I wish you were here, dear,
I wish you were here.
I wish I knew no astronomy
when stars appear,
when the moon skims the water
that sighs and shifts in its slumber.
I wish it were still a quarter
to dial your number

Joseph Brodsky, "A Song"
Assessing morbidity in patients with chronic kidney disease requires longitudinal data from a defined CKD population with relatively complete information on all-cause and cause-specific hospitalization. Such data are rarely available on a random sample of the U.S. population, since it is very difficult to track patients across multiple insurers for consistency of information. Health plan datasets, however, can capture information well, particularly over a one-year period, and they provide a unique opportunity for analysis. In this chapter we use data from three insurers which represent large populations. Data from the Medicare system are very helpful, since the system covers 95 percent of individuals age 65 and older. We also examine Medstat MarketScan and Ingenix i3 data, both from large employer group health plans (EGHPs). Medstat data cover health plan expenditures for employers that are approximately 80 percent self-insured, compared to just 20 percent in the Ingenix i3 data. In each of these datasets CKD is defined during a one-year entry period, with hospitalizations and services noted in the one-year follow-up period.

On the next page we compare hospitalization rates of CKD and non-CKD patients in the Medicare, dually-enrolled (with both Medicare and Medicaid), and Medstat populations. Hospitalization rates in the CKD population are at least two to three times those of non-CKD patients, a finding similar to that reported by other investigators. Rates are greatest for dually-enrolled patients and lowest for those with EGHP coverage — who are at least 20 years younger. We next illustrate trends in hospitalization rates over time. Generally, rates for patients with recognized CKD appear to be declining compared to those in the non-CKD group. This needs to be placed in the context of increasing recognition of CKD, as discussed in Chapter Two, and may simply represent CKD patients who are less ill when they enter the case definition. In the 2009 ADR the USRDS Coordinating Center will address the disease burden of the recognized CKD population over time, attempting to adjust for these potential biases and thereby provide a better assessment of trends in the rates.

Overall, however, hospitalization rates in the Medicare CKD population are approximately half those of the dialysis population, as shown in Volume Two of the ADR.

Data on cause-specific hospitalization rates illustrate the complexity of complications in the CKD population and are less prone to biases; in 2009, however, we will apply additional adjustments. Congestive heart failure, for instance, is a common complication of CKD — particularly in more advanced CKD stages — and related hospitalization rates are six times higher than in the non-CKD population. This discrepancy is even greater among patients with EGHP coverage, with CHF hospitalizations at least 10 times greater for those with CKD than for those without. Rates of hospitalization for ASHD are twice as high in Medicare CKD patients compared to their non-CKD counterparts, and 3–4 times higher in the EGHP populations. Additional causes of hospitalization among CKD patients that occur at 2–5 times the rate seen in the non-CKD population include peripheral vascular disease, CVA/TIA, AMI, and those associated with arrhythmia.

Infectious complications have been noted in the CKD and dialysis populations secondary to multiple defects in ability to kill bacteria. Pneumonia rates are 2–4 times higher in the Medicare CKD population, and up to six times greater in EGHP patients (who are younger) with CKD, compared to those without recognized kidney disease. Similar findings are noted in hospitalizations for bacteremia/septicemia and urinary tract infections, with rates in EGHP patients with CKD some 7–14 times higher than in the non-CKD group.

These hospitalization data are consistent with the cost structures and payment models recently introduced by Medicare, showing that patients with kidney disease but not on dialysis have high expenditures, and leading to different rates of payment to health plans under Medicare Advantage.

We next compare mortality in the CKD and non-CKD populations, providing data on adjusted hazards of death, and illustrating the interactions of CKD with diabetes and congestive heart failure, both high-risk diseases associated with CKD. With the non-CKD population as the reference,
and adjusting for age, gender, race, and dual enrollment in Medicare/Medicaid, CKD is shown to significantly interact with diabetes and CHF, approximately doubling the risk. From this perspective, and in a similar way as for hospitalizations, CKD is a risk multiplier for mortality. The decline in the hazards between 2000 and 2005 may reflect increased recognition of CKD, as illustrated by the increasing percentage of patients carrying the diagnosis; it may also show classification bias rather than a real reduction.

