2006 ANNUAL REPORT
ESRD CLINICAL PERFORMANCE MEASURES PROJECT

OPPORTUNITIES TO IMPROVE CARE FOR IN-CENTER HEMODIALYSIS AND PERITONEAL DIALYSIS PATIENTS

JANUARY 2007

Department of Health and Human Services
Centers for Medicare & Medicaid Services
Office of Clinical Standards & Quality
Baltimore, Maryland

Data on adult and pediatric in-center hemodialysis patients are from October–December 2005

Data on adult and pediatric peritoneal dialysis patients are from October 2005–March 2006

END STAGE RENAL DISEASE NETWORKS

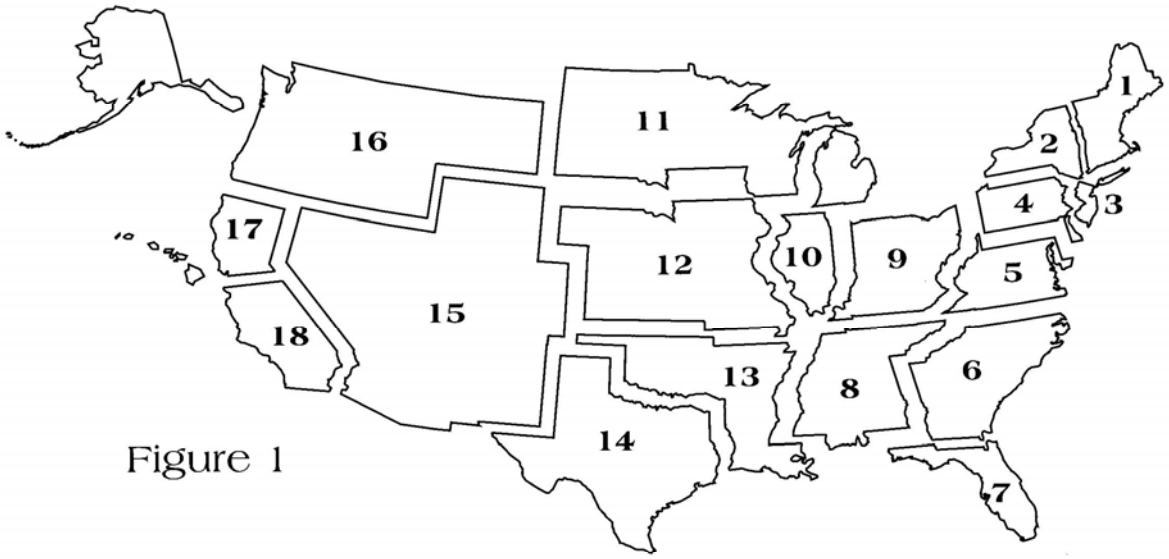

Figure 1

ESRD Network No. 1
Maine, New Hampshire, Vermont,
Massachusetts, Connecticut, Rhode Island

ESRD Network No. 2
New York State

ESRD Network No. 3
New Jersey, Puerto Rico,
U.S. Virgin Islands

ESRD Network No. 4
Pennsylvania, Delaware

ESRD Network No. 5
District of Columbia, Maryland,
Virginia, West Virginia

ESRD Network No. 6
Georgia, North Carolina, South Carolina

ESRD Network No. 7
Florida

ESRD Network No. 8
Alabama, Mississippi, Tennessee

ESRD Network No. 9
Kentucky, Indiana, Ohio

ESRD Network No. 10
Illinois

ESRD Network No. 11
Michigan, Minnesota, Wisconsin,
North Dakota, South Dakota

ESRD Network No. 12
Missouri, Iowa, Nebraska, Kansas

ESRD Network No. 13
Arkansas, Louisiana, Oklahoma

ESRD Network No. 14
Texas

ESRD Network No. 15
New Mexico, Colorado, Wyoming,
Utah, Arizona, Nevada

ESRD Network No. 16
Montana, Alaska, Idaho, Oregon,
Washington

ESRD Network No. 17
Northern California, Hawaii,
Pacific Trust Territory, Guam,
American Samoa

ESRD Network No. 18
Southern California

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Note: The clinical data collected for the 2006 ESRD Clinical Performance Measures Project were from the time period of October–December 2005 for the in-center hemodialysis patients and October 2005–March 2006 for the peritoneal dialysis patients.

2007 Data Collection Effort
In 2007, we will again collect data for the ESRD Clinical Performance Measures on a national sample of adult in-center hemodialysis and peritoneal dialysis patients and all pediatric in-center hemodialysis and peritoneal dialysis patients.

Any questions about the Project may be addressed to your ESRD Network staff (APPENDIX 4).

Look for this Report, as well as other ESRD Clinical Performance Measures Project and Core Indicators Project Reports, by clicking on “Measures and Data Collection” on the Internet at: www.cms.hhs.gov/CPMProject.

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ACKNOWLEDGMENTS

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- The eighteen ESRD Network Organizations throughout the United States (See Appendix 4).
- The staff at Arbor Research Collaborative for Health and University of Michigan Kidney Epidemiology and Cost Center.
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- The staff at The Renal Network, Inc.
- The staff at more than 3,690 dialysis facilities in the United States who abstracted the requested information from medical records on more than 8,000 adult in-center hemodialysis, adult peritoneal dialysis, and pediatric in-center hemodialysis and peritoneal dialysis patients.
- The many other individuals in the renal community and CMS who contributed to this work.

ACRONYMS

List of Commonly Used Acronyms

AM Anemia Management
AV Arterio Venous
AVF Arteriovenous Fistula
BBA Balanced Budget Act
BCG Bromcresol Green Laboratory Method
BCP Bromcresol Purple Laboratory Method
BMI Body Mass Index
BSA Body Surface Area
BUN Blood Urea Nitrogen
CAPD Continuous Ambulatory Peritoneal Dialysis
CCPD Continuous Cycling Peritoneal Dialysis
CI Confidence Interval
CIP Core Indicators Project
CMS Centers for Medicare & Medicaid Services
CPM Clinical Performance Measure
CQI Continuous Quality Improvement
CrCl Creatinine Clearance
CSC Computer Sciences Corporation
DM Diabetes Mellitus
DOQI Dialysis Outcomes Quality Initiative
D/P Cr Ratio Dialysate/Plasma Creatinine Ratio
ESA Erythropoetin Stimulating Agents
ESRD End-Stage Renal Disease
FSGS Focal and Segmental Glomerulosclerosis
GFR Glomerular Filtration Rate
HCFA Health Care Financing Administration
HCQIP Health Care Quality Improvement Program
HD Hemodialysis
Hgb Hemoglobin
IV Intravenous
KDOQI Kidney Disease Outcomes Quality Initiative
KoA Dialyzer Mass Transfer Area Coefficient
Kt/V or Kt/V_{urea} Urea Clearance x Time/Volume of Distribution of Urea (fractional clearance of urea)
KUf Ultrafiltration Coefficient
LDO Large Dialysis Organization
NIH National Institutes of Health
NIPD Nightly Intermittent Peritoneal Dialysis
NKF National Kidney Foundation
PET Peritoneal Equilibration Test
PD Peritoneal Dialysis
QA Quality Assurance
QI Quality Improvement
RRF Residual Renal Function
SC Subcutaneous
SD Standard Deviation
SIMS Standard Information Management System
SI Units Systéme International Units
SLE Systemic Lupus Erythematosis
spKt/V Single-Pool Kt/V
SPSS Statistical Package for the Social Sciences
TCV Total Cell Volume
TSAT Transferrin Saturation
UKM Urea Kinetic Modeling
URR Urea Reduction Ratio
USRDS United States Renal Data System
VA Vascular Access

I. INTRODUCTION

The ESRD Clinical Performance Measures (CPM) Project, now in its thirteenth year, is a national effort led by the Centers for Medicare & Medicaid Services (CMS) and its eighteen ESRD Networks to assist dialysis providers to improve patient care and outcomes. Since 1994 the Project has documented continued improvements, specifically in the areas of adequacy of dialysis and anemia management. We commend the providers of dialysis services for their ongoing efforts to improve patient care.

The 2006 ESRD CPM Annual Report describes the findings of several important clinical measures and characteristics of a nationally representative random sample of adult (aged ≥ 18 years) in-center hemodialysis patients and peritoneal dialysis patients. This Report also includes the findings for all in-center hemodialysis and peritoneal dialysis patients aged < 18 years.

The most recent data described in this Report are from the 2006 study period which includes the months of October-December 2005 for the in-center hemodialysis patients and October 2005-March 2006 for the peritoneal dialysis patients. This Report also compares the 2006 study period findings to findings from previous study periods AND it identifies opportunities to improve care for dialysis patients.

The full Report can be found on the Internet at www.cms.hhs.gov/CPMProject, and clicking on "Measures and Data Collectiton". PowerPoint files containing all of the figures in this Report can also be found at this Internet site. Please feel free to use any of these slides in presentations and quality improvement activities.

