

Chapter IX

The Economic Cost of ESRD and Medicare Spending for Alternative Modalities of Treatment

The 1995 Annual Data Report (ADR) of the USRDS included the first detailed empirical analysis of the cost effectiveness of one of the many health care services provided to ESRD patients, the establishment of vascular access for hemodialysis. The current 1996 report continues this investigation of the cost and cost effectiveness of treatment approaches furnished through the Medicare ESRD program.

This chapter is divided into two sections. The first section presents estimates of the total monetary cost of direct patient care for patients in the U.S. with ESRD. In addition, there is a presentation of recent shifts and trends in these estimates of total direct cost of treating ESRD. These total direct cost estimates are derived from paid Medicare claims and other estimates including private resource use for direct patient care. Also, two separate approaches are used to estimate the magnitude of the Medicare Secondary Payer (MSP) provision for ESRD patients.

The second section of this chapter estimates Medicare spending (payments) per time at risk on an "intent-to-treat" basis for ESRD treatment alternatives stratified by several patient characteristics. The data in this study are derived from the USRDS database which contains information from the Medicare payment records as well as extensive epidemiologic patient histories. The objective is to compare and contrast Medicare reimbursements (payments) per time at risk for different modalities of renal replacement therapy. The results provide information that would be useful in the determination of "capitation" payment rates, i.e., rates of spending per patient per time at risk. However, these results, which do not provide

simultaneous comparison of survival alternatives and costs and are not estimated with consideration for right censoring, are not appropriate for determination of cost effectiveness of alternative modalities of treatment (Cox). Future analyses by the USRDS will estimate cost effectiveness of alternative modalities of care with appropriate estimates as suggested by Cox.

Methods

These two studies analyze Medicare costs (= reimbursements) for patients treated with hemodialysis, CAPD/CCPD, or a renal transplant. The primary focus is ESRD patients prevalent on January 1, 1991 or incident at any time during 1991, 1992, or 1993. Patient age, gender, race, and cause of ESRD were obtained from the USRDS database. Treatment modality was determined using the Modality Sequence file from the USRDS database. (See Chapter XII). A secondary analysis focuses on total spending for 1994.

The total cost of direct medical care resources was estimated by combining the paid claims for Medicare-insured ESRD patients with other cost estimates of resource use. These other estimates included: 1) Medicare payments for ESRD patients not included in the paid claims system, 2) Medicare patient obligations, 3) payments for patients enrolled in Employer Group Health Plans (EGHP) for whom Medicare is the "Secondary Payer" (MSP) for insurance and 4) payments for ESRD patients residing in the U.S. who were not insured by Medicare.

Medicare paid claims, used in both the cost of ESRD and the Medicare Payments analyses, were

obtained from HCFA Standard Analysis Files (SAF; HCFA 1993). These files are constructed for each year of service (determined by the service “to date” listed on the claim) and are based on all final paid claims listed in the Common Working File by the end of July of the following year (HCFA 1993). The SAFs are organized by year and include all Medicare patients. This project used the SAFs for the calendar years 1991-94.

In order to identify all Medicare ESRD patients, a “finder file” was constructed that separated claims for ESRD patients from all other Medicare patients. This finder file constructed from the patient identification numbers (IDs) in HCFA’s Program Medical Management yielded 627,983 patient IDs for the period 1977-95. Changes in patient IDs were tracked using information included in HCFA’s Enrollment Database (HCFA 1993). SAF (paid, final) claims for 1991-94 were extracted for all patients in the finder file which was approximately 60 percent of the total patients in the finder file.

The SAFs are comprised of 6 files with claims classified as (originating from): 1) inpatient institutional, 2) outpatient institutional, 3) skilled nursing facility, 4) hospice, 5) home health agency, and 6) physician/supplier. These SAF files, as selected by the finder file, contained claims for 264,419 patients and 777,486 patient-years-at-risk during 1991-94. Using these figures, the spending for the 1991-94 period totaled \$25.57 billion.

For patients incident during any calendar year, only costs occurring on or after the first day of ESRD (as defined in the PMMIS) were included. That is, pre-ESRD Medicare spending and pre-ESRD time at risk were not included in calculating total Medicare spending or time at risk in either the total spending or in the intent to treat analysis. Likewise, patients whose ESRD start date occurred during a hospitalization had a linearly pro-rated portion of the costs for that hospitalization allocated to the ESRD period. The exception is transplantation. If the first ESRD service is a kidney transplant then the entire hospital stay is included as a cost even if the first day of ESRD occurs during that hospital stay.

The study start date for a patient in the intent-to-treat analysis (limited to 1991-93) was defined as the latest of the following:

- January 1, 1991.
- The first ESRD service date in the USRDS database for the patient.

- For dialysis patients, the beginning of any one month period in which the Medicare paid amount for outpatient dialysis was \$675 or more.

The last constraint was designed to exclude patients who were likely to have a Medicare Secondary Payer (MSP) status even though the Medicare Enrollment Database did not identify them as such.

Patients with MSP status on or at any time following the study start date (identified from the Medicare Enrollment Database) were excluded from the intent-to-treat analysis. These patients were treated separately and excluded from the primary intent-to-treat model because it is impossible to characterize their total costs of care. Dialysis patients with insufficient activity (defined as less than \$675/month for outpatient dialysis for three consecutive months) are censored as lost to followup at the end of the three month period. This limit of \$675/month was the 10th percentile of Medicare dialysis spending (institutional outpatient plus physician/supplier) for all patients; it would cover 6 to 7 dialysis treatments.

In the primary intent to treat analysis, patients entered the study only once over the 1991-93 period, with the exception of transplant patients. Dialysis patients who received a transplant were censored at the transplant date and were then moved into a separate record as a transplant patient. All payments on claims for inpatient transplantation were added to the transplant cost record even though the inpatient stay may have begun during a period also covered by the dialysis record.

In the intent-to-treat analysis (primary and secondary), dialysis patients were removed from the analysis at the earliest of: death; 12/31/93; or transplant (censored). Patient-periods-at-risk were determined by the “from” and “to” dates on the claims records. Unless noted otherwise, periods at risk for mortality and incurred costs were determined for each year with patients frequently counted in more than one year.

HCFA estimates that the SAF files include 98 percent of paid claims (HCFA 1993, Section E2, page 15) in a given year. To account for this, the total dollar amount of SAF claims, as reported in Figure IX-1, were raised by 2 percent. In order to maintain comparability to the Reference Tables, all other reported statistics do not adjust for this reported undercount in the SAFs.

Patient financial obligations for Medicare, i.e. the coinsurance and deductible, were estimated as 18 percent of the sum of Medicare payments and patient obligations (see the 1995 ADR, Chapter X). Medicare rules for patient obligations are complicated, but generally include a nominal deductible (approximately \$100 per year) along with a 20 percent co-payment for approved outpatient charges (Part B). Inpatient (Part A) services require a deductible which approximates the charge for the first hospital day. Additional charges accrue for "outlier" hospital stays.

