The bodies of the elements are united and in them there is neither gravity nor lightness. Gravity and lightness are produced in the mixture of the elements.

LEONARDO DA VINCI

Précis

An introduction to end-stage renal disease in the United States
In 2005, the World Health Organization reported on the impact of chronic diseases in low, middle, and high income countries. The presentation focused on premature loss of life and on the economic impact of deaths during individuals’ most productive years. With the impact of chronic diseases in the United States long an area of concern, we summarize one perspective in the Venn diagrams on the next page, looking at diabetes, cardiovascular disease (CVD), chronic kidney disease (CKD), and end-stage renal disease (ESRD). The growth of diabetes in the Medicare population — from 16.1 percent in 1997 to 24.6 percent in 2007 — is associated with a 32 percent increase in the proportion of Medicare costs consumed by patients with the disease. Cardiovascular disease, including hypertension, has long been an issue within the Medicare population. But while growth in the treated ESRD population has also long been reported, CKD has received little attention, despite the increased frequency of its diagnosis and the doubling of its associated costs. Taken together, expenditures for the care of patients who have CKD or ESRD now total 32 percent of the Medicare budget — up from 18.5 percent just ten years ago. The expanding size of the ESRD program, and projections that it will double in the next ten years (see Figure 2.1) suggest that the population at risk for kidney disease should be addressed with detection and prevention strategies to reduce the long-term burden of ESRD. The size of the ESRD population hit a new high in 2007, with 527,283 patients under treatment, while the number of new cases — precisely 111,000 — was almost exactly the same as in 2006. The number of patients starting dialysis, or returning to dialysis after a failed kidney transplant or the recovery of kidney function, reached 116,073, a 0.9 percent increase. Interestingly, the number returning from a failed transplant dropped to 5,398 from 5,578 in 2006. The number restarting dialysis, however, grew 12.3 percent, to a new high of 3,031. Peritoneal dialysis now accounts for 5–6 percent of the incident and prevalent dialysis populations, continuing to fall from peaks of 13 and 11 percent in the 1990s. The number of kidney transplants reached 17,513 in 2007, while the prevalent transplant population rose 3.6 percent, to 158,739, despite continued growth in the number of patients on the transplant wait list. The median time on the wait list was 678 days. In 2006, 41 percent of prevalent dialysis patients had a functioning fistula (see Figure hp.11), exceeding the 1997 KDOQI target of 40 percent, and leading to a new target of 66 percent. Fistula placement rates, however, appeared to peak in 2006, and in 2007 fell for the first time. The steep fall in graft placement rates appears to be slowing, while catheter placement rates continue to fall, reaching a level below that of 1991 and perhaps contributing to the recent decline in rates of hospitalization for vascular access infection (see Figure 6.4). Many patients receive no nephrologist care, dietary care, or treatment with erythropoietin stimulating agents (ESAs) prior to beginning ESRD therapy. These findings suggest that planning for the transition to ESRD is poor, and that the Medicare CKD education benefit, included in the 2008 Medicare Improvements for Patients and Providers Act (MIPPA), needs to address the selection of patient modality and dialysis access, preemptive kidney transplantation, and cardiovascular risk factors. As of March, 2007, mean monthly hemoglobin levels have fallen below 12 g/dl. Seven percent of prevalent dialysis patients now have a mean monthly level less than 10 g/dl, and the percentage with a mean level above 13 g/dl has fallen slightly, to 16.7 percent. These changes may reflect concerns over high levels reported in clinical trials (CHOIR and CREATE) in 2006, changes mandated by the FDA and CMS to ESA package inserts, and changes in ESA payments by CMS when hemoglobin levels exceed 13 g/dl for three months. After rising steadily over several years, rates of hospitalization for infection again fell in 2007 — an important change in patient morbidity. Incident-based mortality rates continue to fall for those on ESRD treatment.
two or more years, and adjusted first-year rates for hemodialysis patients now show three years of successive declines. The use of catheters is still an important issue here, as more than 80 percent of patients have a catheter at their first outpatient dialysis, and early morbidity from vascular access infections in the first months of dialysis is a concern (see Chapter One for data on infectious hospitalization rates in the first months of hemodialysis). Greater growth in general Medicare costs compared to those for ESRD — in 2006, 16.9 versus 4.9 percent — along with the inclusion, starting in 2006, of Part D in the total Medicare costs, have led to a decline in the percentage of the Medicare budget spent on ESRD, now at 5.8 percent. In absolute dollars, however, the program grew 6.1 percent in 2007. Costs for both diabetic and non-diabetic Medicare patients with ESRD continue to rise. The same is true for patients with employer group health plan (EGHP) coverage, though costs here are significantly higher. The average Medicare ESRD patient with diabetes now costs $72,461 per year, compared to $98,721 in the EGHP population.

