chapter TEN

providers

that all things send forth love, inanimate
that all these loves have mingled in the air
and set up a great clangor
in the nodes
heart of this sound, this deadly spirit love
a cosmos comes to birth

Diane Di Prima, “Ode to Elegance”
The network of dialysis providers has stabilized since the consolidation of Gambro units into DaVita and RCG units into Fresenius. At the end of 2008, 117,000 prevalent patients were being treated by Fresenius, 104,000 by DaVita, and 13,000 by DCI; these organizations manage 3,330 units across the U.S. Smaller dialysis organizations (SDOs) treated 33,084 patients in 438 units, independently owned units accounted for 63,952 patients in 927 units, and the remaining patients were treated in hospital-based units.

Recent clinical trials have shown adverse outcomes when hemoglobin levels are targeted to 13 g/dl and above. The highest percentage of patients with a hemoglobin of 10–<12 earlier occurred in units owned by Dialysis Clinic, Inc. (DCI), but is now reported in units owned by Fresenius. Use of intravenous iron products to treat anemia varies across providers, with DaVita and DCI almost exclusively using Venofer, and Ferrlecit and Venofer used equally in Fresenius units. And the total months of IV iron therapy in the first six months of ESRD has now increased to 4.5, with the mean IV iron dose now at 2,233 mg; this dose is highest in DaVita units, at 2,332 mg, and lowest in hospital-based units, at 1,945 mg.

It is important that patients have adequate iron stores in order to maintain optimal hemoglobin levels. The percentage of patients receiving ferritin testing for three consecutive months after starting ESA therapy, however, is only 8.0 in DCI units, lower than that reported for other providers. The new dialysis bundled payment system, taking effect in 2011, will incorporate all extra monthly tests into a single monthly payment, and its effect on the marked differences in testing rates across providers will be monitored closely by the USRDS in future ADRs.

This year we again assess preventive care services delivered by providers. Glycemic control testing in diabetic patients, for example, differs across providers, with 63–64 percent of patients in Fresenius and DaVita units, and in the SDOs, receiving at least four glycosylated hemoglobin tests in a year, compared to 44–48 percent in DCI and hospital-based units. Rates of vaccinations, both for influenza and for pneumococcal pneumonia, have improved during the past several years.

Variations in Medicare payments across provider groups are considerable, particularly in the areas of erythropoiesis stimulating agents (ESAs), IV iron, and IV vitamin D. Laboratory costs, however, are fairly consistent, with the exception of DCI, for which costs are lower by nearly one-third compared to other providers. As these payments become fixed under the new payment bundle, it will be important to monitor the use of services to determine any changes in clinical performance.
This year we include data on rates of hospitalization for vascular access infections, looking at differences by provider and region. Rates are more than three times higher in patients using a catheter at dialysis initiation rather than an internal access, are slightly lower in SDOs and hospital-based units, and are also lower in the western region of the country. These findings may reflect differences in infection prevention protocols, and should be assessed.

Hospitalizations for heart failure and/or fluid overload differ in the SDOs and other providers, particularly as related to the rate of extra dialysis procedures performed in patients with heart failure. Within the large dialysis organizations, for example, Fresenius has higher rates of billed extra dialysis runs compared to DaVita and DCI. These variations need to be investigated to determine which practice patterns relate to lower rates of infectious complications.

As in past ADRs, we conclude the chapter with comparisons of mortality and hospitalization ratios by provider and geographic region; we also present outcomes across large and small dialysis organizations and hospital-based units. Hospitalization ratios are very similar across the large groups, though lower in DCI units. Ratios for SDOs are lowest in the Pacific region. And for hospital-based units, both mortality and hospitalization ratios are greatest in the East South Central, South Atlantic, and West South Central regions. These differences have narrowed compared to prior years, an important change. We will continue to assess these relative outcomes between providers, and examine them over time to determine areas for improvement.
Between 2003 and 2008, the number of dialysis units grew 36–37 percent in Networks 9 and 14, and 28–29 percent in Networks 10, 15, and 16. In Networks 2 and 5, in contrast, the number of units rose less than 10 percent. The number of patients rose at least 25 percent in Networks 14, 15, 16, and 18. *Figure 10.2; see page 483 for analytical methods. CMS Annual Facility Survey.

Dialysis unit and patient counts rose nearly 20 percent between 2003 and 2008. DaVita showed the largest growth — 163.9 percent in units and 138.3 percent in patients — in large part due to the purchase of Gambro in October, 2005. Hospital-based and independent units experienced negative growth in both the number of units and the number of treated patients during the time period. *Figure 10.3; see page 483 for analytical methods. CMS Annual Facility Survey.

