In Long-Term Care

Chronic Kidney Disease (CKD) Topics for Discussion

- CKD
  - A growing public health problem
  - BEACTIVE® In Identifying and Managing CKD awareness and support program
- A closer look at the CKD epidemic
  - US prevalence
  - Assessment
  - Risk factors
- Major complications
  - Cardiovascular disease (CVD)
  - Anemia
  - Malnutrition
- Management
  - Collaboration among multiple disciplines

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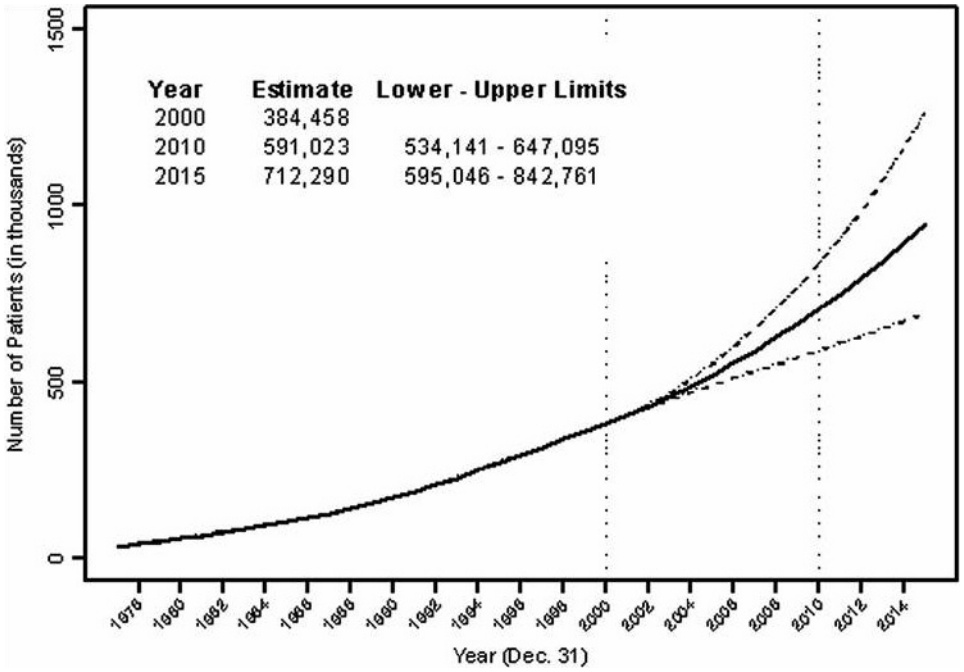
CKD: A Growing Public Health Problem

CKD: Staggering Numbers Projected for 2015

Ongoing Increase in the Prevalence of End-stage Renal Disease (ESRD)[1]



Reference: 1. Gilbertson et al. *J Am Soc Nephrol*. 2005;16:3736-3741.

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CKD Is an Epidemic

- CKD is considered an epidemic according to the:

ASN® THE AMERICAN SOCIETY OF NEPHROLOGY [1]

National Kidney Foundation™ [2]

- Early assessment and management of CKD are supported by the National Kidney Foundation (NKF)[3]

- The American Diabetes Association (ADA) recommends annual screenings to estimate glomerular filtration rate (GFR) to help identify CKD in diabetic patients[4]

References: 1. The American Society of Nephrology. Kidney disease: a growing public health and economic concern. Available at: http://www.asn-online.org/facts_and_statistics/faqs/Index.aspx. Accessed February 1, 2008. **2.** National Kidney Foundation. Chronic kidney disease (CKD): the facts about chronic kidney disease (CKD). Available at: http://www.kidney.org/kidneydisease/ckd/index.cfm. Accessed February 1, 2008**.** **3.** National Kidney Foundation. *Am J Kidney Dis*. 2002;39(suppl 1):S1-S266. **4.** American Diabetes Association. *Diabetes Care*. 2008;31(suppl 1):S12-S54.

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A Disease Awareness Program

Mission:

- Raise awareness of CKD as a major public health problem and encourage early identification, assessment, and management of CKD

Goals:

- Emphasize a collaborative relationship among healthcare providers
- Promote a proactive rather than reactive approach to patient care
- Provide healthcare professionals of multiple disciplines with information, guidelines, and tools to help identify and manage CKD

Available at www.beactive.com

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A Closer Look at the CKD Epidemic: Prevalence, Assessment, and Risk Factors

GFR Is the Best Measure of Kidney Function

NKF Kidney Disease Outcomes Quality Initiative (K/DOQI): CKD Stages[1]

Stage	Description	GFR (mL/min/1.73 m^2)
1	Kidney damage with normal or ↑ GFR	≥90
2	Kidney damage with mild ↓ GFR	60-89
3	Moderate ↓ GFR	30-59
4	Severe ↓ GFR	15-29
5	Kidney failure	<15 (or dialysis)

Adapted with permission from National Kidney Foundation, Inc.[1]

Reference: 1. National Kidney Foundation. *Am J Kidney Dis*. 2002;39(suppl 1):S1-S266.

Serum Creatinine (SCr) Alone Is Not Reliable for CKD Diagnosis[1]

Patient Profile

Characteristic	Patient 1	Patient 2	Patient 3
SCr (mg/dL)	**1.2**	**1.2**	**1.2** ← Identical SCr Levels
Gender	Male	Female	Female
Age	30 years	65 years	80 years
Race	African American	Caucasian	Caucasian
Risk Factors	Hypertensive	Diabetic	Hypertensive
GFR (mL/min/1.73 m^2)*	**92**[2]	**48**[2]	**46**[2]
Diagnosis	**No CKD**	**Stage 3 CKD**	**Stage 3 CKD** → Different CKD Stages

*GFR calculated using the Modification of Diet in Renal Disease study equation.

References: 1. National Kidney Foundation. *Am J Kidney Dis*. 2002;39(suppl 1):S1-S266.
2. Nephron Information Center. MDRD GFR calculator (with SI units). Available at: http://nephron.com/cgi-bin/MDRD_GFR.cgi. Accessed December 11, 2007.

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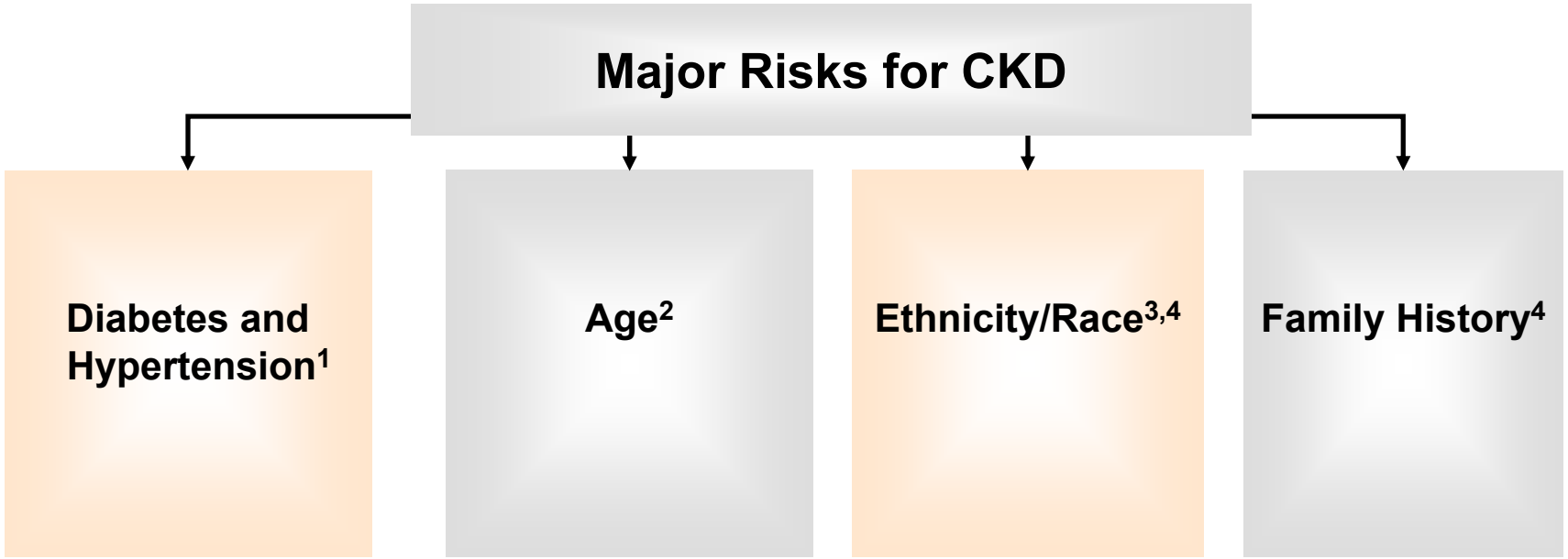
Prevalence of CKD in Long-Term Care (LTC) Patients

- Based on a retrospective, cross-sectional analysis of 9931 LTC residents age 65 years or older[1]
  - Approximately 40% of LTC patients had CKD, with a GFR of <60 mL/min/1.73 m^2 [1]

Reference: 1. Garg et al. *Kidney Int*. 2004;65:649-653.