**Figure p.i;** see page 362 for analytical methods. *Period prevalent general Medicare patients.*
### Summary statistics on reported ESRD therapy in the United States, by age, race, ethnicity, gender, & primary diagnosis, 2007

#### Incidence¹

<table>
<thead>
<tr>
<th>Age</th>
<th>Count</th>
<th>%</th>
<th>Adj. rate²</th>
<th>Count</th>
<th>%</th>
<th>Adj. rate²</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-19</td>
<td>13,304</td>
<td>12.4</td>
<td>1.75</td>
<td>7,596</td>
<td>1.6</td>
<td>0.6</td>
</tr>
<tr>
<td>20-44</td>
<td>13,831</td>
<td>12.5</td>
<td>1.62</td>
<td>98,471</td>
<td>18.6</td>
<td>14.5</td>
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<tr>
<td>45-64</td>
<td>42,184</td>
<td>38.0</td>
<td>0.71</td>
<td>23,419</td>
<td>4.4</td>
<td>3.23</td>
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<tr>
<td>65-74</td>
<td>25,446</td>
<td>22.9</td>
<td>1.42</td>
<td>104,917</td>
<td>19.9</td>
<td>5.870</td>
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<tr>
<td>75+</td>
<td>28,234</td>
<td>25.4</td>
<td>1.735</td>
<td>82,615</td>
<td>15.7</td>
<td>5.124</td>
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<td>Unknown</td>
<td>17,276</td>
<td>15.6</td>
<td>2.14</td>
<td>1,835</td>
<td>0.4</td>
<td>1.7</td>
</tr>
<tr>
<td>White</td>
<td>72,668</td>
<td>65.5</td>
<td>2.373</td>
<td>321,485</td>
<td>61.0</td>
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<tr>
<td>African American</td>
<td>31,561</td>
<td>28.4</td>
<td>0.998</td>
<td>166,062</td>
<td>31.7</td>
<td>5.111</td>
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<td>Native American</td>
<td>1,254</td>
<td>1.1</td>
<td>0.495</td>
<td>7,067</td>
<td>1.3</td>
<td>2.713</td>
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<tr>
<td>Asian/Pacific Islander</td>
<td>5,106</td>
<td>4.6</td>
<td>0.396</td>
<td>25,840</td>
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<tr>
<td>Other/unknown</td>
<td>411</td>
<td>0.4</td>
<td>0.110</td>
<td>5,029</td>
<td>0.11</td>
<td>3.698</td>
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<td>Hispanic</td>
<td>15,057</td>
<td>13.6</td>
<td>0.508</td>
<td>77,680</td>
<td>14.7</td>
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<td>Non-Hispanic</td>
<td>95,943</td>
<td>86.4</td>
<td>0.342</td>
<td>449,603</td>
<td>85.3</td>
<td>1.613</td>
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<td>Male</td>
<td>62,339</td>
<td>56.1</td>
<td>0.444</td>
<td>296,587</td>
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<td>Female</td>
<td>48,785</td>
<td>43.9</td>
<td>0.284</td>
<td>260,368</td>
<td>43.8</td>
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<td>Unknown</td>
<td>17,276</td>
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<td>1,835</td>
<td>0.4</td>
<td>1.7</td>
</tr>
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<td>Diabetes</td>
<td>48,871</td>
<td>44.0</td>
<td>0.155</td>
<td>197,037</td>
<td>37.4</td>
<td>6.199</td>
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<td>Hypertension</td>
<td>30,657</td>
<td>27.2</td>
<td>0.995</td>
<td>132,035</td>
<td>26.3</td>
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<td>Glomerulonephritis</td>
<td>7,571</td>
<td>6.8</td>
<td>2.44</td>
<td>81,599</td>
<td>15.5</td>
<td>260</td>
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<td>Cystic kidney disease</td>
<td>2,633</td>
<td>2.4</td>
<td>0.7</td>
<td>24,828</td>
<td>4.7</td>
<td>7.998</td>
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<tr>
<td>Urologic disease</td>
<td>1,554</td>
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<td>1.45</td>
<td>13,139</td>
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<td>42.744</td>
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<td>Other known cause</td>
<td>14,141</td>
<td>12.7</td>
<td>0.69</td>
<td>56,468</td>
<td>10.7</td>
<td>182</td>
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<tr>
<td>Unknown cause</td>
<td>4,535</td>
<td>4.2</td>
<td>0.15</td>
<td>20,747</td>
<td>3.9</td>
<td>65.3</td>
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<tr>
<td>Missing cause</td>
<td>938</td>
<td>0.8</td>
<td>0.2</td>
<td>5,530</td>
<td>1.04</td>
<td>1.02</td>
</tr>
<tr>
<td>All</td>
<td>111,000</td>
<td>100.0</td>
<td>2.639</td>
<td>527,283</td>
<td>1,665</td>
<td>368.544</td>
</tr>
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</table>