Kidney donor acquisition costs are not paid by Medicare through the claims process and therefore are not included in the HCFA SAFs. Medicare pays these charges by inflating the cost of all Medicare inpatient stays (both ESRD and non-ESRD) by an amount equal to the institutional acquisition cost for all Medicare transplants. We estimated the Medicare payments for donor acquisitions as \$25,000 per acquisition for the 8,000 kidney transplants. The latter was the sum of paid claims for Medicare kidney transplants as recorded in the PMMIS files (6/95 update). Eggers estimated the \$25,000 per donor acquisition through detailed examination of the annual Hospital Cost Reports filed with HCFA (Eggers). We assumed an increase of 5 percent in total acquisition costs from 1993-94.

Also excluded from the claims process recorded in the HCFA SAFs are charges submitted by Health Maintenance Organizations treating ESRD patients. We have estimated these Medicare payments as: [6,000 patients * (the sum of the Part A and Part B Adjusted Average Per Capita Costs (AAPC) per month) *12]. We used the 1995 AAPCC of \$1,438/month (Part A Medicare) and \$2,040/month (Part B Medicare) (HCFA, 1995). The 6,000 HMO patient count per year is only approximate.

Medicare makes separate payments to inpatient institutions for malpractice insurance, education, capital and organ acquisition. The latter were estimated as described above. The former three items were estimated based on personal communication from Paul Eggers at HCFA.

The intent-to-treat analysis for the entire 1991-93 period enlisted patients only once during the period, except for transplant patients as described above. Separate intent-to-treat analyses were performed for each year. Each of these annual analyses also enlisted patients only once during the period, except for transplant patients as described above. Patients who

had any period of MSP status, as reported in HCFA's Enrollment Database between 1991 and 1993, were treated separately. Patients without any reported MSP during the 1991-93 period were entered into the "primary" intent-to-treat group. For both the primary intent-to-treat group and the MSP group, Medicare payments and survival times were aggregated separately but for identical periods at risk from 1991 through 1993.

Payments by Employer Group Health Insurance Plans are private (non-Federal) payments for Medicare ESRD patients and are not reported in the SAFs. We estimated these payments as follows. From the HCFA Enrollment Database, we identified the subset of Medicare patients recorded as being insured under a Medicare Secondary Payer (MSP) for either all or part of the time they were included in the intent-to-treat analysis. Under this analysis, we assessed their Medicare payments per year at risk. We then calculated the difference between the average Medicare payments per year at risk for the MSP patients and the average Medicare payment per year at risk for patients without MSP status, the "primary" intent-to-treat group. This difference was taken to be the average amount paid by EGHPs for MSP patients. This result was then multiplied by the number of patient years at risk in the MSP group in order to derive an estimate of the total EGHP payments for the 1991 through 1993 period. One third of this total was assumed to arise in 1993.

The estimated expenditure for non-Medicare ESRD patients was 7.5 percent of total Medicare claims arising from all "finder file" patients plus patient obligations. This estimate of 7.5 percent is based on the count of non-Medicare dialysis patients (see Chapter II) and non-Medicare incident kidney transplants.

Unless noted otherwise, spending accruing in different years has not been adjusted for inflation or discounted. Thus, the dollar amounts reported can be interpreted as approximating 1992 U.S. dollars.

Rates of increase in Medicare spending per patient year at risk were estimated from the primary intent to treat analysis by aggregating yearly spending estimates and time at risk. The ratio of these estimates provides an estimate of the spending per patient year. This estimate is unadjusted for changes in patient characteristics, including age, sex, race and diabetes. These estimates of spending change are compared to rates of change in the Consumer Price

index as reported by the Department of Labor of the U.S. government.

A sensitivity analysis was performed by adding Medicare spending for a set of patients who received either outpatient dialysis or a kidney transplant service between 1991 and 1994 but were not listed in the finder file described above. We had limited information about these “undocumented” ESRD patients. For example, a confirmed date of first dialysis was not available and subsequent work may reveal that some of these patients were not ESRD.

Financial Expenditures for Direct Patient Care of ESRD Patients in the U.S., 1994

The Medicare SAF paid claims for ESRD patients totaled \$5.17 billion in 1991, \$6.03 billion in 1992, \$6.87 billion in 1993 and \$7.50 billion in 1994, or a total of \$25.57 billion over the four years. Our primary intent to treat analysis (with Medicare Secondary Payer patients and other patients with short or unusual periods of eligibility excluded) included 88 percent of the total payments from 1991-93. The secondary intent to treat model (MSP patients) included three percent of these total dollars. This implies that nine percent of the total Medicare SAF dollars were not in either the primary intent to treat analysis or the secondary MSP model.

Table IX-1 presents estimates of the total 1993 direct monetary cost of medical care for U.S. ESRD patients in the left column aggregated from HCFA paid SAF files. The costs are subdivided into several categories of institutional payments (institutional source and dialysis) and several categories of physician/supplier payments (dialysis, ESRD related treatment such as vascular access, and other treatments). The second column in Table IX-1 presents estimates of 1991-1993 spending for ESRD patient medical care per year at risk from an intent-to-treat analysis. The costs are again subdivided into institutional categories and physician/supplier categories as in the first column.

Total estimated direct medical payments for ESRD by public and private sources was **\$11.13 billion** during 1994 (Figure IX-1). In the terminology of cost effectiveness, this total would represent the viewpoint of insurers, both public and private. The estimated total Federal spending would be \$8.31 billion or 75 percent of the total estimated cost. Other Federal and state funding is provided through

Medicaid and likely accounts for at least some of the patient obligations for SAF claims and payments for non-Medicare patients.

As reported in Figure IX-1, \$7.50 billion (\$7.65 billion after a 2 percent adjustment for the late arriving claims) was paid by Medicare in 1994 as reported in the SAF claims records. Patient obligations were estimated to be \$1.83 billion (see Figure IX-1). There are no precise studies regarding how much of these obligations patients actually pay, but the speculation is that most of these obligations are paid by some insurance or philanthropy.

Employer Group Health Plans were estimated to have paid \$160 million in 1994 for the care of Medicare ESRD patients with Medicare as Secondary Insurer. This estimate of total spending for Employer Group Health Plans (EGHP) for ESRD is likely to be a minimum estimate since EGHP are reported to pay “retail prices,” which are higher than the Medicare payment rate. This estimate is based on two separate approaches described below.