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<th>Unit affiliation</th>
<th>2003</th>
<th>2008</th>
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<td>HB</td>
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The percentage of units remaining under consistent ownership for five or more years fell from 70.6 in 2003 to 55.8 in 2008, a reflection of major unit purchases by DaVita and Fresenius in 2005 and 2006. It appears, however, that purchases of independent and hospital-based units by the large chains may be slowing. In 2003, for example, 57.9 percent of independent units were under the same ownership for five or more years, compared to 62.4 percent in 2008; in hospital-based units, 87.5 percent were owned for five or more years in 2003 compared to 90.9 percent in 2008. *Figure 10.4; see page 483 for analytical methods. CMS Annual Facility Survey.
In 2008, two in three prevalent, EPO-treated dialysis patients had a hemoglobin of 10–<12 g/dl, considerably higher than the 51 percent in 2007 (reported in the 2009 ADR), and perhaps a sign that providers are responding to studies showing the risks of higher hemoglobin levels. The percentage of patients with a level of 13 g/dl or above now ranges from 1.1 in DCI units to 3.3 in those that are hospital-based. **Figure 10.5**; see page 483 for analytical methods. Period prevalent dialysis patients.

In 2008, one in four prevalent patients used Ferrlecit, while 61 percent were treated with Venofer; only 0.3 percent of dialysis patients received INFeD. These numbers vary considerably, however, by unit affiliation. In independent units and those owned by Fresenius, 37–42 percent of patients were treated with Ferrlecit; in DaVita and DCI units, in contrast, Ferrlecit was used by only 2–4 percent of the dialysis population, while 87 percent received Venofer.

In the first six months of dialysis, the number of months in which patients receive IV iron now ranges from 4.4 in Fresenius and hospital-based units to 4.8 in those owned by DCI. The mean total IV iron dose in this period increased 13.2 percent between 2003 and 2008 — from 1,973 units to 2,233 — and now ranges from 1,945 in hospital-based units to 2,274 in those owned by small dialysis organizations (SDOs). **Figures 10.6–8**; see page 483 for analytical methods. Point prevalent dialysis patients (10.6); incident dialysis patients treated with EPO (10.7–8).

In 2008, 15.5 percent of prevalent dialysis patients received one or more transfusions, only slightly higher than the 15.3 percent reported for 2003. By unit affiliation, the percentage ranges from 13.8 in DaVita and DCI units to 17.1–17.6 in hospital-based and independent units. **Figure 10.9**; see page 483 for analytical methods. Period prevalent dialysis patients.
KDOQI guidelines recommend that patients have sufficient iron stores in order to maintain their hemoglobin levels within the range of 11–12 g/dl. Iron status can be evaluated through regular monitoring of serum ferritin and transferrin saturation.

The percentage of 2008 incident hemodialysis patients receiving serum ferritin testing for three consecutive months following initiation of ESA treatment was 13.5 overall, and 13.7, 14.1, and 8.0, respectively, in facilities owned by Fresenius, DaVita, and DCI; patients treated in units owned by small dialysis organizations were the most likely to be tested, at 19.3 percent. The percentage of patients tested for transferrin saturation was highest in facilities owned by DaVita and lowest in those owned by DCI, at 32.6 and 6.0, respectively. And the percentage of patients receiving PTH testing was 21.4 overall and 35.0 in units owned by DaVita. + Figures 10.10–12; see page 484 for analytical methods. Incident hemodialysis patients, 2008.

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<th>Unit affiliation</th>
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<tr>
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<td>All units</td>
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<tr>
<td>F</td>
<td>Fresenius</td>
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<tr>
<td>G</td>
<td>DaVita/Gambro (Gambro units were purchased by DaVita in October, 2005)</td>
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<tr>
<td>DV</td>
<td>DaVita</td>
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<tr>
<td>RCG</td>
<td>Renal Care Group (RCG units purchased by Fresenius in 2006)</td>
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<tr>
<td>DCI</td>
<td>Dialysis Clinic, Inc.</td>
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<tr>
<td>NNA</td>
<td>National Nephrology Associates</td>
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<tr>
<td>SDOs</td>
<td>Small dialysis organizations (defined as 20–99 dialysis units; unit classification assigned by the USRDS, W not used prior to 2005)</td>
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<tr>
<td>Ind</td>
<td>Independent units</td>
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<tr>
<td>HB</td>
<td>Hospital-based units</td>
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Seventeen percent of prevalent dialysis patients with diabetes receive no glycosylated hemoglobin (A1c) testing. By unit affiliation, testing frequency ranges from 13.2 percent in small dialysis organizations to 26.7 percent in hospital-based units. One in four diabetic patients on dialysis receives no lipid testing; this rises to 31.5 percent in hospital-based units, and to nearly 58 percent in units owned by DCI. And across unit affiliations, 57–59 percent of diabetic patients receive no diabetic eye examination during the year. + Figures 10.13–15; see page 484 for analytical methods. Point prevalent dialysis patients with diabetes, age 18–75.

