For it is important that awake people be awake, or a breaking line may discourage them back to sleep; the signals we give – yes or no, or maybe – should be clear; the darkness around us is deep.

William Stafford
“A Ritual to Read To Each Other”
End-stage renal disease received special consideration in 1972 when Medicare entitlement was granted to ESRD patients, ensuring access to life-saving dialysis and kidney transplantation. This report covers information on the program through December 31, 2003, with descriptive data from the Medical Evidence form through June, 2004. The program continues to grow, although at a much slower rate than in previous years, and death rates continue to fall.

The Précis, a summary chapter, covers basic statistics on the ESRD program, and provides information not only on new and prevalent patients but also on those who return to dialysis after a failed kidney transplant or after regaining function. We also look here at modality use, and at both the number of patients on the transplant wait list and the amount of time they wait for a kidney transplant.

The most striking aspects of the ESRD and chronic kidney disease burden are reflected in the size of the recognized populations and their associated costs in the next year of followup (Figure p.1). The Medicare ESRD population has almost doubled in the last ten years, while proportional costs have grown 40 percent. The CKD population has expanded as well, and now accounts for 16.5 percent of Medicare expenditures, nearly double those seen ten years ago; total costs for kidney disease now approach 24 percent.

Clinical care of the ESRD population has been a focus of the USRDS atlas for the last five years. In this sixth year we show that, across almost all aspects of care, patient care is improving, consistent with clinical practice guidelines and HP2010 objectives. The prevalent population with a functioning fistula grew to 35.2 percent in 2002, approaching the 40 percent target set in 1997 by K/DOQI, and fistula placement rates have doubled over the last ten years. Dialysis therapy has improved, with URRs greater than 65 percent in almost nine of ten hemodialysis patients. And mean hemoglobin levels reached 11.9 g/dl in June, 2004, with only 19.5 percent of patients having a single month’s hemoglobin less than 11 g/dl.

Diabetic care has also improved. Still, however, 26 percent of diabetic patients do not receive a single HbA1c test in a year, and 37 percent do not receive a lipid test, indicating the need for better assessment and control of these critical markers of disease management. Therapeutic interventions appear to be improving, with increased use of ACE-Is, ARBs, beta blockers, and statins.

Overall hospitalizations have changed little in the last ten years, but this masks dramatic changes in different types of hospitalization. Vascular access hospitalizations, for instance, have fallen 25.4 percent, reflecting the transition of care to the outpatient setting. There has been a 23 percent increase, however, in infectious hospitalizations, which appears to be associated with increased use of dialysis catheters. Higher cardiovascular hospitalizations reflect increased patient comorbidity.
During the last 20 years, mortality rates for incident patients have declined across all modalities, with five-year survival rates improving as well. Prevalent death rates have also fallen, particularly for patients with less than three years of treatment. In addition, this year saw a fall in the overall adjusted prevalent death rate of the hemodialysis population, after a long period of divergent trends in those with less than five years on treatment compared to those of greater vintage.

ESRD program costs continue to grow, and now account for 6.6 percent of the Medicare budget and 2.2–2.5 percent of EGHP expenditures. The EGHP population pays more for ESRD care—almost $10,000 per person in the month of initiation, and a much higher monthly rate on dialysis. ESRD patients with EGHP coverage provide additional revenue for providers, augmenting Medicare payments.

Costs for complex CKD patients with diabetes and CHF are growing in both the Medicare and EGHP populations. Older EGHP patients—usually retirees—may have characteristics similar to those of the Medicare population, yet, as shown in Chapter One, often receive less care. This may contribute to the growing costs of care for retirees in EGHPs, and to the increased complexity of the population reaching Medicare. Such data suggests that the entire health care system needs to address HP2010 objectives and K/DOQI guidelines related to these complex populations.

