Your life feels different on you, once you greet death and understand your heart’s position. You wear your life like a garment from the mission bundle sale ever after—lightly because you realize you never paid nothing for it, cherishing because you know you won’t ever come by such a bargain again.

LOUISE ERDRICH, Love Medicine
Growth of the end-stage renal disease program has been financed by both public and private insurance coverage for enrollees. Program costs have increased since the inception of Medicare entitlement for ESRD in 1972, partly because of the growing number of treated patients, and also because of accelerating costs for ancillary services not included in the initial reimbursement system.

Financing of the ESRD program changed dramatically in 1982 when Medicare and HCFA (now CMS) initiated a composite rate payment system in which dialysis services were bundled into a single treatment rate, and providers were given incentives to perform home dialysis rather than in-center hemodialysis. Since this time there have been only a few increases in the composite rate. The first, in the mid-1990’s, added $0.50 per treatment to help fund the quality assurance programs run by the ESRD networks. More recently, the composite rate was increased by approximately 2.1 percent. During the last two decades these few alterations have constituted the primary changes in reimbursement for the dialysis component of ESRD services.

In this chapter we present information on Medicare ESRD program expenditures, looking at them in context of the overall general Medicare program. We also provide data on Medicare-allowable expenditures, risk adjusters, and relative costs for patients by age, gender, race, and modality. Standard actuarial analyses, comparable to methods used by health plans, are used to provide readers with per-member per-month expenditures. As expected, insurance coverage at the initiation of dialysis has a significant relationship to the cost structure and services utilized by patients.

We have also included information on hospital use in the ESRD Medicare population, showing how components of hospitalizations have changed over the last decade.

After a steady expansion, use of the Medicare+Choice risk program in the ESRD population has begun to plateau, paralleling trends seen in the general population. Information on these risk patients is presented in this chapter, including
the geographic distribution of such patients throughout the United States.

Recent years have seen significant consolidation in the ownership of dialysis centers in the U.S., as the largest chains continue to acquire units. From the Medicare annual cost reports (available at www.cms.hhs.gov/data/download) we obtained data on dialysis unit ownership, using these data to assess expenditures for dialysis and associated services.

To analyze costs for vascular access services, which constitute a significant portion of ESRD patient costs, we evaluated Part B physician claim records. These records contain considerable data on both inpatient and outpatient care.

Figure 12.1 illustrates the growth in the number of period prevalent ESRD patients, the number of deaths, and overall Medicare expenditures. Over the past decade, while the patient population has almost doubled (an increase of 95 percent), expenditures have increased 129 percent. The yearly total growth in Medicare costs, which slowed to 2–3 percent in 1997–1999, rose to 6.2 percent between 1999 and 2000 (see Table p.a in the Précis). This increase may be related to increases in the use of erythropoietin, intravenous vitamin D, and intravenous iron. It may also be caused in part by a growing provision of preventive health services after the 1997 publication of the NKF’s Dialysis Outcomes Quality Initiative (DOQI).

ESRD program costs are growing more rapidly than general Medicare expenditures (Figure 12.2). Over the last ten years the general Medicare program has grown from $120.2 billion to $219 billion, an increase of 82.2 percent. This increase is significantly lower than the 129 percent growth in the ESRD program, which in 2000 accounted for 5.8 percent of the Medicare program—up from 4.5 percent in 1991 (a 29 percent increase in the percentage of the Medicare budget contributed to the ESRD program).

Most of this increase in the cost of ESRD program can be directly attributed to the growth of the patient population, as noted in Précis Table p.a. Between 1999 and 2000, Medicare expenditures increased 2.6 percent on a per person, per year basis. But after adjusting for inflation, using the consumer and Medicare price indices, this cost actually decreased between 0.8 percent and 1.5 percent, showing that unadjusted costs can be a misleading indicator of growth in the ESRD program. Regardless of these adjustments, however, it is clear that over the last ten years the Medicare ESRD program has consumed an increasing proportion of the Medicare budget.
Table 12.a presents the results of a risk-adjuster economic regression model, showing the percent change in allowable per member per month (PMPM) expenditures as compared to reference populations in each category. Expenditures for older patients, as expected, are 18 percent higher than for those age 45–64, while males incur six percent lower costs than females. Costs for black patients are 4.5 percent higher than those for whites, and costs for diabetics are almost 10 percent higher than for those without the disease.