In the prevalent dialysis population, influenza vaccination rates in 2008 ranged from 60 percent in hospital-based units to 72–73 percent in units owned by DCI or DaVita. With an overall rate of 25.2 percent, pneumococcal pneumonia vaccination rates in 2007–2008 ranged from 17–18 percent in hospital-based and DCI units to 36 percent in DaVita units. And 28 percent of prevalent dialysis patients received hepatitis B vaccinations in 2008, with a range from 23 percent in hospital-based units to 30 percent in units owned by Fresenius or DaVita. + Figures 10.16–18; see page 484 for analytical methods. Point prevalent dialysis patients.
After rising 8.5 percent in 2006, per person per month (PPPM) costs for dialysis rose just 1.4 percent in 2008, with costs reaching $1,465. PPPM costs for IV vitamin D hormones rose 9 percent, to $111. Costs for erythropoiesis stimulating agents (ESAs), in contrast, fell 7 percent, to $478.

By unit affiliation, PPPM dialysis costs in 2008 ranged from $1,423 in hospital-based units to $1,518 in the small dialysis organizations (SDOs), while ESA costs were lowest in hospital-based units, at $47, and highest in units owned by DaVita, at $506. DaVita units also had the highest PPPM costs for both IV iron and IV vitamin D hormone, at $67 and $134, respectively. Costs for other injectables were quite consistent among the larger providers and in the SDOs, but rose to $32 in hospital-based units. And laboratory costs ranged from $106 in DCI units to $151–156 in independent units and those owned by SDOs. *Figures 10.19–20; see page 484 for analytical methods. Period prevalent dialysis patients (10.19); period prevalent dialysis patients, 2008 (10.20).
Per person per month (PPPM) costs for glycosylated hemoglobin (A1c) testing in 2008 were lowest in DCI and hospital-based units, at $2.11–2.18. DCI also had the lowest monthly expenditures for both lipid testing and comprehensive diabetic monitoring, at $0.75 and $1.21, while the highest costs for both types of preventive care were found in independently owned units, at $3.11 and $5.61. Monthly expenditures for diabetic eye examinations ranged in 2008 from $6.93 in DCI units to $9.24 in units that were independently owned.

DaVita units had the lowest PPPM costs for influenza vaccinations in 2008, at $0.65, while expenditures of $1.16 were reported in units owned by Fresenius. And costs for pneumococcal pneumonia vaccinations ranged from $0.24 in DCI units to $0.43 in those owned by Fresenius.

**Unit affiliation**

- **All:** All units
- **F:** Fresenius
- **G:** DaVita/Gambro (Gambro units were purchased by DaVita in October, 2003)
- **DV:** DaVita
- **RCC:** Renal Care Group (RCC units purchased by Fresenius in 2006)
- **DCI:** Dialysis Clinic, Inc.
- **NNA:** National Nephrology Associates
- **SDOs:** Small dialysis organizations (defined as 20–99 dialysis units; unit classification assigned by the USRDS, W not used prior to 2005)
- **Ind:** Independent units
- **HB:** Hospital-based units

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**Per person per month costs for preventive care in dialysis patients, by unit affiliation, 2008**

- **A1c testing**
- **Lipid testing**
- **Diabetic eye examinations**
- **Comprehensive diabetic monitoring**
- **Influenza vaccinations**
- **Pneumococcal pneumonia vaccinations**
Across unit types, rates of hospitalization for vascular access infection are 3.0–3.6 times greater for patients with a catheter than among those with an internal access. The overall rate, for example, reaches 198 hospitalizations per 1,000 patient years at risk in catheter patients, compared to 58.4 in those with an arteriovenous fistula or graft. For both types of access, hospitalization rates are lowest in small dialysis organizations (SDOs) and hospital-based units, and highest in large dialysis organizations (LDOs) and units that are independently owned.

Among the LDOs, hospitalization rates among patients with a catheter are highest for those in units owned by Fresenius, at 215 per 1,000 patient years, and lowest in DCI units, at 138. Rates among patients with an internal access vary less by unit affiliation, ranging from 58 in Fresenius and DaVita units to 67 in those owned by DCI.