**Table p.2** Incident rates continue to be stable, in 2003 reaching 338 per million population. **Figure p.12** Guidelines advocating fistula use appear to be influencing access rates. Placement rates for fistulas have doubled since 1996, and there is clear evidence that catheter placements are down; this appears to be associated with a decline in infectious hospitalization rates. **Figure p.21** While overall hospitalization rates are stable, the composition of those hospitalizations has altered dramatically. Inpatient vascular access admissions have fallen 25 percent, while infectious and cardiovascular hospitalizations are up 23 and 10 percent, respectively. **Figure p.30** Outpatient costs for dialysis patients continue to grow at a higher pace than those for inpatient services.
In 2003, 102,567 new dialysis and transplant patients began ESRD therapy; as in 2002, diabetes was the cause of ESRD in 44 percent of these patients (Table p.a). The overall incident rate, adjusted for age, gender, and race, was 341 patients per million population.

On December 31, 2003, 452,957 patients were receiving ESRD therapy—324,826 were on dialysis, and 128,131 had a functioning transplant. The adjusted prevalent rate was 1,496. More than 16,000 transplants were performed during the year—including 6,466 from living donors—and more than 82,000 patients died.

Between the 1995–1999 and 1999–2003 periods, the average annual percent change in rates per million for the hemodialysis population fell from 5.6 to 1.3 in incident patients, and from 5.8 to 2.6 among prevalent patients. In the transplant population, growth slowed from 5.5 to 2.3 percent and from 5.2 to 4.2 percent, respectively. By primary diagnosis, however, there were some dramatic changes in the population beginning therapy with a transplant: the average annual percent change rose from 4.7 to 16.4 percent for patients with hypertension, and from 5 to 13 percent for those with cystic kidney disease. Rates of increase for the peritoneal dialysis population continued to decline in 1999–2003, though not as quickly as in the earlier period—3.7 percent for incident patients, and 1.8 percent for prevalent patients.

Between 2002 and 2003, Medicare spending per patient year grew 2.0 percent; after being adjusted for inflation, however, spending dropped 0.3–1.9 percent. Total Medicare costs for ESRD topped $18 billion, and non-Medicare costs exceeded $9 billion.

Since 1988, the prevalent dialysis population has nearly tripled, reaching almost 325,000 in 2003 (Figure p.2). The number of new patients starting therapy on dialysis rose 150 percent in the same period, and has now grown to more than 100,000. The largest increase, however, has occurred in the prevalent transplant population—from 41,141 in 1988 to 128,131 in 2003. During this year nearly 5,000 patients returned to dialysis after a transplant failure, while almost 2,000 restarted dialysis after either recovering function or discontinuing therapy—increases over 1988 levels of 99 and 197 percent, respectively.
The great majority of new ESRD patients, as expected, begin therapy on hemodialysis (Figure p.3). Incident populations for both hemodialysis and transplant have grown quite steadily, reaching levels in 2003 that were some six times greater than those of 1980. The peritoneal dialysis population, in contrast, peaked in the mid-1990s, and has since fallen to 1990–1991 levels.

Similar trends are visible in the prevalent population (Figure p.4). The numbers of hemodialysis and transplant patients continue to rise, in 2003 nearly reaching the 300,000 mark for hemodialysis, and increasing to 128,131 for transplant. The peritoneal dialysis population, however, peaked at 30,294 in 1995, and has remained near 26,000 for the last several years.

Medicare ESRD costs in 2003 totaled $18.1 billion, a 7.2 percent increase from the previous year (Table p.a and Figure p.5). This growth was, however, lower than the 10–11 percent increase seen in 2001 and 2002. Non-Medicare spending grew 6 percent to $9.2 billion, and total ESRD costs rose from $25.6 to $27.3 billion, an increase of 6.8 percent.