In terms of clinical indicators reported on the Medical Evidence form, patients with a low body mass index (BMI) are more costly than those with higher values. Rising estimated glomerular filtration rates (eGFRs) are accompanied by dramatically higher expenditures, suggesting that patients initiating with higher eGFRs utilize an increased amount of services, which may reflect more comorbidity at the initiation of dialysis. Higher expenditures are also consistent with higher scores on the Charlson index, an indicator of comorbidity (see Figure 2.31), and with the pattern of increased pre-ESRD hospital days with higher eGFRs at initiation (see Figure 2.32).

Lower hemoglobin levels at the start of dialysis are associated with higher costs, while patients with levels above 11 g/dl cost approximately 3.6 percent less than those with levels of 10–11 g/dl. These findings suggest a benefit to higher hemoglobin levels at the initiation of dialysis.

Albumin is associated with a number of outcomes and appears to be a strong predictor of expenditures, with each one gram per deciliter increase associated with a decrease in costs of almost 11 percent. Costs also differ by modality, with peritoneal dialysis patients costing 15 percent less than those on hemodialysis.

Expenditures for non-diabetic patients vary more between the youngest and oldest patients than do those for diabetics (Figure 12.3). Racial differences are present between white and black diabetics, but not in the non-diabetic population. Analyses by diabetic status otherwise parallel those made for the population as a whole.

In terms of modality, there is a larger variation in costs by age among peritoneal dialysis patients than among those on hemodialysis (Figure 12.4). Individual regression models are performed separately for diabetic and non-diabetic patients and for hemodialysis and peritoneal dialysis patients; comparisons across all groups cannot be made, therefore, due to variations in the reference populations.
Unadjusted PMPM expenditures by billing type and diabetic status are presented in Figure 12.5. Overall, Part A costs for non-diabetic patients are almost $400 PMPM less than those for diabetic patients, and Part B costs are almost $160 lower.

Within age groups, Medicare Part A expenditures are significantly less in peritoneal dialysis patients than in those on hemodialysis (Figure 12.6). While Part B expenditures are significantly higher in peritoneal dialysis patients, the $340 PMPM increase in Part B expenditures for these patients does not eclipse the almost $1,400 increase on Part A claims for hemodialysis patients. The main source of the increase in the Part B expenditures appears to be the Medicare Method II payments for patients on CCPD.

Table 12.b presents unadjusted allowable Medicare PMPM expenditures by modality and diabetic status. Within each age group, non-diabetic hemodialysis patients are consistently more expensive than those on peritoneal dialysis. The same is true for the diabetic population, with patients age 65–74 having the least difference by modality. Expenditures relative to hemoglobin levels are also apparent within the Medicare data. Across populations, the highest costs are associated with hemoglobins <10 g/dl.

