# Complete Summary

## GUIDELINE TITLE

Age-related changes in health. In: Evidence-based geriatric nursing protocols for best practice.

## BIBLIOGRAPHIC SOURCE(S)

Smith CM, Cotter V. Age-related changes in health. 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. 431-58. [107 references]

## GUIDELINE STATUS

This is the current release of the guideline.

## COMPLETE SUMMARY CONTENT



## SCOPE

### DISEASE/CONDITION(S)

Gerontological changes that adversely affect health and functionality

### GUIDELINE CATEGORY

Evaluation
Management
Prevention
Risk Assessment

### CLINICAL SPECIALTY

Geriatrics
Nursing

## INTENDED USERS

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

## GUIDELINE OBJECTIVE(S)

To identify anatomical and physiological changes which are attributed to the normal aging process

## TARGET POPULATION

Older adults

## INTERVENTIONS AND PRACTICES CONSIDERED

### Assessment

1. Cardiovascular system
2. Pulmonary system
3. Genitourinary system
4. Oropharyngeal and gastrointestinal systems
5. Musculoskeletal system
6. Nervous system and cognition

### Management

1. Changes that adversely affect health and functionality
    - Cardiovascular system
        - Decreased cardiac reserve and associated implications
    - Pulmonary system
        - Decreased pulmonary functional reserve, ciliary and macrophage activity, cough reflex, and response to hypoxia and hypercapnia, and associated implications
    - Genitourinary system
        - Decreased renal functional reserve and risk of nephrotoxic injury and associated implications
        - Urinary urgency, incontinence
    - Oropharyngeal and gastrointestinal systems
        - Poor nutrition, gastric changes, constipation, and fecal incontinence, and associated implications
    - Musculoskeletal system
        - Sarcopenia, osteopenia, and osteoporosis and associated implications

- Nervous system and cognition
    - Decreased muscle strength, temperature sensitivity, cognitive processing speed and associated implications
    - Sleep disorders, delirium, neurodegenerative disorders

### MAJOR OUTCOMES CONSIDERED

Successful aging

## 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

## 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.

### Age-Associated Cardiovascular Changes

Definition: *Isolated systolic hypertension*: systolic blood pressure (BP) >140 mmHg and diastolic BP <90 mmHg.

- Etiology

- Arterial wall thickening and stiffening, decreased compliance
- Left ventricular and atrial hypertrophy
- Sclerosis of atrial and mitral valves

**Parameters of Cardiovascular Assessment**

- Cardiac assessment: Electrocardiogram (ECG); heart rate, rhythm, murmurs, heart sounds ($S_4$ common, $S_3$ in disease) (Seidel et al., 2003 **[Level VI]**).
- Assess BP (lying, sitting, standing) and pulse pressure (Kenny, 2003 **[Level V]**).
- Palpate carotid artery & peripheral pulses for symmetry (Seidel et al., 2003 **[Level VI]**).

**Nursing Care Strategies for Cardiovascular**

- Safety precautions for orthostatic hypotension: Avoid prolonged recumbency; rise slowly from lying or sitting position; wait 1 to 2 minutes after position change to stand or transfer (Kenney, 2003 **[Level V]**). Institute fall prevention strategies. (See the National Guideline Clearinghouse [NGC] summary of the Hartford Institute for Geriatric Nursing guideline Fall Prevention).
- Encourage lifestyle practices to attain a healthy body weight (body mass index [BMI] 18.5 to 24.9 $kg/m^2$) (American Heart Association (AHA) Nutrition Committee et al., 2006 **[Level 1]**) and normal blood pressure ("Seventh report," 2004 **[Level I]**); healthful diet (Knoops et al., 2004 [**Level II]**, physical activity (Netz et al., 2005 **[Level I]**), smoking cessation (U.S. Department of Health and Human Services, "The health consequences," 2004 **[Level I]**).

**Age-Associated Changes in the Pulmonary System**

- Etiology
  - Decreased respiratory muscle strength; stiffer chest wall with reduced compliance
  - Diminished ciliary and macrophage activity, drier mucus membranes. Decreased cough reflex
  - Decreased response to hypoxia and hypercapnia

**Parameters of Pulmonary Assessment**

- Assess respiration rate, rhythm, regularity, volume, depth (Docherty, 2002 **[Level I]**), exercise capacity (Mahler, Fierro-Carrion, & Baird, 2003 **[Level V]**). Auscultate breath sounds throughout lung fields (Mick & Ackerman, 2004 **[Level V]**).
- Inspect thorax, symmetry of chest expansion. Obtain smoking history (Seidel et al., 2003 **[Level VI]**).
- Monitor secretions, breathing rate during sedation, positioning (Docherty, 2002 **[Level I]**; Watters, 2002 **[Level V]**) arterial blood gases, pulse oximetry (Zeleznik, 2003 **[Level V]**).
- Assess cough, need for suctioning (Smith & Connolly, 2003 **[Level V]**).