{Figure p.2} first graph: incident patients & December 31 point prevalent patients.
second graph: data obtained from CMS’s annual End-Stage Renal Disease Facility Survey, CMS Independent Renal Facility Cost Reports, & the CMS “Dialysis Facility Compare” website. {Figure p.3} incident ESRD patients. {Figure p.4} December 31 point prevalent ESRD patients. {Figure p.5} Medicare spending includes paid claims, estimated Medicare+Choice costs, & estimated organ acquisition costs. Non-Medicare spending includes estimates of costs for EGHP patients & for non-Medicare ESRD patients, & estimates of patient obligations. See Appendix A for further details.
Between 2002 and 2003 incident rates remained relatively stable across dialysis modalities, reaching 308 and 22 per million population for hemodialysis and peritoneal dialysis, respectively, and 331 for the dialysis population as a whole (Figure p.6). Incident rates for the transplant population fell 75 percent, to 6.1. The prevalent rate for hemodialysis is nearing the 1,000 mark, rising 1.7 percent in 2003 to reach 982 per million, while the rate for all dialysis rose 1.6 percent, to 1,070. In the transplant population, the prevalent rate increased 3.7 percent to 426; in the peritoneal dialysis population, however, the rate has fallen 27 percent since its peak in 1995, stabilizing in the last two years at 85 per million population.

Incident and prevalent rates for hemodialysis patients are highest in the South and East and areas on the West Coast, while rates for peritoneal dialysis vary widely but are consistently highest in states such as New Mexico, Arkansas, Mississippi, Georgia, and South Carolina (Figure p.7). Transplant rates are highest in the Upper Midwest states of Minnesota, North and South Dakota, Iowa, Wisconsin, and Illinois.

On December 31, 2003, there were 30,448 white patients on the waiting list for a kidney or kidney-pancreas transplant, 20,427 black patients, and 21,000 patients of other races—up 124, 141, and 139 percent, respectively, from levels in 1995 (Figures p.8–10). Median waiting times are one and a half times greater in the non-white population, at 861–854 days compared to 573 in whites.

Counts of wait-listed patients are highest in the Ohio Valley, Illinois, California, Texas, Alabama, and North Carolina, while median waiting times are highest in California, Arizona, New Mexico, Colorado, Alabama, Virginia, Michigan, Delaware, and Connecticut.
Geographic variations in counts of transplant wait-listed patients & waiting time, by race

Counts of wait-listed patients

Median waiting time (in days)

- **White** patients listed for kidney or kidney-pancreas transplants on December 31
- **Black** patients listed for kidney or kidney-pancreas transplants on December 31
- **Other race** patients listed for kidney or kidney-pancreas transplants on December 31

1,925 + (3,792)
1,006 to <1,925
301 to <1,006
132 to <301
below 132 (50)

- **White**
- **Black**
- **Other race**

- 1,925 + (3,792)
- 1,006 to <1,925
- 301 to <1,006
- 132 to <301
- below 132 (50)

- **White**
- **Black**
- **Other race**

- 796 + (904)
- 648 to <796
- 577 to <648
- 403 to <577
- below 403 (299)
- Insuff. data

2003

2005 Annual Data Report
n this spread we examine indicators of the quality of care provided to ESRD patients. Vascular access data from the Clinical Performance Measures (CPM) Project, for instance, show that 42 percent of prevalent hemodialysis patients were using an arteriovenous graft at the time of data collection in 2002, down from 55 percent in 1998 (Figure p.12). Fistula use, in contrast, grew from 28 to 35 percent—an encouraging change, showing that guidelines advocating increased fistula use seem to be changing clinical practice. Catheter insertion rates are declining, and it appears that this fall is associated with a decrease in hospitalizations for vascular access infections (see Figure 6.29). This is truly good news for patients, and has the potential to reduce morbidity and mortality.

Data from Medicare claims, also shown in Figure p.12, provide further detail on vascular access use. Fistula insertion rates are 25 percent higher in males than in females, in 2003 reaching 104 per 1,000 patient years, compared to 83 in women. Graft and catheter insertions, in contrast, are 25–27 percent greater in women. Fistula use varies little by diabetic status; insertion rates for grafts and catheters, however, are 16–18 percent higher in diabetic patients compared to non-diabetics. Since 1993, overall insertion rates for fistulas have nearly doubled, while those for grafts have fallen 34 percent. Catheter insertion rates peaked in the late 1990s and have fallen since; in 2003 they were just 8 percent higher than in 1993.