Magnitude of MSP: Approach #1

These estimates are reasonably consistent with a report of the General Accounting Office (GAO, 1993) which estimated that the increase of the period of coordination of insurance benefits from 12 to 18 months was saving the Federal Government \$56 million per year. Assuming that a 22 percent mortality per year (average for all Medicare ESRD) applies to the MSP patients, the GAO estimate would suggest total Federal savings of approximately \$193 million per year for the MSP provision for ESRD patients. Since MSP patients are likely to be younger than average, the mortality rates are likely to be lower for MSP patients than for all ESRD patients, so this estimate may be biased high.

Magnitude of MSP: Approach #2

Data from the Dialysis Morbidity and Mortality Study (DMMS; see Chapter IV) provide estimates of the insurance coverage of a national sample of hemodialysis patients. Shown in Figure IX-2 is the distribution of insurance coverage for 1993 incident patients by age group. Patients less than 65 years of age who have Medicare and other insurance are likely candidates for MSP. (Patients with Medicare and Medicaid are not likely candidates for MSP and patients without Medicare, as well as patients with Medicare only, are not candidates for MSP).

As shown in Figure IX-2, 35 percent of incident patients less than 65 years old had Medicare and

Total Medicare Payments for ESRD by Source of Claim, 1991-93		
Category of Spending by Source of Claim	1993 Total SAF Claims \$ Millions	1991-1993 Spending/YAR Intent-to-Treat \$/YAR
Patients	239,832	
Patient years at risk		438,597
Patient intent to treat periods		281,542
Total Medicare Payments	\$6,875	\$36,941
Total - Institutional	5,435	29,261
Inpatient	2,634	14,375
Non-transplant inpatient	2,473	13,472
Transplant inpatient	161	903
Outpatient Institutional	265	1,371
Skilled Nursing Facility	73	305
Home Health Agency	151	615
Hospice	6	17
Total - Physician/Supplier (Part B)	1,440	7,680
Total Physician/Supplier Dialysis	232	1,248
Total Hemo - Physician/Supplier	115	702
Hemodialysis - Physician/Supplier	90	549
Hemodialysis - Home Supply	25	14
Hemodialysis Unit Supply	0	139
Total PD - Physician/Supplier	117	546
Perit Dial - Physician/Supplier	14	4
PD Home Supply	104	533
PD Unit Supply	0	9
Non-dialysis - Physician/Supplier	1,208	6,432
PD Catheter - Physician/Supplier	3	77
Capitation - Physician/Supplier	201	1,111
Vascular Access - Physician/Supplier	102	584
EPO - Physician/Supplier	2	6
Transplant - Physician/Supplier	19	38
Immunosuppressive - Physician/Supplier	13	64
Parenteral Nutrition	78	407
Other Surgical - Physician/Supplier	159	864
Other Medical - Physician/Supplier	173	897
Transportation - Physician/Supplier	138	725
Diag Lab/Rad - Physician/Supplier	220	1,170
DME - Physician/Supplier	44	204
Other Physician/Supplier	56	285

Source: Reference Tables K.1 and K.4

Table IX-1

other insurance. During 1993, Medicare was a secondary payer for up to 18 months of ESRD. Since approximately 18.0 percent of all prevalent ESRD patients on 12/31/93 (not shown) were under age 65 and in their first 18 months of treatment, we estimate that 6.3 percent of all ESRD patients were likely candidates for MSP (35 percent * 18 percent). This fraction corresponds to 10.0K patient years at risk (YAR) for MSP patients during 1993 (see Figures IX-4 and IX-5).

The average Medicare spending per year at risk for all ESRD patients under age 65 was approximately \$29.9K (see Figures IX-4 and IX-5). This would imply \$299 million in direct medical payments in 1993 for patients with MSP (10K YAR * \$29.9K/YAR). However, our analysis of the intent to treat model indicates that Medicare as secondary payer pays approximately 52 percent as much for MSP patients as for non-MSP patients. This would suggest that Employer Group Health Plans would

Estimated Total U.S. ESRD Costs, 1994

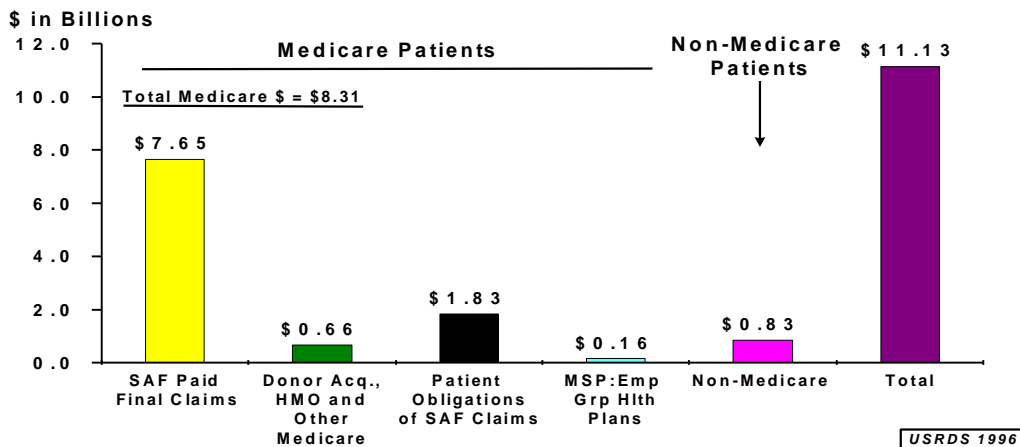


Figure IX-1

Estimated total direct monetary cost of treating ESRD in the United States, 1993. Separate estimates of cost are reported according to patient eligibility for Medicare insurance. The estimated cost of treating Medicare ESRD patients includes the following components: total Medicare payments from the HCFA Standard Analysis File (SAF) claims; estimated Medicare payments for organ donor acquisition, patients enrolled in a Health Maintenance Organization (HMO) and other Medicare payments (includes education, capital and malpractice costs); patient obligations of Medicare claims; and payments by private sources for patients who are covered by an employer group health plan and for whom Medicare is a secondary insurance payer (MSP). Source: Reference Table K.1 and special analysis.

have paid approximately \$145 million in 1993 if MSP patients cost in total as much as non-MSP patients. The net result of these alternative approaches is to suggest that the Employer Group Health Plans may have spent on the order of \$150 million per year for Medicare ESRD patients with a wide range of uncertainty.

The estimated Medicare payments for donor acquisition, HMO contributions and other costs to Medicare was \$0.66 billion. Payments for non-Medicare patients were estimated to be \$0.83 billion.

Changes Over Time in Resource Cost Per ESRD Patient

Our analysis of this issue has suggested that comparing the total level of spending, whether Federal or All, indicates that there may be a significant enough noise component that trends in the cost per patient may be biased. In our previous reports we had used an approach of total spending compared to an estimated patient count to estimate rates of change in spending per patient.