**Nursing-Care Strategies**

- Maintain patent airways through upright positioning/repositioning (Docherty, 2002 **[Level I]**), suctioning (Smith & Connolly, 2003 **[Level V]**), and bronchodilators (National Heart, Lung, and Blood Institute, 1996 **[Level I]**).
- Provide oxygen as needed (Docherty, 2002 **[Level I]**).
- Incentive spirometry as indicated, particularly if immobile or declining in function (Dunn, 2004 **[Level V]**).
- Maintain hydration and mobility (Watters, 2002 **[Level V]**)
- Education on cough enhancement (Dunn, 2004 **[Level V]**), smoking cessation (U.S. Department of Health and Human Services, 2004 **[Level I]**).

**Age-Associated Changes in the Renal and Genitourinary Systems**

- Definitions: *Cockroft-Gault Equation*: Calculation of creatinine clearance in older adults:

  *For Men*:

  Creatinine clearance (mL/min) =

  $$\frac{(140 - \text{age in years}) \times (\text{body weight in kg})}{72 \times (\text{serum creatinine, mg/dL})}$$

  *For Women*: the calculated value is multiplied by 85% (0.85).

- Etiology
  - Decreases in kidney mass, blood flow, glomerular filtration rate (10% decrement/decade after age 30). Decreased drug clearance
  - Reduced bladder elasticity, muscle tone, capacity
  - Increased post-void residual, nocturnal urine production
  - In males, prostate enlargement with risk of benign prostatic hyperplasia (BPH)

**Parameters of Renal and Genitourinary Assessment**

- Assess renal function (creatinine clearance) (Beck, 1998 **[Level V]**).
- Assess choice/need/dose of nephrotoxic agents and renally cleared drugs (Beyth & Shorr, 2002 **[Level V]**). (See the NGC summary of the Hartford Institute for Geriatric Nursing guideline Reducing Adverse Drug Events in Older Adults).
- Assess for fluid/electrolyte and acid/base imbalances (Suhayda & Walton, 2002 **[Level V]**).
- Evaluate nocturnal polyuria (Miller, 2003 **[Level V]**), urinary incontinence, benign prostatic hypertrophy (BPH). Assess urinary tract infection (UTI) symptoms (Bradway & Yetman, 2002 **[Level V]**).
- Assess fall risk if nocturnal or urgent voiding (see the NGC summary of the Hartford Institute for Geriatric Nursing guideline Fall Prevention).

**Nursing Care Strategies**

- Monitor nephrotoxic and renally cleared drug levels (Beyth & Shorr, 2002 **[Level V]**).
- Maintain fluid/electrolyte balance. Minimum 1,500 to 2,500 mL/day from fluids and foods for 50 to 80 kg adults to prevent dehydration (Suhayda & Walton, 2002 **[Level I]**).
- For nocturnal polyuria: limit fluids in evening, avoid caffeine, use prompted voiding schedule (Miller, 2003 **[Level V]**).
- Fall prevention for nocturnal or urgent voiding (see the NGC summary of the Hartford Institute for Geriatric Nursing guideline Fall Prevention)

**Age-Associated Changes in the Oropharyngeal and Gastrointestinal Systems**

- Definition: *BMI*: Healthy: 18.5 to 24.9 kg/$m^2$; overweight: 25 to 29.9 kg/$m^2$; obesity: $\geq$30 kg/$m^2$.
- Etiology
    - Decreases in strength of muscles of mastication, taste, and thirst perception.
    - Decreased gastric motility with delayed emptying. Atrophy of protective mucosa.
    - Malabsorption of carbohydrates, vitamins $B_{12}$ and D, folic acid, calcium.
    - Impaired sensation to defecate.
    - Reduced hepatic reserve. Decreased metabolism of drugs.

**Parameters of Oropharyngeal and Gastrointestinal Assessment**

- Assess abdomen, bowel sounds (Edwards, 2002 **[Level V]**).
- Assess oral cavity (see the NGC summary of the Hartford Institute for Geriatric Nursing guideline Managing Oral Hydration); chewing and swallowing capacity, dysphagia (coughing, choking with food/fluid intake) (Shaker & Staff, 2001 **[Level V]**). If aspiration, assess lungs (rales) for infection and typical/atypical symptoms (Bartlett et al., 2000 **[Level I]**; Kelley, 2002 **[Level V]**).
- Monitor weight, calculate BMI, compare to standards (AHA Nutrition Committee et al., 2006 [Level I]). Determine dietary intake, compare to nutritional guidelines. (See the NGC summary of the Hartford Institute for Geriatric Nursing guideline Nutrition).
- Assess for gastroesophageal reflux disease (GERD) (Edwards, 2002 **[Level V]**), constipation and fecal incontinence; fecal impaction by digital examination of rectum or palpation of abdomen (Tariq, 2004 **[Level V]**).

**Nursing-Care Strategies**

- Monitor drug levels and liver function tests if on medications metabolized by liver. Assess nutritional indicators (McGee & Jensen, 2000 **[Level V]**).
- Educate on lifestyle modifications and over-the-counter (OTC) medications for GERD (Edwards, 2002 **[Level V]**).
- Educate on normal bowel frequency, diet, exercise, recommended laxatives. Encourage mobility, provide laxatives if on constipating medications (Harari, 2003 **[Level V]**).