The National Kidney Foundation’s Kidney Disease Outcomes Quality Initiative (K/DOQI) sets a target urea reduction ratio of 65 percent or higher. In 2002 this target was met by nearly 86 percent of hemodialysis patients tracked by the CPM Project—nearly twice as high as the 1993 level (Figure p.13). The proportion of peritoneal dialysis patients achieving a mean weekly Kt/V of at least 2.0 was 45 percent in 1996, and rose to...
74 percent in 2000 (Figure p.14). Since then, however, the distribution of peritoneal dialysis patients by Kt/V has seen little change.

The target hemoglobin set by K/DOQI is 11–12 g/dl. Since 1995, at least 30 percent of prevalent dialysis patients have met this target, a level remaining relatively stable (Figure p.15). Changing dramatically, in contrast, is the proportion of patients with a hemoglobin of 12 g/dl or above—this topped 50 percent in June of 2004, with nearly one in five patients having a hemoglobin of 13 g/dl or greater. At the same time, the number of patients with a hemoglobin of 11 g/dl or lower continues to fall, dropping below 20 percent, for the first time, in June of 2004. These improvements, however, are associated with increasing doses of EPO, adding additional costs to the care of the dialysis population.

The mean monthly hemoglobin level and mean EPO dose per week continue to rise in tandem (Figure p.16). In June, 2004, the overall mean hemoglobin for prevalent dialysis patients reached 11.9 g/dl, up 2.3 g/dl since the start of 1991, while the mean weekly EPO dose was 19,172 units—more than three times the average dose in January, 1991. Increasing EPO doses are an economic issue, as costs for this single medication reach levels almost half as high as those incurred by dialysis therapy itself (see Figure 11.26).

The American Diabetic Association recommends that patients with complex disease burdens receive at least four glycosylated hemoglobin (HbA1c) tests per year. While nearly 75 percent of prevalent ESRD patients received at least one test in 2003, only 42 percent met the guideline (Figure p.17). Sixty-three percent of prevalent patients received at least one lipid test during 2003—a rate only slightly higher than that of the previous year. Benefits for Medicare patients with diabetes increased in 1997 to include coverage of glucose testing supplies. It does not appear, however, that this coverage has translated into increased use. Continued monitoring will be required to determine if this benefit is being utilized.

ACE inhibitor/ARBs and beta blockers use continues to increase, while insulin is the most used diabetic drug (Figures p.18–19). Use of insulin sensitizers has almost doubled in the last four years and 15 percent of diabetic EGHP patients now receive these medications. (Figure p.12) top graph: prevalent hemodialysis patients; CPM data. Access represents the current access as of the latest data collection for the year. Includes only patients for whom the access is known. Lower three graphs: period prevalent hemodialysis patients. Data from Part B claims. Some patients may have more than one access at a given point in time. (Figure p.13) hemodialysis patients; CPM data. Each patient has 1–3 Kt/V measurements (one for each of three consecutive two-month intervals); the mean of these measurements is calculated. (Figure p.14) peritoneal dialysis patients; CPM data. Each patient has 1–3 Kt/V measurements (one for each of three consecutive two-month intervals); the mean of these measurements is calculated. (Figures p.15–16) period prevalent dialysis patients with EPO claims; monthly hemoglobin includes all claims with a hematoctrit value between 20 & 50; weekly EPO dose includes all claims for patients with an average number of administrations per month of ≥20. EPO doses adjusted for inpatient days through December, 2003; doses in January–June, 2004, are unadjusted. (Figure p.17) prevalent patients initiating ESRD 90 days prior to January 1 of the first year, age 18–75 on December 31 of the second year, & alive through the end of the second year, with diabetes as the primary cause of ESRD or a comorbidity on the Medical Evidence form, or with diabetes diagnosed during the first year. HbA1c, lipid testing & glucose testing test strips tracked in the second year. HbA1c & lipid tests are at least 30 days apart. (Figures p.18–19) EGHP patients age 20–63; Medstat data.
In new ESRD patients age 67 and older (the only patients who can also be tracked in the pre-ESRD period), all-cause and cause-specific hospital admission rates rise dramatically near the initiation of treatment (Figure p.20). In the period just preceding initiation, rates are 5–8 times higher than those found in the two years prior and, in the case of infectious hospitalizations, continue to be up to 6–7 times greater in the following six months. More than 80 percent of these patients are hospitalized during the three months prior to the start of ESRD therapy.