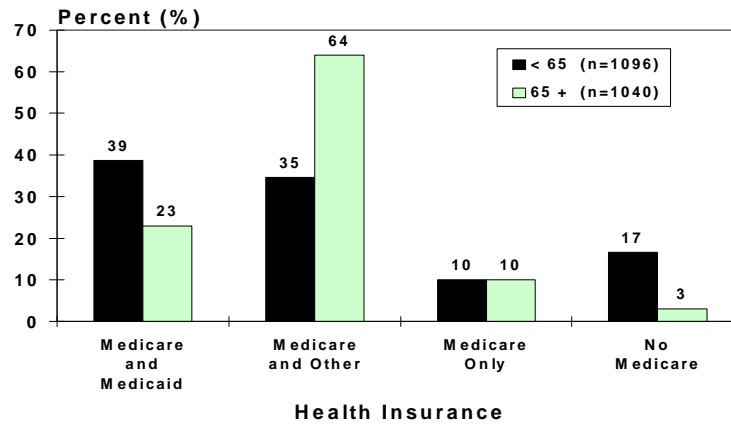
Our current approach is to compute a cost per patient year at risk from our intent to treat analysis (see next section) for each of several years. This

approach provides for a more precise control over patient time at risk and the manner in which patients are selected (e.g. no Medicare Secondary Payer).

Shown in Table IX-2 are estimates for both the rate of change in Medicare spending for ESRD (per patient year at risk), reported changes in the Consumer Price Index and the rate of change in Medicare spending per person served. Medicare spending per patient increased 5.3 and 3.9 percent during 1992 and 1993, respectively. By comparison, total Medicare spending per person served increased by 8.1 percent per year from 1991-92.

During this same time the CPI increased approximately three percent for the "all item" or general category and six to seven percent for the Medical component of the CPI. The last row of this table reports that the rate of increase in payments for ESRD (after adjustment for inflation) was one to two percent per year if the general CPI is employed. If the Medical component CPI is used, Medicare ESRD spending decreased by approximately two percent per year in real economic resources, i.e., adjusted for inflation.

Distribution of Insurance Coverage for Incident Patients by Age, DMMS Wave I, 1993-94



USRDS 1996

Figure IX-2

Distribution of health insurance coverage for incident hemodialysis patients, by age group, 1993-94. Data are from Wave I of the USRDS Dialysis Morbidity and Mortality Study (DMMS) and include all patients whether or not they are insured by Medicare. Source: special analysis.

The general CPI would be the correct index to choose if one were examining rates of change in the context of what other social purpose these ESRD costs could serve. A point of view which considers the management of ESRD care would suggest the use of the medical component. Whichever one uses, the rate of increase in real resources spent for the treatment of ESRD is small, with estimates from 2.3 percent to -2.1 percent per year over the 1991-93 period.

The important message from these estimated rates of spending increases is: the primary driver of the increase in the ESRD program costs is the continuing increase in the number of patients treated for ESRD. Patient counts are increasing at approximately 10 percent per year, while growth in spending per patient is small by comparison.

Errata for 1992 Estimate of Total Federal Spending for ESRD Reported in the 1995 ADR

Table X-6 of the 1995 ADR reported that Federal Payments for Medicare eligible ESRD patients amounted to \$6.80 billion. However, the earlier estimate overstated total Federal payments by including all Medicare payments for patients subsequently identified as having ESRD. The prior estimate in effect included some Medicare expenses which occurred before ESRD, for example with elderly patients.

The estimate from the 1995 ADR simultaneously understated total Federal payments for ESRD by not including payments for kidney donor acquisitions, for patients in an HMO and for education, capital and malpractice costs (approximately \$0.66 billion). Based on these corrections, we now estimate total Federal Expenditures for 1992 to be approximately \$6.7 billion. This means that most of the other estimates presented in Table X-6 of the 1995 ADR were biased high by approximately one to two percent.

Limitations of this Research

- The estimates for organ procurement and HMO payments by Medicare are particularly soft.
- The estimates of Employer Group Health Plan payments for Medicare ESRD patients are soft. But the overall picture is that MSP may be a smaller issue than the common wisdom would suggest.
- There are a number of medical and non-medical costs that are not included in the tally shown in Figure IX-1. These excluded costs would include: outpatient drugs not paid by Medicare; cost of transportation not paid by Medicare; costs incurred by the Department of Veterans Affairs; and lost labor production in and out of the home. In addition, there are substantial transfer payments involved with ESRD such as Social Security Payments which are not technically a true cost of ESRD, but are nonetheless substantial items on

**Changes in Medicare Payment Rates For ESRD and
Changes in the Consumer Price Index, 1991-93**

Spending / Price Index	Change Per Year (%)	
	1991-92	1992-93
ESRD		
Total ESRD Payment (Per Patient Year at Risk ^a)	5.3	3.9
Consumer Price Index ^b		
General (All Items)	3.0	3.0
Medical	7.4	5.9
ESRD - CPI		
General (All Items)	2.3	0.9
Medical	-2.1	-2.0
All Medicare		
Total Medicare Payments per Person Served ^c	8.1	n.a.

^a Estimated From an intent to treat analysis.

^b Source: Bureau of Labor Statistics, 1996.

^c Source: Health Care Financing Administration, 1995.

Table IX-2

the public policy agenda. While the cost of Medicaid payments for ESRD is included in the tally shown in Figure IX-1, the Federal portion of these costs is not identified. The Federal expenses for Medicaid insurance would be included in the patient obligations and in the cost of non-Medicare patients.

- A sensitivity analysis, not shown, indicates that those patients receiving dialysis or transplant services that were not identified in the PMMIS file (see Methods above) may create a downward bias in the total Medicare spending of approximately one percent.
- There is evidence that not all claims make their way into the HCFA billing records. (Petronis; Sadler; Held). So the estimated spending from HCFA records may have a downward bias.

Medicare Spending for Alternative Modalities of Treatment

Introduction

This study provides a preliminary analysis of the Medicare spending (also called payment or reimbursement) for different treatment modalities for patients with chronic renal failure. The analyses were stratified by age, sex, race and cause of end-stage renal disease (ESRD). However, no other adjustments for case mix severity were attempted.

Since the data are observational (patients were not randomly assigned to treatment modalities), the results are presented with the caveat that there may be selection of patients with particular comorbidities into particular treatment modalities.

A secondary motivation for performing these analyses is the increasing proportion of Medicare's enrollees choosing managed care alternatives to the traditional fee-for-service (FFS) system. In December 1994, 6.3 percent of all Medicare beneficiaries (not restricted to ESRD) were enrolled in at-risk Health Maintenance Organizations (HMOs), a 22 percent increase compared to one year earlier (GAO 1995). Currently, the Health Care Financing Administration (HCFA) sets capitation rates paid to at-risk HMOs on the basis of reimbursements in the FFS system. (This rate is called the AAPCC for Adjusted Annual Per Capita Cost). These rates take ESRD status and the local price level into account, but a wide variety of additional predictors of costs are not explicitly used in the rate-setting process. To the extent that costs of care vary predictably with respect to patient characteristics that are not included in the rate-setting method, the incentives for at-risk HMOs to enroll and care for specific patients can be substantially affected.

