom a reality for LTC residents, maintaining current functional status is important for the individual’s quality of life and the physical workload of facility staff. Changes in function are always important and to be taken seriously.

The evaluation for function change should always start with medications. If medications are ruled out as the cause and other interventions are deemed necessary, professional nurses need to take the lead in promoting nonpharmacological measures as adjunct or supplemental treatments.

Polypharmacy causes a significant burden and risk for error. Generally, the nurse is expected to pass and administer varying forms and preparations of medications to as many as 15 to 30 residents and complete the task within 1 hour of the assigned administration time (Cassidy, 2005). The time needed for the task of medication administration is substantial and often confounded by interruptions (Thomson et al., 2009). Nurses are in a key position to advocate for identifying medications that could be stopped or dose reduced over time based on trends in behaviors and changes in function. By identifying whether the original indication for medications is still valid—or if the medication has had the desired effect—better decisions can be made about whether the cost and burden of monitoring are worthwhile (Bain et al., 2008; Hamdy et al., 1995).

Professional nurses need good resources for identifying ADRs and inappropriate medications. Foremost, current drug guides and prescriber references need to be readily available. The consulting pharmacist is also an excellent resource for nurses when questions arise regarding plans of care or symptoms. Prescribing providers in LTC facilities need to consult with nursing staff regarding rationale, risks, and benefits of initiation, change, or discontinuing medicines. This not only helps with making the right decision but also decreases the need for follow-up clarifications via fax or telephone calls. When medications are discontinued, a mutually agreed-on plan for monitoring symptom recurrences and/or withdrawal reactions needs to be established before the
drug is withdrawn (Gurwitz et al., 2003; Schiff & Galanter, 2009). Older adults in LTC facilities often take several medications to manage their complex chronic conditions. Although medications can be helpful, they can also contribute to unwanted health effects. Added burdens from current practices are the financial cost of drugs and the workload for nurses to safely administer medications in LTC facilities. The use of evidence-based practices to improve medication management, through guidelines such as the one summarized in this article, should be priority for professional nurses in LTC practice and has the potential to improve the health and outcomes of this vulnerable population.

REFERENCES


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