All-cause hospital admission rates in the prevalent dialysis population have been relatively steady since 1993 (Figure p.21). Rates for cause-specific hospitalization show the largest change over time—between 1993 and 1996, for example, rates for infectious hospitalization rose 16 percent, and in 2003 were 23 percent higher than their 1993 levels. Rates of hospitalization for vascular access, in contrast, have fallen more than 25 percent. Cardiovascular admission rates rose slightly until 2001, but since then have been stable.

Overall, patients with three or more years of ESRD have hospital admission rates in 2003 that are 6–7 percent lower than those for patients of lesser vintage (Figure p.22). When looking at rates for specific modalities, however, this trend holds true only in patients on hemodialysis, and may indicate selection bias, with these patients having vascular access events or increased comorbidity at the onset of their treatment regime. Not surprisingly, 2003 rates of admission for transplant patients of both vintages are 48–57 percent lower than those of their dialysis counterparts.

Since 1993, all-cause hospitalization rates across modalities have fallen only slightly (Figure p.23). Cardiovascular and infectious rates in hemodialysis patients have shown a steady increase over time, rising 12 and 31 percent, respectively. All-cause admission rates in dialysis patients are double those found in patients with a transplant.
Mortality rates for patients in their first year of therapy have fallen 23 percent since 1980, from 308 to 237 deaths per 1,000 patient years for patients in the first, third, and fifth years, respectively (Figure p.24). Overall and for hemodialysis patients, however, first-year mortality rates have been relatively stable for the past decade. The positive effect of improved dialysis therapy may be offset by the increase in pre-ESRD comorbidity seen in the dialysis population or an increased use of dialysis catheters. In the transplant population, first-year death rates have fallen dramatically—almost 80 percent since 1980.

Overall and for transplant patients, mortality rates are highest in this first year; for peritoneal dialysis patients, in contrast, the lowest rates occur in the first year of therapy. This may reflect a selection bias, as sicker and older patients tend to be placed on hemodialysis. Transplant patients, as expected, have the lowest mortality rates, in the most recent period reaching 78, 50, and 74 per 1,000 patient years for patients in the first, third, and fifth years, respectively.

Patients who begin therapy with a renal transplant also, as expected, have the greatest five-year survival (Figure p.25). Between the 1989–1993 and 1994–1998 periods, survival for these patients rose from 68 to 73 percent. In the dialysis population, patients who initiate therapy on peritoneal dialysis have a slight survival advantage in the first 18–24 months; by five years, however, survival probabilities for the two dialysis therapies are nearly the same.

Mortality rates in the prevalent population vary widely by vintage and modality (Figure p.26). In the mid- to late-1980s, rates overall and for hemodialysis were highest in patients with a vintage of less than three years. The rates for these patients, however, then began a steady decline, while rates for older vintage patients remained stable. Across all modes of therapy, mortality is now greatest in patients of older vintage—17 percent higher overall, and 13, 62, and 77 percent higher for hemodialysis, peritoneal dialysis, and transplant, respectively.

Rates continue to be greatest in peritoneal dialysis patients on the modality for three years or more, in 2003 reaching 289 deaths per 1,000 patient years—a rate 28 percent greater than that occurring in the comparable hemodialysis population.

Figure p.25 shows incident ESRD patients age 67 & older, with a first ESRD service date between January 1, 2002, & June 30, 2003. Values show percent of patients with at least one admission during each three-month interval. Figure p.21 shows the period prevalent dialysis patients; rates adjusted for age, gender, race, & primary diagnosis. ESRD patients, 2003, used as reference cohort. Vascular access hospitalizations are “pure” inpatient vascular access events, as described in Appendix A.