Methods and Materials

See the Methods section at the beginning of this chapter.

Results

For each patient, length of follow up and Medicare costs during the follow up period in an analysis were calculated. The total Medicare payments from the Standard Analysis Files (SAFs) for identified Medicare ESRD patients from January 1, 1991, until December 31, 1993, were \$18.07 billion (Reference Table K.1). Of these total program costs, \$16.20 billion (89.7 percent) was incurred by patients who were included in the primary “intent to treat” model (Reference Table K.2). The remaining \$1.87 billion was incurred by patients with Medicare Secondary Payer (MSP) status indicated in the HCFA system (\$0.51 billion) and other patients with low spending at some time during the study period (\$1.36 billion), including patients who were lost to followup (see Methods) or with insufficient billing information to establish that the patient had received a transplant or was receiving regular dialysis. The latter two low-spending categories likely include patients for whom there was incomplete billing, patients with short treatment periods that were associated with very low

spending or possibly other patients with MSP sometime during the study period. See the Methods section earlier in this chapter for further details.

Figure IX-3 reports the Medicare payments per patient year at risk by treatment modality. Total spending averaged \$36.9K for all treatment modalities combined. However, there was considerable variation across modalities. While costs for all dialysis patients averaged \$43.7K per year, Medicare payments for transplant patients were only \$17.6K annually. (As described above, the cost of organ procurement is not included in these payments). Likewise, there were differences between alternative dialysis modalities. Hemodialysis spending (\$44.2K) was \$4.8K per year more costly than CAPD/CCPD. Patients treated with other or uncertain dialysis methods, which represented a very small number of patients and years at risk, were the most costly per year (\$56.8K). These figures are not adjusted for differences in the characteristics of patients on different treatment modalities.

Analogous results for five age groups (0-19, 20-44, 45-64, 65-74 and 75 years and older) are reported in Figures IX-4 through IX-6. These figures indicate several findings.

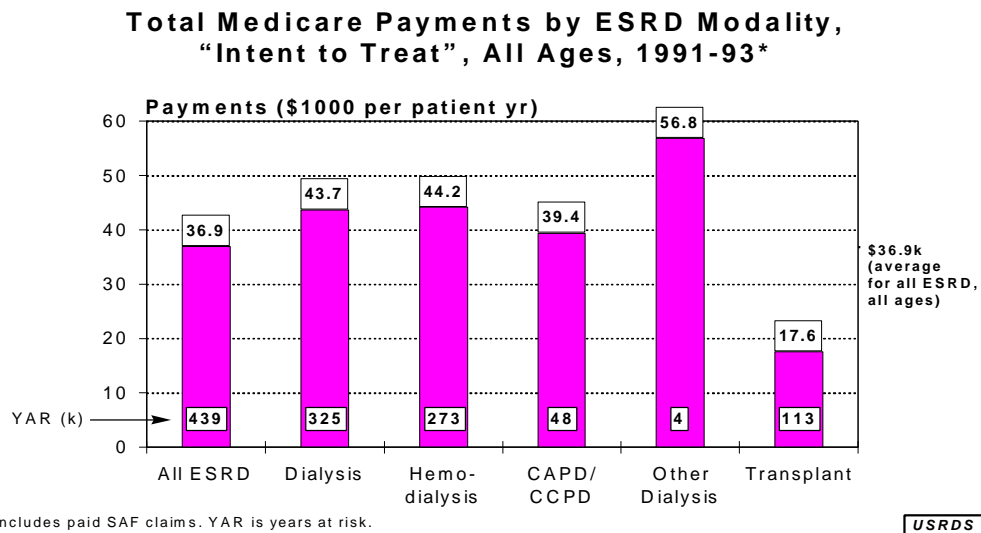


Figure IX-3

Total Medicare payments per patient year, by ESRD modality, 1991-93. An “intent-to-treat” analysis was used (see Methods). Medicare payments were based on paid SAF claims. Excludes patients for whom Medicare was a secondary insurance payer. Source: Reference Table K.4.

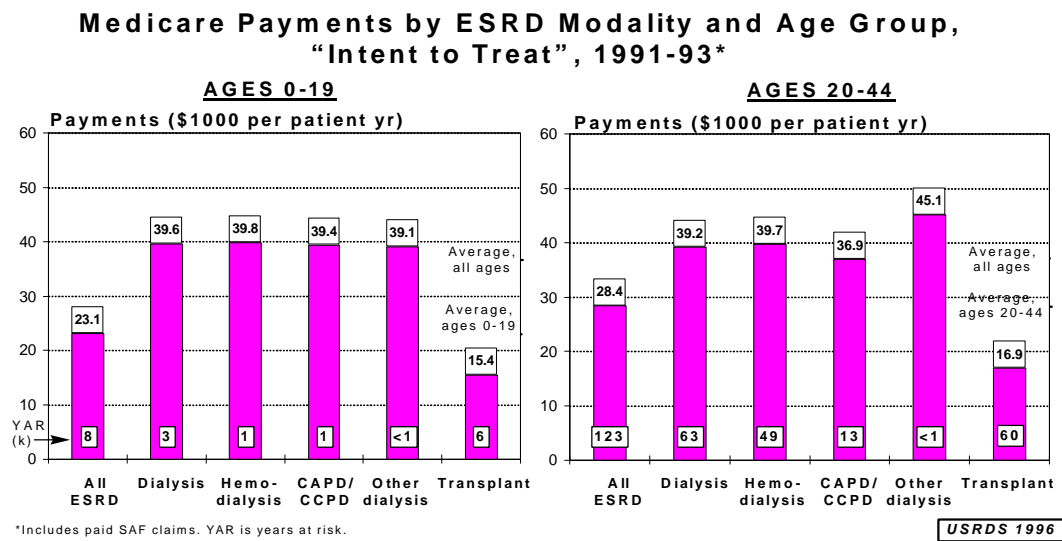


Figure IX-4

Total Medicare payments per patient year, by ESRD modality, ages 0-19 and 20-44 years, 1991-93. An "intent-to-treat" analysis was used (see Methods). Medicare payments were based on paid SAF claims. Excludes patients for whom Medicare was a secondary insurance payer. Source: Reference Table K.4.

First, annual costs for all ESRD patients rise steadily with age, from a low of \$23.1K for ages 0-19 to \$48.2K for ages 75 and older (109 percent increase between youngest and oldest age group).