We next address the diagnosis, treatment, and survival of patients with cardiovascular disease. Those with recognized CKD generally receive 35 percent more stress tests, 50 percent more coronary angiograms, almost twice the echocardiograms, 50 percent more EKGs, and 50–70 percent more percutaneous coronary interventions than do non-CKD patients. Rates of lipid testing, however, are virtually the same in the CKD and non-CKD populations, despite the high burden of cardiovascular disease and higher cardiovascular event rates among CKD patients. These low levels suggest that primary and secondary prevention are underutilized.

In the concluding spread we examine the incidence and prevalence of walking disabilities in patients with and without CKD, and examine the association between walking disability and mortality. The ability to walk is a deceptively simple but robust measure of physical function and independence, and the inability to ambulate is predictive of many health outcomes including hospitalization, nursing home placement, and death.

Data in this chapter suggest that the care of patients with CKD needs to be further addressed. The poor blood pressure and lipid control illustrated in Chapter One are consistent with the high event rates noted here and by other investigators. As suggested in Chapter One, detection approaches for targeting populations at high-risk for CKD — such as those with diabetes and hypertension — can be achieved with simple identification tests. We address prescription drug treatment in Chapter Four, but this area will also be addressed in more detail in the 2009 ADR.

---

**Figure 3.1: All-cause hospitalization rates in the Medicare, dually-enrolled, & Medstat populations**

<table>
<thead>
<tr>
<th>Admission per 1,000 patient years</th>
<th>Medicare (age 66+)</th>
<th>Dually-enrolled (age 66+)</th>
<th>Medstat (age 50-64)</th>
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</thead>
<tbody>
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<td>66-74</td>
<td>CKD</td>
<td>Non-CKD</td>
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</tr>
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<td>50-54</td>
<td></td>
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<tr>
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</table>

And adjusting for age, gender, race, and dual enrollment in Medicare/Medicaid, CKD is shown to significantly interact with diabetes and CHF, approximately doubling the risk. From this perspective, and in a similar way as for hospitalizations, CKD is a risk multiplier for mortality. The decline in the hazards between 2000 and 2005 may reflect increased recognition of CKD, as illustrated by the increasing percentage of patients carrying the diagnosis; it may also show classification bias rather than a real reduction.

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**Highlights**

**Figure 3.1: All-cause hospitalization rates in the Medicare, dually-enrolled, & Medstat populations**

Medicare: point prevalent patients on January 1, 2006, age 66 & older. During 2005, patients have continuous Medicare inpatient/outpatient & physician/supplier coverage, & are not enrolled in an HMO. Dually-enrolled: the subset of the Medicare group (age 66 & older) also enrolled in Medicaid at any time during 2005. Medstat: point prevalent patients on January 1, 2006, continuously enrolled in a fee-for-service plan during 2005; includes EGHP patients age 50–64 on December 31, 2005. For both populations, CKD is defined during 2005, patients diagnosed with ESRD prior to January 1, 2006, are excluded, & follow-up for admissions begins on January 1, 2006. Adjusted for gender; 2005 Medicare cohort used as reference.

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**Contents**

- All-cause hospitalization - 50 all-cause hospitalization rates, by age, gender, race, & CKD status
- Cause-specific hospitalization: Cardiovascular disease - 52 hospitalization rates for CHF, ASHD, PVD, CVA/TIA, AMI, & sudden cardiac death
- Cause-specific hospitalization: Infection - 54 hospitalization rates for pneumonia, bacteremia/sepsis, & UTI
- Mortality - 56 trends in all-cause mortality, predictors of ESRD, death, or the combined event
- Diagnosis & treatment of patients with cardiovascular disease - 58 probability of diagnostic testing for CVD, by CKD status
- Survival of patients with cardiovascular disease - 60 survival of patients with CHF, AMI, revascularization, CABG, & ICD/CRT-D, by CKD status
- Mortality rates
- Incidence of walking disabilities
**Figures 3.2–3** All-cause rates of hospital admissions in Medicare CKD patients age 66 and older have declined 14 percent since 2001, reaching 934 per 1,000 patient years in 2006 — 2.7 times greater that the rate of 341 seen among patients without CKD. Among CKD patients in this age group with both Medicare and Medicaid coverage (dually-enrolled), the 2006 rate reached 1,313 per 1,000 patient years, nearly 41 percent higher than that of the overall Medicare population, and 2.4 times greater than the rate of 553 found in non-CKD patients with dual coverage. With the exception of dually-enrolled CKD patients, rates increase with age. They differ little by gender in patients with and without CKD. And by race, 2006 rates among Medicare patients with and without CKD were 17–19 percent higher in African Americans than in whites; among dually-enrolled patients, in contrast, this difference was less than 2 percent.