Who Is at Risk for CKD?



References: 1. United States Renal Data System. *2006 Annual Data Report: Atlas of Chronic Kidney Disease & End-Stage Renal Disease in the United States*. Bethesda, Md: National Institutes of Health, National Institute of Diabetes & Digestive & Kidney Diseases, Division of Kidney, Urologic, & Hematologic Diseases; 2006. **2.** Hansberry et al. *Adv Chronic Kidney Dis*. 2005;12:71-77. **3.** Levey et al. *Ann Intern Med*. 2003;139: 137-147. **4.** National Kidney Foundation. *Am J Kidney Dis*. 2005;46(suppl 3):S1-S158.

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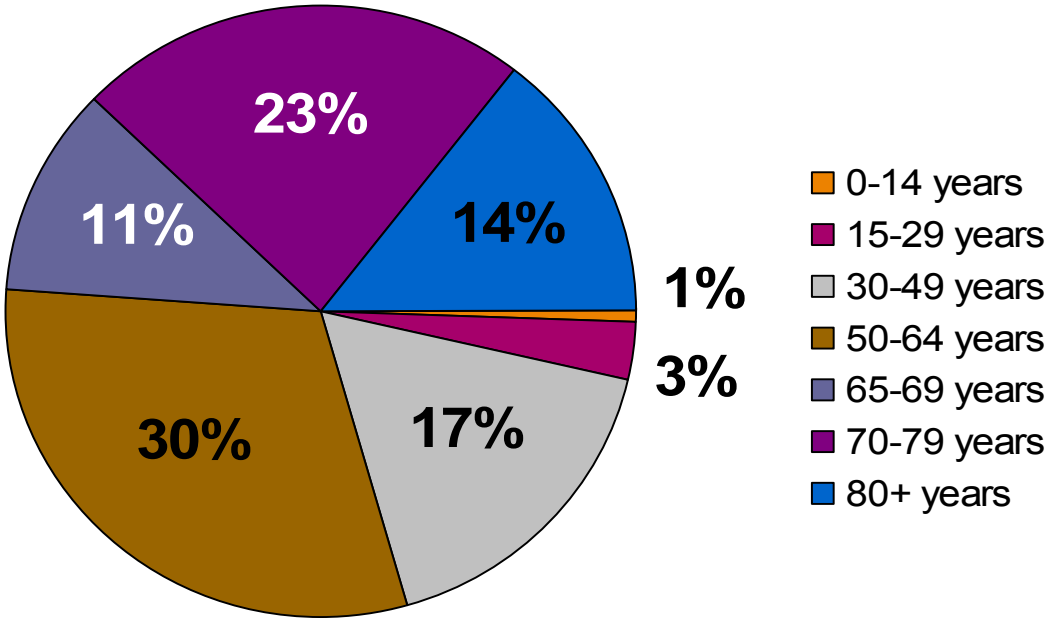
USRDS: ESRD Incidence by Age

Patients Age 65 Years or Older Are More Than Twice as Likely to Have ESRD as People Under Age 50 Years[1]



Adapted from the United States Renal Data System (USRDS).[1]

Reference: 1. United States Renal Data System. 2007 annual data report reference tables: incidence. Available at: http://www.usrds.org/2007/ref/A_incidence_07.pdf. Accessed February 6, 2008.

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Complications of CKD

References: 1. Collins et al. *Kidney Int*. 2003;64(suppl 87):S24-S31. **2.** Go et al. *N Engl J Med*. 2004;351:1296-1305. **3.** National Kidney Foundation. *Am J Kidney Dis*. 2006;47(suppl 3):S1-S145. **4.** Pupim et al. *Semin Nephrol*. 2006;26:134-157.

CKD and Cardiovascular Disease (CVD)

CVD Defined

NKF Definition of CVD Includes[1]:

- Coronary heart disease
- Cerebrovascular disease
- Peripheral vascular disease
- Heart failure

Reference: 1. National Kidney Foundation. *Am J Kidney Dis*. 2002;39(suppl 1):S1-S266.

CVD Risk Factors[1]

Traditional Risk Factors	CKD-related Risk Factors
• Hypertension • Diabetes melitus • Elevated low-density lipoprotein (LDL) cholesterol • Decreased high-density lipoprotein (HDL) cholesterol • Family history of CVD • Physical inactivity • Tobacco use	• Anemia • Malnutrition • Thrombogenic factors • Abnormal calcium and phosphorus metabolism • Proteinuria

Reference: 1. National Kidney Foundation. *Am J Kidney Dis*. 2002;39(suppl 1):S1-S266.

Patients With CKD Are at Increased Risk for CVD

NKF Assessment Guidelines[1]

- Consider patients with CKD at highest risk for CVD, irrespective of the level of traditional risk factors
- Measure traditional CVD risk factors in all CKD patients
- Measure selected CKD-related CVD risk factors based on individual patient needs

Reference: 1. National Kidney Foundation. *Am J Kidney Dis.* 2002;39(suppl 1):S1-266.

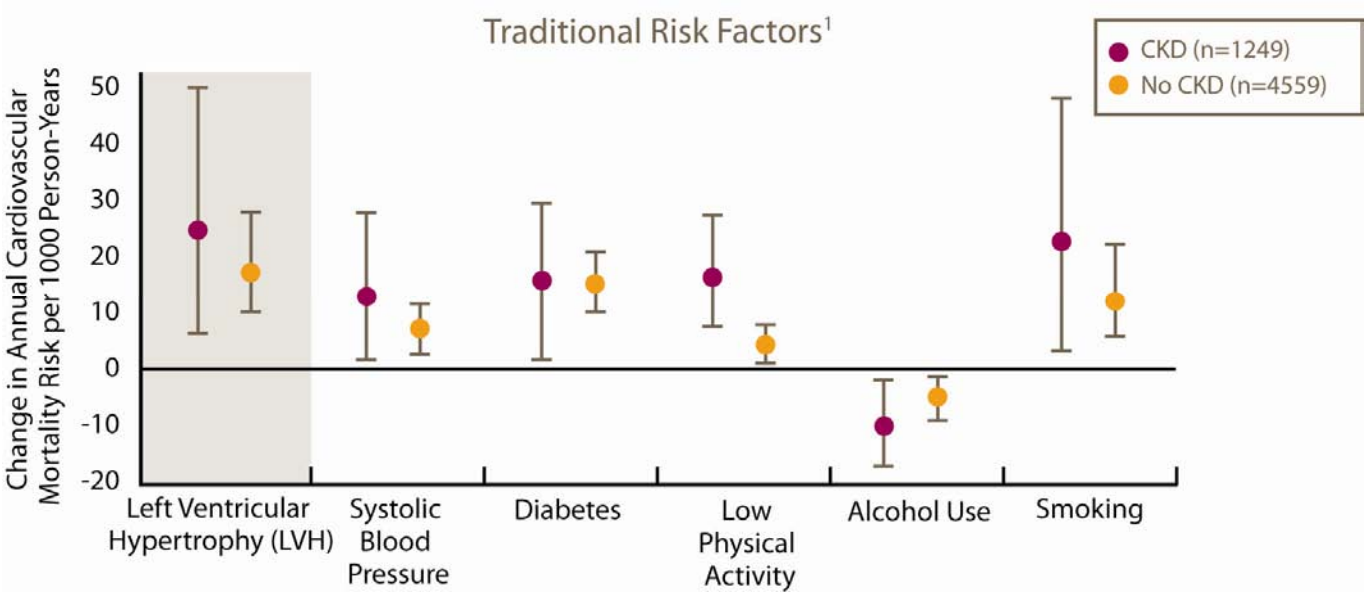
Absolute Risk Associated With Traditional Risk Factors for Patients With CKD and Without CKD