#### December 31 point prevalence

- **Hypertension**
- **Other known cause**
- **Unknown cause**
- **Diabetes**
- **Cystic kidney disease**
- **Urologic disease**
- **Diabetes**
- **Hypertension**
- **Glomerulonephritis**
- **Cystic kidney disease**
- **Urologic disease**
- **Other known cause**
- **Unknown cause**
- **Missing cause**

#### Decedents & Transplants

- **Kidney transplants**
- **Living donor**
- **ESRD**

#### Wait-list for kidney & pancreas transplants

- **New listings in 2007**
- **% of as of 12.31.07**
- **Median time on list (yrs)**

<table>
<thead>
<tr>
<th>Age</th>
<th>New listings</th>
<th>% as of 12.31.07</th>
<th>Median time on list (yrs)</th>
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</thead>
<tbody>
<tr>
<td>0-17</td>
<td>805</td>
<td>0.75</td>
<td>0.75</td>
</tr>
<tr>
<td>18-44</td>
<td>4,049</td>
<td>1.42</td>
<td>1.42</td>
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<tr>
<td>45-64</td>
<td>9,612</td>
<td>1.76</td>
<td>1.76</td>
</tr>
<tr>
<td>65-69</td>
<td>13,444</td>
<td>2.97</td>
<td>2.97</td>
</tr>
<tr>
<td>70+</td>
<td>5,023</td>
<td>1.18</td>
<td>1.18</td>
</tr>
<tr>
<td>Male</td>
<td>19,644</td>
<td>3.80</td>
<td>3.80</td>
</tr>
<tr>
<td>Female</td>
<td>13,275</td>
<td>2.63</td>
<td>2.63</td>
</tr>
<tr>
<td>White</td>
<td>19,711</td>
<td>3.45</td>
<td>3.45</td>
</tr>
<tr>
<td>African American</td>
<td>9,612</td>
<td>1.76</td>
<td>1.76</td>
</tr>
<tr>
<td>Native American</td>
<td>397</td>
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<td>0.07</td>
</tr>
<tr>
<td>Asian/Pacific Islander</td>
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<td>0.45</td>
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<tr>
<td>Other/unknown</td>
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<td>0.15</td>
<td>0.15</td>
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<tr>
<td>Hispanic</td>
<td>5,272</td>
<td>0.97</td>
<td>0.97</td>
</tr>
<tr>
<td>Non-Hispanic</td>
<td>27,643</td>
<td>5.20</td>
<td>5.20</td>
</tr>
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<td>2.00</td>
<td>2.00</td>
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<tr>
<td>Hypertension</td>
<td>6,493</td>
<td>1.23</td>
<td>1.23</td>
</tr>
<tr>
<td>Glomerulonephritis</td>
<td>5,980</td>
<td>1.10</td>
<td>1.10</td>
</tr>
<tr>
<td>Cystic kidney disease</td>
<td>2,429</td>
<td>0.46</td>
<td>0.46</td>
</tr>
<tr>
<td>Urologic disease</td>
<td>582</td>
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<td>0.11</td>
</tr>
<tr>
<td>Other known cause</td>
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<td>0.93</td>
</tr>
<tr>
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<td>0.22</td>
<td>0.22</td>
</tr>
<tr>
<td>Missing cause</td>
<td>523</td>
<td>0.10</td>
<td>0.10</td>
</tr>
</tbody>
</table>

