



## Complete Summary

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### GUIDELINE TITLE

Reducing adverse drug events. In: Evidence-based geriatric nursing protocols for best practice.

### BIBLIOGRAPHIC SOURCE(S)

Zwicker D, Fulmer T. Reducing adverse drug events. In: Capezuti E, Zwicker D, Mezey M, Fulmer T, editor(s). Evidence-based geriatric nursing protocols for best practice. 3rd ed. New York (NY): Springer Publishing Company; 2008. p. 257-308. [104 references]

### GUIDELINE STATUS

This is the current release of the guideline.

## COMPLETE SUMMARY CONTENT

SCOPE  
METHODOLOGY - including Rating Scheme and Cost Analysis  
RECOMMENDATIONS  
EVIDENCE SUPPORTING THE RECOMMENDATIONS  
BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS  
IMPLEMENTATION OF THE GUIDELINE  
INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT  
CATEGORIES  
IDENTIFYING INFORMATION AND AVAILABILITY  
DISCLAIMER

## SCOPE

### DISEASE/CONDITION(S)

Adverse drug events

- Drug-drug interactions
- Drug-disease interactions
- Inappropriate prescribing
- Poor adherence
- Medication errors

### GUIDELINE CATEGORY

Management  
Prevention

## **CLINICAL SPECIALTY**

Geriatrics  
Nursing  
Pharmacology

## **INTENDED USERS**

Advanced Practice Nurses  
Allied Health Personnel  
Health Care Providers  
Hospitals  
Nurses  
Pharmacists  
Physician Assistants  
Physicians

## **GUIDELINE OBJECTIVE(S)**

To reduce adverse drug events in older adults

## **TARGET POPULATION**

Hospitalized older adults

## **INTERVENTIONS AND PRACTICES CONSIDERED**

### **Assessment**

1. Detailed medication history
  - Beers Criteria for potentially inappropriate medications
2. Renal function
3. At discharge
  - Reconciliation of medications
  - Abilities and limitations and health literacy in self-administration of medications
  - Adherence issues
4. Patients' ability to self-administer medications at discharge

### **Management**

1. Reduction of adverse drug events
  - Patient empowerment
  - Comprehensive medication assessment
  - Collaboration with interdisciplinary team
  - Prescribing principles
2. Prevention of iatrogenic adverse drug events
  - New symptoms
  - Monitoring of medication orders
  - Prescribing practices and documentation
  - Computer-assisted technology for medication order entry

3. Patient/caregiver education
4. Follow-up monitoring

### **MAJOR OUTCOMES CONSIDERED**

- Drug-drug interactions
- Drug-disease interactions
- Inappropriate prescribing
- Poor adherence
- Medication errors

## **METHODOLOGY**

### **METHODS USED TO COLLECT/SELECT EVIDENCE**

Hand-searches of Published Literature (Primary Sources)  
Hand-searches of Published Literature (Secondary Sources)  
Searches of Electronic Databases

### **DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE**

Although the AGREE instrument (which is described in Chapter 1 of the original guideline document) was created to critically appraise clinical practice guidelines, the process and criteria can also be applied to the development and evaluation of clinical practice protocols. Thus the AGREE instrument has been expanded for that purpose to standardize the creation and revision of the geriatric nursing practice guidelines.

#### **The Search for Evidence Process**

Locating the best evidence in the published research is dependent on framing a focused, searchable clinical question. The PICO format—an acronym for population, intervention (or occurrence or risk factor), comparison (or control), and outcome—can frame an effective literature search. The editors enlisted the assistance of the New York University Health Sciences librarian to ensure a standardized and efficient approach to collecting evidence on clinical topics. A literature search was conducted to find the best available evidence for each clinical question addressed. The results were rated for level of evidence and sent to the respective chapter author(s) to provide possible substantiation for the nursing practice protocol being developed.

In addition to rating each literature citation to its level of evidence, each citation was given a general classification, coded as "Risks," "Assessment," "Prevention," "Management," "Evaluation/Follow-up," or "Comprehensive." The citations were organized in a searchable database for later retrieval and output to chapter authors. All authors had to review the evidence and decide on its quality and relevance for inclusion in their chapter or protocol. They had the option, of course, to reject or not use the evidence provided as a result of the search or to dispute the applied level of evidence.