Shlipak et al[1]

- Objective
  - To compare traditional and novel risk factors as predictors of cardiovascular mortality in patients with and without CKD
- Study Design
  - An analysis of the Cardiovascular Health Study cohort
- Methods
  - CKD was defined as GFR <60 mL/min/1.73 m^2
  - Cardiovascular mortality was evaluated in patients with and without CKD
- Patients
  - Community-dwelling individuals participated in the Cardiovascular Health Study and were selected from an age-stratified random sample of Medicare-eligible persons
  - 5808 patients aged 65 years and older

Reference: 1. Shlipak et al. *JAMA.* 2005;293:1737-1745.

Absolute Risk Associated With Traditional Risk Factors for Patients With CKD and Without CKD



Adapted with permission from the *Journal of the American Medical Association*.[1]

- CKD was defined as GFR <60 mL/min/1.73 m^2 [1]

Reference: 1. Shlipak et al. *JAMA.* 2005;293:1737-1745.

Management of CVD Risk Factors in CKD

Risk Factors	Management Considerations
Hypertension*	Antihypertensive agents are suggested by the NKF clinical guidelines[1] • Results from the ALLHAT† study showed that an average of 2 antihypertensives were required to achieve blood pressure control in two thirds of patients[2]
Elevated total or LDL cholesterol Reduced HDL cholesterol Elevated triglycerides	Lipid-lowering diets and drugs[3]
Diabetes	Glycemic control[3,4]
Tobacco use	Tobacco use cessation[3]
Physical inactivity	Exercise (ie, moderate physical activity for 30 minutes most days of the week)[3]

*Hypertension is a major risk factor for the development and progression of CKD and CVD. It should be treated early, with a blood pressure goal of <130/80 mm Hg.[1,3]

†Antihypertensive and Lipid-Lowering Treatment to Prevent Heart Attack Trial.

References: 1. National Kidney Foundation. *Am J Kidney Dis.* 2004;43(suppl 1):S1-S290. 2. Cushman WC. *J Clin Hypertens*. 2002;4:393-404. **3.** Levey et al. *Am J Kidney Dis*. 1998;32:853-906. **4.** American Diabetes Association. *Diabetes Care*. 2006;29(suppl 1):S4-S42.

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CKD and Anemia

NKF and World Health Organization (WHO) Definitions of Anemia

NKF Definition of CKD-related Anemia[1]	WHO Definition of Anemia in the General Population[2]
Men: Hb level <13.5 g/dL Women: Hb level <12.0 g/dL	Men: Hb level <13.0 g/dL Women: Hb level <12.0 g/dL

Hb=hemoglobin.

References: 1. National Kidney Foundation. *Am J Kidney Dis*. 2006;47(suppl 3):S1-S145.
2. Guralnik et al. *Hematology*. 2005:528-532.

NKF Guidelines: Assessment of Anemia in CKD

Monitor and Measure Hb in Patients With CKD[1]

- **Test Hb at least annually in all patients, regardless of stage or cause of CKD**
- **Assessment should include the following tests:**
  - A complete blood count
  - Absolute reticulocyte count
  - Serum ferritin to assess iron stores
  - Serum transferrin saturation (TSAT) or content of Hb in reticulocytes to assess adequacy of iron for erythropoiesis
  - Stool for occult blood[2]

References: 1. National Kidney Foundation. *Am J Kidney Dis*. 2006;47(suppl 3):S1-S145.
2. National Kidney Foundation. Available at: http://www.kidney.org/professionals/kdoqi/guidelines_updates/doqiupan_i.html. Accessed December 18, 2006.

Potential Complications of Anemia in Older Adults

An Association Was Reported Between Hb Concentration and Adverse Events in Older Adults[1]

- Falls[1]
- Increased hospitalization[2]
- Greater mortality[1,2]
- Functional impairment[1]
- Cognitive impairment[3]
- Tachycardia[1]
- Orthostasis[1]
- Frailty[1]
- Mobility impairment[1]
- Fatigue[1]
- Left ventricular hypertrophy[1]
- Impaired quality of life[1]

References: 1. Messinger-Rapport et al. *J Am Med Dir Assoc.* 2007;8:421-433. **2.** Penninx et al. *Blood*. 2003;102(11, pt 1):251a. Abstract 881. **3.** Zamboni et al. *Int J Geriatr Psychiatry*. 2006;21:529-534.

Study of Anemia in Long-Term Care (SALT)

Pandya et al

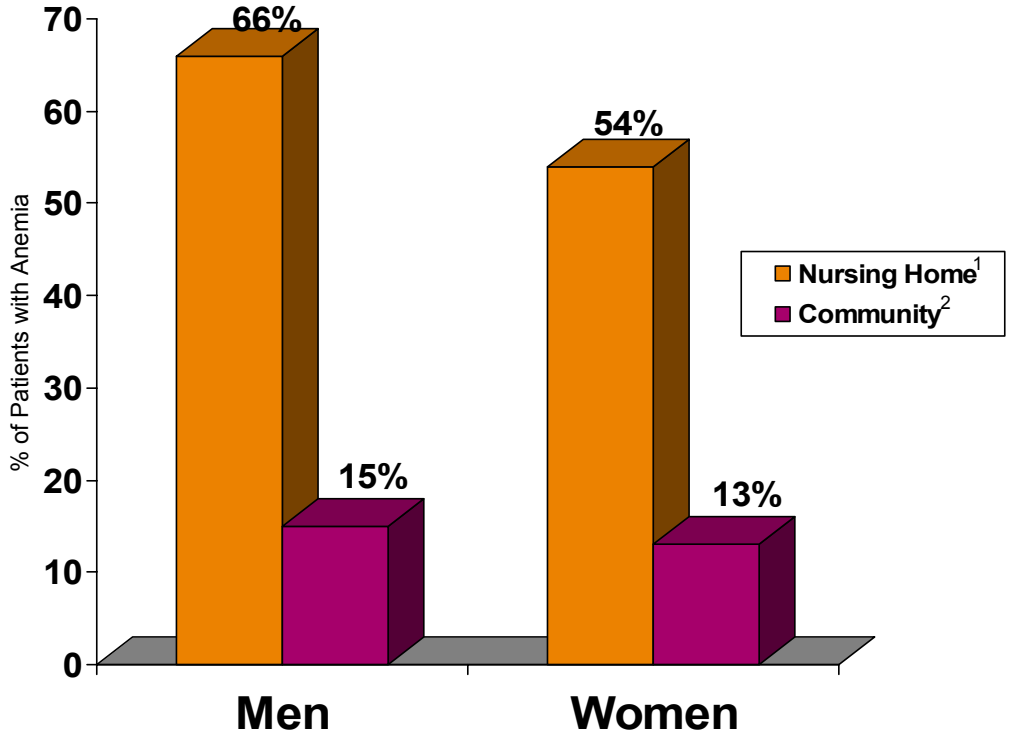
- Objectives
  - To investigate anemia* prevalence in a general population of US nursing home residents and its relationship with key resident characteristics, comorbidities, risk factors, and treatment[1]
  - To explore the association between anemia and falls in the same population[2]
- Study Design/Methods
  - Retrospective, cross-sectional analysis using multiple regression to explore the relationship of characteristics including age, mobility, anemia state, disease states, and current medications with the reported incidence of falls[1,2]
- Patients
  - 564 residents of 40 nursing homes (mean age: 81 years)[2]
  - 44% had CKD[2]

*Anemia was defined by WHO criteria: Hb <12 g/dL in women,<13 g/dL in men.[1,2]

References: 1. Pandya et al. Study of anemia in long-term care (SALT)—prevalence of anemia in nursing home residents: relationship with resident characteristics and comorbidities. Poster presented at: Annual Symposium of the American Medical Directors Association; March 29-April 1, 2007; Hollywood, Fla.
2. Pandya et al. Study of anemia in long-term care (SALT): relationship between anemia and falls in the nursing home setting. Poster presented at: Annual International Meeting of the International Society of Pharmacoeconomics and Outcomes Research; May 19-23, 2007; Arlington, Va.