**Figures 3.2–3** point prevalent patients on January 1 of the year, age 66 & older. During the prior year, patients have continuous Medicare inpatient/outpatient & physician/supplier coverage, & are not enrolled in an HMO. Dually-enrolled patients are a subset of the Medicare cohort, also enrolled in Medicaid at any time during the prior year. CKD defined using claims during the prior year. Patients diagnosed with ESRD prior to January 1 of the year are excluded, & follow-up for admissions begins on January 1. Rates by age adjusted for gender & race; by gender adjusted for age & race; by race adjusted for gender & age; & “all” group adjusted for age, gender, & race. Medicare cohort, 2005, used as reference.

**Figures 3.4–5** point prevalent patients on January 1 of the year. During the prior year, Medstat & Ingenix i3 patients are age 50–64 on December 31, continuously enrolled in a fee-for-service commercial health plan. CKD defined using claims. Patients diagnosed with ESRD prior to January 1 of the year are excluded, & follow-up begins on January 1. Rates by age adjusted for gender; rates by gender adjusted for age; overall rates adjusted for age & gender. Medstat cohort, 2005, used as reference. Note: a different reference cohort is used in Figures 3.4–5 than in 3.2–3 due to adjustment for age & to different age distributions among the data sources. For this reason, & because racial data for adjustments are available only for the Medicare & dually-enrolled populations, rates in 3.4–5 are not directly comparable to those in 3.2–3. In addition, rates adjusted for different factors are not directly comparable. 

**Figure 3.6** point prevalent Ingenix i3 patients on January 1 of the year. During the prior year, patients are age 50–64 on December 31, continuously enrolled in a commercial health plan, & have at least one serum creatinine value. CKD defined in this year. Patients diagnosed with ESRD prior to January 1 of the year are excluded, & follow-up begins on January 1. For the CKD group identified from biochemical data, the MDRD equation is used to compute eGFR, & an eGFR<60 defines CKD. Non-CKD is defined as patients without either claims-based or biochemical evidence of CKD. Rates adjusted for age & gender. Medstat 2005 cohort used as reference.
**Figure 3.4** In 2006, all-cause hospitalization rates in Medstat CKD patients age 50–64 reached 455 per 1,000 patient years — nearly 5 times greater than the rate of 94 found in those without CKD. Admissions increase by age, from 418 per 1,000 patients years in CKD patients age 50–54 to 516 in those age 60–64, and from 71 to 123 in the non-CKD population. And by gender, the rate is 5 percent greater in women with CKD than in their male counterparts, and 7 percent less for women in the non-CKD population.

**Figure 3.5** The overall all-cause hospitalization rate for CKD patients in the Ingenix i3 dataset reached 468 per 1,000 patient years in 2006, a rate similar to that found in Medstat patients, and nearly 5 times greater than the rate of 96 found in Ingenix i3 patients without CKD. By age, the 2006 rate in CKD patients ranged from 445 in patients age 50–54 to 523 in those age 60–64; in those without CKD, the range was 74 to 125. Admissions in women with CKD reached 495 in 2006, 13 percent higher than the rate of 437 found in males.