#### **Developing a Search Strategy**

Development of a search strategy to capture best evidence begins with database selection and translation of search terms into the controlled vocabulary of the database, if possible. In descending order of importance, the three major databases for finding the best primary evidence for most clinical nursing questions are the Cochrane Database of Systematic Reviews, Cumulative Index to Nursing and Allied Health Literature (CINAHL), and Medline or PubMed. In addition, the PsycINFO database was used to ensure capture of relevant evidence in the psychology and behavioral sciences literature for many of the topics. Synthesis sources such as UpToDate® and British Medical Journal (BMJ) Clinical Evidence and abstract journals such as *Evidence Based Nursing* supplemented the initial searches. Searching of other specialty databases may have to be warranted depending on the clinical question.

It bears noting that the database architecture can be exploited to limit the search to articles tagged with the publication type "meta-analysis" in Medline or "systematic review" in CINAHL. Filtering by standard age groups such as "65 and over" is another standard categorical limit for narrowing for relevance. A literature search retrieves the initial citations that begin to provide evidence. Appraisal of the initial literature retrieved may lead the searcher to other cited articles, triggering new ideas for expanding or narrowing the literature search with related descriptors or terms in the article abstract.

## **NUMBER OF SOURCE DOCUMENTS**

Not stated

## **METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE**

Weighting According to a Rating Scheme (Scheme Given)

## **RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE**

### **Levels of Evidence**

**Level I:** Systematic reviews (integrative/meta-analyses/clinical practice guidelines based on systematic reviews)

**Level II:** Single experimental study (randomized controlled trials [RCTs])

**Level III:** Quasi-experimental studies

**Level IV:** Non-experimental studies

**Level V:** Care report/program evaluation/narrative literature reviews

**Level VI:** Opinions of respected authorities/Consensus panels

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## **METHODS USED TO ANALYZE THE EVIDENCE**

Review of Published Meta-Analyses  
Systematic Review

## **DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE**

Not stated

## **METHODS USED TO FORMULATE THE RECOMMENDATIONS**

Expert Consensus

## **DESCRIPTION OF METHODS USED TO FORMULATE THE RECOMMENDATIONS**

Not stated

## **RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS**

Not applicable

## **COST ANALYSIS**

A formal cost analysis was not performed and published cost analyses were not reviewed.

## **METHOD OF GUIDELINE VALIDATION**

External Peer Review  
Internal Peer Review

## **DESCRIPTION OF METHOD OF GUIDELINE VALIDATION**

Not stated

# **RECOMMENDATIONS**

## **MAJOR RECOMMENDATIONS**

Levels of evidence (I – VI) are defined at the end of the "Major Recommendations" field.

### **Assessment Tools and Strategies**

- Assessment Tools
  - Use appropriate assessment tools as indicated for each individual's needs and specific setting:

- Beers Criteria: 2002 Criteria for Potentially Inappropriate Medication Use in Older Adults: Independent (see Table 12.1 in the original guideline document). 2002 Criteria for Potentially Inappropriate Medication Use in Older Adults: Considering Diagnoses or Condition (see Table 12.2 in the original guideline document) (Fick et al., 2003 **[Level VI]**).
- Common Drug–Drug Interactions (see Table 12.3 in the original guideline document). List of some commonly known interactions.
- Cockcroft-Gault Formula: to estimate renal function (see Figure 12.1 in the original guideline document).
- Functional Capacity (activities of daily living [ADL], instrumental ADL [IADL], Mini-Cog, or Mini-mental State Examination [MMSE]). (See the NGC summaries of the Hartford Institute for Geriatric Nursing guidelines [Assessment of Function](#) and [Assessing Cognitive Function](#).)
- Brown Bag Method (Nathan et al., 1999 **[Level IV]**). Method used to assess all medications an older adult has at home, including prescriptions from all providers, over-the-counter (OTC) medications, and herbal remedies (all medications are to be brought in a "brown bag"). Should be used in conjunction with a complete medication history (see Table 12.4 in original guideline document).
- Drugs Regimen Unassisted Grading Scale (DRUGS) Tool. Assessment of self-administration ability (Edelberg, Shallenberger, & Wei, 1999; Hutchinson et al., 2006 **[both level IV]**). Typically used at time of transfer to other levels of care.
- Assessment Strategies
  - Comprehensive medication assessment should be performed at admission, discharge, and intervals in between (Petrone & Katz, 2005 **[Level IV]**; Shekelle et al., 2001). Obtain a detailed medication history and confirm its accuracy (Lau et al., 2000 **[Level IV]**; Tam et al., 2005 **[Level I]**), detailing the type and amount of prescriptions, OTCs, vitamins, supplements, and herbal remedies (Hanlon et al., 2001 **[Level V]**; Kaufman et al., 2002 **[Level IV]**), alcohol and illicit drugs, using appropriate assessment tool (e.g., Brown Bag method) (Nathan et al., 1999 **[Level IV]**).
  - Assess renal function using Cockcroft-Gault formula for assessing renal function prior to administering renal-clearing drugs (see Figure 12.1 in the original guideline document).
  - Reconciliation of medications ordered at admission and at discharge in consultation with a pharmacist (Gleason et al., 2004 **[Level IV]**; Santell, 2006 **[Level VI]**), geriatric expert, or computer-based program (Joanna Briggs Institute, 2006 **[Level I]**; Feldman et al., 2006 **[Level IV]**).
  - Review medication list using Beers criteria for potentially inappropriate medications, particularly those with *high severity* and for potential drug–drug and drug–disease interactions (see Tables 12.1 and 12.2 in the original guideline document) (Fick et al., 2003 **[Level VI]**; Zhan et al., 2005 **[Level IV]**).
  - At discharge from hospital, use appropriate tools to assess individual's ability to self-administer medications:

- Assess functional capacity: ADLs, IADLs, Mini-Cog. (See the NGC summaries of the Hartford Institute for Geriatric Nursing guidelines [Assessment of Function](#) and [Assessing Cognitive Function](#).)
- Assess individuals (at admission or initial encounter and at discharge) who administer their own medicines with DRUGS tool to identify potential areas of self-administration difficulty (see Resources section of topic at [www.ConsultGeriRN.org](http://www.ConsultGeriRN.org)) (Edelberg, Shallenberger, & Wei, 1999; Edelberg et al., 2000; Hutchinson et al., 2006 [**all Level IV**]).

## Interventions and Nursing Care Strategies

- Reduce adverse drug events (ADEs) (during and post hospitalization)
  - *Patient empowerment.* Patients should be given the necessary information and the opportunity to exercise the degree of control they choose over health care decisions that affect them. If patients are involved in decision making, they are less likely to make decisions that may lead to adverse drug reactions (ADRs) (National Coordinating Council for Medication Errors Reporting and Prevention [NCC MERP], 2001 [**Level VI**]), such as abruptly discontinuing a medication that should be tapered off.
  - *Comprehensive Medication Assessment* on admission as indicated in assessment (see Table 12.4 in the original guideline document).
  - *Collaborate with the interdisciplinary team* to effect change in reducing the numbers of ADEs and ADRs, many of which are preventable (Hanlon et al., 2001 [**Level V**]).
  - *Prescribing Principles.* Monitoring for appropriate prescribing and alerting the prescriber to potential problem areas helps reduce medication-related problems. Prescribing a medication is multifaceted: deciding that a drug is truly indicated; choosing the best drug; determining appropriate dose for the individual; monitoring for toxicity and effectiveness; and seeking consultation when necessary (Rochon, 2006 [**Level V**]). These principles support recommendations to:
    - *Reduce the dose.* "Start Low and Go Slow," or give the lowest possible dose when starting a medication and slow upward titration to obtain clinical benefit; many ADEs are dose-related (Petroni & Katz, 2005 [**Level IV**]; Rochon, 2006 [**Level V**]). Primary provider should be notified if the dosage ordered is higher than the recommended starting dose (e.g., digoxin maximum dose  $\leq 0.125$  mg for treatment of congestive heart failure [CHF]) (Fick et al., 2003 [**Level VI**]).
    - *Discontinue unnecessary therapy.* Prescribers are often reluctant to stop medications, especially if they did not initiate the treatment. This practice increases the risk for an adverse event (Rochon, 2006 [**Level V**]).
    - *Attempt a trial of nonpharmacological interventions/treatments* prior to requesting medication for new symptoms (Rochon, 2006 [**Level V**]).
    - *Recommend safer drugs.* Avoid drugs that are likely to be associated with adverse outcomes (review *Try this*: Beers