#### Medicare & Non-Medicare spending

- **Medicare spending for ESRD, 2007**
  - (billions of dollars)
  - SAF paid claims (Parts A & B)
  - 2% incurred but not reported
  - HMO Medicare
  - Organ acquisition
  - Total Medicare costs
  - Non-Medicare spending for ESRD, 2007
  - (billions of dollars)
  - EGHIP (MSF)
  - Patient obligations
  - Total Non-Medicare patients
  - Total non-Medicare costs
  - Total ESRD costs, 2007

#### Change in Medicare spending, 2006 to 2007

- Total
- Per patient year
- Adjusted for inflation

- Medicare spending per patient year, 2007

- ESRD
  - Hemodialysis
  - Peritoneal dialysis
  - Transplant

---

**Notes:**

- **A** Incident counts include all known ESRD patients, regardless of any incomplete data on patient characteristics and U.S. residency status.
- **B** Includes only residents of the 50 states and Washington D.C. Rates are adjusted for age, race, and/or gender using the estimated July 1, 2005 U.S. resident population as the standard population. All rates are per million population. Rates by age are adjusted for race and gender. Rates by gender are adjusted for race and age. Rates by race are adjusted for age and gender. Rates by disease group and total adjusted rates are adjusted for age, gender, and race. Adjusted rates do not include patients with other or unknown race.
- **C** Patients are classified as receiving dialysis or having a functioning transplant. Those whose treatment modality on December 31 is unknown are assumed to be receiving dialysis. Includes all Medicare and non-Medicare ESRD patients, and patients in the U.S. Territories and foreign countries.
- **D** Deaths are not counted for patients whose age is unknown.
- **E** Age is computed at the start of therapy for incidence, on December 31 for point prevalence, at the time of transplant for transplants, and on the date of death for death.
- **F** Includes patients whose modality is unknown.
- **G** Unadjusted total rates include all ESRD patients in the 50 states and Washington D.C.
- **H** Total transplants as known to the USRDS; 26 transplants with unknown donor type excluded from counts.
- **I** Adjustments using the CMS inflation adjustment for the medical component, and the Bureau of Labor Statistics inflationary adjustment.
- *** Values for cells with ten or fewer patients are suppressed. **Zero patients in this cell.**
In 2007, 111,000 new dialysis and transplant patients initiated ESRD therapy, for an adjusted rate per million population of 354—a 2.1 percent decrease from the rate of 362 in 2006 (Figure p.4). More than 527,000 patients were receiving treatment on December 31, 2007, for an adjusted rate of 1,665 per million population—a 2.0 percent higher than the 2006 rate of 1,632. Nearly 369,000 of these patients were being treated with dialysis, while 158,739 had a functioning transplant. A total of 17,513 transplants were performed during the year—6,041 from living donors—and 87,812 ESRD patients died. Nearly 33,000 patients were added to the transplant wait list in 2007, and 73,555 were on the list at the end of the year; the median time on the list was 1.5 years.

With Medicare spending for ESRD at $23.9 billion, and non-Medicare spending at $11.4 billion, total ESRD costs in 2007 reached $35.3 billion. Medicare costs per person per year were nearly $62,000 overall, ranging from $24,572 for transplant patients to $87,008 for those receiving hemodialysis. (Table p.1; see page 362 for analytical methods. Dialysis & transplant patients, 2007.)

