

The Prevalence and Recognition of Chronic Kidney Disease (CKD) in Long Term Care (LTC) Residents in Colorado

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ABSTRACT

Introduction: The prevalence of chronic kidney disease (CKD) increases with age, mainly due to the higher prevalence of diabetes and hypertension in older individuals. Identification of CKD in LTC residents is a necessary first step toward implementing appropriate disease interventions and medication dosing adjustments. Although previous studies have evaluated CKD prevalence in older community-dwelling adults, no study has yet evaluated the prevalence and diagnosis of CKD in LTC residents.

Objective: To evaluate the prevalence of CKD in LTC residents using 2 methods: 1) laboratory-identified CKD and 2) Minimal Data Set (MDS)-identified CKD.

Methods: Data were collected from the AnalytiCare™ database that included nondialysis CKD patients with sufficient laboratory results and MDS reports from 27 LTC facilities in Colorado. During the study timeframe of 1/1/07-9/15/08, the earliest non-admission MDS was identified for each resident. From MDS Section I, a checkbox entry for renal failure, or an open-ended ICD9 code entry for any CKD condition, were used to indicate MDS-identified CKD. From the laboratory data, estimated glomerular filtration rate (eGFR) was calculated using the closest serum creatinine value within 90 days of the index MDS using the Modification of Diet in Renal Disease Formula. Laboratory-identified CKD was defined as GFR<60 mL/min (National Kidney Foundation Outcomes Quality Initiative definition).

Results: 838 residents met all inclusion criteria and formed the analysis population. Mean age was 78 (SD=12) years; 67% were female. Laboratory findings showed a CKD prevalence rate of 362/838 residents or 43% (48% rate for females and 32% for males). The index MDS findings showed a CKD prevalence rate of 15/838 residents or 1.8% (1.4% rate for females and 2.5% for males). Of the 362 residents having laboratory-identified CKD, only 10 (2.8% rate) were documented as having a CKD diagnosis on the single index MDS. Sensitivity analysis using all MDS reports available for each resident during the study timeframe resulted in an additional 43 residents (53 in total, 14.6% rate) documented on any MDS as having CKD.

Conclusions: Based on laboratory evidence, CKD is common in the LTC population studied. The lack of concordance between laboratory-identified and MDS-identified CKD should alert LTC health care professionals that CKD may be under-recognized and under-diagnosed based on MDS evaluation alone. Improved recognition of CKD may allow more optimal care of LTC residents by initiating appropriate disease interventions and medication adjustments. Further study of CKD reporting and outcomes in other LTC populations is warranted.

BACKGROUND

- CKD prevalence increases with age due to:
 - Higher prevalence of diabetes and hypertension in older individuals¹
 - Age-related decline in renal function²
- Approximately 40% of LTC residents have CKD^{3,4}
- Recognition of CKD in LTC residents is important for several reasons including:
 - Medication related:^{5,6,7}
 - Avoidance of inappropriate drug use
 - Dosage adjustments based on level of kidney function
 - Detection of potentially adverse effects on kidney function
 - Detection of drug interactions
 - Therapeutic drug monitoring
 - Resident-safety related^{8,9}
 - Avoidance of certain diagnostic tests
 - Iodinated contrast
 - Gadolinium
 - CKD-related complications⁷
 - Anemia
 - Malnutrition
 - Bone Disease
 - Neuropathy
 - Reduced functioning and well-being
 - CKD recognition by healthcare providers is low¹⁰
 - CKD recognition based on MDS reports in LTC residents has not been previously studied

OBJECTIVE

- To evaluate CKD in LTC residents using 2 methods:
 1. Prevalence: Laboratory-identified CKD
 2. Recognition: Minimum Data Set (MDS)-identified CKD.

METHODS

STUDY DESIGN

- A retrospective cross-sectional study design was used to evaluate the prevalence and recognition of CKD in LTC residents

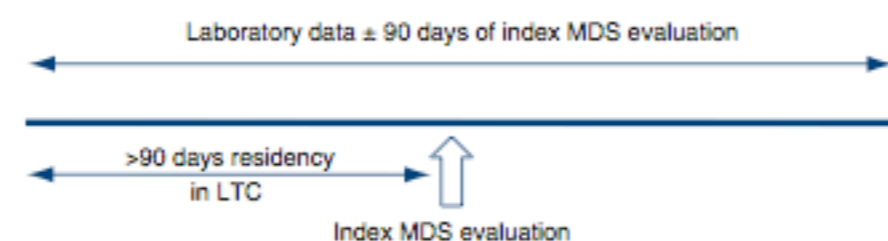
DATA

- HIPAA compliant de-identified data were obtained from the AnalytiCare™ LTC database for LTC residents in the state of Colorado
- The database contained the following linked elements for each resident:
 - Laboratory results
 - MDS version 2.0 files
 - Pharmacy dispensing information