Among the SDOs there is little variation by census region in hospitalization rates for patients with an internal access, with a range of 49–52. Rates for those with a catheter, in contrast, range from 139 in the West region to 219 in the South. And for hospital-based units, rates are greatest in the Northeast region, at 167 for catheter patients and 65 for those with an internal access. + Figures 10.22–25; see page 484 for analytical methods Incident hemodialysis patients, 2007.
Overall rates of hospitalization for fluid overload and heart failure reached 39.7 per 1,000 patient years in 2008, and 46.4 in patients requiring extra dialysis. By unit type, rates overall and among those requiring additional dialysis were 41.0 and 42.6, respectively, in large dialysis organizations, 40.5 and 73.9 in small dialysis organizations, 34.6 and 37.6 in independently owned units, and 40.4 and 59.2 in units that are hospital-based. *Figures 10.26–29; see page 484 for analytical methods. Point prevalent hemodialysis patients, 2008. Extra dialysis defined as more than three dialysis sessions in at least three out of four weeks. *Cohort too small to graph.
For 2008, small dialysis organizations (SDOs) have slightly lower standardized hospitalization and mortality ratios (SHRs and SMRs) than do large dialysis organizations (LDOs); independent facilities have a higher SHR, and hospital-based facilities a lower one. By unit affiliation, DCI continues to have the lowest ratios for both hospitalization and mortality.

Within the SDOs, three U.S. Census Divisions — East North Central, East South Central, and Middle Atlantic — have statistically significant higher SHRs; the New England, Pacific, South Atlantic, and West South Central divisions have statistically significant lower ones. Mortality ratios less than one and statistically significant occur in the East North Central, Middle Atlantic, New England, and Pacific divisions. Among hospital-based units, the Mountain, Pacific, and West North Central divisions have lower SHRs, while the East North Central, East South Central, Middle Atlantic, and South Atlantic divisions each have higher SHRs and SMRs.

In units owned by Fresenius, white patients have statistically significant higher SHRs, while African American patients have statistically significant lower SHRs and SMRs. In hospital-based units, SHRs are lower than one for whites, but higher than one for African Americans (both statistically significant). *Figures 10.30–33; see page 484 for analytical methods. January 1 point prevalent hemodialysis patients with Medicare as primary payor (SHRs); January 1 point prevalent hemodialysis patients (SMRs).*
In units owned by Fresenius, white patients have statistically significant higher SHRs, while African American patients have statistically significant lower SHRs and SMRs. In hospital-based units, SHRs are lower than one for whites, but higher than one for African Americans (both statistically significant).

In the East South Central division, white patients have a statistically significant higher SHR, as do African Americans in the Middle Atlantic, South Atlantic, and West South Central divisions. In the Mountain division, the SHR is lower than one for whites, and in the Pacific division it is lower than one for both whites and African Americans. SMRs greater than one and statistically significant are reported for both white and African American patients in the East South Central, South Atlantic, and West South Central divisions, and in the Middle Atlantic division for African Americans only. + FIGURES 10.34–37; see page 484 for analytical methods. January 1 point prevalent hemodialysis patients with Medicare as primary payor (SHRs); January 1 point prevalent hemodialysis patients (SMRs).
The percentage of units remaining under consistent ownership for five or more years fell from 70.6 in 2003 to 55.8 in 2008, a reflection of major unit purchases by DaVita and Fresenius in 2005 and 2006. **Figure 10.4**

In independent units and those owned by Fresenius, 37–42 percent of 2008 patients were treated with Ferrlecit; in DaVita and DCI units, in contrast, Ferrlecit was used by only 2–4 percent of the dialysis population, while 87 percent received Venofer. **Figure 10.5**

In 2007–2008, one in four diabetic patients received no lipid testing; this rose to 31.5 percent in hospital-based units, and to nearly 58 percent in units owned by DCI. **Figure 10.14**

After an 8.5 percent rise in 2006, growth in per person per month (PPPM) costs for dialysis slowed to 1.4 percent in 2008, with costs reaching $1,465. PPPM costs for IV vitamin D hormones rose 9 percent, to $111. Costs for erythropoiesis stimulating agents, in contrast, fell 7 percent, to $478. **Figure 10.19**

Rates of hospitalization for vascular access infection are lowest in small dialysis organizations and hospital-based units, and highest in large dialysis organizations and units that are independently owned. **Figure 10.22**

Overall rates of hospitalization for fluid overload and heart failure reached 39.7 per 1,000 patient years in 2008, and 46.4 in patients requiring extra dialysis. **Figure 10.26**