The number of new dialysis patients rose just 0.85 percent in 2007—down from 3.6 percent in 2006—to 107,644. Nearly 5,400 patients with graft failure returned to dialysis from transplant, a one-year decrease of 3.2 percent. The number of patients restarting dialysis, in contrast, grew 12.3 percent, to 3,031. Overall, the CMS Annual Facility Survey showed 116,073 patients starting or restarting dialysis in 2007, up 0.9 percent from 2006. (Figure p.2. CMS Annual Facility Survey.)

The prevalent dialysis population grew 30 percent between 2000 and 2007, reaching nearly 370,000. The transplant population increased 46 percent in this same period, and in 2007, with almost 159,000 patients, showed a one-year growth of 4.9 percent. The number of incident patients, in contrast, remained stable in 2007, at 111,000. These data suggest that the prevalent population is living longer, influencing both the growth of the treated ESRD population and the annual expenditures these patients incur. (Figure p.3. Incident & December 31 point prevalent ESRD patients.)
Reaching 101,688, the hemodialysis population accounted for nearly 92 percent of new 2007 patients, with an adjusted rate per million of 325. The number of new patients placed on peritoneal dialysis continues to fall—3.4 percent in 2007—with the rate down 5.3 percent, to 20.8. Transplant patients now comprise 2.4 percent of the incident population, with a rate of 8.1 per million population. Figure p.4; see page 362 for analytical methods. Incident ESRD patients; excludes those with unknown modality.

In 2007, patients receiving hemodialysis again accounted for nearly 65 percent of prevalent ESRD patients, with an adjusted rate of 1,076 per million population—15 percent higher than in 2000. Three in ten prevalent patients now have a transplant, with the rate per million population growing 3.1 percent between 2006 and 2007, to reach 502. Figure p.5; see page 362 for analytical methods. December 31 point prevalent ESRD patients; excludes those with unknown modality.

More than 71,000 patients were listed for a kidney-only transplant on December 31, 2007—8.3 percent more than in the previous year, and three times more than in 1995. The median wait time for patients receiving a transplant during 2007 was 678 days, only three days lower than for patients transplanted in 2006, but nearly twice as long as in 1995. Figure p.6; see page 362 for analytical methods. Patients listed for kidney-only transplants on December 31 of each respective year.
In 2007, unadjusted incident and prevalent rates for hemodialysis patients were highest in states along the Gulf Coast and Atlantic Seaboard, averaging 489 and 1,742 per million population, respectively, in the upper quintile. Peritoneal dialysis rates vary considerably by location, and in the incident population are highest in North Dakota, Wyoming, Idaho, Missouri, Oklahoma, West Virginia, and along the Gulf Coast, at an average of 33.9 per million in the upper quintile. Prevalent rates average 128.5 per million in many of the same states, as well as in Arkansas and New Mexico. Transplant rates are highest in the Upper Midwest, with an average of 14.2 and 647 per million population in the upper quintile.

When compared to unadjusted rates, incident and prevalent hemodialysis rates adjusted for age, gender, and race average 18 and 16 percent lower, respectively, in the upper quintile, while rates for peritoneal dialysis patients are similar, at 34.2 and 129.6 per million. Transplant rates are similar as well, at 14.9 and 690. \( \text{Figures p.7–8; see page 362 for analytical methods. Incident} \) & December 31 point prevalent ESRD patients, 2007.
Slightly more than one in three patients beginning maintenance hemodialysis in 2006 and 2007 did so with a maturing access. Erythropoiesis stimulating agents (ESAs) were used prior to ESRD by 29.3 and 27.7 percent of patients, respectively, while 55.9 and 54.7 percent were under the care of a nephrologist at some time prior to initiation. In 2006 and 2007, 21.6 and 22.1 percent of incident hemodialysis patients, respectively, were under the care of a nephrologist for more than 12 months prior to ESRD initiation, while just 7.2 and 7.5 percent had used ESAs for more than a year. These data suggest that early referral and timely placement of a dialysis access are challenging, and a smooth transition to dialysis is severely impeded by lack of referral. (Figure P.9 Incident hemodialysis patients, with new (revised edition) Medical Evidence forms.)