STUDY PERIOD

- 1/1/2007 to 9/15/2008

Figure 1. Study Design



ELIGIBILITY CRITERIA

- **Inclusion criteria**
 - Index MDS available
 - Residency in LTC facility >90 days prior to index MDS
 - Hemoglobin and serum creatinine (sCr) values available ± 90 days of index MDS
 - Documented age, gender, race and sCr to calculate estimated GFR (eGFR)
- **Exclusion criteria (as reported on MDS)**
 - Diagnosis of cancer
 - Received chemotherapy
 - Received renal dialysis
 - End-stage disease or <6 months to live
 - Received hospice care during LTC stay

ENDPOINTS ANALYZED

- Prevalence of CKD using the KDOQI definition of eGFR values < 60 ml/min/1.73m²
- Recognition of CKD as reported on the MDS

DEFINITIONS

- Recognition of CKD from the MDS
 - Checkbox entry for renal failure from MDS Section I
 - Open-ended ICD-9 code entry for any CKD condition (shown below)
- Recognition of CKD from the MDS
 - Checkbox entry for renal failure from MDS Section I
 - Open-ended ICD-9 code entry for any CKD condition (shown below)

SECTION 13. OTHER CURRENT OR MORE DETAILED DIAGNOSES AND ICD-9 CODES

CHRONIC KIDNEY DISEASE STAGE I - 585.1
 CHRONIC KIDNEY DISEASE STAGE II - 585.2
 CHRONIC KIDNEY DISEASE STAGE III - 585.3
 CHRONIC KIDNEY DISEASE STAGE IV - 585.4
 CHRONIC KIDNEY DISEASE STAGE V - 585.5
 CHRONIC KIDNEY DISEASE UNSPECIFIED - 585.9
 DIAB RENAL MANIF TYPE II - 250.40
 DM RENAL MANF TYP II UNC - 250.42
 IMPAIRED RENAL FUNCT NOS - 588.9
 NEPHROTIC SYNDROME NOS - 581.9
 PROTEINURIA - 791.0
 RENAL VASCULAR DISORDER - 593.81

RESULTS

- 838 LTC residents from 27 facilities were identified

Table 1. Resident Characteristics

	N=838
Mean age, years (SD)	78 (12)
Female (%)	67

- Laboratory-defined (stage 3-5, eGFR <60 mL/min/1.73 m²) was identified in 43% of LTC residents
- Greater prevalence was observed in female LTC residents

Table 2. CKD Prevalence as Defined by Laboratory Evaluation

	N	Mean eGFR ml/min/1.73m ² (SD)	% with CKD
Total	838	68.3 (32.2)	43
Female	561	63.9 (30.1)	48
Male	277	77.2 (34.4)	32

- Of the 362 LTC residents with CKD based on laboratory evaluation, the index MDS reported CKD in 10 (2.8%) of these LTC residents

Table 3: Recognition of CKD Based on Index MDS

	Identified on MDS?		Total	% with recognized CKD
	Yes	No		
All CKD (Stages 3-5)	10	352	362	2.8
Stage 3	6	298	304	2.0
Stage 4	2	52	54	3.7
Stage 5	2	2	4	50

- Sensitivity analysis using all MDS reports available for each resident during the study timeframe resulted in an additional 43 residents documented as having CKD

Table 4: Sensitivity Analysis: Recognition of CKD Based on All MDS

	Identified on MDS?		Total	% with recognized CKD
	Yes	No		
All CKD (Stages 3-5)	53	309	362	14.6
Stage 3	37	267	304	12
Stage 4	14	40	54	26
Stage 5	2	2	4	50

LIMITATIONS

- These observations are limited to LTC residents in 27 Colorado facilities
 - The characteristics of LTC residents and the health care providers in other facilities may be different
 - These observations may or may not be similar to those in other geographies
- The determination of CKD recognition was limited to entries in the MDS
- CKD may be documented elsewhere in the residents' medical record

CONCLUSIONS

- Predialysis CKD is common with laboratory evidence of CKD reported in 43% of LTC residents
- Recognition of CKD as documented on the MDS is low
 - Of the residents with laboratory evidence of CKD, 2.8% were found to have CKD reported on the single-index MDS
 - Approximately 15% were found to have CKD reported on any of the available MDS assessments
- Improved recognition of CKD may allow more optimal care of LTC residents
 - Recognition of CKD in patients who are frequent users of the health system is a lost opportunity to initiate recommended treatments for the disease and minimize threats to patient safety⁹
- Further study of CKD recognition and outcomes in LTC residents is warranted

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Disclosures

M. Wasserman, G. Reardon, S. Hord, and B. Kilpatrick are consultants to Centocor Ortho Biotech Services, LLC
 R.S. McKenzie and R.A. Bailey are employed by Centocor Ortho Biotech Services, LLC