- Criteria in resources section at [www.consultgeriRN.org](http://www.consultgeriRN.org)) (Petrone & Katz, 2005 [**Level IV**]).
- *Assess renal function* using Cockcroft-Gault formula (for renally cleared drugs) to determine accurate dosage prior to prescribing such as many routinely prescribed intravenous (IV) antibiotics. Dosage recommendations are available based on this formula in Physician's Desk Reference (PDR) and other common prescribing resources.
  - *Optimize drug regimen*. When prescribing medications, the focus should be on risk versus benefit where the expected health benefit (e.g., relief of agitation in dementia with psychosis) exceeds the expected negative consequences (e.g., morbidity and mortality from falls that result in hip fracture) (Leipzig, Cumming, & Tinetti, 1999 [**Level I**]; Ooi, Hossain, & Lipsitz, 2000 [**Level II**]).
  - *Initiation of new medication*. Assess for potential drug–disease and drug–drug interactions and correct dosages, the most common causes of ADRs, before starting new drugs (Doucet et al., 2002 [**Level V**]; NCC MERP, 2001 [**Level VI**]; Petrone & Katz, 2005 [**Level IV**]).
  - *Avoid the prescribing cascade*. Avoid the prescribing cascade by first considering a new symptom as being a consequence of a current medication prior to adding a new medication (Rochon, 2006 [**Level V**]; Rochon & Gurwitz, 1997 [**Level V**]).
  - *Avoid inappropriate medications in older persons*. Review criteria for potentially inappropriate medications (see Table 12.1 in the original guideline document) or drug–disease interactions (see Table 12.2 in the original guideline document) and potential drug–drug interactions (see Table 12.3 in the original guideline document) (Fick et al., 2006 [**Level VI**]).
  - Specific interventions for prevention of iatrogenic adverse drug reactions (in hospital and after discharge)
    - Consider any new symptom as a possible ADE before requesting/administering new medication for the symptom, avoiding the prescribing cascade (Gurwitz et al., 2003 [**Level IV**]).
    - Monitor medication orders for wrong drug choices (high-risk inappropriate medications, drug–disease and drug–drug interactions), wrong dosages, or administration errors (Doucette et al. 2005 [**Level V**]; Gurwitz et al., 2003 [**Level IV**]; Hanlon et al., 1997 [**Level IV**]). Consider use of technological handheld devices such as personal digital assistant (PDA) for quick access to Beers criteria, drug–drug or drug–disease interactions, and geriatric assessment tools (see [www.ConsultGeriRN.org](http://www.ConsultGeriRN.org)).
    - Improve prescribing practices by documenting indication for initiation of new drug therapy, maintaining a current medication list, documenting response to therapy, as well as the need for ongoing treatment (Knight & Avorn, 2001 [**Level VI**]; Merle et al., 2005 [**Level VI**]) and evaluating co-morbidities (Merle et al., 2005 [**Level VI**]).
    - Institutional implementation of computer-assisted technology for medication order entry: has the potential to prevent an estimated 84% of dose, frequency, and route errors; and from 28% to 95% of ADEs can be prevented by reducing medication errors through computerized

monitoring systems (Agency for Healthcare Research and Quality [AHRQ], 2001 **[Level I]**). Identifying and reporting of ADRs can also be performed using computer-assisted National Surveillance system. Institutions must facilitate a culture of safety to reduce ADRs/ADEs.

- Interventions at discharge
  - *Reconciliation* of medications at discharge (Gleason et al., 2004 **[Level IV]**; Nickerson et al., 2005 **[Level II]**; Joint commission on Accreditation of health care Organizations [JCAHO], 2006, 2007 **[Level VI]**) helps to reduce ADR/ADEs and therefore rehospitalization.
  - *Assess abilities and limitations* and health literacy in self-administration of medications using appropriate tools at discharge (Curry et al., 2005 **[Level VI]**) and recognize that self-administration and nonadherence can induce ADRs (Merle et al., 2005 **[Level VI]**).
  - *Assess for adherence* issues that may develop after discharge, which can help to reduce ADEs (Nickerson et al., 2005 **[Level II]**) and rehospitalization (Bergman-Evans, 2006; Edelberg, Shallenberger, & Wei, 1999 **[Level IV]**; Fulmer et al., 2000). Recommend devices that can assist in enhancing adherence behavior (Fulmer et al., 1999) and interventions to address cost and other adherence issues.
  - *Patient/Caregiver Education*. Provide patient and caregiver education using relevant nursing content and principles (Curry et al., 2005 **[Level VI]**) including assessment of factors that might affect adherence. Nurses are the primary source for providing education to patients at discharge; therefore, their role is key to preventing medication-related consequences after hospitalization, including rehospitalization. Discharge education and counseling includes:
    - Education tailored to the age group and needs of the individual (Bergman-Evans, 2006)
    - Educate the patient/caregiver about benefits and risks (Shekelle et al., 2001) and potential medication side effects (Rochon, 2006 **[Level V]**).
    - Teach safe medication management (Curry et al., 2005 **[Level VI]**).
    - Consider an interactive computer program (Personal Education Program [PEP]) designed for the learning styles and psychomotor skills of older adults to teach about potential drug interactions that can result from self-medication with OTC agents and alcohol (Neafsey et al., 2002 **[Level II]**).