Figures p.22–23: period prevalent ESRD patients; rates adjusted for age, gender, race, & primary diagnosis. ESRD patients, 2003, used as reference cohort. Figure p.24 shows incident ESRD patients; adjusted for age, gender, race, & primary diagnosis. Incident ESRD patients, 1996, used as reference cohort. Figure p.25 shows incident dialysis patients & patients receiving a first transplant in the calendar year; adjusted for age, gender, race, & primary diagnosis. Incident ESRD patients, 1996, used as reference cohort. Figure p.26 shows period prevalent ESRD patients; adjusted for age, gender, race, & primary diagnosis. Data for all patients also adjusted for modality. Period prevalent ESRD patients, 2001, used as reference population.
Medicare costs for ESRD rose to $18.1 billion in 2003—three times the costs incurred in 1991, and 6.6 percent of total Medicare expenditures for the year (Figure p.27). Expenditures for employer group health plans (EGHPs) accounted for $338 million, 2.3 percent of their total costs of $15 billion.

In the six months prior to and following the initiation of ESRD therapy, per person per month (PPPM) expenditures for Medicare patients age 65–74 remain nearly the same as those for patients age 75 and older, and change at the same rate (Figure p.28). In the month prior to the start of therapy, for example, PPPM costs rise 457 and 439 percent, respectively, reaching $4,958 and $4,398. With commercial insurers reimbursing at much higher rates, PPPM costs are greater in younger patients with EGHP coverage. Increasing nearly five times in the month before initiation, they reach a high of $14,537 in patients age 45–64, and grow more than sevenfold in the youngest patients, to $12,742. Although PPPM costs do not differ widely by insurance coverage in the first several months leading up to a diagnosis of ESRD, the difference visible at initiation continues after. At month six, for example, costs for EGHP patients age 45–64 are 3.3 times higher than those for Medicare patients age 75 and older.

ESRD expenditures tripled between 1991 and 2003, growing from $5.5 billion to $16.7 billion (Figure p.29). Inpatient and Part B costs reached $6.1 and $3.4 billion, respectively, 2.7–2.8 times higher than in 1991. Outpatient expenditures saw the largest change, rising 236 percent after 1991 to reach $6.4 billion in 2003.

Dialysis expenditures continue to rise (Figure p.30 and Table p.b). Overall costs, for example, reached $14.8 billion in 2003—6 percent greater than in the previous year, and more than triple the level of 1991. Between 2002 and 2003, inpatient, outpatient, and
Part B costs for dialysis grew 1.3, 8.5, and 10.8 percent, respectively. Overall expenditures for patients with a functioning graft in 2002 were nearly four times as high as costs in 1991. Except for a slight dip between 1997 and 2000, overall costs for kidney transplants have almost doubled since 1991, as have those for inpatient and Part B services, while outpatient expenditures are more than twice what they were in 1991. Overall expenditures for graft failure continue to rise—costs between 2002 and 2003 increased by 4.6 percent.

Per person per year (PPPY) total ESRD expenditures have increased by 54 percent since 1991, largely influenced by 5–7 percent yearly growth in the early to mid-1990s (Figure p.31). Between 1997 and 2000, the maximum yearly increase was just under 3 percent; in 2001, it jumped to nearly 8 percent. This growth, however, has not been sustained, and yearly costs appear to be slowing, as evidenced by the 1.63 percent increase between 2002 and 2003. Outpatient costs seem to be driving overall costs, showing a 4 percent rise between 2002 and 2003, and may be indicative of an increasing provider awareness of clinical guidelines, resulting in more medical interventions and treatments.

Trends in per person per year ESRD expenditures by modality parallel those for total ESRD expenditures in most categories (Figure p.32 and Table p.b). Of interest, however, is a comparison between the relative differences of total ESRD and PPPY costs for dialysis and transplant events. While total yearly ESRD expenditures for transplant events are much lower than those incurred for dialysis, PPPY transplant costs in 2003 were 52 percent higher than those found for dialysis, demonstrating the complexities involved with each transplant event.