### Table 12.b: Part A & B Medicare payments, by age, modality, & diabetic status

<table>
<thead>
<tr>
<th>Age</th>
<th>Hemodialysis</th>
<th>Peritoneal dialysis</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Non-diabetic</td>
<td>Diabetic</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>PMPM</td>
</tr>
<tr>
<td>20-44</td>
<td>1,334</td>
<td>4,931</td>
</tr>
<tr>
<td>45-64</td>
<td>2,595</td>
<td>5,227</td>
</tr>
<tr>
<td>65-74</td>
<td>4,052</td>
<td>5,050</td>
</tr>
<tr>
<td>75+</td>
<td>6,929</td>
<td>5,623</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>10,122</td>
<td>9,330</td>
</tr>
<tr>
<td>Black</td>
<td>4,121</td>
<td>6,217</td>
</tr>
<tr>
<td>Other race</td>
<td>667</td>
<td>5,223</td>
</tr>
<tr>
<td>Male</td>
<td>8,339</td>
<td>5,270</td>
</tr>
<tr>
<td>Female</td>
<td>6,571</td>
<td>5,673</td>
</tr>
<tr>
<td>&lt;9</td>
<td>5,201</td>
<td>5,584</td>
</tr>
<tr>
<td>9&lt;10</td>
<td>3,595</td>
<td>5,554</td>
</tr>
<tr>
<td>10&lt;11</td>
<td>2,948</td>
<td>5,369</td>
</tr>
<tr>
<td>11&lt;12</td>
<td>1,815</td>
<td>5,215</td>
</tr>
<tr>
<td>12+</td>
<td>1,351</td>
<td>5,115</td>
</tr>
<tr>
<td>All</td>
<td>14,910</td>
<td>5,447</td>
</tr>
</tbody>
</table>
Insurance coverage at the initiation of dialysis varies greatly across populations. Patients with primary coverage from Medicare, for example, have a mean age of 67–74, while the mean for patients with coverage from the Department of Veterans Affairs (DVA) is 58 (Figure 12.7). Patients covered only by Medicaid, who have EGHP coverage, or who are uninsured have a mean age of approximately 50 years.

The percentage of women in the Medicaid and Medicare/Medicaid populations is disproportionately high, as is the percentage of black patients in these same populations and among the uninsured. Nearly 20 percent of Medicaid patients (with or without Medicare) are Hispanic, a number that rises to 28 percent among those 65 and older.

The distribution of patients by diagnosis and diabetic status also varies significantly by insurance. The Medicare population contains the highest percentage of diabetics, while those who are uninsured have the lowest incidence of the disease.

Remaining figures compare PMPM Medicare expenditures in the first three months after initiation to those in the fourth month. Because ESRD patients younger than 65 and not disabled must wait 90 days for Medicare eligibility, it is only the data for patients who are Medicare eligible at initiation that show the high cost of initiating ESRD treatment. Medicare entitlement also differs for home dialysis versus in-center treatment.

For patients with other types of insurance, and particularly those who are uninsured, there may be significant gaps in payments between delivered and covered services. Insurance coverage may affect not only the provision of dialysis therapy but also the delivery of other injectibles and medications.

As shown in Chapter Three (see Figures 3.5 and 3.8), dual-eligible patients with both Medicare and Medicaid account for 21 percent of new patients on hemodialysis, 12 percent of those on peritoneal dialysis, and 4.3 percent of those starting treatment with a transplant. Among dual-eligible prevalent patients, 33 percent are on hemodialysis, 25 percent on peritoneal dialysis, and 17 percent have functioning transplants. Insurance coverage clearly plays an important role in the care of the ESRD population.

Figures 12.7–10 incident ESRD patients, 1999, with completed Medical Evidence forms; insurance information obtained from the Medical Evidence form.

<table>
<thead>
<tr>
<th>Insurance groups</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>All</td>
</tr>
<tr>
<td>2</td>
<td>Medicaid only</td>
</tr>
<tr>
<td>3</td>
<td>Medicare only</td>
</tr>
<tr>
<td>4</td>
<td>Medicare with other</td>
</tr>
<tr>
<td>5</td>
<td>Medicare &amp; Medicaid</td>
</tr>
<tr>
<td>6</td>
<td>Medicare &amp; EGHP</td>
</tr>
<tr>
<td>7</td>
<td>DVA or other</td>
</tr>
<tr>
<td>8</td>
<td>EGHP only</td>
</tr>
<tr>
<td>9</td>
<td>None</td>
</tr>
</tbody>
</table>

Insurers insurance group (see table at left for codes)
Medicare allowable PMPM net pay, by insurance coverage at initiation, age, & billing period

12.8 · Total costs

12.9 · Part A costs, by diabetic status

12.10 · Part B costs, by diabetic status
Despite significant increases in patient age and comorbidity, overall hospitalization rates for the Medicare population have increased only 3.9 percent over the last ten years (Table 12.c). The adjusted rate actually shows no net change over the ten-year period (see Figure 6.1). Rates for patients age 15–34 decreased, while those for older patients increased or stayed essentially the same.