The majority of incident hemodialysis patients begin therapy with a catheter, predisposing them to infectious complications and early death — particularly those patients age 65 and older. (Figure P.10 Incident hemodialysis patients, 2007, with new (revised edition) Medical Evidence forms.)

One in three patients beginning ESRD therapy in 2007 had seen a nephrologist for a year or less, and 24 percent for a longer period; 43 percent had not received this specialized care. Ninety percent of patients received no dietary counseling prior to ESRD therapy, and 71 percent received no treatment with erythropoiesis stimulating agents. (Figure P.11 Incident ESRD patients, 2007, with new (revised edition) Medical Evidence forms.)
Recent clinical trials (CHOR and CREATE) presented evidence of potential harm from high hemoglobin levels, and KDOQI guidelines released in 2006 indicated no benefit related to morbidity and mortality with a hemoglobin above 13 g/dl. Recommendations in 2007 returned to the target of 11–12 g/dl after a previous target of 11 g/dl or higher.

In 2007, 34.8 percent of prevalent hemodialysis patients were within this target, up from 31 percent in 2006. In conjunction, however, with an 8.8 percent drop in the mean monthly EPO dose, mean monthly hemoglobin levels fell 0.2 g/dl. But while use of erythropoiesis stimulating agents is decreasing, per person per year costs for IV iron are up, indicating increased use (see Figure p.26). The USRDS will continue to monitor hemoglobin levels in order to determine the impact of changing practices in anemia management. Figures p.12–13; see page 362 for analytical methods. Period prevalent dialysis patients with EPO claims.

The use of transfusions has fallen dramatically since the early days of the dialysis program. From a high of 19 percent in 1980, and with a significant drop after the introduction of EPO in 1989, the number of patients transfused in the outpatient setting is now just 0.35 percent. Figures p.14; see page 362 for analytical methods. Hemodialysis patients receiving at least one transfusion.

Eighty-seven percent of hemodialysis patients have a mean URR of 65 percent or greater, a number that has remained steady since 2003. Among peritoneal dialysis patients, 90 percent have a Kt/V meeting or exceeding the KDOQI adequacy benchmark of 1.7 per week, established in 2006; this is down from 92 percent in 2006. Figures p.15–16; see page 362 for analytical methods. Hemodialysis & peritoneal dialysis patients; ESRD CPM data.
After remaining steady through the 1990s and the early years of the current decade, all-cause hospitalization rates have fallen since 2004, and in 2007 were 2.7 percent below their 1993 level. Rates for infectious admissions reached their highest point in 2005 — nearly 37 percent higher than in 1993. They have since fallen, yet in 2007 were 25.8 percent above 1993 levels. Vascular access admissions in hemodialysis patients continue to fall from their 1993 levels, with the rate in 2007 more than 41 percent lower. And cardiovascular hospitalization rates continue to fall in the transplant population — nearly 32 percent since 1993. Figure p.17; see page 363 for analytical methods. Period prevalent ESRD patients.
Trends in hospitalization & mortality

Since 1980, the first-year mortality rate among incident dialysis and first transplant patients has fallen 30.5 percent, from 331.2 per 1,000 patient years at risk to 230.2 in 2006. Real progress is finally visible in first-year mortality rates for hemodialysis patients. After remaining quite stable in the late 1990s and early part of this decade, they have begun to fall, with a one-year decline of 1.9 percent in 2005, and of 3.4 percent in 2006. (Figure p.19; see page 363 for analytical methods. Incident dialysis & first transplant patients.)

Five-year survival rose across all modalities between the 1993–1997 and 1998–2002 periods. Patients on peritoneal dialysis have a slight survival advantage over those on hemodialysis in the first three years of therapy, but at five years survival is equal, at 33.5 and 33.9 percent. Patients who initiate with a transplant are 2.2 times more likely to survive five years than those on dialysis. (Figure p.20; see page 363 for analytical methods. Incident dialysis patients & patients receiving a first transplant in the calendar year.)