Anemia Prevalence Higher in LTC Versus Community Setting

- Based on index Hb in the SALT study, 56% (n=317) of all residents evaluated were anemic*[1]
- 4-fold higher rate of anemia found in nursing home residents over 70 years of age in the SALT study versus community rates found by Salive, 1992[1,2]



*WHO definition: Hb <12 g/dL in women, <13 g/dL in men.[1,2]

References: 1. Pandya et al. Study of Anemia in Long-Term Care (SALT)–Prevalence of anemia in nursing home residents: relationship with resident characteristics and comorbidities. Poster presented at: Annual Symposium of the American Medical Directors Association; March 29-April 1, 2007; Hollywood, Fla. **2.** Salive et al. *J Am Geriatr Soc*. 1992;40:489-496.

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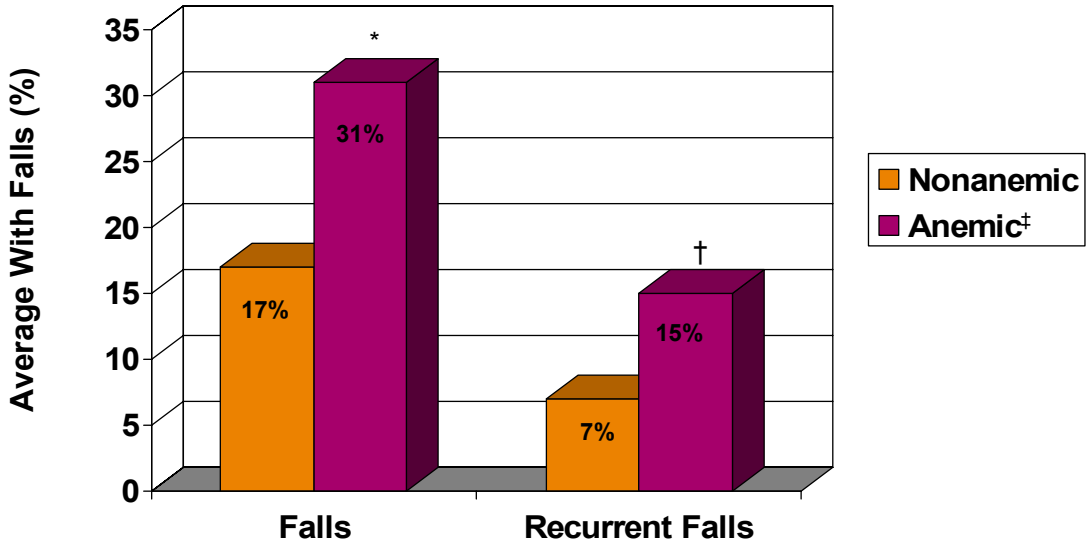
Anemia and Recurrent Falls

Patients With Anemia Had More Falls and More Recurrent Falls[1]



- Based on the regression model developed for the SALT study, anemia‡ and use of psychoactive medication were found to be associated with 4 times the risk of experiencing a fall[1]
- Another retrospective study by Philpot et al (2007) found a 68% higher likelihood of falling in patients with anemia‡ compared to nonanemic patients (OR: 1.68; 95% confidence interval: 1.20-2.36) (N=804)[2]

*P<.001.
†P=.003.
‡Anemia defined by the WHO criteria: Hb <13 g/dL men, Hb <12 g/dL women.[1]

References: 1. Pandya et al. Study of anemia in long-term care (SALT): relationship between anemia and falls in the nursing home setting. Poster presented at: Annual International Meeting of the International Society of Pharmacoeconomics and Outcomes Research; May 19-23, 2007; Arlington, Va. **2.** Philpot et al. Anemia in long-term care patients: prevalence and relationship to falls. Poster presented at: Annual International Meeting of the International Society for Pharmacoeconomics and Outcomes Research; May 19-23, 2007; Arlington, Va.

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Anemia and Cognitive Impairment in Older Patients

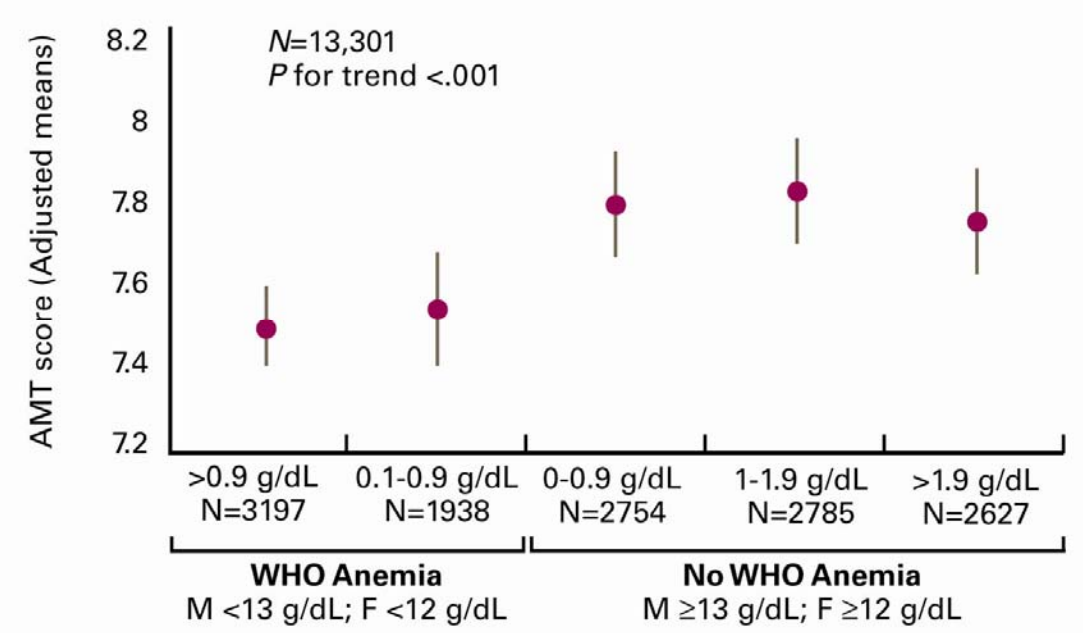
Zamboni et al[1]

- Objective
  - To evaluate the association between Hb levels/anemia and cognitive function in hospitalized older patients
- Study Design
  - Data from the Italian Group of Pharmacosurveillance in the Elderly (GIFA) study
  - Collaborative, observational study
- Methods
  - Cognitive performance was assessed by the Hodkinson's Abbreviated Mental Test (AMT). Scores <7 defined cognitive impairment
  - Anemia was defined by WHO criteria: Hb <12 g/dL in women; Hb <13 g/dL in men
- Patients
  - 13,301 patients; mean age was 72 years

Reference: 1. Zamboni et al. *Int J Geriatr Psychiatry*. 2006;21:529-534.

Anemia and Cognitive Impairment in Older Patients (cont)

- Patients without anemia had significantly higher AMT scores versus those with anemia (*P*<.001)[1]



Reproduced by permission of John Wiley & Sons Limited.[1]
Adjusted mean AMT scores (and 95% confidence intervals) for different Hb levels, above and below the WHO cut-points.