This Report contains seven major sections: **Background and Project Methods, Clinical Performance Measures (CPMs), Other Significant Findings and Trends, Adult In-Center Hemodialysis Patients, Adult Peritoneal Dialysis Patients, Pediatric In-Center Hemodialysis (aged < 18),** and **Pediatric Peritoneal Dialysis Patients (aged < 18).** The list of tables and figures are located at the back of the Report as Section X (page 64).

NOTE: Highlights of important findings from the 2006 ESRD CPM Project may be found on the following pages:

This Report also contains features and tools to assist dialysis providers in using the information presented here. Appendices 7 and 8 (pages 102 and 104) contain tear-out ESRD CPM Outcomes Comparison Tools (one for hemodialysis and one for peritoneal dialysis) that providers can use to record their facility-specific results for comparisons to national and Network findings (Network rates are only available for hemodialysis results). (Note: Each provider will have to calculate its own facility-specific results to record on this tool.) Even though the national and Network hemodialysis findings included in this Report are from the time period October–December 2005 (national peritoneal dialysis findings are from the time period October 2005–March 2006), the facility data that you calculate and enter on this form can be from any time period. Appendix 6 provides you with some Network-level hemodialysis findings that you can use to record on your Network's Outcomes Comparison Tool (Appendix 7). On the back of each tool are two graphs that can be used to record monthly facility-specific adequacy and anemia management results. We encourage each dialysis facility to use these tools. Consider posting the charts somewhere in the dialysis facility that is visible to staff and patients so everyone can follow the monthly entries.

The **Background and Project Methods** section, beginning on page 6, provides information on the Medicare ESRD program and why the ESRD CPM Project was initiated. Patient selection criteria and data collection and analysis methodologies are also described.

The **ESRD Clinical Performance Measures (CPMs)** section, beginning on page 13, has a short summary of each CPM collected for this project as well as a brief summary of the 2006 CPM findings. Appendix 1 (page 71) provides a more detailed description of each CPM.

The **Other Significant Findings and Trends** section, beginning on page 17, provides highlights of important findings from the 2006 ESRD CPM Project.

The **Adult In-Center Hemodialysis Patients, Adult Peritoneal Dialysis Patients, Pediatric In-Center Hemodialysis Patients**, and **Pediatric Peritoneal Dialysis Patients** sections describe the findings for each cohort for the 2006 study period and compare these findings to previous study periods.

This Report provides the dialysis community with Network and national profiles for the clinical measures that were collected for the ESRD CPM Project. While significant improvements in care have occurred, there are still opportunities to improve care for dialysis patients in the U.S. in the areas of adequacy of dialysis, vascular access, and anemia management. Every dialysis caregiver should be familiar with the clinical practice guidelines developed by the Renal Physicians Association (1) and the National Kidney Foundation Kidney Disease Outcomes Quality

Initiative (NKF-KDOQI) (2-5). Your Network staff and Medical Review Board are also available to assist you in identifying opportunities for improvement.

In the future, the ESRD Networks, in collaboration with dialysis facilities, will continue to assess the ESRD CPMs for dialysis patients in the U.S. The purpose of these efforts will be to assess improvement in care and to encourage further improvements. The ultimate goal is to improve patient care and outcomes for all ESRD patients.

Serum Albumin

Although serum albumin is not a CPM for this data collection period, it is known to be an important indicator of patient health and was chosen as an indicator for assessing mortality risk for adult in-center hemodialysis patients and adult peritoneal dialysis patients. This project collects the serum albumin value as well as the test method, (bromcresol green [BCG] method and bromcresol purple [BCP] method), because these two methods are commonly used for determining serum albumin concentrations and have been reported to yield systematically different results—the BCG method yielding higher serum albumin concentrations than the BCP method (6).

For the history of this project, mean serum albumin values < 3.5 g/dL (35 g/L) by the BCG method have been defined as an indicator of inadequate serum albumin. Since the percent of mean serum albumin values < 3.2 g/dL (32 g/L) by the BCP method was nearly the same as the percent of mean serum albumin values < 3.5 g/dL (35 g/L) by the BCG method, for the purposes of this report we have historically also defined a BCP result < 3.2 g/dL (32 g/L) as an indicator of inadequate serum albumin. In June 2000, the NKF-KDOQI Guidelines for Nutrition in Chronic Renal Failure were published. Guideline 3 of the Clinical Practice Guidelines states that a pre-dialysis or stabilized serum albumin equal to or greater than the lower limit of normal range (approximately 4.0 g/dL [40 g/L] for the bromcresol green method) is the outcome goal (7).

Findings from this project allow us to report the percentage of patients with mean serum albumin values ≥ 4.0 g/dL (40 g/L) (BCG method) or ≥ 3.7 g/dL (37 g/L) (BCP method) and the percent of patients with mean serum albumin values ≥ 3.5 g/dL (35 g/L) (BCG method) or ≥ 3.2 g/dL (32 g/L) (BCP method) nationally for all hemodialysis and peritoneal dialysis patients (both adult and pediatric), and for adult hemodialysis patients in each Network area.

Pediatric In-Center Hemodialysis and Peritoneal Dialysis Patients

Although there are no CPMs established for the pediatric age group, demographic and clinical information from October-December 2005 were collected on all hemodialysis patients aged < 18 years and from October 2005-March 2006 on all peritoneal dialysis patients aged < 18 years in the U.S. in order to describe several core indicators of dialysis care. These core indicators included dialysis clearance, vascular access (hemodialysis only), anemia management, and serum albumin.

II. BACKGROUND AND PROJECT METHODS

A. MEDICARE'S ESRD PROGRAM

The Social Security Amendments of 1972 (PL 92-603) extended Medicare coverage to individuals with end-stage renal disease (ESRD) or chronic kidney failure who require dialysis or a kidney transplant to maintain life. To qualify for Medicare under the renal provision, a person must have ESRD and either be entitled to a monthly insurance benefit under Title II of the Social Security Act (or an annuity under the Railroad Retirement Act); or be fully or currently insured under Social Security; or be the spouse or dependent child of a person who meets at least one of these last two requirements. There is no minimum age for eligibility under the renal disease provision. The incidence of treated ESRD in the United States is 339 per million population (8). As of December 31, 2004, there were 320,404 patients receiving dialysis therapy in the United States (9).

ESRD Health Care Quality Improvement Program (HCQIP)

CMS, which oversees the Medicare program, contracts with 18 ESRD Network Organizations throughout the United States. The ESRD Networks stimulate and facilitate improvements in the quality of care for ESRD patients throughout the U.S. In 1994, CMS, with input from the renal community, reshaped the approach of the ESRD Network program to focus on quality assurance and improvement in order to respond to the need to improve the care of Medicare ESRD patients (10). This approach was named the ESRD Health Care Quality Improvement Program (HCQIP).

The ESRD HCQIP allows the ESRD Networks and CMS a chance to demonstrate that health care provided to Medicare beneficiaries with renal disease can be measurably improved. The HCQIP is based on the assumption that most health care providers welcome information and, where necessary, help in applying the tools and techniques of quality management (11).

ESRD Core Indicators Project

One activity included in the ESRD HCQIP was the National/Network ESRD Core Indicators Project (CIP). This project was initiated in 1994 as a national intervention approach to assist dialysis providers in the improvement of patient care and outcomes. The ESRD CIP was CMS's first nationwide population-based project designed to assess and identify opportunities to improve the care of patients

with ESRD (12). This project established the first consistent clinical ESRD database. The elements included in the database represent clinical measures thought to be indicative of key components of care surrounding dialysis. As such, the data points are considered "indicators" for use in triggering improvement activities.

ESRD Clinical Performance Measures Project

Section 4558(b) of the Balanced Budget Act (BBA) of 1997 required CMS to develop and implement by January 1, 2000, a method to measure and report quality of renal dialysis services provided under the Medicare program. To implement this legislation, CMS funded the development of Clinical Performance Measures (CPMs) based on the National Kidney Foundation (NKF) Dialysis Outcomes Quality Initiative (DOQI) Clinical Practice Guidelines (13-16).

For information regarding the development of the CPMs, please refer to the 1999 Annual Report, End-Stage Renal Disease Clinical Performance Measures Project on the Internet by clicking on "Archives" at www.cms.hhs.gov/esrdQualityImproveInit/.

On March 1, 1999, the ESRD CIP was merged with the ESRD CPM Project, and this project is now known as the ESRD CPM Project. The ESRD CPMs are similar to the core indicators with the addition of measures for assessing vascular access.

This 2006 ESRD CPM Project Annual Report provides the results of the CPMs for a sample of adult in-center hemodialysis patients and adult peritoneal dialysis patients. Findings on all pediatric (aged < 18 years) in-center hemodialysis patients and all pediatric (aged < 18 years) peritoneal dialysis patients are also included. The Report does not provide results on a dialysis facility-specific basis. The quality of dialysis services is reported for adult and pediatric in-center hemodialysis patients for the last quarter in 2005 and adult and pediatric peritoneal dialysis patients for the time period October 2005–March 2006.