- Encourage participation in community-based nutrition programs (Krassie & Roberts, 2001 **[Level V]**); educate on healthful diets (U.S. Department of Health and Human Services, 2000, 2005 **[both Level I]**).

**Age-Associated Changes in the Musculoskeletal System**

Definition: *Sarcopenia*: Decline in muscle mass and strength associated with aging.

- Etiology
    - Sarcopenia with increased weakness and poor exercise tolerance.
    - Lean body mass replaced by fat with redistribution of fat.
    - Bone loss in women and men after peak mass at 30 to 35 years.
    - Decreased ligament and tendon strength. Intervertebral disc degeneration. Articular cartilage erosion. Changes in stature with kyphosis, height reduction.

**Nursing-Care Strategies**

- Encourage physical activity through health education and goal setting (Conn et al., 2003 **[Level I]**; Conn, Valentine, & Cooper, 2002 **[Level I]**) to maintain function (Fielding et al., 2002 **[Level II]**; Netz et al., 2005 **[Level I]**).
- Pain medication to enhance functionality (see the NGC summary of the Hartford Institute for Geriatric Nursing guideline Pain Management). Implement strategies to prevent falls (Carter, Kannus, & Khan, 2001 **[Level I]** ). (See the NGC summaries of the Hartford Institute for Geriatric Nursing guidelines Fall Prevention.
- Prevent osteoporosis by adequate daily intake of calcium and vitamin D (USDHHS, "Bone health," 2004 **[Level I]**), physical exercise, smoking cessation (USDHHS, 2004 The health consequences of smoking: **[Level I]**; U.S. Preventive Services Task Force (USPSTF), 1996 **[Level I]**). Advise routine bone-mineral density screening (USPSTF, 2002 **[Level I]**).

**Age-Associated Changes in the Nervous System and Cognition**

- Etiology
    - Decrease in neurons and neurotransmitters.
    - Modifications in cerebral dendrites, glial support cells, synapses.
    - Compromised thermoregulation.

**Parameters of Nervous System and Cognition Assessments**

- Assess, with periodic reassessment, baseline functional status (Craft, Cholerton, & Reger, 2003 **[Level V]**). (See the NGC summaries of the Hartford Institute for Geriatric Nursing guidelines Assessment of Function and Fall Prevention). During acute illness, monitor functional status and delirium. (See the NGC summary of the Hartford Institute for Geriatric Nursing guideline Delirium: Prevention, Early Recognition, and Treatment).
- Evaluate, with periodic reassessment, baseline cognition (See the NGC summary of the Hartford Institute for Geriatric Nursing guideline Assessing

Cognitive Function) and sleep disorders (Floyd, 2002 **[Level I]**). (See the NGC summary of the Hartford Institute for Geriatric Nursing guideline Excessive Sleepiness).
- Assess impact of age-related changes on level of safety and attentiveness in daily tasks (e.g., driving) (Henry et al., 2004 **[Level I]**; Park, O'Connell, & Thomson, 2003 **[Level I]**).
- Assess temperature during illness or surgery (Abrass, 2003 **[Level V]**). Monitor atypical symptoms of infection, absent fever.

**Nursing-Care Strategies**

- Institute fall preventions strategies (See the NGC summary of the Hartford Institute for Geriatric Nursing guideline Fall Prevention).
- To maintain cognitive function, encourage lifestyle practices of regular physical exercise (Colcombe & Kramer, 2003 **[Level I]**), intellectual stimulation (Mattson, 2003 **[Level V]**), and healthful diet ("Seventh report," 2004 **[Level I]**).
- Recommend reaction time training and safe driving courses to improve safety (Craft Cholerton, & Reger, 2003 **[Level V]**).
- Recommend behavioral interventions for sleep disorders (Irwin, Cole, & Nicassio, 2006 **[Level I]**).

**Follow-up Monitoring of Condition**

- Continue to reassess effectiveness of interventions.
- Incorporate continuous quality improvement criteria into existing programs.

**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



## 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

#### Patient

Successful aging through appropriate lifestyle practices and health care experiences

#### Health Care Provider

- Identification of normative changes in aging and differentiation from pathological changes
- Development of interventions to correct for adverse effects associated with aging

#### Institution

- Development of programs to promote successful aging
- Provision of staff education on age-related changes in health

### 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
Staying Healthy

**IOM DOMAIN**

Effectiveness

## IDENTIFYING INFORMATION AND AVAILABILITY

**BIBLIOGRAPHIC SOURCE(S)**

Smith CM, Cotter V. Age-related changes in health. 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. 431-58. [107 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**

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**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 of Geriatric Nursing Web site.

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.

### AVAILABILITY OF COMPANION DOCUMENTS

None available

### PATIENT RESOURCES

None available

### NGC STATUS

This NGC summary was completed by ECRI Institute on June 11, 2008. The information was verified by the guideline developer on August 4, 2008.

### COPYRIGHT STATEMENT



## DISCLAIMER

### NGC DISCLAIMER

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