

Preventive healthcare & associations with atherosclerotic heart disease events & all-cause mortality in chronic kidney disease patients in the general Medicare population

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Introduction

- Chronic kidney disease (stage 1-4, CKD) is now estimated to affect 13.1% of the adult population of the United States, translating to 26.3 million adults.
- In 2002, the KDOQI working group highlighted the top three adverse consequences of CKD to be kidney failure, cardiovascular disease, and premature death.
- Various recommendations have been made by the KDOQI guidelines to slow the progression of kidney disease and prevent morbidity and mortality.
- The objectives of the current analysis were
 - to assess adherence to various KDOQI recommendations regarding serum creatinine monitoring, lipid monitoring, calcium-phosphorus monitoring, PTH monitoring, influenza vaccination, A1C monitoring in diabetic patients, and nephrology care; and
 - to assess associations between adherence and incident atherosclerotic heart disease (ASHD) events.

Methods

- This study was conducted as a retrospective cohort study using the 5% Medicare random sample limited data set standard analytic files from 1999-2005, containing approximately 1.2 million beneficiaries per year.
- 3-year rolling cohorts were constructed starting in 1999 through 2003. Beneficiaries were required to survive the first two years and outcomes were assessed during year 3.
- CKD, DM, and CVD status were classified during the first year of the entry period.
- Use of preventive measures were assessed during year 2 of the entry period.
- Outcomes were assessed during year 3. ASHD outcomes assessed during year 3 included acute myocardial infarction, other acute and subacute forms of ischemic heart disease, angina, cardiac arrest, and coronary revascularizations, and all-cause death.
- Adjusted hazard ratios comparing CKD patients who met or did not meet the preventive measure were estimated using Poisson regression.

Results

- The highest rate of meeting a preventive measure guideline was seen with serum creatinine monitoring, with 80% of CKD patients received at least 2 serum creatinine tests during the year. The lowest rate was seen with PTH monitoring, with only 11% having PTH monitored during the year (Figure 1).
- The one-year cumulative incidence of the combined ASHD outcome was 25% in CKD patients with known cardiovascular disease and 11% in CKD patients without prior cardiovascular disease (Figure 2).
- Meeting the preventive measure was associated with lower ASHD event rates in the subsequent year for all measures except serum creatinine monitoring and outpatient nephrology visits (Figure 3). Prior CVD did not alter this trend (Figure 4).
- Receiving a larger number of preventive measures was associated with decreased ASHD event rates in the subsequent years in all CKD patients (Figure 5) and the diabetic CKD subset (Figure 6).

Figure 1
The percentage meeting each preventive measure during the second year of the two-year entry period (2+) = at least 2 tests within the year

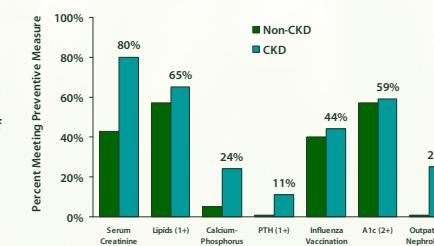


Figure 3
Adjusted hazard ratios associated with each preventive care measure

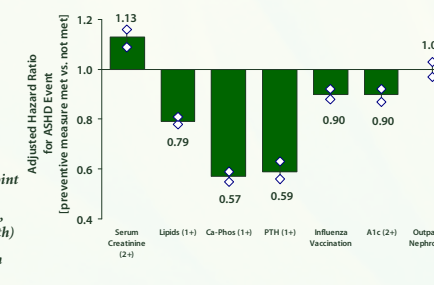


Figure 5
Adjusted Hazard Ratios Associated with the Number of Preventive Care Measures Met

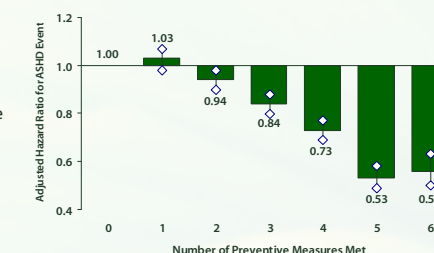
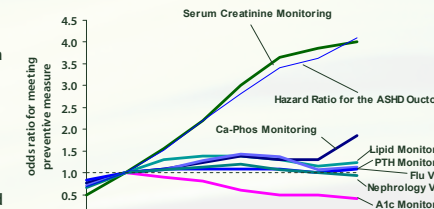


Figure 7
Odds of meeting a preventive measure by level of comorbid burden. In general odds are higher at higher levels of comorbid



Conditions considered: CVD, COPD, gastro-intestinal disorders, cancer, diabetes, anemia, and hypertension.

Figure 2
One-year cumulative incidence of ASHD events, CKD patients only; by prior CVD status

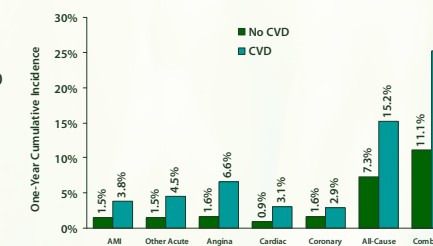


Figure 4
Adjusted hazard ratios associated with each preventive care measure by prevalent CVD status

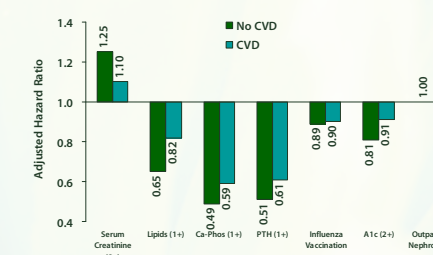
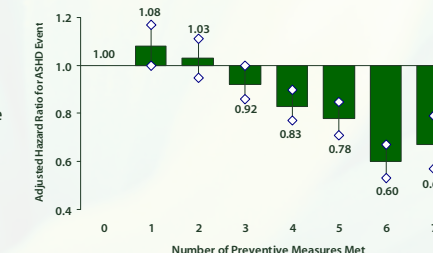


Figure 6
Adjusted Hazard Ratios Associated with the Number of Preventive Care Measures Met



Conclusions

- CKD patients who receive more preventive measures experience lower ASHD event rates in the subsequent year.
- Compared with CKD patients who received none of the preventive measures during the year, the risk was nearly 50% lower in all CKD patients receiving five or six of the six measures considered, and the risk was 33-40% lower among diabetic CKD patients receiving six or seven of the seven measures considered.
- As comorbid burden increases, the odds of receiving preventive measures also increases (Figure 7), therefore results are not likely to be biased by the healthy user effect.
- As efforts by the NKF, such as the Kidney Early Evaluation Program (KEEP), continue to educate the public about the increasing prevalence of CKD and to identify patients early in the course of their disease, preventive measures recommended by the KDOQI guidelines will help slow the progression of kidney disease and prevent comorbid events.