(Figure p.37) total ESRD expenditures are from paid claims (Table K.1) as well as estimated costs for HMO & organ acquisition. ESRD costs in 2003 are inflated by 2 percent to account for costs incurred but not reported. Total Medicare expenditures obtained from the CMS Office of Financial Management, Division of Budget. EGHP data derived from the Medstat claims database. See Appendix A for further details. (Figure p.28) incident ESRD patients, 2002. Medicare: incident patients with Medicare as primary payor (not enrolled in an HMO). Medstat: patients enrolled for full year in both 2001 & 2002. (Figure p.29) period prevalent ESRD patients. Includes payments for MSP patients, but no estimate for HMO costs. (Figures p.30–32 & Table p.b) period prevalent ESRD patients with Medicare as primary payor. Modalities in Figures p.30 & p.32 & in Table p.b are determined using Model 2 methodology, as described in Appendix A. Patients with Medicare as secondary payor are included in Table p.b.
The Venn diagrams on this spread illustrate the disproportionate use of resources by patients with some of the greatest disease burdens. In the Medicare population, for example, only 3.6 percent of patients have both diabetes and congestive heart failure, but their care accounts for 9.8 percent of total costs (Figures p.33–34). Patients with diabetes, CHF, or CKD, alone or in combination with one another, account for 30.5 percent of the Medicare population, yet use 56.1 percent of the total expenditures.

Yearly expenditures for Medicare CKD patients have more than tripled since 1993, and now exceed $35 billion (Figure p.35). The greatest portion of these costs are attributable to inpatient services, which now account for over half of all CKD costs, and in 2003 totaled over $19 billion. Part B costs have almost quadrupled in ten years, rising from $2.4 billion in 1993 to nearly $9 billion in 2003, while in 2003 outpatient costs accounted for only six percent of total costs.

Per person per year (PPPY) costs for CKD overall totaled close to $20,000 in 2003—a 34 percent increase since 1993 (Figure p.36). Comorbidity plays an important role in annual costs, with the highest costs incurred by patients who have coexisting diabetes and congestive heart failure—costs for these patients totaled over $29,000 in 2003. It is interesting to note that, over a ten-year period, costs for patients with CHF increased by more than two-fold compared to costs for those with diabetes, and in 2003 were 77 percent higher, indicating the severity of this condition.

Diabetes and CHF not only have a major impact on PPPY costs in the CKD population, but highly influence hospitalization rates—themselves tied directly to costs. Rates at three months are greatest in patients with both diabetes and CHF (2.2 admissions per patient year) and remain so through the three-year study interval, ending at 1.5 admissions per patient year (Figure p.37). Disease severity is also reflected in the fact that at the end of three years, admissions in patients with CHF are 37 percent higher than those in diabetics.
Venn diagrams for the EGHP population also dramatically illustrate the impact of certain patient populations on costs (Figures p.38–39). Only 4.2 percent of EGHP patients, for example, have diabetes, CHF, and/or CKD, but care of these patients accounts for one-fifth of total expenditures.

Costs for EGHP patients with CKD topped $901 million in 2003 (Figure p.40). In contrast to Medicare costs, in which the largest portion of total expenditures are inpatient costs, costs for EGHP patients are almost equally divided between inpatient and outpatient settings, at $404 and $475 million, respectively. PPPY costs are highest for CHF patients, and in 2003 totaled over $82,000 (Figure p.41). Costs for patients with diabetes and CHF were lower, at $72,000, and those for patients with diabetes only were less than $26,000.

The hospitalization rate for EGHP patients overall was 0.30 per patient year at risk in 2003—almost three times lower than the rate in the Medicare population (Figure p.42), and reflecting the younger age of the EGHP population.

{Figures p.33–34} population estimated from the 5 percent Medicare sample, & includes patients surviving all of 2002 with Medicare as primary payor. Diagnoses determined from claims in 2002. Patients with ESRD in the 5 percent sample are excluded. Costs are for calendar year 2003, with patients censored at development of ESRD. {Figures p.35–36} period prevalent CKD patients from the 5 percent Medicare sample. Patients are Medicare entitled, not enrolled in HMO for entire year, & diagnosed with CKD in the year prior to cost year or during cost year. {Figure p.37} point prevalent CKD patients from the 5 percent Medicare sample, followed from January 1, 2003, through December 31, 2003. Patients are enrolled for the entire 2003 calendar year, not enrolled in HMO, & diagnosed with CKD during 2003. {Figures p.38–39} all patients in the Medstat database who survive & are eligible for all of 2002. Diagnoses determined from claims in 2002. Patients with ESRD are excluded. Costs are for calendar year 2003, with patients censored at development of ESRD. {Figures p.40–41} period prevalent CKD patients from Medstat database. Patients are enrolled for the full year prior to the cost year & diagnosed with CKD, or diagnosed with CKD during the cost year. {Figure p.42} point prevalent CKD patients from the Medstat database, followed from January 1, 2003, through December 31, 2003. Patients are enrolled for the entire 2000 calendar year, & diagnosed with CKD during 2000.