By diagnosis, vascular access hospitalizations declined 25 percent, while those for circulatory diagnoses rose almost the same amount, reflecting the rising number of outpatient vascular access procedures and the growing comorbidity of the patient population. Hospitalizations for other diagnoses—digestive, genitourinary, endocrine, respiratory, and infectious—have varied little for patients of most age groups over the past decade.

Changes in hospitalization rates are illustrated in Figure 12.11, which shows how vascular access admissions have declined among all age, gender, race, and primary diagnosis groups. Admissions for circulatory diagnoses have increased in all groups over the past ten years, but particularly in the black population. Admissions for respiratory diagnoses have decreased in younger patients, but risen for all other age groups. Since these latter diagnoses may reflect not only infectious respiratory complications but also pulmonary edema or COPD, this increase merits further attention. Additional work is also needed to determine how the stable overall rate is affected by the increasing complexity of the patient population.

Total expenditures increased between ten and 15 percent each year from 1991 to 1996, while expenditures per patient year increased approximately five percent annually during the same period (Figure 12.12). By 1998 the yearly change in both measures had dropped to almost zero percent, and has been increasing slightly since then. This rise is due in part to increased use of Method II payments for CCPD, greater use of erythropoietin to achieve target hemoglobin levels, and changes in the use of other injectables such as intravenous vitamin D and intravenous iron.

Figure 12.13 illustrates, by modality and expenditure type, the details of these changes. The number of patients increased an average of 6.9 percent per year from 1991 to 2000, while total Medicare expenditures increased at a rate of 9.3 percent per year. The largest increases have been seen in costs for outpatient services (10.6 percent per year), skilled nursing facilities (27.6 percent), home health services (14.5 percent), and hospice services (28.3 percent).
On a per patient level, overall expenditures increased 2.7 percent per year between 1991 and 2000, with disproportionate increases in costs for skilled nursing facilities (20 percent per year; Figure 12.14). These values are not adjusted for inflation. As mentioned in the Précis, overall per person expenditures for dialysis patients, after adjustments for inflation, have decreased over the past several years. These findings suggest that the main growth in overall ESRD program expenditures is predominately related to expansion of the patient population. Growth in the Medicare+ Choice risk program, conceived in the mid-1980s as the social health maintenance organization initiative, has led to increasing numbers of ESRD patients being cared for within HMO programs.

Figures 12.11–14 HCFA model; see page 237 of Appendix A for details.

Table 12.c & Figure 12.11 period prevalent dialysis patients; patients with Medicare as secondary payor are excluded. Figures 12.12–13 period prevalent ESRD patients. Figure 12.14 period prevalent ESRD patients; patients with Medicare as secondary payor are excluded.

Expenditure groups
Pts · Total patients
Total · Total expenditures
IP · Inpatient
OP · Outpatient
SN · Skilled nursing
HH · Home health
HS · Hospice
PS · Physician/supplier

Table 12.c & Figure 12.11 period prevalent dialysis patients; patients with Medicare as secondary payor are excluded. Figures 12.12–13 period prevalent ESRD patients. Figure 12.14 period prevalent ESRD patients; patients with Medicare as secondary payor are excluded.
The Medicare risk program offers alternative coverage plans to Medicare enrollees. While these plans sometimes limit access to care, they may also offer prescription drug coverage and other benefits not usually covered by Medicare. The risk program, now known as Medicare+Choice, is run by private health plans which contract with Medicare to deliver services for eligible enrollees. The ESRD population is unique in that only certain individuals can be covered by “risk” health maintenance organizations. Under current rules only patients covered by a managed care health plan prior to developing ESRD may enroll.