**Figure 3.6** All-cause hospitalization rates for patients with CKD are 4–5 times higher than rates for those without the diagnosis. It appears that biochemical evidence of CKD yields higher rates of hospitalization compared to rates determined using claims data, at 520 versus 483 per 1,000 patient years. When both data sources are used, the 2006 all-cause hospitalization rate increases to 607 per 1,000 patient years.
Figures 3.7–9 Cause-specific hospitalization rates in the three datasets show a decline over time similar to that seen with all-cause hospitalizations. Within the Medicare data, dually-enrolled (Medicare/Medicaid) CKD patients have higher rates of hospitalization for congestive heart failure than do all Medicare CKD patients, but rates in the two populations are similar for hospitalizations due to ASHD and PVD. In the Medicare data, by age, patients 80 and older have higher CHF hospitalization rates, lower ASHD hospitalization rates, and similar PVD hospitalization rates compared to those age 66–79.
For both CKD and non-CKD patients, rates of hospitalization for AMI and dysrhythmia are approximately three times higher in the Medicare population age 66 and older than among EGHP patients age 50–64. Within each dataset, those with CKD are also about three times more likely than those without CKD to experience one of these outcomes. Although event rates for CVA/TIA are generally lower, Medicare patients with CKD are again about three times more likely to be hospitalized for a CVA/TIA event than those without CKD.
**Figure 3.13** Hospitalizations for pneumonia are almost three times more likely among Medicare beneficiaries with CKD than in those without. This ratio increases in the younger populations of the EGHP datasets, to almost six times more likely. The dually-enrolled (Medicare/Medicaid) population has higher rates of admission for pneumonia than do general Medicare patients, overall, and approximately the same as general Medicare patients age 80 and above.

**Figure 3.14** Medicare beneficiaries with CKD have approximately four times the risk of being hospitalized for bacteremia/septicemia than those without CKD, while EGHP patients with CKD are about 12 times more likely. And within the Medicare data, dually-enrolled individuals (those with both Medicare and Medicaid coverage) with CKD are eight times more likely to be hospitalized for bacteremia/septicemia than are their non-CKD counterparts.
**Figure 3.15** Patterns in rates of admission for urinary tract infections are similar to those for bacteremia/septicemia: Medicare beneficiaries with CKD have approximately four times the risk of being hospitalized for a UTI than do those without CKD, while EGHP patients have a risk nine times greater. Within the Medicare data, dually-enrolled individuals with CKD—who often have additional health concerns—are 6.5 times more likely to be hospitalized for a UTI than are non-CKD Medicare patients.

---

**Figure 3.15**

**Cause-specific hospitalization, by dataset: urinary tract infection**

- **Medicare & dually-enrolled (age 66+):**
  - Non-CKD
  - CKD: all
  - CKD: age 50-56
  - CKD: age 57-64
  - CKD: M/C all
  - CKD: M/C 66-79
  - CKD: DE

- **Medstat (age 50-64):**
  - Non-CKD
  - CKD: all
  - CKD: age 50-56
  - CKD: age 57-64

- **Ingenix i3 (age 50-64):**
  - Non-CKD
  - CKD: all
  - CKD: age 50-56
  - CKD: age 57-64

**Figures 3.13–15**

- Medicare: point prevalent patients on January 1 of the year, age 66 & older, from the 5 percent general Medicare sample, continuously enrolled in Medicare inpatient/outpatient & physician/supplier coverage, & with no HMO coverage during the prior year. Dually-enrolled patients: a subset of the Medicare population, also enrolled in Medicaid at any time during the prior year. Medstat & Ingenix i3: point prevalent patients on January 1 of the year, age 50–64 on December 31 of the prior year, continuously enrolled in a fee-for-service commercial health plan; CKD defined using claims. Patients diagnosed with ESRD prior to January 1 of the year are excluded, & patients are followed for admissions from January 1. Rates adjusted for gender. Medicare 2005 cohort used as reference. Cause-specific rates reflect hospital admissions for the purpose of the stated condition & are identified by principal ICD-9-CM diagnosis codes.
Among Medicare individuals without claims evidence of CKD, all-cause mortality rates (adjusted for age, gender, and race) declined 13 percent from 1994 to 2006. A much larger decrease of 46 percent is observed in patients with claims evidence of CKD. Greater recognition and coding of less severe CKD probably explains much of this decline. Among dually-enrolled Medicare/Medicaid beneficiaries with CKD, in contrast, there has been an increase of about 15 percent; these individuals generally have other comorbid conditions, and the change in recognition and coding of less severe CKD may not be as prevalent in this population.