*Adjusted for age, gender, smoking, education, body mass index, chronic obstructive pulmonary disease, cerebrovascular disease, congestive heart failure, peptic ulcer, dementia, depression, hypertension, Charlson's index, creatinine, angiotensin-converting enzyme inhibitors, antibiotics, corticosteroids, and nonsteroidal anti-inflammatory drugs.

Reference: 1. Zamboni et al. *Int J Geriatr Psychiatry.* 2006;21:529-534.

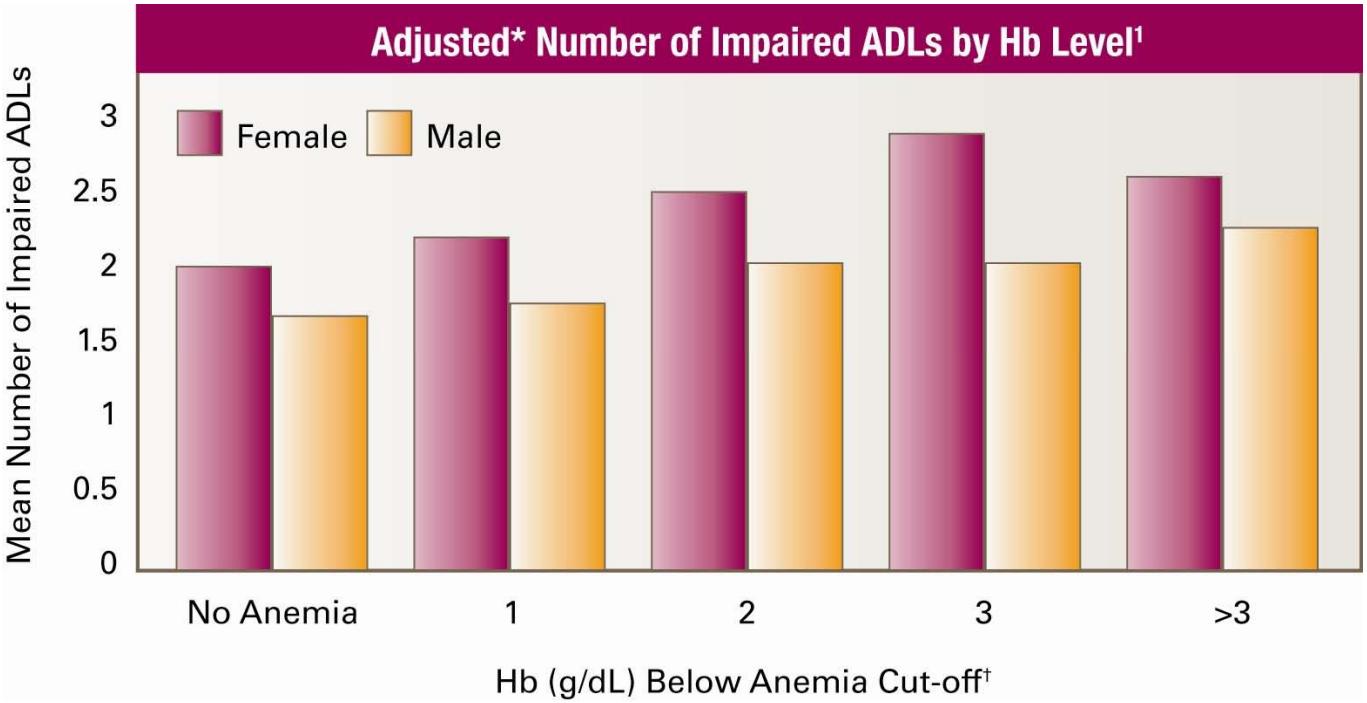
Anemia and Activities of Daily Living (ADLs) in Older Patients

Maraldi et al[1]

- Objective
  - To investigate the association between anemia and ADLs in older, hospitalized patients and to assess the impact of comorbidity on this association
- Study Design
  - Cross-sectional analysis of data collected from 81 clinical centers in Italy
- Methods
  - A questionnaire was completed at admission and updated daily for each participant
  - Self-reported ADL assessments were based on:
    - Transferring from bed to chair
    - Walking across a small room
    - Eating
    - Bathing
    - Using the toilet
    - Personal hygiene
  - Anemia defined by the WHO criteria: Hb <13 g/dL in men, Hb <12 g/dL in women
- Patients
  - 10,903 patients aged 65 years and older[1]

Reference: 1. Maraldi et al. *Aging Clin Exp Res*. 2006;18:485-492.

Anemia and ADLs in Older Patients (cont)



Adapted with permission from *Aging Clinical and Experimental Research.*[1]

*Adjusted for age and Charlson index score.[1]

†Anemia was defined by WHO criteria: Hb <12 g/dL in women, Hb <13 g/dL in men.[1]

Reference: 1. Maraldi et al. *Aging Clin Exp Res*. 2006;18:485-492.

Anemia, Hospitalization, and Mortality in Older Patients

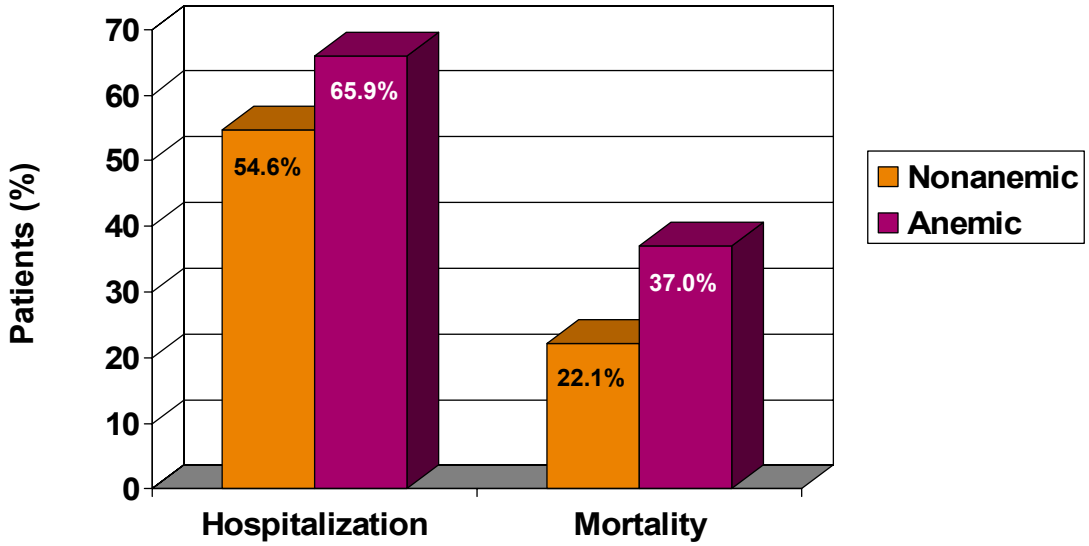
Penninx et al, 2003[1]

- Objective
  - To examine the relationship of anemia with hospitalization and mortality outcomes in a large community-based sample of older persons
- Study Design/Methods
  - Retrospective review of data from three communities of the Established Populations for Epidemiologic Studies of the Elderly study
  - Anemia was defined by WHO criteria (Hb <12 g/dL in women, Hb <13 g/dL in men)
- Patients
  - 3607 patients aged 71 years or older

Reference: 1. Penninx et al. *Blood*. 2003;102(11, pt 1):251a. Abstract 881.

Anemia, Hospitalization, and Mortality in Older Patients (cont)

Patients With Anemia Had Increased Hospitalization and an Increased Risk of Death (*P*<.001)[1]



- N=3607 patients aged 71 years or older

Reference: 1. Penninx et al. *Blood*. 2003;102(11, pt 1):251a. Abstract 881.