After peaking in 1999, the number of Medicare+Choice enrollees appears to have stabilized at 6.5 million (Figure 12.15). The Medicare ESRD risk population is approaching 30,000, though growth slowed markedly between 1999 and 2000.

This growth is illustrated as well in maps showing the percent of Medicare enrollees in each state who are defined as managed care or “risk” patients (Figure 12.16). Since 1990, the Medicare populations of the West Coast, the Southwest, Minnesota, Florida, West Virginia, and New York have consistently contained the greatest proportion of risk patients. In the past decade, however, these numbers have been growing throughout most of the country.

Among prevalent patients with HMO coverage only 15 percent have functioning transplants, compared to 28 percent among non-HMO patients (Figure 12.17). Among pediatric patients, in contrast, a larger proportion of HMO patients have received transplants.

The five metropolitan statistical areas with the most ESRD patients in Medicare+Choice risk programs are Los Angeles/Long Beach, New York, Philadelphia, Riverside-San Bernardino, and Oakland.

Metropolitan Statistical Areas (MSAs) with the greatest numbers of Medicare risk patients

1. Los Angeles-Long Beach CA
2. New York NY
3. Philadelphia PA
4. Riverside-San Bernardino CA
5. Oakland CA
6. Chicago IL
7. Miami FL
8. Phoenix AZ
9. San Diego CA
10. San Francisco CA
11. Boston MA
12. Ft. Lauderdale FL
13. Orange County CA
14. Pittsburgh PA
15. Sacramento CA
16. Denver CO
17. Tampa-St. Bernardino CA
18. Cleveland OH
19. San Jose CA
20. Houston TX
21. Portland OR
22. St Louis MO
23. Washington DC
24. Ft. Lauderdale-Plantation FL
25. San Antonio TX
### Table 12.d