CMS and the ESRD Networks are committed to improving ESRD patient care and outcomes by providing tools that can be used by the renal community in assessing patient care processes and outcomes, and by identifying opportunities for improvement. One of these tools includes data feedback reports based on the clinical information obtained from the ESRD CPM Project. We invite the renal community to provide us with ideas and feedback as to ways CMS and the Networks can best help the community to improve patient care.

B. PROJECT METHODS

The purpose of the ESRD CPM Project is to provide comparative data to ESRD caregivers to assist them in assessing and improving the care provided to dialysis patients. The data collected in 1994 (for the time period October-December 1993) established a baseline estimate for important clinical measures of care for adult in-center hemodialysis patients in the United States (17). From 1994 to 1998, CMS collected ESRD data under the ESRD CIP. The purpose of these data collections was to determine whether patterns in these clinical measures had changed and if opportunities to improve care continued to exist (18-22).

The initial data collection effort for the ESRD CPMs was conducted in 1999. This effort examined data from October–December 1998 for adult in-center hemodialysis patients, and from October 1998 to March 1999 for adult peritoneal dialysis patients. Information to calculate the CPMs was collected and further opportunities to improve care were identified (23).

This Report describes the findings from the eighth data collection effort for the ESRD CPMs, which was conducted in 2006. Data were collected from October-December 2005 for adult and pediatric in-center hemodialysis patients, and from October 2005 -March 2006 for adult and pediatric peritoneal dialysis patients. These data help to determine if there are opportunities to improve care and to evaluate patterns of care across the nation.

The Sample

Annually, each ESRD Network conducts a survey of ESRD facilities to validate the census of ESRD patients in the Network at the end of the calendar year. In March 2006, a listing of adult (aged ≥ 18 years as of September 30, 2005) in-center hemodialysis and adult peritoneal dialysis patients who were alive and dialyzing on December 31, 2005, was obtained from each of the 18 ESRD Networks.

From this universe of patients, a national random sample of adult in-center hemodialysis patients was drawn, stratified by Network. The sample size of adult in-center hemodialysis patients was selected to allow estimation of a proportion with a 95% confidence interval (CI) around that estimate no larger than 10 percentage points (i.e., ± 5%) for Network-specific estimates of the key hemodialysis CPMs and other indicators. Additionally, a 30% over-sample was drawn to compensate for an anticipated non-response rate and to assure a large enough sample of the adult in-center hemodialysis patient population who were dialyzing at least six months prior to October 1, 2005. The final sample consisted of 8,915 adult in-center hemodialysis patients.

The peritoneal dialysis patient sample included a random selection of 5% of all adult peritoneal dialysis patients in the nation. Additionally, a 10% over-sample was drawn to compensate for an anticipated non-response rate. The final sample consisted of 1,469 peritoneal dialysis patients.

All pediatric (aged < 18 years) in-center hemodialysis patients in the U.S. (n = 803) and all pediatric peritoneal dialysis patients in the U.S. (n = 807) were included in the 2006 ESRD CPM Study.

C. SAMPLE SELECTION

Data Collection

Two data collection forms were used: a four-page in-center hemodialysis form and a four-page peritoneal dialysis form (Appendices 2, 3; Pages 76, 82 respectively); the use of these forms was authorized through the National Institutes of Health (NIH) clinical exemption process. Descriptive information on each selected patient and dialysis facility was printed onto the data collection forms that were downloaded by Networks from the Network Standard Information Management System (SIMS). If demographic information (e.g., name, date of birth, race) or clinical information (e.g., date that initial dialysis occurred) was incorrect, facility staff were asked to correct the information on the forms. Staff at ESRD facilities were also asked to abstract clinical information from the medical record of each selected patient, and were instructed to obtain ethnicity information from the patient.

Electronic data for some of the data elements were accepted from the large dialysis organizations (LDOs) — Fresenius Medical Care N.A.; Dialysis Clinic, Inc.; and Davita, Inc. The electronically submitted data were printed onto paper forms, and these paper forms were sent to facilities for sampled patients. Facility staff were instructed to supply the data not already provided on the paper form. These updated paper collection forms were then forwarded to the appropriate Network, where data were reviewed for acceptability and manually entered into the Network database using SIMS.

Facilities that were not part of an LDO (non-LDO facilities) and had one or more patients in the samples received a blank paper data collection form as in past study years. Clinical information contained in the medical record was abstracted for each patient in the adult hemodialysis sample and for all pediatric in-center hemodialysis patients who received in-center hemodialysis at any time during October, November, and December 2005. Clinical information contained in the medical records was also abstracted for each patient in the adult peritoneal dialysis sample and for all pediatric peritoneal dialysis patients who were receiving peritoneal dialysis at any time during October 2005-March 2006. The completed data collection forms were then forwarded to the appropriate Network, where data were reviewed for acceptability and manually entered into SIMS.

In October 2006, each Network completed data entry into SIMS. CMS's contractor, Computer Sciences Corporation (CSC) aggregated the data and submitted it to Arbor Research Collaborative for Health (CMS Contractor) for analysis.

Adult In-Center Hemodialysis

Initial analyses for the CPMs and other indicators focused on the following elements: paired pre- and post-dialysis blood urea nitrogen (BUN) values with patient height, weight, and dialysis session length (used to calculate spKt/V values); hemoglobin values; vascular access information; and serum albumin levels.

To be included in the analysis file, a patient must have had data available for at least one of the months in the three-month project period, with at least one paired pre- and post-dialysis BUN, at least one hemoglobin, and at least one serum albumin. We were able to include for analysis 8,609 of the 8,915 patients from the sample (response rate = 97%) (TABLE 1). In the vascular access section, some findings are presented for incident patients alone. An incident patient is defined as a patient initiating in-center hemodialysis on or between January 1, 2005 and August 31, 2005. Other findings in this section are presented for prevalent or all patients, which includes incident patients.

Characteristics regarding the gender, race, ethnicity, age, diagnosis, and duration of dialysis (years) for these patients are shown in Table 2. As expected, the characteristics of this random sample were very similar to the characteristics of the overall U.S. hemodialysis population (8). Data regarding erythropoietin stimulating agent (ESA) use, serum ferritin concentrations, transferrin saturation, iron use, and actual time on dialysis were also analyzed. The initial analysis utilized SAS v.8.02 and Statistical Package for the Social Sciences (SPSS) software (24, 25).

For this Report, each patient's mean value for the three-month project period was determined from the available data for the following items: spKt/V (calculated using the Daugirdas II formula [26]), dialysis session length, hemoglobin, transferrin saturation, serum ferritin concentration, and serum albumin. Because we had data from a stratified random sample of patients (i.e., a separate random sample from each of the 18 Networks), it was necessary to weight the collected data in order to obtain unbiased estimates of mean clinical values for the total population. This weighting was assigned according to the proportion of each Network's total population sampled. Aggregate national results shown in this report were derived from weighted data; Network-specific comparisons were derived from unweighted data.

TABLE 1: *Number of adult in-center hemodialysis patients in each Network in December 2005, sample size and response rate for the 2006 ESRD CPM Project.*

Network	# HD Patients Dec 2005	Sample Size	# Acceptable Forms^	Response Rate %
1	9,782	488	471	96.5
2	21,127	500	473	94.6
3	12,845	493	486	98.6
4	13,524	492	482	98.0
5	17,758	499	490	98.2
6	28,570	501	495	98.8
7	17,442	499	476	95.4
8	16,667	500	491	98.2
9	21,457	501	484	96.6
10	12,429	495	461	93.1
11	18,750	496	470	94.8
12	10,797	491	472	96.1
13	11,754	490	477	97.3
14	26,836	497	491	98.8
15	13,416	494	484	98.0
16	7,577	482	473	98.1
17	15,357	497	462	93.0
18	23,883	500	471	94.2
Total	**299,971**	**8,915**	**8,609**	**96.6**

^ A form was considered acceptable if the patient met the selection criteria for inclusion in the study and if data were provided for at least one of the months in the fourth quarter of 2005 for the following items: 1) hemoglobin; 2) paired pre- and post-dialysis BUN values; and 3) serum albumin value.

Two or more monthly values for these clinical measures were available for 97% of patients for hemoglobin and 96% for serum albumin by either BCG or BCP method. Monthly hemoglobin values were available for 91% of patients. At least one monthly paired pre-and post-dialysis BUN value was available for 100% of patients, and two or more were available for 95%. Monthly paired pre- and post-dialysis BUN values were available for 83% of patients.

Adult Peritoneal Dialysis

The initial analysis focused on the adequacy of peritoneal dialysis CPMs, anemia management CPMs, and serum albumin values. Inclusion of a case for analysis required that the patient received peritoneal dialysis at least one month during the time period October 2005–March 2006, and that at least one hemoglobin and at least one serum albumin value were reported during the six-month study period. Of the 1,469 patients sampled, 1,409 patients were included in the sample for analysis (96% response rate) (TABLE 3). Selected patient characteristics of this sample for analysis were similar to the characteristics of the overall U.S. peritoneal dialysis population (TABLE 4).