Mortality Risk Multipliers

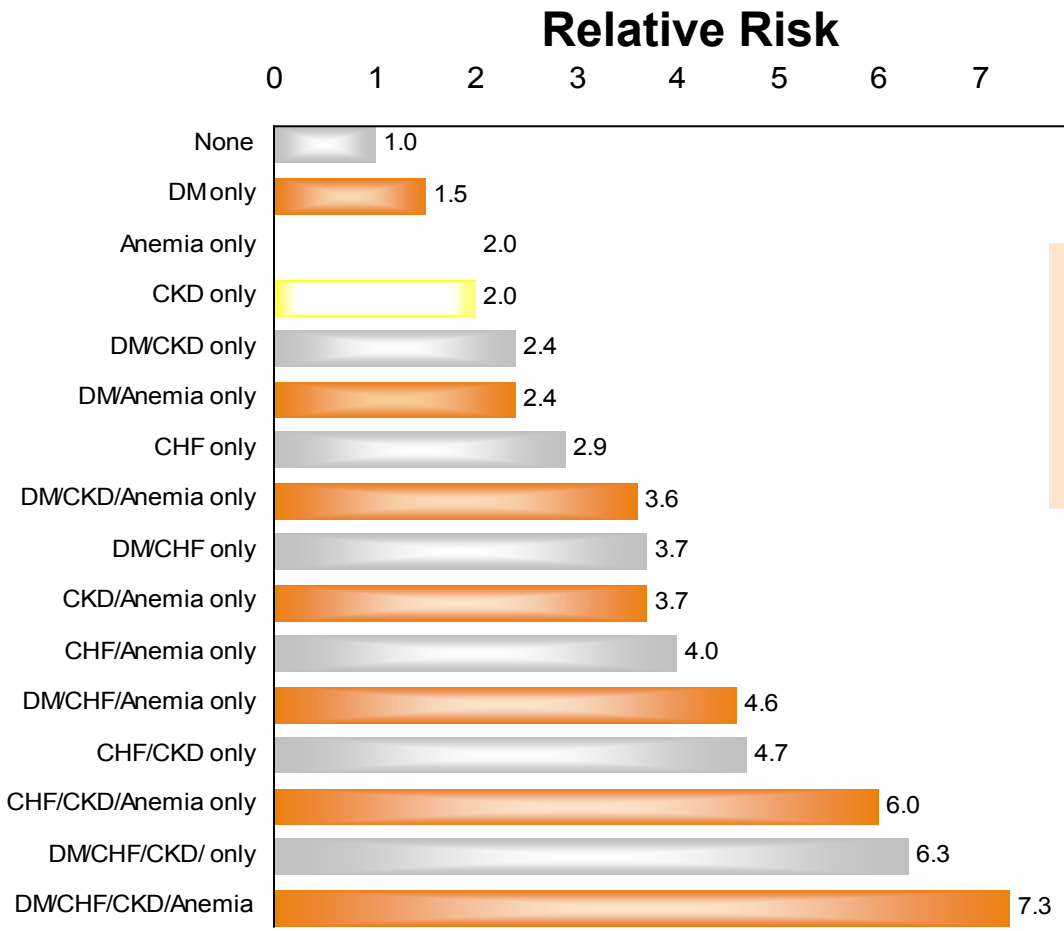
Collins et al[1]

Through an analysis of observational data from the United States Renal Data System on a 5% Medicare sample of patients, the following observations were made:

- Patients with CKD were more likely to experience cardiac death than advance to ESRD
- Anemia was associated with increased risk of mortality in CKD patients
- Anemia, CKD, and congestive heart failure (CHF) were each mortality risk factors; however, patients with all 3 risk factors were 6 times more likely to die within 2 years than patients with none of these risk factors

Reference: 1. Collins AJ. *Adv Stud Med*. 2003;3:S194-S197.

Anemia Was Observed to Be a Mortality Risk Multiplier[1]

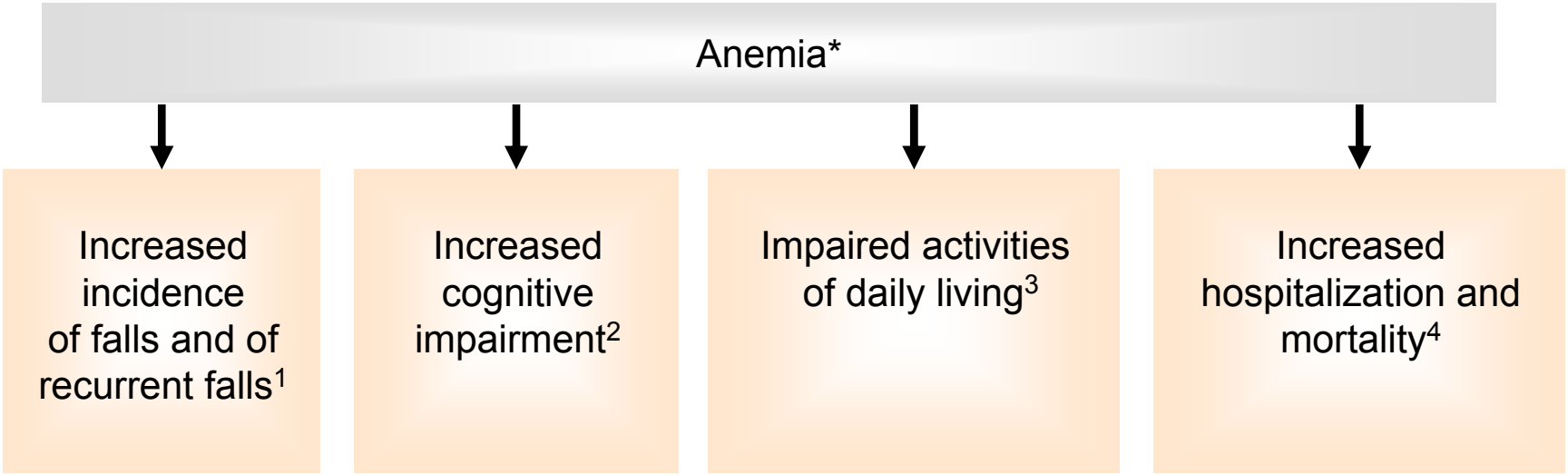


Likelihood of Death Before ESRD During a 2-Year Follow-up in Medicare Patients With CHF, CKD, Diabetes Mellitus (DM), Anemia, or a Combination of These Comorbidities

Reprinted from the United States Renal Data System 2002 Annual Data Report.[2]

References: 1. Collins AJ. *Adv Stud Med*. 2003;3:S194-S197. **2.** United States Renal Data System. *2002 Annual Data Report: Atlas of End-Stage Renal Disease in the United States*. Bethesda, Md: National Institutes of Health, National Institute of Diabetes & Digestive & Kidney Diseases, Division of Kidney, Urologic, and Hematologic Diseases; 2002.

Negative Associations of Anemia in Older Patients



*Anemia was defined by WHO criteria: Hb <12 g/dL in women, <13 g/dL in men.[1-4]

References: 1. Pandya et al. Study of anemia in long-term care (SALT): relationship between anemia and falls in the nursing home setting. Poster presented at: Annual International Meeting of the International Society of Pharmacoeconomics and Outcomes Research; May 19-23, 2007; Arlington, Va. **2.** Zamboni et al. *Int J Geriatr Psychiatry*. 2006;21:529-534. **3.** Maraldi et al. *Aging Clin Exp Res*. 2006;18:485-492. **4.** Penninx et al. *Blood*. 2003;102(11, pt 1):251a. Abstract 881.

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Management of Anemia in CKD

Stepwise Approach to Management of CKD-related Anemia

Rule out all other causes of anemia[1]	These include but are not limited to: • Gastrointestinal bleeding • Nutritional deficiencies (iron or folate)
After CKD-related anemia diagnosis is confirmed[1]	• Evaluate for iron deficiency by measuring levels including serum TSAT and ferritin • Supplement iron as necessary • Evaluate Hb response
If anemia persists despite iron repletion[1]	• Consider erythropoiesis-stimulating agent therapy Monitor Hb and iron levels regularly

Reference: 1. National Kidney Foundation. *Am J Kidney Dis*. 2001;37(suppl 1):S182-S238.