Age is a strong predictor of mortality, and relative risks using 2005 data compared to 2000 show similar effects of age on the risk of death. Similarly, the effects of gender and race on the risk of death are stable. The effect of dual enrollment in Medicare/Medicaid has increased by about 45 percent, presumably because of an increasing comorbidity burden over time. The effects of CKD, diabetes, and congestive heart failure on the risk of death have declined slightly, although less so for CHF. Increased recognition and coding of less severe disease may be responsible for the decline related to CKD and diabetes. Compared to that of CHF, the presence of CKD appears to confer an equal risk for mortality, and increasing comorbidity burden increases the risk of death; individuals with codes for CKD, diabetes, and CHF have approximately six times the risk of death compared to individuals with none of those conditions.
3.17 Predictors of mortality in the Medicare-only population
point prevalent Medicare patients age 66 & older

3.18 Predictors of mortality in the dually-enrolled population
point prevalent Medicare patients age 66 & older

**Figure 3.17** An increasing burden of comorbidity (CKD, diabetes, congestive heart failure, and their combinations) confers an increased risk of death; individuals with all three conditions are about seven times more likely to die than individuals without any of these conditions. Diabetes appears to be associated with somewhat less risk than CKD, and CHF appears to be associated with the highest risk of death. Comparing 2005 results to those from 2000, the presence of CKD, diabetes, and the two combined appears to be associated with a slightly lower increase in the risk of death compared to individuals with neither condition — again, presumably because of increased recognition and/or coding of less severe disease.

**Figure 3.18** Increasing comorbidity combinations of CKD, diabetes, and congestive heart failure confer slightly less increased risk of death in dually-enrolled (Medicare/Medicaid) patients than in the non-dually-enrolled population. This may be due to a generally decreased health status in the dually-enrolled population; these individuals often have additional comorbidities than similarly aged individuals without dual coverage.
**Diagnosis of cardiovascular disease**

**3.19 Patients receiving stress testing, by CKD status** Medicare patients age 66+

**3.20 Patients receiving coronary angiography, by CKD status** Medicare pts age 66+

**3.21 Pts with stress testing or coronary angiography, by CKD status** MC pts 66+

**3.22 Patients receiving an echocardiogram, by CKD status** Medicare patients age 66+

**3.23 Patients receiving an ECG, by CKD status** Medicare patients age 66+

**3.24 Patients receiving lipid testing, by CKD status** Medicare patients age 66+
It is now generally recognized that CKD patients constitute a population at high risk for cardiovascular disease. Neglected by clinical trialists in the past, this population has recently attracted much attention among cardiologists and nephrology researchers, particularly as CKD can legitimately be considered a “coronary heart disease equivalent,” like diabetes. There has been a progressive increase over the last decade in the use of both non-invasive and invasive diagnostic testing for ischemic heart disease, from 6.5 and 9.0 percent at one year in 1993 for non-CKD and CKD patients, respectively, to 12.6 and 17.6 percent in 2002. Not surprisingly, angiography use is considerably lower. These data suggest that there is an expanding pool of potential patients at risk for contrast nephropathy, as elderly CKD patients constitute a higher risk population for this complication.

Echocardiograms are frequently performed in elderly patients, and use has increased: from 9.2 and 20.6 percent of non-CKD and CKD patients, respectively, in 1993, to 17.3 and 32.3 percent in 2004. There has been little change, in contrast, in the use of electrocardiography over the same period, while rates of lipid testing differ little by CKD status.