For this Report, each patient's mean value for the six-month study period was determined from available data for the following items: weekly Kt/V_{urea}, weekly creatinine clearance, hemoglobin, serum albumin, prescribed epoetin or darbepoetin dose, serum ferritin concentration, and transferrin saturation. Information on iron prescription and route of administration was collected. The data are from a random sample, not stratified by Network; thus, only national aggregate data are reported. No Network-specific or facility-specific analyses were conducted.

Pediatric In-Center Hemodialysis Patients

Inclusion of a pediatric record for analysis required that data were available for at least one of the months in the three-month project period, with at least one paired pre- and post-dialysis BUN, at least one hemoglobin, and at least one serum albumin. Of the 803 pediatric hemodialysis patients, 743 patients were included in the sample for analysis (93%). Selected patient characteristics of this sample for analysis are shown in Table 5.

For this Report, each patient's mean value for the three-month project period was determined from the available data for the following items: spKt/V, dialysis session length, hemoglobin, transferrin saturation, serum ferritin concentration, prescribed epoetin or darbepoetin dose and route of administration, and serum albumin. Information on iron prescription and route of iron administration was collected. Data were collected on all pediatric in-center hemodialysis patients aged < 18 years in the U.S. Only national aggregate data are reported. No Network-specific or facility-specific analyses were conducted.

Pediatric Peritoneal Dialysis Patients

The Pediatric Peritoneal Dialysis Patients section describes findings for this cohort for the 2006 study period and compares these findings to the 2005 study period. Inclusion of a record for analysis required that the patient received peritoneal dialysis at least one month during the time period October 2005-March 2006 and that at least one hemoglobin value and at least one serum albumin value were reported during the six-month study period. Of the 807 pediatric peritoneal dialysis patients identified, 781 (97%) were included in the sample for analysis (TABLE 6).

TABLE 2: *Characteristics of adult in-center hemodialysis patients in the 2006 ESRD CPM Project compared to those of all in-center hemodialysis patients in the U.S. in 2004.*

Patient Characteristic	2006 CPM Sample for Analysis		All U.S. in 2004*	
	#^	%	# in 1,000s	%
TOTAL	**8,609**	**100**	**307.1**	**100**
GENDER				
Men	4,666	54	166.6	56.2
Women	3,943	46	140.5	47.4
RACE				
American Indian/ Alaska Native	156	2	4.6	1.5
Asian/Pacific Islander	335	4	12.8	4.3
Black or African American	3,129	36	116.5	39.3
White	4,915	57	167.7	56.6
Other/Unknown	74	1	5.6	1.9
ETHNICITY				
Hispanic	1,224	14	45.0	15.2
Non-Hispanic	7,383	86	262.1	88.4
AGE GROUP (years)				
18-49	1,823	21	67.5**	22.8
50-59	1,790	21	63.5	21.4
60-64	1,020	12	35.4	11.9
65-69	968	11	36.1	12.2
70-79	1,948	23	67.6	22.8
80+	1,060	12	35.6	12.0
CAUSE OF ESRD				
Diabetes Mellitus	3,763	44	132.3	44.6
Glomerulonephritis	855	10	33.8	11.4
Hypertension	2,269	26	87.7	29.6
Other/Unknown	1,716	20	53.4	18.0
DURATION OF DIALYSIS (years)				
< 0.5	1,084	13		
0.5-0.9	1,047	12		
1.0-1.9	1,552	18		
2.0-2.9	1,181	14		
3.0-3.9	885	10		
4.0+	2,828	33		

*USRDS: 2006 Annual Data Report, Bethesda, MD, National Institutes of Health, 2006. Table D.11

^ Subgroup totals may not equal 8,609 due to missing data.

** For ages 20-49 years

Note: Percentages may not add up to 100% due to rounding.

For this Report, each patient's mean value for the six-month study period was determined from available data for the following items: weekly Kt/V_{urea}, weekly creatinine clearance, hemoglobin, serum albumin, prescribed epoetin or darbepoetin dose, serum ferritin concentration, and transferrin saturation. Information on iron prescription and route of administration was collected. The data were collected on all pediatric peritoneal dialysis patients aged < 18 years in the U.S. Only national aggregate data are reported. No Network-specific or facility-specific analyses were conducted.

D. REPORT FORMAT

This Report describes the clinical performance measures and other findings for both the adult in-center hemodialysis patient sample and the adult peritoneal dialysis patient sample in separate sections, V and VI, respectively, for the following study periods: October–December 2005 for the adult in-center hemodialysis patients, and October 2005–March 2006 for the adult peritoneal dialysis patients. This Report also describes findings on clinical parameters of care for pediatric in-center hemodialysis and peritoneal dialysis patients in the U.S. for October-December 2005 (hemodialysis) and October 2005-March 2006 (peritoneal dialysis) in Sections VII and VIII, respectively.

The national results are presented separately in tables by gender, race, ethnicity, age group (for adult patients: 18-44, 45-54, 55-64, 65-74, and 75+ years of age; for pediatric patients: 0-4, 5-9, 10-14, and 15 to < 18 years of age), diagnosis of ESRD, and duration of dialysis. The diagnoses are categorized as diabetes mellitus, hypertension, glomerulonephritis, and other/unknown for adult patients. In some instances clinical characteristics for patients in each Network area are also shown. Selected results are highlighted in accompanying figures. In addition, key findings from the 2006 CPM study period are compared to key findings from previous study periods.

TABLE 3: *Number of adult peritoneal dialysis patients in each Network in December 2005, sample size and response rate for the 2006 ESRD CPM Project.*

Network	# Peritoneal Dialysis Patients Dec 2005	Sample Size	# Acceptable Forms^	Response Rate %
1	1,134	69	63	91.3
2	1,161	72	66	91.7
3	863	45	45	100
4	905	67	66	98.5
5	1,625	85	85	100
6	2,599	144	143	99.3
7	1,355	57	54	94.7
8	1,737	95	94	98.9
9	2,173	115	107	93
10	1,159	63	61	96.8
11	1,676	99	93	93.9
12	1,264	71	66	93
13	1,033	64	61	95.3
14	1,951	110	108	98.2
15	1,244	65	63	96.9
16	1,038	56	56	100
17	1,772	85	78	91.8
18	1,997	107	100	93.5
Total	**26,686**	**1,469**	**1,409**	**95.9**

^ A form was considered acceptable if the patient received peritoneal dialysis at least once during the six-month study period and met the selection criteria for inclusion in the study.

TABLE 4: *Characteristics of adult peritoneal dialysis patients in the 2006 ESRD CPM Project compared to those of all peritoneal dialysis patients in the U.S. in 2004.*

Patient Characteristic	2006 CPM Sample for Analysis		All U.S. in 2004*	
	#^	%	# in 1,000s	%
TOTAL	**1,409**	**100**	**25.8**	**100.0**
GENDER				
Men	694	49	13.3	51.6
Women	715	51	12.5	48.4
RACE				
American Indian/ Alaska Native	17	1	0.3	1.2
Asian/Pacific Islander	84	6	1.5	5.6
Black or African American	382	27	6.7	26.0
White	915	65	16.8	65.2
Other/Unknown	11	1	0.5	1.9
ETHNICITY				
Hispanic	175	12	3.3	12.9
Non-Hispanic	1,234	88	22.5	87.1
AGE GROUP (years)				
18-49	481	34	8.4**	32.5**
50-59	368	26	5.9	23.0
60-64	155	11	2.8	10.8
65-69	116	8	2.6	10.0
70-79	213	15	3.9	15.1
80+	76	5	1.2	4.8
CAUSE OF ESRD				
Diabetes Mellitus	488	35	8.8	34.2
Glomerulonephritis	213	15	4.9	19.1
Hypertension	317	22	6.1	23.8
Other/Unknown	391	28	5.9	22.9
DURATION OF DIALYSIS (years)				
< 0.5	191	14		
0.5-0.9	205	15		
1.0-1.9	312	22		
2.0-2.9	217	15		
3.0-3.9	137	10		
4.0+	340	24		

*USRDS: 2006 Annual Data Report, Bethesda, MD, National Institutes of Health, 2006. Table D.11

^ Subgroup totals may not equal 1,409 due to missing data.

** For ages 20-49 years

Note: Percentages may not add up to 100% due to rounding.

A form was considered acceptable if the patient met the selection criteria for inclusion in the study and if data were provided at least once during the six-month study period for hemoglobin and serum albumin.

Two or more values were available for 98% of patients for hemoglobin and 98% for serum albumin by either BCG or BCP methods. Three hemoglobin values were available for 85% of patients; three serum albumin values were available for 84% of patients.