CKD and Malnutrition

Defining Malnutrition in Patients With CKD

Definition of Malnutrition
The NKF describes protein energy malnutrition (PEM) as the insidious loss of body fat and protein stores, diminished serum protein concentrations, and poor performance status and function.[1]
Pupim et al suggested that a more accurate term to describe malnutrition in patients with CKD is uremic malnutrition because factors other than insufficient nutrient intake cause poor nutritional status in these patients.[2]

References: 1. National Kidney Foundation. *Am J Kidney Dis*. 2002;39(suppl 1):S1-S266.
2. Pupim et al. *Semin Nephrol*. 2006;26:134-157.

Malnutrition: A Common Complication of CKD

- Evidence shows malnutrition is prevalent in CKD patients[1]
- Higher prevalence of impaired nutritional status occurs when GFR is <60 mL/min/1.73 m^2 [2]
- Malnutrition may occur despite appropriate caloric intake[1]

References: 1. Pupim et al. *Semin Nephrol*. 2006;26:134-157. **2.** National Kidney Foundation. *Am J Kidney Dis*. 2002;39(suppl 1):S1-S266.

Markers to Assess Protein-Energy Nutritional Status

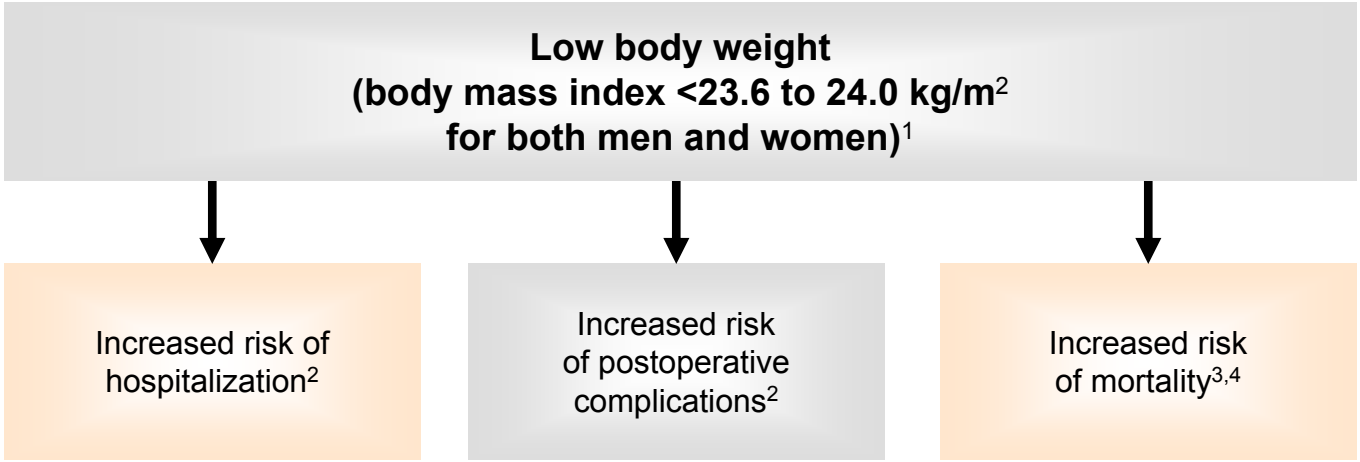
- The NKF recommends that patients with a GFR <60 mL/min/1.73 m^2 undergo assessment of dietary protein and energy intake as well as nutritional status[1]

Evaluate Patients With At Least 1 Value From the Following Groups of Markers[1]

Serum albumin	**&**	Edema-free actual body weight **OR** Percent standard body weight **OR** Subjective global assessment	**&**	Normalized protein nitrogen appearance (nPNA) **OR** Dietary interviews and diaries

Reference: 1. National Kidney Foundation. *Am J Kidney Dis*. 2002;39(suppl 1):S1-S266.

Malnutrition and Adverse Consequences



References: 1. National Kidney Foundation. *Am J Kidney Dis*. 2002;39(suppl 1):S1-S266. **2.** National Kidney Foundation. NKF K/DOQI guidelines 2000. I. Adult guidelines. B. Advanced chronic renal failure without dialysis. Available at: http://www.kidney.org/professionals/kdoqi/guidelines/guidelines/nut_a23.html. Accessed November 21, 2006. **3.** Kopple et al. *Kidney Int*. 1999;56:1136-1148. **4.** Leavey et al. *Am J Kidney Dis*. 1998;31:997-1006.

Renal Insufficiency and Malnutrition: NHANES III

Garg et al, 2001[1]

- Objective
  - To determine prevalence estimates for nutritional factors and associated conditions, stratified by levels of GFR
  - To examine whether renal insufficiency is associated with malnutrition, independent of relevant demographic, social, and medical conditions
- Study Design
  - A retrospective cross-sectional analysis including 5248 participants from the United States Third National Health and Nutrition Examination Survey (NHANES III; 1988-1994) using a multivariate logistic regression model
  - NHANES III was sponsored by the United States National Center for Health Statistics, and is considered a representative sample of the US civilian noninstitutionalized population
- Methods
  - Estimated dietary and nutritional factors were based on 24-hour dietary recall, biochemistry measurements, anthropometry, and bioelectrical impedance to assess skeletal mass
- Patients
  - 5248 participants (age, ≥60 years)

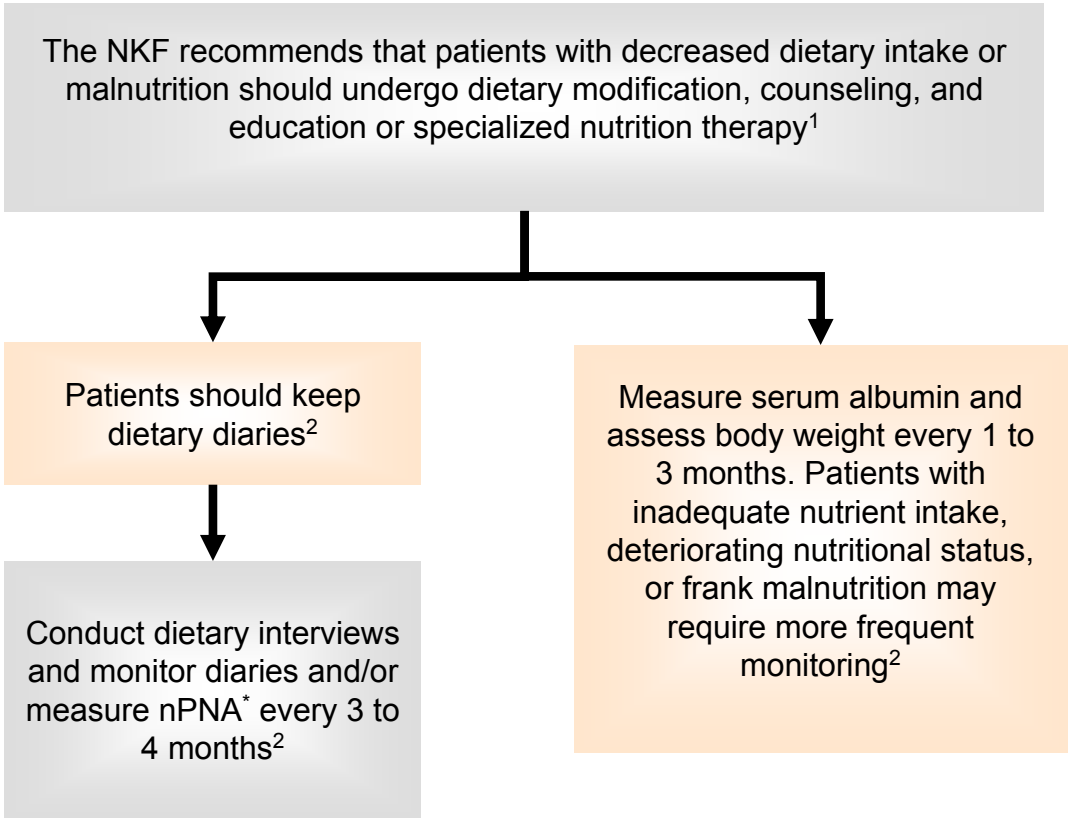
Reference: 1. Garg et al. *Kidney Int.* 2001;60:1867-1874.