There has been a progressive increase in the percent of elderly patients treated with PCI within a year, from 0.5 and 0.7 percent in 1993 for non-CKD and CKD patients, respectively, to 1.1 and 1.9 percent in 2004. After three years, 2.9 and 4.3 percent are now receiving PCI. As these data reflect cumulative percentages rather than Kaplan-Meier estimates, the estimated probability of undergoing PCI would be higher (due to the competing risk of death during the follow-up period). The use of surgical revascularization, in contrast, has declined since 1997.

Although the numbers are still small, there has been a large proportional increase in the use of device therapy, particularly in CKD patients. In 1995, only 0.06 percent of CKD patients received an ICD/CRT-D within a year; this increased tenfold by 2005, to 0.66 percent. Approximately 1.5 percent of all elderly CKD patients in 2004 received an ICD/CRT-D over 36 months. Again, this number would be higher with Kaplan-Meier probability estimates, as cumulative percentages do not reflect the competing risk of death. (As a significant number of patients would not survive a three-year period, the estimated probability of receiving device therapy is higher than the “raw” cumulative percent data.)

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For illustrative purposes, figures 3.25–27 point prevalent Medicare CKD & non-CKD patients (from the 5 percent sample) age 66 & older on January 1 of each calendar year 1993–2005. Patients diagnosed with ESRD before January 1 of the year are excluded. ICD: implantable cardioverter defibrillator. CRT-D: cardiac resynchronization therapy defibrillator.
Chronic kidney disease is a powerful independent predictor of adverse cardiovascular outcomes. With the modification of the ICD-9-CM codes to include CKD stages by estimated GFR ranges, our original intent was to provide information using these new codes, but currently there are not sufficient data for this type of analysis. We have thus relied on our traditional identification of CKD patients through the comprehensive list of codes, as described in the appendix. As more claims data become available, we anticipate that the newer CKD staging schema will be used in future ADRs.

The development of incident CHF is associated with adverse outcomes in all patients, particularly those with CKD. The estimated mortality for elderly non-CKD patients after the development of incident CHF is 20 percent at one year, compared to 32 percent for those with CKD.

Poor long-term survival after acute myocardial infarction (AMI) has been a long-term interest of the Cardiovascular Special Studies Center at the USRDS. As documented in prior ADRs, the two-year mortality of dialysis patients hospitalized for AMI is approximately 73–74 percent — compared to 59 percent in those with CKD, and 38 percent in non-CKD patients. The overall survival of CKD patients following AMI more closely approximates that of ESRD than non-CKD patients, and the overall hazard of death after AMI is markedly increased by the presence of CKD.

In patients undergoing coronary revascularization, the presence of CKD is also an important independent predictor of adverse outcomes. In elderly patients without CKD, the estimated mortality following PCI is 8.3 percent at one year and 12.9 percent at two years, compared to 22 and 31.3 percent for those with CKD. In the broad context of survival after coronary revascularization, elderly patients without CKD do surprisingly well after both PCI and surgical coronary revascularization. The presence of CKD, however, is associated with a markedly increased risk of death after intervention.
Mortality after coronary artery bypass surgery in elderly patients without CKD is 10.2 percent at one year and 13.8 percent at two years. This contrasts with the markedly increased risk of death in patients with CKD, at 29 and 34.8 percent, respectively. As noted for patients with acute myocardial infarction, survival characteristics of CKD patients after surgical coronary revascularization are more similar to those of ESRD patients than to the characteristics of patients without CKD.

As shown in Figure 3.32, there has been a large proportional increase in the use of ICD/CRT-D devices in elderly patients over the past decade, in particular patients with CKD. Data here confirm findings in smaller observational studies of greater adverse outcomes in CKD patients receiving device therapy compared to non-CKD patients. At one year after device implantation, mortality was 10.6 percent in the non-CKD cohort, but 26.2 percent for those with CKD. One important and presently unresolved clinical issue is whether the high-risk CKD cohort receives equivalent benefit from device implantation. Convincing resolution of this issue may require a prospective randomized clinical trial.
### Table 3.b & Figure 3.33

The prevalence of walking disability among the 2005 prevalent CKD population is described here using two different types of measures. The first is a Medicare claims diagnosis of difficulty walking, abnormal gait, or a history of falling, present in 16 percent, (falls make up about half of these Medicare claims for walking disability). The second is the use of an assistive device for walking, including canes, walkers, and wheelchairs. Seventeen percent of patients use an assistive device; 9 percent use a wheelchair (data not shown).