TABLE 5: *Characteristics of pediatric (aged < 18 years) in-center hemodialysis patients in the 2006 ESRD CPM Project.*

Patient Characteristic	2006 CPM Project #^	%
TOTAL	**743**	**100**
GENDER		
Males	404	54
Females	339	46
RACE		
American Indian/Alaska Native	20	3
Asian/Pacific Islander	26	3
Black or African American	285	38
White	406	55
Other/Unknown	*	*
ETHNICITY		
Hispanic	236	32
Non-Hispanic	507	68
AGE GROUP (years)		
0-4	42	6
5-9	74	10
10-14	215	29
15 to <18	412	55
CAUSE OF ESRD		
Cystic Disease	19	3
Diabetes	*	*
Glomerulonephritis	95	13
Hypertension	35	5
FSGS^^	106	14
Congenital/Urologic	147	20
Other/Unknown	341	46
DURATION OF DIALYSIS (years)		
< 0.5	155	21
0.5-0.9	125	17
1.0-1.9	150	20
2.0-2.9	85	11
3.0-3.9	52	7
4.0+	175	24

^Subgroup totals may not equal 743 due to missing data.

^^FSGS = Focal and Segmental Glomerulosclerosis

*Data not displayed, n < 11.

Note: Percentages may not add up to 100% due to rounding.

A form was considered acceptable if the patient met the selection criteria for inclusion in the study and if data were provided for at least one of the months in the fourth quarter of 2005 for the following items: 1) hemoglobin; 2) paired pre- and post-dialysis BUN values; and 3) serum albumin value.

Two or more monthly values for these clinical measures were available for 94% of patients for hemoglobin and 93% for serum albumin by either BCG or BCP method. Monthly hemoglobin values were available for 86% of patients. At least one monthly paired pre- and post-dialysis BUN value was available for 100% of patients, and two or more were available for 91%. Monthly paired pre- and post-dialysis BUN values were available for 78% of patients.

TABLE 6: *Characteristics of pediatric (aged < 18 years) peritoneal dialysis patients in the 2006 ESRD CPM Project.*

Patient Characteristic	2006 CPM Project #^	%
TOTAL	**781**	**100**
GENDER		
Males	426	55
Females	355	45
RACE		
American Indian/Alaska Native	*	*
Asian/Pacific Islander	30	4
Black or African American	205	26
White	526	67
Other/Unknown	11	1
ETHNICITY		
Hispanic	227	29
Non-Hispanic	554	71
AGE GROUP (years)		
0-4	192	25
5-9	124	16
10-14	258	33
15 to <18	207	27
CAUSE OF ESRD		
Cystic Disease	30	4
Glomerulonephritis	75	10
Hypertension	*	*
FSGS	116	15
Congenital/Urologic	201	26
Other/Unknown	349	45
DURATION OF DIALYSIS (years)		
< 0.5	166	21
0.5-0.9	153	20
1.0-1.9	196	25
2.0-2.9	87	11
3.0-3.9	60	8
4.0+	111	14

^Subgroup totals may not equal 781 due to missing data.

*Data not displayed, n < 11.

Note: Percentages may not add up to 100% due to rounding.

A form was considered acceptable if the patient met the selection criteria for inclusion in the study and if data were provided at least once during the six-month study period for hemoglobin and serum albumin.

Two or more values were available for 97% of patients for hemoglobin and 97% for serum albumin by either BCG or BCP methods. Three hemoglobin values were available for 83% of patients; three serum albumin values were available for 81% of patients.

III. CLINICAL PERFORMANCE MEASURES (CPMs)

The clinical information abstracted by dialysis facility staff is used in this Report to describe some of the CPMs that were developed from the NKF-KDOQI Guidelines and other quality indicators for several aspects of care for adult dialysis patients. These CPMs do not apply to patients under the age of 18 years. The CPMs were developed in the areas of hemodialysis and peritoneal dialysis adequacy, vascular access and anemia management. A complete description of the 13 CPMs appears in Appendix 1 (page 70); brief descriptions follow here.

The Hemodialysis Adequacy CPMs described in this Report are:

CPM I. The patient's delivered dose of hemodialysis is measured at least once per month.

CPM II. The patient's delivered dose of hemodialysis reported in the patient's chart is calculated by using formal urea kinetic modeling (UKM) or the Daugirdas II formula for spKt/V.

CPM III. For those patients on hemodialysis six months or longer and dialyzing three times per week, the delivered dose of hemodialysis calculated from data points on the data collection form (monthly measurement averaged over the three-month study period) is spKt/V $\geq$ 1.2.

The clinical information collected to calculate these adequacy CPMs also allows us to describe other aspects or indicators of dialysis adequacy, such as the mean spKt/V values for hemodialysis patients in each Network area and in the U.S.

The Peritoneal Dialysis Adequacy CPMs described in this Report are:

CPM I. The patient's total solute clearance for urea and creatinine is measured routinely (defined for this report as at least once during the six-month study period).

CPM II. The patient's total solute clearance for urea (weekly Kt/V_{urea}) and creatinine (weekly creatinine clearance) is calculated in a standard way. (See Peritoneal Dialysis Adequacy CPM II in Appendix 1, page 71).

CPM III. For patients on continuous ambulatory peritoneal dialysis (CAPD), the delivered peritoneal dialysis dose is a total Kt/V_{urea} of at least 2.0 per week and a total creatinine clearance (CrCl) of at least 60 L/week/1.73 m^2 — OR there is evidence that the dialysis prescription was changed if the adequacy measurements were below these thresholds.

For Cycler patients, the weekly delivered peritoneal dialysis dose is a total Kt/V_{urea} of at least 2.1 and a weekly total creatinine clearance of at least 63L/week/1.73 m^2 — OR there is evidence that the dialysis prescription was changed if the adequacy measurements were below these thresholds.

The Vascular Access CPMs described in this Report are:

CPM I. A primary arteriovenous fistula (AVF) should be the access for at least 50% of all new patients initiating hemodialysis. A native AVF should be the primary access for at least 40% of prevalent patients undergoing hemodialysis.

CPM II. Less than 10% of chronic maintenance hemodialysis patients should be maintained on catheters continuously for ≥ 90 days as their permanent chronic dialysis access.

CPM III. A patient's AV graft should be routinely monitored for stenosis. (See Vascular Access CPM III in Appendix 1, page 74 for a list of techniques and frequency of monitoring used to screen for the presence of stenosis.)

The Anemia Management CPMs described in this Report are:

CPM I. The target hemoglobin for patients prescribed epoetin is 11-12 g/dL (110-120 g/L). Patients with a mean hemoglobin > 12 g/dL (120 g/L) and not prescribed epoetin were excluded from analysis for this CPM.

CPM IIa. For anemic patients (hemoglobin < 11 g/dL (110 g/L) in at least one study month) or patients prescribed epoetin, the percent transferrin saturation and serum ferritin concentration are assessed (measured) at least once in a three-month period for hemodialysis patients and at least two times during the six-month study period for peritoneal dialysis patients.

CPM IIb. For anemic patients (hemoglobin < 11 g/dL (110 g/L) in at least one study month) or patients prescribed epoetin, at least one serum ferritin concentration ≥ 100 ng/mL and at least one transferrin saturation ≥ 20% were documented during the three-month study period for hemodialysis patients or during the six-month study period for peritoneal dialysis patients.

CPM III. All anemic patients (hemoglobin < 11 g/dL (110 g/L) in at least one study month) or patients prescribed epoetin, and with at least one transferrin saturation < 20% or at least one serum ferritin concentration < 100 ng/mL during the study period are prescribed IV iron; UNLESS the mean transferrin saturation was $\geq$ 50% or the mean serum

ferritin concentration was ≥ 800 ng/mL; or UNLESS the patient was in the first three months of dialysis and was prescribed oral iron.

The clinical information collected to calculate these CPMs allows us to describe other aspects or indicators of anemia management. For example, the percentages of patients with a mean hemoglobin ≥ 11 g/dL (110 g/L) and < 10 g/dL (100 g/L) are profiled in this Report. Additionally, the percentages of all patients with mean transferrin saturation ≥ 20%, mean serum ferritin concentration ≥ 100 ng/mL, and the percentages of patients prescribed subcutaneous (SC) epoetin or IV iron are profiled.

Information was collected on epoetin and darbepoetin use during this data collection period. All monthly recorded data were used in determining the percentage of patients prescribed epoetin or darbepoetin.

All monthly recorded data were used in determining the percentage of patients prescribed any IV iron product.

The CPMs may have been calculated slightly differently than other findings reported in this Annual Report. Please refer to Appendix 1 (page 70) for the specific inclusion and exclusion criteria for each CPM.