Second, costs within any given modality do not rise as sharply with age as costs averaged across all

ESRD patients. Costs for dialysis patients aged 65 and older are only 22 percent higher than costs for dialysis patients aged 0-19 (\$48.3K vs. \$39.6K). Annual reimbursements for transplant patients rise at a faster rate with age (costs for ages 75 and older are 35 percent higher than for ages 0-19), but the absolute increase in costs (\$8.4K difference between

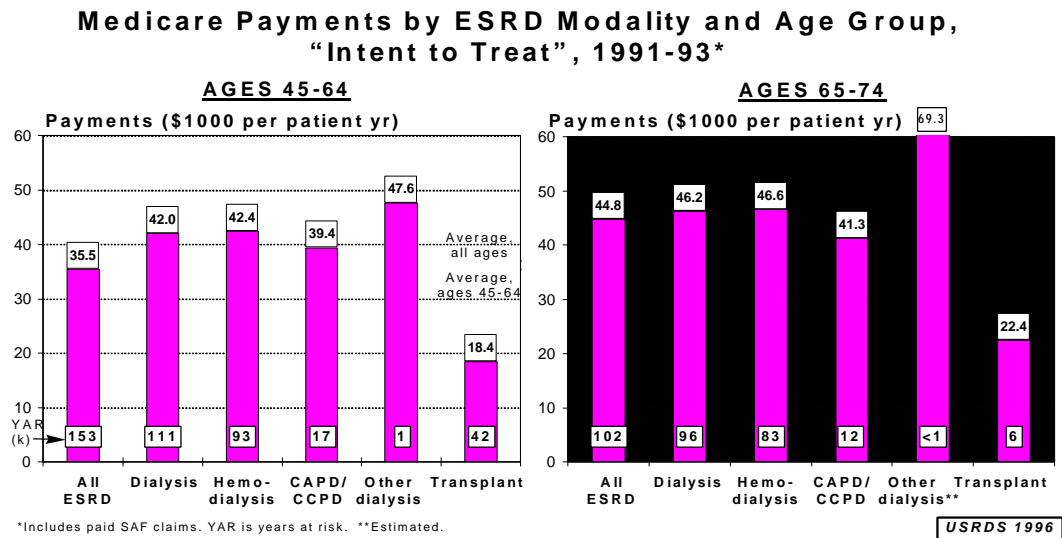
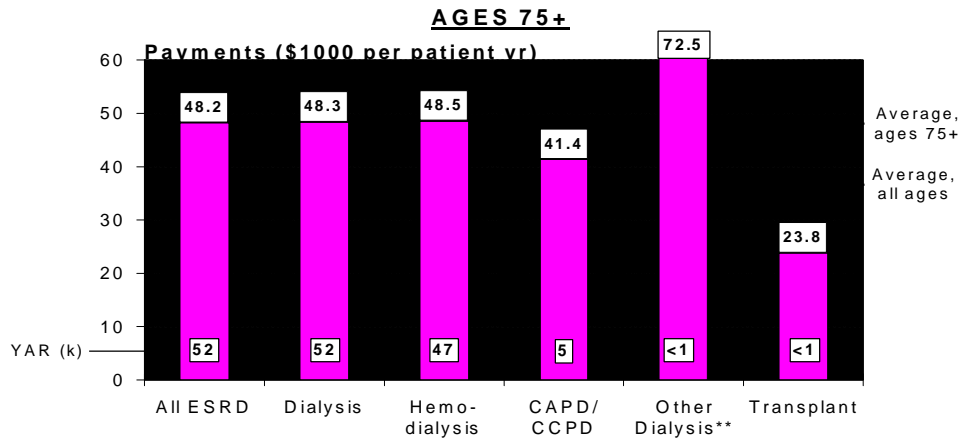


Figure IX-5

Total Medicare payments per patient year, by ESRD modality, ages 45-64 and 65-74 years, 1991-93. An "intent-to-treat" analysis was used (see Methods). Medicare payments were based on paid SAF claims. Excludes patients for whom Medicare was a secondary insurance payer. Source: Reference Table K.4.

Medicare Payments by ESRD Modality and Age Group, "Intent to Treat", 1991-93*



USRDS 1996

Figure IX-6

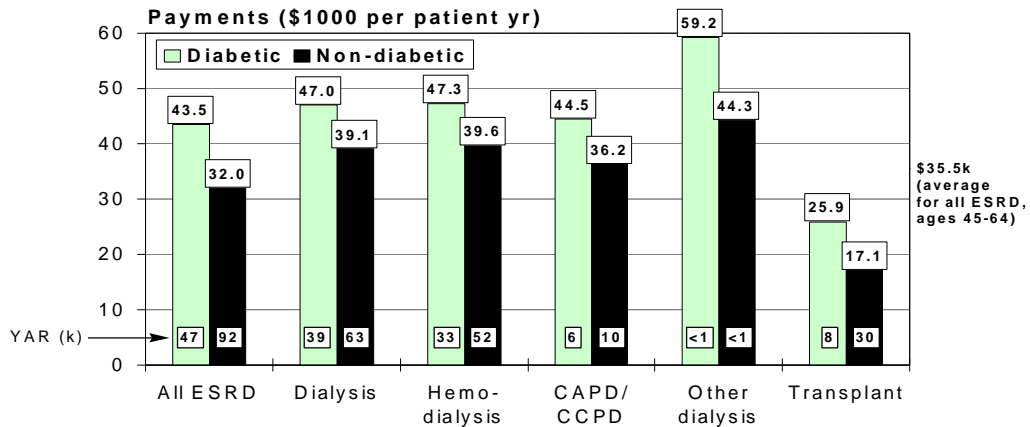
Total Medicare payments per patient year, by ESRD modality, ages 75+ years, 1991-93. An "intent-to-treat" analysis was used (see Methods). Medicare payments were based on paid SAF claims. Excludes patients for whom Medicare was a secondary insurance payer. Source: Reference Table K.4.

oldest and youngest group, \$23.9K vs. \$15.4K) is very similar to that observed in dialysis patients. Thus, the higher costs associated with older patients can be attributed primarily to the sharp decline in the ratio of transplants to dialyzed patients with age.

treat than nondiabetics (\$11.5K difference, \$43.5K vs. \$32.0K for patients aged 45-64; Figure IX-7). Within all treatment modalities except the very small "other dialysis" group, the differences between diabetics' and nondiabetics' costs are strikingly similar (ranging from \$7.7K for hemodialysis to

Diabetic patients are considerably more costly to

Medicare Payments by ESRD Modality and Diabetes, Ages 45-64, "Intent to Treat", 1991-93*



USRDS 1996

Figure IX-7

Total Medicare payments per patient year, by ESRD modality and diabetes as cause of ESRD, ages 45-64 years, 1991-93. An "intent-to-treat" analysis was used (see Methods). Medicare payments were based on paid SAF claims. Excludes patients for whom Medicare was a secondary insurance payer. Source: Reference Table K.5.