Trends in hospitalization & mortality

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Since 1980, the first-year mortality rate among incident dialysis and first transplant patients has fallen 30.5 percent, from 331.2 per 1,000 patient years at risk to 230.2 in 2006. Real progress is finally visible in first-year mortality rates for hemodialysis patients. After remaining quite stable in the late 1990s and early part of this decade, they have begun to fall, with a one-year decline of 1.9 percent in 2005, and of 3.4 percent in 2006. (Figure p.19; see page 363 for analytical methods. Incident dialysis & first transplant patients.)

Five-year survival rose across all modalities between the 1993–1997 and 1998–2002 periods. Patients on peritoneal dialysis have a slight survival advantage over those on hemodialysis in the first three years of therapy, but at five years survival is equal, at 33.5 and 33.9 percent. Patients who initiate with a transplant are 2.2 times more likely to survive five years than those on dialysis. (Figure p.20; see page 363 for analytical methods. Incident dialysis patients & patients receiving a first transplant in the calendar year.)
Following a nearly 17 percent increase in 2006, total Medicare costs rose just 7 percent in 2007, totaling $410 billion. Total dollars spent on ESRD grew 6.1 percent, to $23.9 billion, and accounted for 5.8 percent of the total Medicare budget. (As of 2006, total Medicare costs now include Part D. Because Part D is not included in available ESRD data, ESRD’s portion of total Medicare costs has declined.)

Costs for outpatient services are approximately 9 percent higher than those incurred for inpatient services, at $8.0 and $7.3 billion, respectively, and nearly double the $4.4 billion expended for physician-supplier services.

Overall per person per year (PPPY) Medicare ESRD expenditures grew less than 1.0 percent in 2007, totaling $61,768. **Figures p.21–23; see page 363 for analytical methods.** Total ESRD expenditures are from paid claims (Table K.2) as well as estimated costs for HMO & organ acquisition (p.21); period prevalent ESRD patients (p.22–23).

Total Medicare expenditures Medicare expenditures per patient year

dialysis transplant event functioning transplant failure dialysis transplant event functioning transplant failure
1991 4,717,992,978 461,065,523 258,840,993 69,132,241 39,990 80,164 8,545 47,339
1992 5,475,848,459 471,805,558 297,685,340 92,786,616 42,443 82,778 8,975 49,963
1993 6,117,993,056 531,595,388 331,579,054 95,938,756 43,871 86,284 9,208 49,276
1995 7,736,455,745 631,219,420 429,382,194 97,383,842 48,644 92,357 10,661 53,863
1996 8,750,093,174 647,982,377 489,783,531 108,268,742 51,711 92,264 11,218 58,975
1997 9,397,981,191 668,126,749 547,999,393 112,283,295 52,768 93,294 11,674 60,315
1999 10,059,481,207 655,629,857 563,831,829 125,673,266 52,516 90,221 11,165 60,565
2000 10,827,191,418 677,626,471 646,856,640 135,090,756 53,870 92,928 12,055 60,605
2001 12,175,771,021 743,702,326 746,199,721 155,310,973 57,704 94,900 13,432 66,362
2002 13,562,207,488 801,980,321 848,240,270 162,137,903 60,941 96,923 14,388 70,458
2003 14,358,133,041 824,657,094 941,268,438 173,099,783 66,061 100,771 16,540 75,875
2004 15,955,879,843 916,758,763 1,035,805,987 182,149,382 68,901 104,307 17,435 79,316
2005 17,144,742,500 984,479,364 1,157,839,935 196,623,935 70,102 106,850 17,067 82,191
2006 17,904,140,040 1,032,480,022 1,183,559,522 206,827,248 70,581 106,373 16,844 82,765
2007 18,388,011,248 1,010,373,962 1,222,881,106 204,159,996 70,102 106,850 17,067 82,191