Note Regarding Race

In this Report, several tables describe important clinical characteristics of adult in-center hemodialysis and peritoneal dialysis patients for the following race groups: American Indian/Alaska Native, Asian/Pacific Islander, Black, White, and Other/Unknown. In the accompanying figures, these clinical characteristics are compared by race group; however, the comparisons are limited to White vs. Black. The reason for this is sample size. Because of small sample size (TABLE 2), the 95% confidence intervals for estimates for some race groups — e.g., American Indian/Alaska Native, Asian/Pacific Islander — are very broad. On the other hand, the sample sizes for White and Black patients were large enough to provide stable estimates; i.e., the 95% confidence intervals are narrow.

CPM HIGHLIGHTS FROM THE NATIONAL 2006 ESRD PROJECT

Random Sample of Adult In-Center Hemodialysis (HD) Patients (n=8,609 sample for analysis) The data are from OCT-DEC 2005:

HD Adequacy

- 82% of patients had monthly adequacy measurements performed (HD Adequacy CPM I)
- 76% of patients had their delivered spKt/V calculated using either UKM or the Daugirdas II formula (26) (HD Adequacy CPM II)
- 94% of patients on dialysis for 6 months or more and dialyzing three times a week had a mean delivered adequacy dose of spKt/V ≥ 1.2 calculated using the Daugirdas II formula (HD Adequacy CPM III)

Vascular Access (VA)

- 54% of incident patients were dialyzed using an AV fistula (AVF) (VA CPM I) (FIGURE 28)
- 44% of prevalent patients were dialyzed using an AVF (VA CPM I) (FIGURES 2, 28)
- 21% of prevalent patients were dialyzed with a chronic catheter continuously for 90 days or longer (VA CPM II) (FIGURE 2)
- 69% of prevalent patients with an AV graft were routinely monitored for the presence of stenosis (VA CPM III)

Anemia Management (AM)

- 35% of targeted patients prescribed epoetin had a mean hemoglobin 11.0-12.0 g/dL (110-120 g/L) (AM CPM I)
- 95% of patients who met the inclusion criteria[1] had at least one documented transferrin saturation value and one documented serum ferritin concentration value during the study period (AM CPM IIa)
- 80% of patients who met the inclusion criteria[1] had at least one transferrin saturation ≥ 20% and one serum ferritin concentration ≥ 100 ng/mL during the study period (AM CPM IIb)
- 81% of patients who met the inclusion criteria[1] were prescribed intravenous iron in at least one month during the study period (AM CPM III)

	Year							
ESRD CPM Trends (percent of patients meeting the CPMs)[1]	**1998**	**1999**	**2000**	**2001**	**2002**	**2003[4]**	**2004**	**2005**
HD Adequacy								
HD Adequacy CPM I (monthly measurement of delivered HD dose)	79	76	80	82	83	83	83	**82**
HD Adequacy CPM II (method of measurement of delivered dose)	99[5]	50	52	68	67	83	76	**76**
HD Adequacy CPM III (mean delivered HD dose ≥ 1.2)	85	90	91	92	92	94	95	**94**
Vascular Access								
Vascular Access CPM Ia (incident patient with an AVF[2] as access)	26	28	27	29	27	35	37	**54**
Vascular Access CPM Ib (prevalent patients with an AVF as access)	26	27	30	31	33	35	39	**44**
Vascular Access CPM II (dialyzed with chronic catheter[3])	14	14	17	19	21	20	21	**21**
Vascular Access CPM III (AVF graft was routinely monitored for stenosis)	37	45	47	51	61	77	67	**69**
Anemia Management								
Anemia CPM I (mean Hgb 11-12 g/dL)	36	36	38	38	36	36	34	**35**
Anemia CPM IIa (iron stores assessed for anemic patients or patients prescribed Epoetin)	90	89	91	92	94	96	95	**95**
Anemia CPM IIb (iron stored maintained at KDOQI targets)	67	66	71	75	78	81	80	**80**
Anemia CPM III (administration of IV iron to anemic patients)	63	67	73	77	79	79	82	**81**

[1]See Appendix for a description of the inclusion and exclusion criteria

[2]Arteriovenous fistula

[3]For 90 days or longer

[4]First year for Large Dialysis Organization (LDO) electronic data submission

[5]For 1998 only, accepted HD dose calculated using urea kinetic modeling (UKM), or Daugirdas II , or urea reduction ratio (URR); for all subsequent years, only UKM or Daugirdas II accepted.

NOTE: When a single year, such as 2005, is used in displaying data, it refers to October, November, and December of that year for the hemodialysis patients.

CPM HIGHLIGHTS FROM THE NATIONAL 2006 ESRD PROJECT

Random Sample of Adult Peritoneal Dialysis (PD) Patients (n=1,409 sample for analysis) The data are from OCT 2005-March 2006:

PD Adequacy

- 80% of patients had at least one measured total solute clearance for urea and creatinine (PD Adequacy CPM I) during the six-month study period (FIGURE 3)
- 41% of patients had their total solute clearance for urea and creatinine calculated in a standard way[2] (PD Adequacy CPM II) (FIGURE 3)
- 72% of CAPD patients had a mean weekly Kt/V_{urea} of ≥ 2.0 and a mean weekly creatinine clearance ≥ 60L/week/1.73m^2 OR there was evidence the dialysis prescription was changed if the adequacy measurements were below these thresholds during the six-month study period (PD Adequacy CPM III) (FIGURES 4, 41)
- 59% of Cycler[4] patients had a mean weekly Kt/V_{urea} of ≥ 2.1 and a mean weekly creatinine clearance ≥ 63 L/week/1.73m^2 OR there was evidence the dialysis prescription was changed if the adequacy measurements were below these thresholds during the six-month study period (PD Adequacy CPM III) (FIGURES 4, 41)

Anemia Management (AM)

- 30% of targeted patients prescribed epoetin had a mean hemoglobin between 11.0-12.0 g/dL (110-120 g/L) (AM CPM I)
- 76% of patients who met the inclusion criteria[1] for this CPM had at least two documented transferrin saturation values and two documented serum ferritin concentration values during the six-month study period (AM CPM IIa)
- 83% of patients who met the inclusion criteria[1] for this CPM had at least one transferrin saturation ≥ 20% and one serum ferritin concentration ≥ 100 ng/mL during the six month study period (AM CPM IIb)
- 39% of patients who met the inclusion criteria[1] for this CPM were prescribed intravenous iron in at least one of the two-month periods during the six-month study period (AM CPM III)

	Year							
ESRD CPM Trends (percent of patients meeting the CPMs)[1]	**1999**	**2000**	**2001**	**2002**	**2003**	**2004[3]**	**2005**	**2006**
PD Adequacy								
PD Adequacy CPM I								
(measurement of total solute clearance at regular intervals)	82	83	85	86	88	86	82	**80**
PD Adequacy CPM II								
(weekly Kt/V_{urea} & weekly CrCl calculated in a standard way)[2]	55	59	62	62	65	44	41	**41**
PD Adequacy CPM III (delivered PD dose meets KDOQI thresholds)								
CAPD	55	68	69	68	71	70	73	**72**
Cycler with daytime dwell	58	65	62	70	66	65	59	
Cycler without daytime dwell	45	66	64	61	67	62	58	
Cycler[4]								**59**
Anemia Management								
Anemia CPM I (mean Hgb 11-12 g/dL)	32	34	39	36	39	39	33	**30**
Anemia CPM IIa								
(iron stores assessed for anemic patients or patients prescribed Epoetin)	70	68	72	74	77	79	77	**76**
Anemia CPM IIb (iron stores maintained at KDOQI targets)	72	70	75	76	81	83	82	**83**
Anemia CPM III (administration of IV iron to anemic patients)	17	18	23	31	32	29	31	**39**

[1]See Appendix 1 for a description of the inclusion and exclusion criteria.

[2]See Appendix 1 for a description of standard ways for calculating total solute clearance.

[3]First year for Large Dialysis Organization (LDO) electronic data submission.

[4]For the Oct 2005-Mar 2006 collection, CCPD and NIPD were not distinguishable.

NOTE: When a single year, such as 2006, is used for the peritoneal dialysis patients, it refers to January, February, and March of that year, as well as October, November, and December of the previous year.

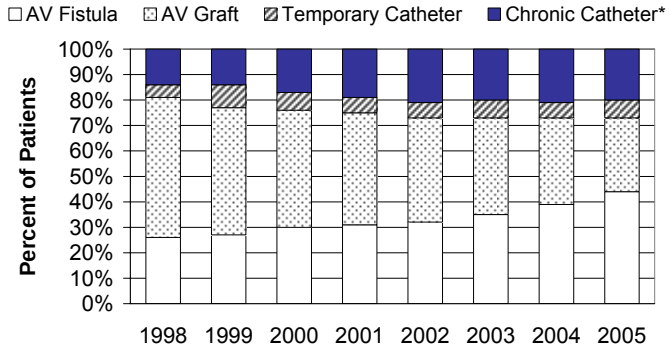
IV. OTHER SIGNIFICANT FINDINGS AND TRENDS

ESRD CPM Data Trends
The figures on the following pages show the trends in the ESRD CPM data for various study periods.