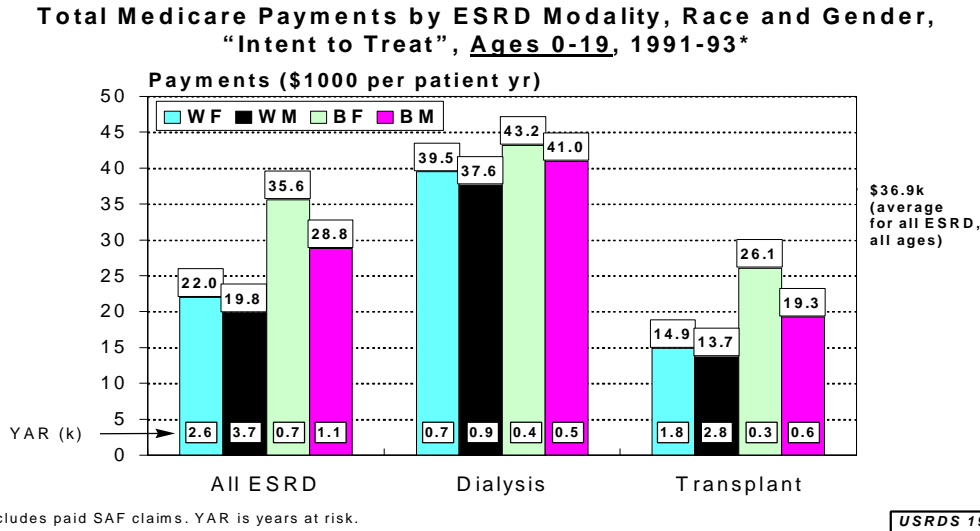


Figure IX-8

Total Medicare payments per patient year, by ESRD modality, race and gender, ages 0-19 years, 1991-93. An "intent-to-treat" analysis was used (see Methods). Medicare payments were based on paid SAF claims. Excludes patients for whom Medicare was a secondary insurance payer. Source: Reference Table K.5.

\$8.8K for transplant).

Thus, no major modality stands out as being particularly costly or inexpensive for diabetics compared to nondiabetics. The finding that the overall difference between diabetics and nondiabetics (\$11.5K) exceeds those found within any major

modality arises because diabetics are underrepresented in the lowest cost group (transplant).

Gender and race adjusted spending comparisons for all ESRD, dialysis, and transplant, are reported by age group in Figures IX-8 through IX-11. Several

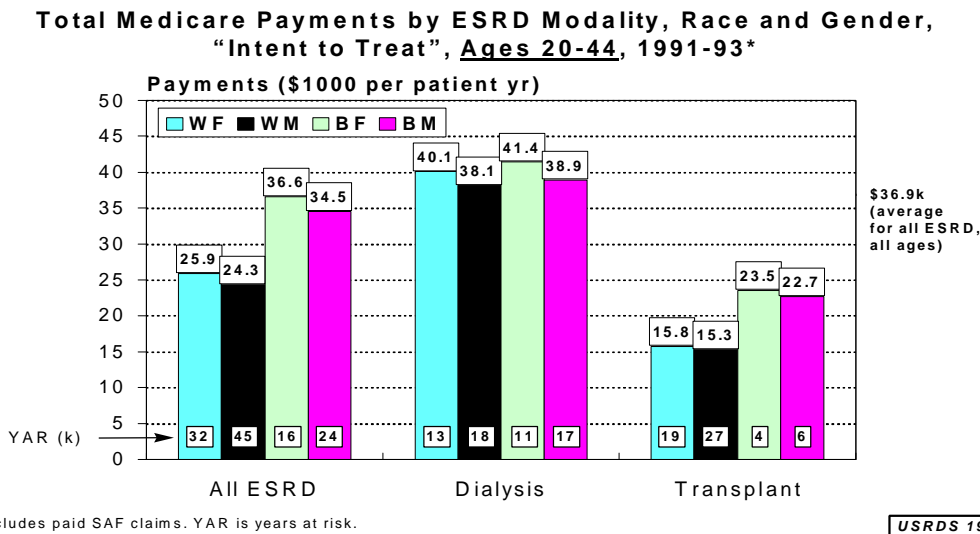


Figure IX-9

Total Medicare payments per patient year, by ESRD modality, race and gender, ages 20-44 years, 1991-93. An "intent-to-treat" analysis was used (see Methods). Medicare payments were based on paid SAF claims. Excludes patients for whom Medicare was a secondary insurance payer. Source: Reference Table K.5.

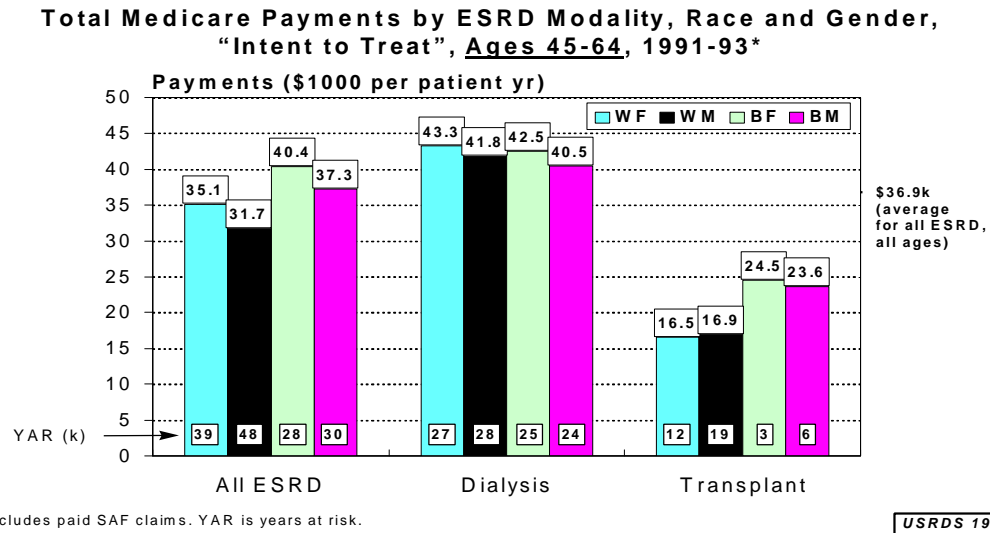


Figure IX-10

Total Medicare payments per patient year, by ESRD modality, race and gender, ages 45-64 years, 1991-93. An "intent-to-treat" analysis was used (see Methods). Medicare payments were based on paid SAF claims. Excludes patients for whom Medicare was a secondary insurance payer. Source: Reference Table K.5.

patterns emerge from these figures. First, Medicare payments for female patients are higher than for males in all age/race/modality categories except transplants in Whites aged 45-64. The absolute differences between males and females are fairly small, usually between \$1K and \$2K.