### **Follow-Up Monitoring**

- Health care providers will:
  - Provide consistent and appropriate care and follow-up in presence of a medication-related problem.
  - Evaluate with physical exam and laboratory tests (as appropriate) on regular basis to ensure that the older adult is responding to therapy as expected (Edelberg et al., 2000 **[Level IV]**).
- Institutions will:
  - Provide ongoing assessment of staff competence in assessing and intervening for prevention of ADEs.
  - Embed reduction of ADEs in the culture of safety

## **Definitions:**

### **Levels of Evidence**

**Level I:** Systematic reviews (integrative/meta-analyses/clinical practice guidelines based on systematic reviews)

**Level II:** Single experimental study (randomized controlled trials [RCTs])

**Level III:** Quasi-experimental studies

**Level IV:** Non-experimental studies

**Level V:** Care report/program evaluation/narrative literature reviews

**Level VI:** Opinions of respected authorities/Consensus panels

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## **CLINICAL ALGORITHM(S)**

None provided

## **EVIDENCE SUPPORTING THE RECOMMENDATIONS**

### **REFERENCES SUPPORTING THE RECOMMENDATIONS**

[References open in a new window](#)

### **TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS**

The type of supporting evidence is identified and graded for selected recommendations.

## **BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS**

### **POTENTIAL BENEFITS**

#### **Patients**

- Fewer iatrogenic outcomes from medication-related events.
- Understand medication regimens upon discharge from the hospital

#### **Health Care Providers**

- Use a range of interventions to prevent, alleviate, or ameliorate medication problems with older adults.

- Improve prescribing practices by documenting indication for initiation of new drug therapy, maintaining a current medication list, documenting response to therapy, as well as the need for ongoing treatment.
- Evaluate nature and origins of medication-related problems in a timely manner.
- Increase their knowledge about medication safety in older adults.
- Increase referrals to appropriate practitioners (e.g., geriatrician, geriatric/gerontological or psychiatric clinical nurse specialist, nurse practitioner, or consultation-liaison service).

**Institution**

- Provide education to health care providers regarding prevention, identification, and reporting of adverse drug reactions (ADRs).
- Make information on ADRs accessible to patients.
- Enhance surveillance and reporting of ADRs using a National Surveillance system. Consider use of computerized physician ordering system.
- Track and report morbidity and mortality due to medication-related problems.
- Provide a system for medication reconciliation and follow-up its effectiveness with regard to rehospitalization rates due to ADRs.
- Review for careful documentation of iatrogenic medication and other iatrogenic events for continuous quality improvement (CQI).
- Provide ongoing education related to safe medication management for physicians and staff.

**POTENTIAL HARMS**

Not stated

**IMPLEMENTATION OF THE GUIDELINE**

**DESCRIPTION OF IMPLEMENTATION STRATEGY**

An implementation strategy was not provided.

**INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES**

**IOM CARE NEED**

Getting Better  
 Living with Illness  
 Staying Healthy

**IOM DOMAIN**

Effectiveness  
 Patient-centeredness

## IDENTIFYING INFORMATION AND AVAILABILITY

### **BIBLIOGRAPHIC SOURCE(S)**

Zwicker D, Fulmer T. Reducing adverse drug events. In: Capezuti E, Zwicker D, Mezey M, Fulmer T, editor(s). Evidence-based geriatric nursing protocols for best practice. 3rd ed. New York (NY): Springer Publishing Company; 2008. p. 257-308. [104 references]

### **ADAPTATION**

Not applicable: The guideline was not adapted from another source.

### **DATE RELEASED**

2008

### **GUIDELINE DEVELOPER(S)**

Hartford Institute for Geriatric Nursing - Academic Institution

### **SOURCE(S) OF FUNDING**

Hartford Institute for Geriatric Nursing

### **GUIDELINE COMMITTEE**

Not stated

### **COMPOSITION OF GROUP THAT AUTHORED THE GUIDELINE**

*Primary Authors:* DeAnne Zwicker and Terry Fulmer

### **FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST**

Not stated

### **GUIDELINE STATUS**

This is the current release of the guideline.

### **GUIDELINE AVAILABILITY**

Electronic copies: Available from the [Hartford Institute for Geriatric Nursing Website](#).

Copies of the book *Geriatric Nursing Protocols for Best Practice*, 3rd edition: Available from Springer Publishing Company, 536 Broadway, New York, NY

10012; Phone: (212) 431-4370; Fax: (212) 941-7842; Web:  
[www.springerpub.com](http://www.springerpub.com).

#### **AVAILABILITY OF COMPANION DOCUMENTS**

None available

#### **PATIENT RESOURCES**

None available

#### **NGC STATUS**

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