Please note that when a single year, such as 2005, is used in displaying data, it refers to October, November, and December of that year for hemodialysis patients. When a single year, such as 2006, is used for peritoneal dialysis patients, it refers to January, February, and March of that year as well as October, November, and December of the previous year. Also, "adult", refers to ages 18 ≥ years and "pediatric" refers to ages <18 years.

Vascular Access Trends

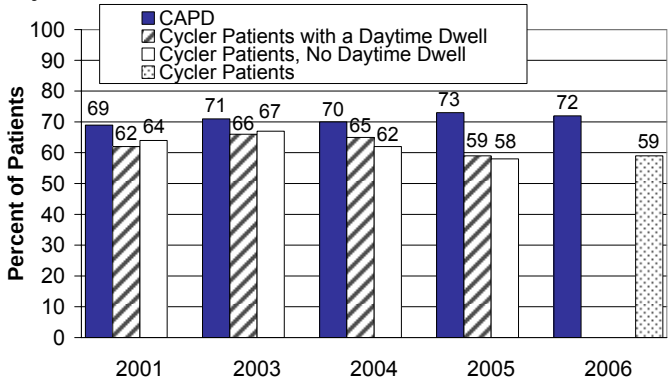
Figure 2: *Vascular access type for all prevalent adult in-center hemodialysis patients on their last hemodialysis session during the study period. 2006 ESRD CPM Project.*



*Chronic catheter defined as use of a catheter access continuously for 90 days or longer.

Peritoneal Dialysis Adequacy Trends

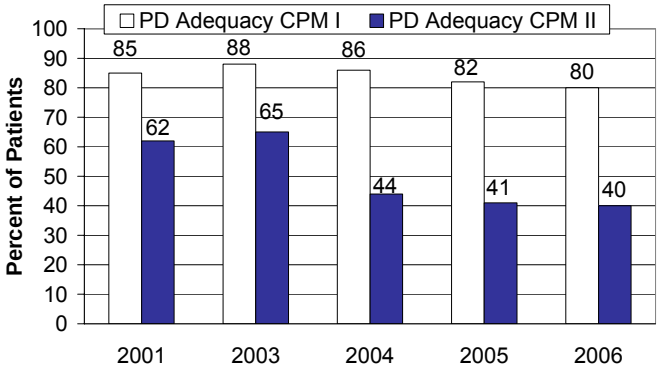
Figure 4: *Percent of adult peritoneal dialysis patients meeting 1997 NKF-DOQI guidelines for weekly Kt/V_{urea} and weekly creatinine clearance (PD Adequacy CPM III). 2006 ESRD CPM Project.*



Note: For Oct 2005-Mar 2006 collection, CCPD and NIPD were not distinguishable.

Peritoneal Dialysis Adequacy Trends

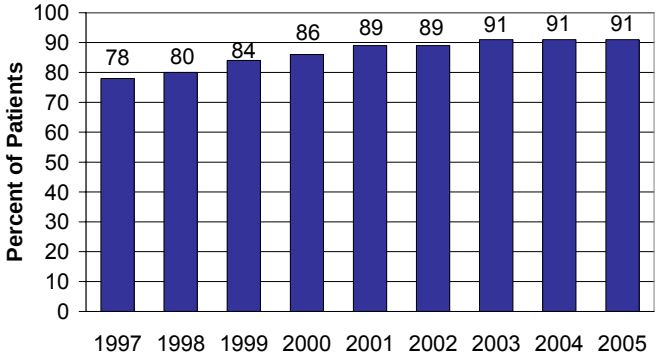
Figure 3: *Percent of adult peritoneal dialysis patients with total solute clearance for urea and creatinine measured at least once during the study period (PD Adequacy CPM 1) and with total solute clearance calculated in a standard way (PD Adequacy CPM II)*, Oct 2005-March 2006 compared to previous study periods. 2006 ESRD CPM Project.*



*See Appendix 1 for a complete description of the standard methods to calculate the solute clearance for urea and creatinine. Note: 2004 was first year for Large Dialysis Organization (LDO) electronic data submission.

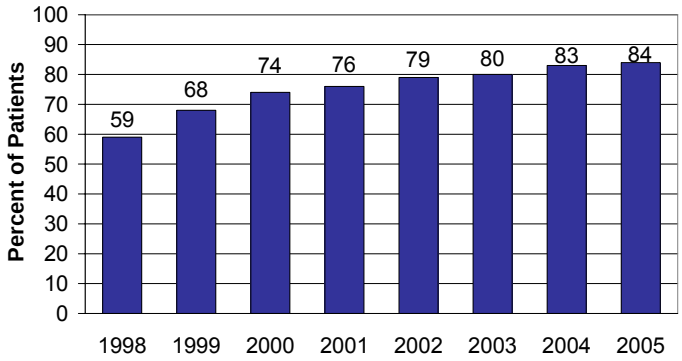
Hemodialysis Adequacy Trends

Figure 5: *Percent of adult in-center hemodialysis patients with mean delivered calculated, single session single pool (sp)Kt/V ≥ 1.2 in October-December 2005 compared to previous study periods. 2006 ESRD CPM Project.*



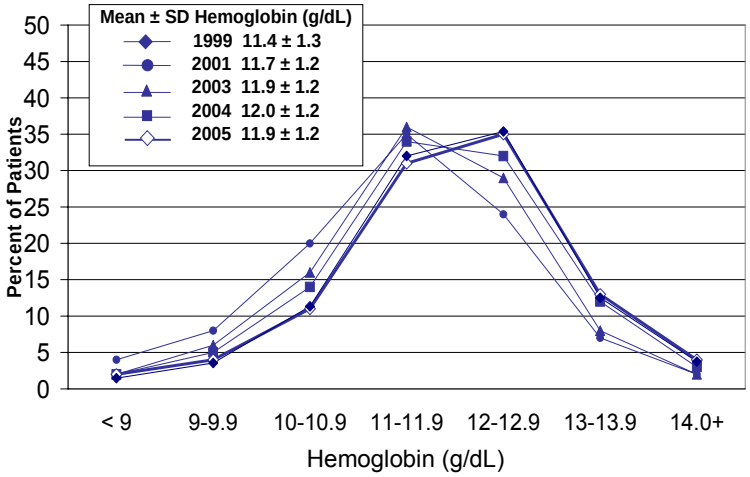
Anemia Management Trends

Figure 6: *Percent of adult in-center hemodialysis patients with mean hemoglobin ≥ 11 g/dL, October-December 2005 compared to previous study periods. 2006 ESRD CPM Project.*



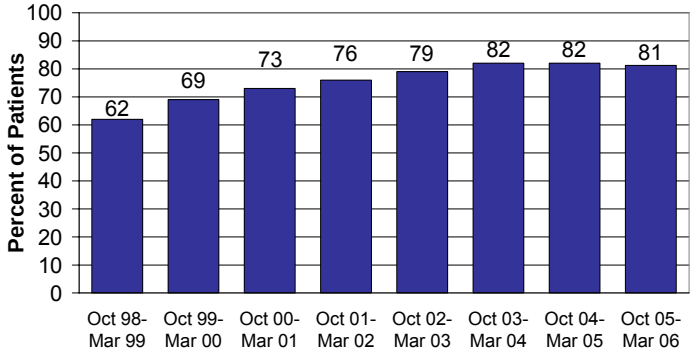
Note: To convert hemoglobin conventional units of g/dL to SI units (g/L), multiply by 10.

Figure 7: *Distribution of mean hemoglobin values for adult in-center hemodialysis patients, October-December 2005 compared to previous study periods. 2006 ESRD CPM Project.*



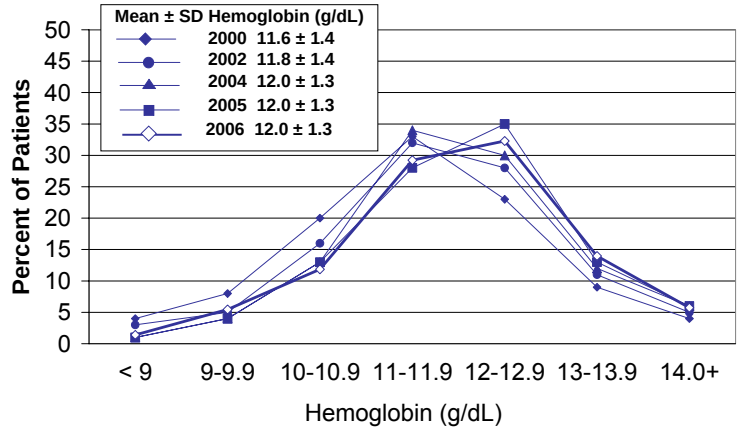
Note: To convert hemoglobin conventional units of g/dL to SI units (g/L), multiply by 10.

Figure 8: *Percent of adult peritoneal dialysis patients with mean hemoglobin ≥ 11 g/dL, October 2005-March 2006 compared to previous study periods. 2006 ESRD CPM Project.*



Note: To convert hemoglobin conventional units of g/dL to SI units (g/L), multiply by 10.