Second, the average payments for Blacks are substantially higher than for Whites among patients less than age 65. Since dialysis patients' Medicare payments per year at risk are similar for both races, the overall difference arises for two reasons: Blacks are significantly under-represented among transplant patients and even within transplant patients, reimbursements for Black patients exceed those for White patients. Again, much of the unadjusted differences in cost per year at risk can be attributed to differences in the modality mix across patient groups.

Reference Table K.5 contains substantially more detail on Medicare reimbursements per year at risk than is reported in this chapter. Annual Medicare spending for each treatment modality is reported stratifying by four age groups, four race groups, gender, and diabetic versus nondiabetic cause of ESRD.

Conclusions and Limitations

The analyses reported here demonstrate considerable variation in Medicare spending across patient groups and treatment modalities. Some or all

of these observed relationships between patient characteristics and spending could be used to derive appropriate capitation rates for Medicare ESRD patients. Future analyses will explore how variable spending is within specific clinical/demographic categories, another issue sure to be of great interest to managed care organizations that are placed at risk for the costs of a patient's care.

All results reported in this section use the intent-to-treat analyses to determine spending rates. In the process of constructing the "finder file" (see Methods) we identified a group of patients receiving dialysis who were not in the PMMIS files. We have not included the additional spending of these patients outside PMMIS except to note a sensitivity analysis above. However, this exclusion should not affect the spending level reported in this section since these additional patients would not have been included in the intent-to-treat analyses of this section.

It should again be emphasized that, despite adjustment for observable patient characteristics, the results reported here and in the Reference Tables (Section K) are based on observational data rather than on random assignment of patients into treatment modalities. Thus, any causal interpretations should be made with caution. Likewise, the unavailability of organ procurement spending by Medicare for specific patients creates a downward bias in the reported transplant costs. Future analyses will attempt to

Total Medicare Payments for All ESRD Patients, by Race and Gender, "Intent to Treat", Ages 65-74 and 75+, 1991-93*

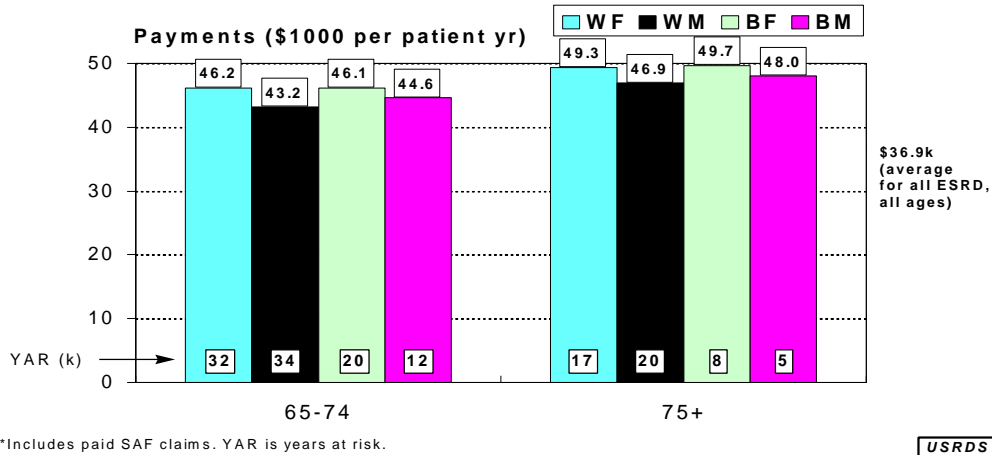


Figure IX-11

Total Medicare payments per patient year for all ESRD patients (including dialysis and transplant patients), by race and gender, ages 65-74 and 75 years and older, 1991-93. An "intent-to-treat" analysis was used (see Methods). Medicare payments were based on paid SAF claims. Excludes patients for whom Medicare was a secondary insurance payer. Source: Reference Table K.5.

develop an approximate adjustment for these costs, but it is clear that transplant will remain the lowest cost alternative by a substantial margin under any reasonable assumption about the magnitude of organ procurement costs.

Payments for patients with Medicare Secondary Payer status, which are not included in our measures of spending in the intent-to-treat analysis, should not be a source of bias in these analyses given our procedures of excluding such patients. Of course a related question develops of whether the patients with Medicare Secondary Payer status are similar to the patients without such Employer Group Health Insurance at initiation of ESRD. More than likely, these MSP patients would not be included in Medicare capitation arrangements until their MSP status expires.

In excluding MSP patients we used both an identified indicator from HCFA's Enrollment Database and a minimum Medicare dialysis spending requirement of \$675 per month. Future analyses should test the sensitivity of the total and component spending per month to the minimum dialysis spending filter by which patients are excluded from our intent to treat analysis.

Comparability to Other Sources

The data reported in this section are based on HCFA Standard Analysis Files for identified ESRD

patients. Other analyses have been performed using these HCFA sources. The 1992 HCFA Research Report (Table 51) reports for 1991 a spending of \$35.7K **per calendar year** for dialysis patients, excluding MSP patients. This is in contrast to our reported \$43.8K **per year at risk** for dialysis patients in 1992. Our results suggest that on average, a patient year at risk corresponds to 1.2 calendar years (since some patients are treated for less than a full calendar year). So inflation of the HCFA estimate by 1.2 yields \$42.8K per year at risk for 1991. Our estimate is 2.2 percent higher for one year later, or reasonably comparable.

As reported above, the Office of the HCFA Actuaries publish estimates called the AAPCC which is the capitation rate HCFA pays for ESRD beneficiaries enrolled in at risk HMOs. The weighted average for the sum of Part A and Part B across all states for 1995 was \$3,478 per month. This would correspond to \$41.7K over 12 months. Given the per month basis of this estimate, we can presume it is comparable to per year at risk. This estimate is in contrast with our \$35.5K per year at risk for all ESRD in 1992. So the HCFA actuary estimate is 18 percent higher for 2 years later. This would appear to be an inconsistent set of results.

The HCFA actuary estimate is much closer to our estimate of dialysis patient spending per year at risk. Our dialysis estimate is 5 percent higher for 2 years

earlier. Is it possible that the HCFA actuary only includes dialysis patients? This would seem most unlikely since it would involve determination of patient modality, something more detailed than what actuaries normally deal with. Perhaps the HCFA actuaries include organ acquisition costs and HMO payments, which are excluded from our estimate. But these costs only account for 6 percent of costs in total. Finally, it is possible that when we revise our estimates with no censoring at transplant failure that our overall estimates will increase substantially. But until then, our estimate (and the HCFA estimate from the Research Report) appear to be in conflict with the AAPCC estimates published by the HCFA actuaries.

HMO payment problem. Washington, D.C., November 1995.

United States Renal Data System; USRDS 1995 Annual Data Report; National Institute of Health; National Institute of Diabetes, Digestive, and Kidney Diseases; Bethesda, MD. June 1995.

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