The “either” column is a summation of the percentage of patients who have at least one of the two measures of walking disability. Almost one-third (28 percent) of CKD patients have some walking disability. Walking disability increases exponentially with each decade of age, and is greater among females. Of the comorbidities listed, dementia and stroke are associated with the highest rates of walking disabilities overall.

The prevalence rates of each type of walking disability among the 2005 non-CKD population are less than half of the comparable disability rates in the CKD population; a total of 12 percent (versus 28 percent) have any walking disability.

The relative negative effect of prevalent walking disability on survival among CKD patients is 40 percent greater than in non-CKD patients. Walking disability in CKD patients is associated with a relative 11.5 percent decrease in survival compared to CKD patients without disability (0.77 survival rate compared to 0.87), but with only a 7 percent negative effect on survival in the non-CKD disability group (0.89 versus 0.96). CKD again thus acts as a disease “multiplier,” resulting in greater than additive effects on negative outcomes.
A walking disability increases the odds of mortality in all cohorts. When using logistic regression models adjusted for all listed factors, however, the relative effect of CKD is greater than the added effect of disability on mortality. The presence of CKD and a walking disability in patients more than doubles the odds of death compared to the odds of death for those without either condition—a similar effect to that of aging ten years. Dementia carries the highest odds of mortality, at 2.87.

### Table 3.c

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<td>9.1</td>
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</table>

### Table 3.d

<table>
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<tr>
<th>Comorbidity</th>
<th>N ( % )</th>
<th>OR (CI)</th>
<th>p-value</th>
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<tr>
<td>Age</td>
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<tr>
<td>65–74</td>
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<td>75–84</td>
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<td>9.8</td>
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<td>85+</td>
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<td>Sex</td>
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<td>9.2</td>
<td>8.2</td>
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<tr>
<td>Female</td>
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<td>10.0</td>
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<tr>
<td>Race</td>
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<tr>
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<td>8.9</td>
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<td>African Am</td>
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<tr>
<td>Oth/unk</td>
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<td>9.0</td>
<td>10.5</td>
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<tr>
<td>Dementia</td>
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<tr>
<td>ASHD</td>
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<tr>
<td>CHF</td>
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<tr>
<td>CVA</td>
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<td>Htn</td>
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<tr>
<td>All</td>
<td>47,472</td>
<td>10.8</td>
<td>9.1</td>
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</tbody>
</table>

### Figures 3.33–34

The risk of mortality increases with the presence of a walking disability in all patient cohorts. The demographic factors and comorbidities associated with the strongest risk of mortality are age greater than 85, male gender, white race, and dementia.
All-cause mortality rates:

- Medicare patients age 66+ (per 1,000 patient years; 3.2)
- Dually-enrolled patients age 66+ (per 1,000 patient years; 3.3)
- Medicare patients age 66+ (per 1,000 patient years; 3.2)

All-cause hospitalization rates:

- Medicare CKD patients 50–64 (per 1,000 patient years; 3.4)
- Medicare CKD patients 50–64 (per 1,000 patient years; 3.4)
- Medicare CKD patients 50–64 (per 1,000 patient years; 3.4)

Hazard ratio of mortality:

- Medicare patients age 66+, 2005 (3.17)
- Dually-enrolled patients age 66+, 2005 (3.18)

Hospitalization for CHF:

- Medicare patients age 66+ (per 1,000 patient years; 3.2)
- Medicare patients age 66+ (per 1,000 patient years; 3.2)
- Medicare patients age 66+ (per 1,000 patient years; 3.2)

Medicare patients age 66+ with a stress test or coronary angiography, 2005 (3.21)

Probability of survival at 36 months after CHF, Medicare patients age 66+ (3.28)

Unadjusted two-month mortality rates in 2006 (per 100 patient years; 3.34)