<table>
<thead>
<tr>
<th>ESRD network</th>
<th>Total Medicare pts</th>
<th>Medicare ESRD pts</th>
<th>% of ESRD risk pts in network</th>
<th>% of total ESRD pts</th>
<th>Months</th>
<th>% of total Medicare pts in network</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 CT, MA, ME, NH, RI, VT</td>
<td>18,372</td>
<td>1,138</td>
<td>6.2</td>
<td>3.8</td>
<td>8,881</td>
<td>6.3</td>
</tr>
<tr>
<td>2 NY</td>
<td>31,967</td>
<td>2,031</td>
<td>6.3</td>
<td>6.7</td>
<td>16,327</td>
<td>7.5</td>
</tr>
<tr>
<td>3 NJ, PR</td>
<td>14,704</td>
<td>746</td>
<td>5.1</td>
<td>2.5</td>
<td>5,528</td>
<td>2.7</td>
</tr>
<tr>
<td>4 DE, PA</td>
<td>22,803</td>
<td>2,233</td>
<td>9.8</td>
<td>7.4</td>
<td>17,664</td>
<td>9.3</td>
</tr>
<tr>
<td>5 MD, DC, VA, WV</td>
<td>27,502</td>
<td>946</td>
<td>3.4</td>
<td>3.1</td>
<td>7,643</td>
<td>0.5</td>
</tr>
<tr>
<td>6 NC, SC, GA</td>
<td>38,323</td>
<td>409</td>
<td>1.1</td>
<td>1.4</td>
<td>3,086</td>
<td>1.5</td>
</tr>
<tr>
<td>7 FL</td>
<td>25,582</td>
<td>3,156</td>
<td>12.3</td>
<td>10.5</td>
<td>25,067</td>
<td>11.6</td>
</tr>
<tr>
<td>8 AL, MS, TN</td>
<td>24,519</td>
<td>451</td>
<td>1.8</td>
<td>1.5</td>
<td>3,523</td>
<td>1.7</td>
</tr>
<tr>
<td>9 IN, KY, OH</td>
<td>34,100</td>
<td>1,539</td>
<td>4.5</td>
<td>5.1</td>
<td>11,997</td>
<td>5.0</td>
</tr>
<tr>
<td>10 IL</td>
<td>21,610</td>
<td>983</td>
<td>4.5</td>
<td>3.3</td>
<td>7,860</td>
<td>3.3</td>
</tr>
<tr>
<td>11 MI, MN, ND, SD, WI</td>
<td>32,367</td>
<td>779</td>
<td>2.4</td>
<td>2.6</td>
<td>6,174</td>
<td>2.7</td>
</tr>
<tr>
<td>12 IA, KS, MO, NE</td>
<td>18,817</td>
<td>798</td>
<td>4.2</td>
<td>2.6</td>
<td>6,483</td>
<td>3.2</td>
</tr>
<tr>
<td>13 AR, LA, OK</td>
<td>19,088</td>
<td>590</td>
<td>3.1</td>
<td>2.0</td>
<td>4,627</td>
<td>2.6</td>
</tr>
<tr>
<td>14 TX</td>
<td>34,686</td>
<td>1,593</td>
<td>4.6</td>
<td>5.3</td>
<td>12,577</td>
<td>3.7</td>
</tr>
<tr>
<td>15 AZ, CO, NV, NM, UT, WY</td>
<td>19,781</td>
<td>2,264</td>
<td>11.4</td>
<td>7.5</td>
<td>18,573</td>
<td>7.8</td>
</tr>
<tr>
<td>16 AK, ID, MT, OR, WA</td>
<td>13,235</td>
<td>1,209</td>
<td>9.1</td>
<td>4.0</td>
<td>10,104</td>
<td>5.3</td>
</tr>
<tr>
<td>17 &amp; 18 CA, HI, GUAM, AS</td>
<td>53,601</td>
<td>9,264</td>
<td>17.3</td>
<td>30.7</td>
<td>79,508</td>
<td>26.4</td>
</tr>
</tbody>
</table>

#### Demographic characteristics of patients with Medicare risk coverage

**12.19 · Incident patients**

<table>
<thead>
<tr>
<th>Age</th>
<th>Gender</th>
<th>Race/ethnicity</th>
<th>Primary diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>All</td>
<td>0-19</td>
<td>20-44</td>
<td>45-74</td>
</tr>
<tr>
<td>All</td>
<td>0-19</td>
<td>20-44</td>
<td>45-74</td>
</tr>
</tbody>
</table>

Table 12.d provides information on the percent of Medicare+Choice risk patients by ESRD network, diabetic status, age, and race. The Medicare risk patients in Networks 17 and 18 account for 17.3 percent of all patients in the two networks, and almost 31 percent of all risk patients in the country (Table 12.d).

The age distribution of ESRD Medicare risk patients, as expected, is heavily skewed toward the elderly, reflecting requirements that only those previously enrolled in a Medicare+Choice program or a managed care program can enter Medicare risk programs after initiating ESRD treatment. Racial distribution is also skewed, with a greater proportion of white patients in the Medicare risk program than in the general ESRD fee-for-service population.

**Figure 12.15** Period prevalent patients in each year. Source for Medicare risk patients: CMS, Office of Information Systems. **Figure 12.16** ESRD patients enrolled in Medicare+Choice managed care organizations. **Figure 12.17** ESRD patients point prevalent on January 1, 2000. **Figure 12.18** Period prevalent ESRD patients, 2000; map: percent of patients, adjusted. **Table 12.d** Period prevalent ESRD patients, 2000. **Figure 12.19** Incident ESRD patients, 2000. **Figure 12.20** Point prevalent ESRD patients, 2000.
As anticipated, per member per month (PMPM) dialysis expenditures fall into a narrow range around $1,100 (Figure 12.21). Some of the variation between provider types is related to geographic variation in the Medicare price index.