Total Medicare expenditures for dialysis far exceed those for a transplant event, reaching $18.3 billion in 2007. Costs were just over $1 billion for patients with a transplant event during the year, and reached $1.2 billion for those with a functioning graft; for patients with a graft failure, costs decreased slightly to $204 million. Per person per year growth across modalities was minimal in 2007 — less than 1 percent for dialysis patients or those with a graft failure, and 0.4 and 1.3 percent, respectively, for patients with a transplant event within the year or those with a functioning graft. Yearly costs for these latter patients were just one-quarter of the annual costs incurred for dialysis patients. **Table p.8; see page 363 for analytical methods.** Total expenditures; period prevalent ESRD patients; patients with Medicare as secondary payor included. Expenditures per patient year; period prevalent ESRD patients; patients with Medicare as secondary payor excluded.
or diabetics and non-diabetics in 2006, respectively, PPPM costs for those with Medicare coverage were $7,382 and $4,206 prior to initiation, rising to $16,924 and $11,868 the next month. MarketScan patient costs were $5,901 and $6,881 prior to initiation, and $28,565 and $37,141 in the month following. (Costs for diabetic patients are usually greater than for those without diabetes; several non-diabetic patients in the MarketScan database, however, had unusually high costs during this month, which appear to have skewed the data.)

**Figure** p.24; see page 363 for analytical methods. Incident ESRD patients, age 67 & older at initiation (Medicare), & age younger than 65 at initiation (MarketScan), 2006.

![Graph showing trends in expenditures months before and after first ESRD service date.](image)

Per person per month expenditures for Medicare & MarketScan patients initiating in 2006, by diabetic status.

- Medicare: NDM
- MarketScan: NDM
- Medicare: DM
- MarketScan: DM

Months before and after first ESRD service date.

For Medicare and MarketScan patients with diabetes, PPPY costs in 2007 reached $72,461 and $98,721, respectively, 56 and 103 percent greater than for those without diabetes. Costs for MarketScan diabetic patients were 36 percent higher than those of their Medicare counterparts. **Figure** p.25; see page 363 for analytical methods. Medicare: period prevalent ESRD patients with Medicare as primary payor. MarketScan: period prevalent ESRD patients younger than 65.

![Graph showing per person per year costs for prevalent Medicare & MarketScan ESRD patients, by diabetic status.](image)

Per person per year costs for prevalent Medicare & MarketScan ESRD patients, by diabetic status.

- Medicare NDM
- MarketScan NDM
- Medicare DM
- MarketScan DM

91 93 95 97 99 01 03 05 07

Total Medicare spending on injectables.

- Other injectables
- IV iron
- IV vitamin D hormone
- ESAs

91 93 95 97 99 01 03 05 07

Total Medicare spending for erythropoiesis stimulating agents (ESAs) fell 2.2 percent in 2007, to $1.84 billion. Costs for IV vitamin D hormone, in contrast, increased 5.3 percent, reaching nearly $438 million. And spending on IV iron increased 4.5 percent, to $255 million. **Figure** p.26; see page 363 for analytical methods. Period prevalent dialysis patients.
In 2007, **111,000** new patients began ESRD therapy. • p.a

On December 31, 2007, **527,283** patients were receiving ESRD therapy. • p.a

Total Medicare spending on ESRD reached **$23.9 BILLION** in 2007, **UP 2.6%** from the prior year. • p.a

The number of new dialysis patients rose just **0.85%** in 2007 — down from 3.6% in 2006. • p.2

In 2007, **65%** of ESRD patients were treated with hemodialysis. • p.5

In 2006 & 2007, slightly more than **ONE-THIRD** of patients starting maintenance hemodialysis did so with a **MATURING ACCESS**. • p.9

Among new ESRD patients in 2007, **43%** had not seen a **NEPHROLOGIST** prior to initiation. • p.11

Among hemodialysis patients, **87%** have a mean **URR** of 65% or greater. • p.15

Rates for infectious hospitalizations have fallen since their 2005 peak, but in 2007 were **25.8%** above 1993 levels. • p.17

In 2006, Medicare expenditures per person per year reached **$70,000** for dialysis patients, & **$17,000** for those with a functioning graft. • p.b

Patients who initiate ESRD with a transplant are **2.2 TIMES** more likely to **SURVIVE** five years than patients on dialysis. • p.20

Total Medicare spending for erythropoiesis stimulating agents fell 2.2 percent in 2007, to **$1.84 BILLION**. • p.26

**summary**