Table p.1 Incident rates continue to be stable, in 2003 reaching 338 per million population. The 2003 prevalent rate was 1,496, a 2.5 percent increase from the previous year—the smallest growth yet for the program. In 2003, 102,567 patients began ESRD therapy; 452,957 patients were prevalent on December 31, and 128,131 patients had a functioning graft. Expenditures reached $27.3 billion in 2002, with Medicare covering $18.1 billion. On a per patient level, expenditures increased 1 percent; after adjustments for inflation, however, the amount was down 2 percent.

Figure p.7 ESRD rates continue to vary significantly across the country, even after adjusting for age, gender, and race; suggesting that other factors contribute to the recognition of kidney disease.

Figure p.12 Guidelines advocating fistula use appear to be influencing access rates. Placement rates for fistulas have doubled since 1996, and there is clear evidence that catheter placements are down to levels of 8–9 years ago; this appears to be associated with a decline in infectious hospitalization rates. Figure p.15 Hemoglobin levels continue to increase slowly. This has been achieved, however, with increasing doses of EPO, which add considerable cost to the care of the dialysis population. Figure p.18 The use of renoprotective drugs such as ACE-Is and ARBs, associated with reduced event and mortality rates, has grown. Figure p.19 The use of glycemic control medications is changing, with more patients on TZDs, which have been shown to lower HbA1c levels in non-ESRD patients.

Figure p.20 Morbidity during the transition from CKD to ESRD is high, with 80 percent of patients age 67 and older hospitalized during the three months prior to initiation. Figure p.21 While overall hospitalization rates are stable, the composition of those hospitalizations has altered dramatically. Inpatient vascular access admissions have fallen 25 percent, while infectious and cardiovascular hospitalizations are up 23 and 10 percent, respectively. Figures p.24–26 Incident mortality rates continue to fall. First-year death rates have declined slightly, a change from the previous six years. Prevalent death rates overall are also down, and the rate for patients on dialysis five or more years has begun to fall as well.

Figure p.27 The ESRD program is consuming an ever-increasing part of the Medicare budget—6.7 percent in 2003. Figure p.28 Increased morbidity during the transition from CKD to ESRD is associated with high costs. Figure p.30 Outpatient costs for dialysis patients continue to grow at a higher pace than those for inpatient services. Figures p.33–34 Comparisons of CKD populations and costs are revealing. The recognized Medicare CKD population is considerable. CKD patients in the EGHP population make less impact, but they are not the older and retired patients also covered by employers. The picture of this latter population, which consumes considerable resources, may be closer to that of the Medicare population. Figures p.41–42 The interaction of CKD with other major diseases such as diabetes and CHF shows its considerable impact on morbidity, hospitalization rates, and costs.

MAPS: NATIONAL MEANS & PATIENT POPULATIONS

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<th>Figure number</th>
<th>p.7 Inc/HD</th>
<th>p.7 Inc/PD</th>
<th>p.7 Inc/Tx</th>
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<td>25,825</td>
<td>128,131</td>
<td>7,328</td>
</tr>
<tr>
<td>Overall value for pts mapped</td>
<td>308</td>
<td>22</td>
<td>6</td>
<td>982</td>
<td>85</td>
<td>426</td>
<td>615</td>
</tr>
<tr>
<td>Missing HSA/state: pts dropped</td>
<td>3,008</td>
<td>220</td>
<td>274</td>
<td>8,256</td>
<td>761</td>
<td>2,838</td>
<td>53</td>
</tr>
</tbody>
</table>