Billings for erythropoietin increased from approximately $360 PMPM in 1996 to $469 in 2000, and there is considerable variation across unit types. Billings for both intravenous iron and vitamin D hormones have increased for all providers. Among the individual chains, independent units, and hospital-based units there is wide variation in the use of other injectables, with PMPM costs in some chains three times higher than those in others. Costs for billed laboratory services have decreased significantly within the large chains, but have been relatively stable for smaller chains, independent units, and hospital-based units.

EPO and iron expenditures are highest in the eastern and southern regions of the United States (Figure 12.22), consistent with regional differences in anemia treatment and with the lower hemoglobin levels in these areas of the country (see Chapter Four). Since data in the maps are not adjusted for race, these patterns are also consistent with the larger proportion of black patients living in these areas.

Differences in costs for other injectables (including vitamin D) are quite striking, with expenditures twice as high in some areas of the country as in others.

Medicare costs for Part A and B expenditures, before and after adjustments for patient characteristics, are shown in Figures 12.24–25. Most notable in these maps is the almost ten-fold difference, after adjustments, in inpatient hospitalization expenditures from the lightest to the darkest areas. Outpatient expenditures differ by 38 percent, and dialysis expenditures by 21 percent. These variations require careful consideration, since dialysis payments are modified by the CMS wage price index on a county level. Higher expenditures in the western states are consistent with the area’s higher cost of living. Greater relative costs for hospitalizations and physician services are also expected, since higher hospitalization rates are accompanied by

| Unit affiliation | All · All units | Chain 1 · Fresenius | Chain 2 · Gambro | Chain 3 · DaVita | Chain 4 · Renal Care Group | Chain 5 · Dialysis Clinics, Inc. | O · All other chain-affiliated units | NC · Non-chain units | HB · Hospital-based units | U · Unknown affiliation |
considerable amounts of physician services.

Figures 12.21–25 patients with Medicare as secondary payor are excluded.

Figure 12.21 period prevalent patients, as-treated economic model (see page 239 for a discussion of this model); unit ownership information obtained from FOIA requests & CMS’s Independent Renal Facility Cost Reports. Figures 12.22–25 period prevalent dialysis patients, 2000, by HSA; adjusted data in Figure 12.25 are adjusted for age, gender, race, & diabetes. Cost data use the as-treated economic model.
Vascular access insertions and complications continue to account for a large portion of expenditures in the dialysis population. The number of hemodialysis vascular access procedures increased by almost four times between 1991 and 2000, while costs for these procedures grew from $104 million to almost $200 million (Figures 12.26–27). The number of procedures and the costs for peritoneal dialysis have remained stable over the same time period.

The delivery of vascular access services has moved steadily from inpatient to outpatient settings (Figure 12.28). These services, as expected, vary significantly in cost (Figure 12.30). Costs for insertions and complications related to hemodialysis catheters are relatively close to those for insertions only, while for fistulas, grafts, and peritoneal dialysis catheters the costs of insertions alone are less than half of those for insertions and complications combined (Figure 12.31).

While surgeons perform most fistula, graft, and peritoneal dialysis catheter procedures, most hemodialysis catheters are inserted by radiologists (Figure 12.32), a major shift in practice from the period in which nephrologists placed most of these devices. These changes may reflect the increased use of permanent cuffed catheters, which cannot be inserted at the bedside.

Regardless of setting, fistula insertion costs have fallen approximately 60 percent since 1991, while synthetic graft costs have decreased 50 percent, and costs for vascular access services associated with catheters have also fallen by nearly 50 percent. Changes in costs associated with vascular access complications have been even more dramatic, with expenditures per event decreasing almost 200 percent over the last decade.