Renal Insufficiency Is Independently Linked to Malnutrition in Older Adults

- In univariate analysis, malnutrition was more probable in patients with GFR <30 mL/min/1.73 m^2 versus those with a GFR >60 mL/min/1.73 m^2 [1]
- Among the participants, 2.3% of the males and 2.6% of the females had a GFR of <30 mL/min/1.73 m^2 and demonstrated low energy and protein intake and higher serum markers of inflammation[1]
- 31% of participants with malnutrition had a GFR <60 mL/min/1.73 m^2 [1]
- A multivariate analysis showed that a GFR of <30 mL/min/1.73 m^2 was independently associated with malnutrition, with an odds ratio of 3.6 (range, 2.0 to 6.6) after adjustment for demographic, social, and medical conditions[1]

Reference: 1. Garg et al. *Kidney Int.* 2001;60:1867-1874.

Management of Malnutrition in Patients With CKD



* nPNA= normalized protein nitrogen appearance.

References: 1. National Kidney Foundation. *Am J Kidney Dis*. 2002;39(suppl 1):S1-S266. **2.** National Kidney Foundation. NKF K/DOQI guidelines 2000. I. Adult guidelines. B. Advanced chronic renal failure without dialysis. Available at: http://www.kidney.org/professionals/kdoqi/guidelines/nut_a23.html. Accessed November 21, 2006.

BEACTIVE® In Identifying and Managing CKD

Management of CKD

Multidisciplinary Team Approach

Multidisciplinary Approach in the LTC Setting—Rationale

- The Geriatrics Interdisciplinary Advisory Group of the American Geriatrics Society found that[1]:
  - Complex needs of older adults require multidisciplinary support
  - Cost of care may be reduced by applying multidisciplinary expertise toward prevention of:
    - Disease exacerbation
    - Other common geriatric syndromes, including falls and delirium

Reference: 1. Geriatrics Interdisciplinary Advisory Group. *Interdisciplinary Care for Older Adults with Complex Needs.* New York, NY: American Geriatrics Society; 2005.

Multidisciplinary Team Approach in Assessing CKD and CKD-related Anemia

Anatomy of Multidisciplinary Care in the LTC Setting[1]

- Medical Director
- Consultant Pharmacist
- Director of Nursing
- Attending Physician
- Nurse Practitioner
- Dietitian
- Other Specialists—Such as a Nephrologist—When Appropriate

Adapted from *ElderCare*.[1]

Reference: 1. Resnick B. *ElderCare*. 2005;5:7-10.

Multidisciplinary Care and Patient Survival

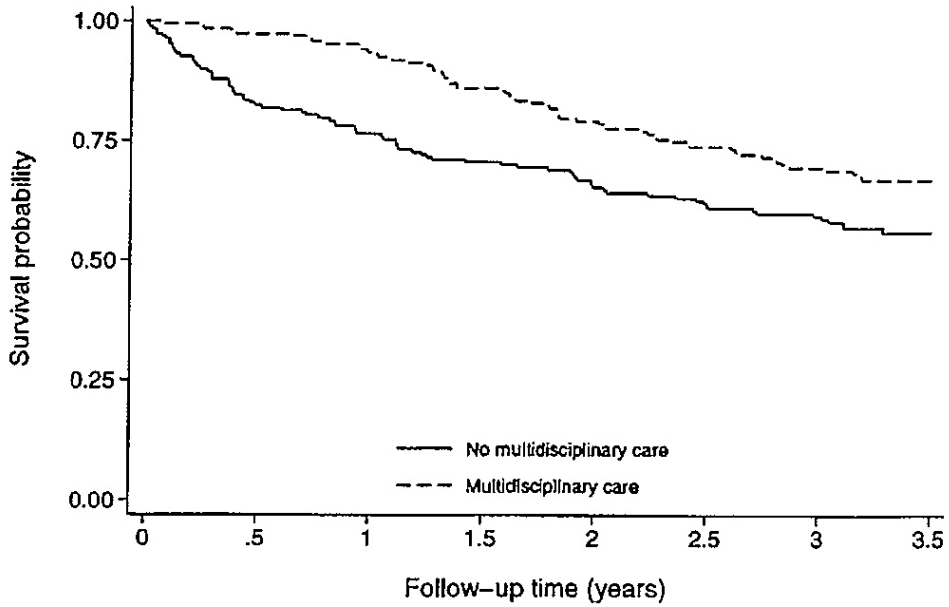
Hemmelgarn et al[1]

- Objective
  - To determine the association among multidisciplinary care, survival, and risk of hospitalization in elderly outpatients with CKD
- Study Design
  - Prospective Canadian cohort study
  - All-cause mortality was the primary outcome
- Methods
  - Examined patients' health records
  - Patients and their families were counseled by:
    - Specialized clinic nurses
    - Registered dieticians
    - Social workers
    - Primary nephrologists
  - Patients underwent blood work every 1 to 3 months to monitor kidney function and metabolic complications
  - Patients were seen by their primary nephrologist every 3 to 6 months
- Patients
  - 6978 patients at least 66 years of age with CKD from the Calgary Laboratory Services computerized database
  - Identified between July 1 and December 31, 2001; followed until December 31, 2004

Reference: 1. Hemmelgarn et al. *J Am Soc Nephrol*. 2007;18:993-999.

Survival More Probable With Multidisciplinary Care

Patient Survival Over Time in Multidisciplinary Care (*P*=.008)[1]



- Of 374 patients, 61 (32.6%) in the multidisciplinary group and 77 (41.2%) in the nonmultidisciplinary group died during the study period[1]

Reference: 1. Hemmelgarn et al. *J Am Soc Nephrol*. 2007;18:993-999.

Management of CKD Aligns With Quality Indicators (QIs)

1999 Federally Sponsored QIs[1]

Incidence of new fractures	Prevalence of fecal impaction
Prevalence of falls	Prevalence of urinary tract infections
Prevalence of behavioral symptoms affecting others (verbally abusive, physically abusive, or socially inappropriate/disruptive behavior) [Risk Adjusted]	Prevalence of weight loss
Prevalence of symptoms of depression (sad mood plus at least 2 of the following: resident made negative statements, agitation or withdrawal, wakes with unpleasant mood, suicidal or has recurrent thoughts of death, weight loss)	Prevalence of tube feeding
Prevalence of symptoms of depression and no antidepressant therapy	Prevalence of dehydration
Prevalence of residents using 9 or more different medications	Prevalence of bedfast residents
Incidence of cognitive impairment	Incidence of decline in late loss ADLs
Prevalence of bladder or bowel incontinence [Risk Adjusted]	Incidence of decline in range of motion
Prevalence of occasional bladder or bowel incontinence without a toileting plan	Prevalence of antipsychotic use in the absence of psychotic and related conditions [Risk Adjusted]
Prevalence of indwelling catheters	Prevalence of antianxiety/hypnotic use
	Prevalence of hypnotic use more than two times in the last week
	Prevalence of daily physical restraints
	Prevalence of little or no activity
	Prevalence of stage 1-4 pressure ulcers [Risk Adjusted]

- QIs are measures of the quality of health care in nursing homes and related facilities[1]

Reference: 1. American Association of Retired Persons. *Nursing Home Quality Indicators: Their Uses and Limitations*. Washington, DC: American Association of Retired Persons; 2002.

Improving Outcomes in the Elderly in the LTC Setting

- Among elderly patients with CKD, survival was found to be more probable with multidisciplinary care in older patients[1]
- Efforts to reverse the CKD prevalence and improve outcomes involves:
  - The expertise and collaboration of multiple healthcare professionals[1]
  - Early detection to prevent or delay adverse consequences[2]

References: 1. Hemmelgarn et al. *J Am Soc Nephrol*. 2007;18:993-999. **2.** National Kidney Foundation. *Am J Kidney Dis*. 2002;39(suppl 1):S1-S266.

Summary

Healthcare professionals in the LTC setting should determine the approach to CKD management that best suits their needs so that they can provide appropriate care for residents with this complex disease.

QUESTIONS?

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