Figures 12.26–27 Medicare ESRD Part B vascular access claims, identified by CPT codes. Figure 12.28 Medicare ESRD Part B vascular access claims, identified by CPT codes; location derived from the CMS “Place of Service” variable. Figure 12.29 Medicare ESRD Part B vascular access claims in which Part B can be matched with corresponding Part A claims. “Pure” inpatient access services are defined as those in which vascular access is the cause of hospitalization (determined by DRG & ICD-9-CM diagnosis codes); “pure” outpatient access services are defined through Part A outpatient vascular access claims with matching Part B claims. Figures 12.30–31 “pure” inpatient & “pure” outpatient claims. Figure 12.31 inpatient & outpatient claims for access insertion or access insertion + complication, unadjusted. Figures 12.33–36 dollars, event-based analysis; all patients in the Medicare claims database during 1991 & 2000 are potentially eligible for inclusion. Maps are constructed with data from “pure” inpatient & “pure” outpatient vascular access events only.
Geographic variations in cost per vascular access procedure

12.33 · Fistula insertions

1991

2000

Percent change 1991–2000

12.34 · Synthetic graft insertions

1991

2000

Percent change 1991–2000

12.35 · Catheter insertions

1991

2000

Percent change 1991–2000

12.36 · Vascular access complications

1991

2000

Percent change 1991–2000
Chapter Twelve

Patient populations & analytical methods

- Introduction: all ESRD patients identified by the REBUS system (Figure 12.1) and all ESRD patients with Medicare claims (Figures 12.2–3).
- Overall costs of ESRD: non-MSP dialysis patients incident during 1999 with EPO claims and complete biochemical data on the Medical Evidence form.
- Incident patient costs: all ESRD patients incident during calendar year 1999 with completed Medical Evidence forms (actuarial calculation, per member per month costs).
- Trends in the Medicare program: all period prevalent ESRD patients for each calendar year 1991–2000. Total expenditures include both MSP and non-MSP patients; per patient per year expenditures include only non-MSP patient, and inpatient data include only non-MSP patients. HCFA economic model (see Appendix A for details).
- Medicare risk patients: all period prevalent ESRD patients for each year 1991–2000; HMO risk patients identified from the Medicare Enrollment Database, and total Medicare population data obtained from CMS.
- Components of dialysis care: all period prevalent non-MSP dialysis patients for calendar years 1996 and 2000; as-treated economic model (same as that used for reference tables).
- Vascular access costs: not patient-based; all Medicare claims for vascular access procedures for all years 1991–2000. May include pre-ESRD claims for patients eligible for Medicare prior to the development of ESRD. Event-based analysis.
- Compared to patients with low hemoglobins at the initiation of dialysis, those with high levels incur significantly lower expenses.
- Non-diabetic peritoneal dialysis patients cost almost $1,100 per person per month less than their counterparts on hemodialysis, while diabetics on peritoneal dialysis cost nearly $900 less.
- Insurance coverage at the initiation of dialysis is highly associated with certain racial and ethnic groups. Providers receive no payment for uninsured patients or for patients with no secondary coverage for Medicare.
- Overall hospital utilization has changed little in the last ten years. There have, however, been significant decreases in vascular access and respiratory hospitalizations in younger age groups. The annual percent increase in total patient expenditures has dropped from 15 to 6 percent. Per patient expenditures have remained relatively flat and, after adjustment for inflation, have declined.
- The size of the Medicare risk program appears to have peaked in the general Medicare population at six million patients, and in the ESRD population at approximately 30,000 patients. The distribution of these patients varies considerably across the United States.
- There has been a significant shift of Medicare risk patients within the ESRD population, with 80 percent of patients now over the age of 65.
- Substantial variation exists by provider type for expenditures related to erythropoietin, intravenous iron, intravenous Vitamin D, other injectables, and laboratory services.
- Vascular access services have shifted from an inpatient to an outpatient basis.
- The number of vascular access procedures for hemodialysis has increased by four times over the last ten years, while physician services have doubled. The number of peritoneal dialysis access procedures has remained constant. Physician and institutional payments have decreased for all types of vascular access services, reflecting the transition from inpatient to outpatient settings.