Figure 9: *Distribution of mean hemoglobin values for adult peritoneal dialysis patients, October 2005-March 2006 compared to previous study periods. 2006 ESRD CPM Project.*



Note: To convert hemoglobin conventional units of g/dL to SI units (g/L), multiply by 10.

Pediatric Dialysis Trends

Figure 10: *Distribution of mean delivered, calculated, single session spKt/V values for pediatric (aged < 18 years) in-center hemodialysis patients, October-December 2005 compared to previous study periods. 2006 ESRD CPM Project.*

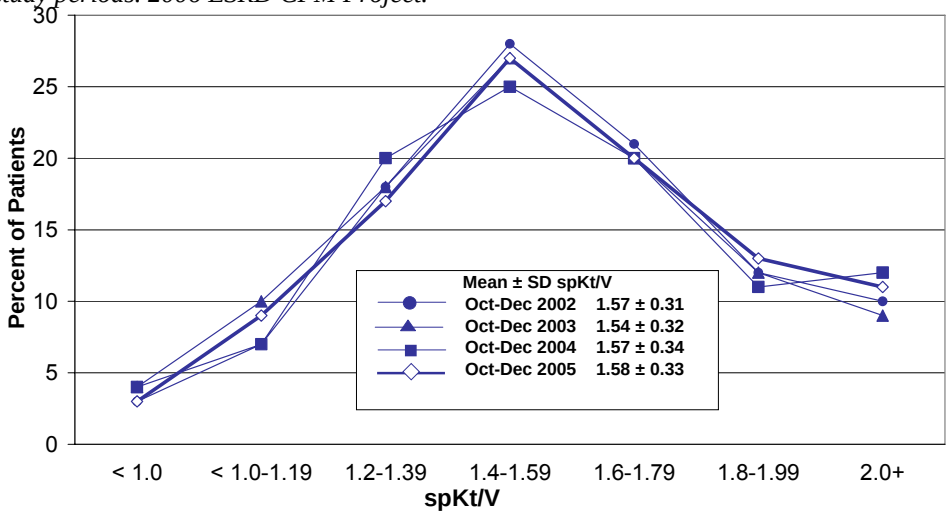
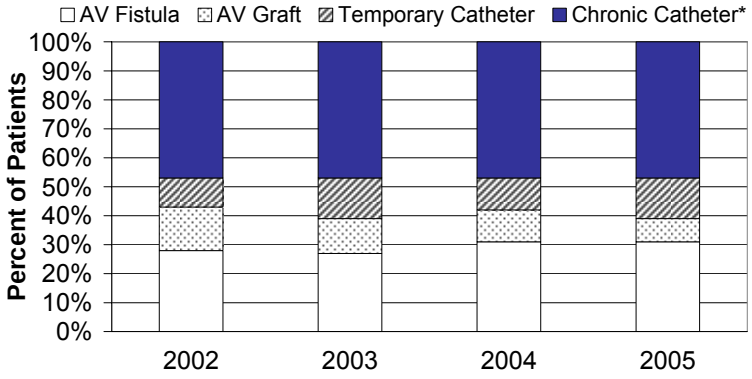
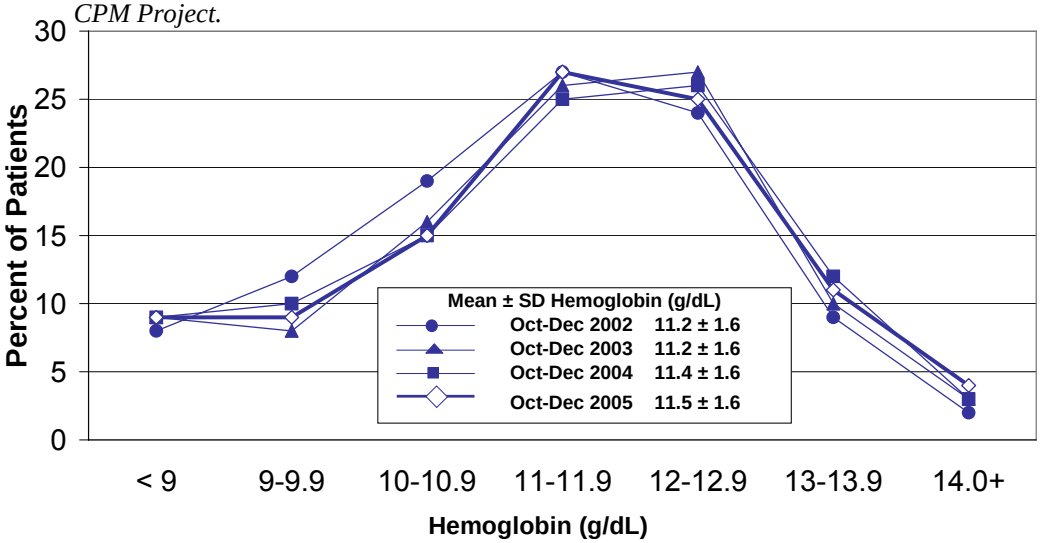


Figure 11: *Vascular access type for pediatric (aged < 18 years) in-center hemodialysis patients on their last hemodialysis session during the study period. 2006 ESRD CPM Project.*



*Chronic catheter use defined as continuous catheter use 90 days or longer.

Figure 12: *Distribution of mean hemoglobin values for pediatric (aged < 18 years) in-center hemodialysis patients, October-December 2005 compared to previous study periods. 2006 ESRD CPM Project.*



Note: To convert hemoglobin conventional units of g/dL to SI units (g/L), multiply by 10.

SELECTED SIGNIFICANT FINDINGS FROM THE NATIONAL 2006 ESRD CPM PROJECT

Random Sample of Adult In-Center Hemodialysis (HD) Patients (n=8,609 sample for analysis) Data from OCT-DEC 2005.

HD Adequacy

- 91% of prevalent patients had a mean delivered, calculated, single-session adequacy dose of spKt/V ≥ 1.2 (FIGURE 5)
- 94% of female patients and 88% of male patients were receiving dialysis with a mean delivered, calculated, single-session spKt/V ≥ 1.2 in OCT-DEC 2005 (TABLE 7)
- Mean ± SD spKt/V was 1.6 ± 0.3 (FIGURE 13)
- 88% of patients had a mean URR ≥ 65% (APPENDIX 6)
- Mean ± SD URR was 72 ± 7% (APPENDIX 7)
- Mean ± SD dialysis session length was 216 ± 31 minutes (FIGURE 18)

Opportunity to Improve Adequacy

- 9% of patients did not have a mean spKt/V ≥ 1.2 during the three-month study period (TABLE 7)

Vascular Access

- 54% of incident and 44% of prevalent patients dialyzed with an AVF during their last hemodialysis session of the data collection period OCT-DEC 2005 (FIGURE 28, TABLE 9)
- 69% of patients with an AVF or AV graft had their access routinely monitored for the presence of stenosis during the three-month study period (APPENDIX 6)

Opportunities to Improve Vascular Access

- 46% of incident patients and 56% of all patients were not dialyzed with an AVF during their last hemodialysis session OCT-DEC 2005 (FIGURE 28, TABLE 9)
- 31% of patients with an AVF or AV graft did not have their access routinely monitored for the presence of stenosis during the three-month study period (APPENDIX 6)

Anemia Management (AM)

- 84% of patients had a mean hemoglobin ≥ 11 g/dL (110 g/L) in the last quarter of 2005 (FIGURE 6)
- 5% of patients had a mean hemoglobin < 10.0 g/dL (100 g/L) (TABLE 14)
- Mean ± SD hemoglobin was 12.0 ± 1.2 g/dL (119 ± 12 g/L) (FIGURE 7)
- 78% of patients had a mean transferrin saturation ≥ 20% (FIGURE 35, TABLE 16)
- 95% of patients had a mean serum ferritin concentration ≥ 100 ng/mL (FIGURE 35, TABLE 16)
- 24% of patients had a mean serum ferritin > 800 ng/mL (FIGURE 35, TABLE 16)
- 69% of patients were prescribed IV iron during the study period (FIGURE 35, TABLE 16)

Opportunities to Improve Anemia Management

- 16% of patients did not have a mean hemoglobin ≥ 11 g/dL (110 g/L) during the three-month study period (FIGURE 6)
- 22% of patients did not have a mean transferrin saturation ≥ 20% and 5% of patients did not have a mean serum ferritin ≥ 100 ng/mL (FIGURE 35, TABLE 16)

Serum Albumin

- 33% of patients had a mean serum albumin ≥ 4.0/3.7 g/dL (40/37 g/L) (BCG/BCP)[1] (FIGURE 40, TABLE 17)
- 80% of patients had a mean serum albumin ≥ 3.5/3.2 g/dL (35/32 g/L) (BCG/BCP) (FIGURE 40, TABLE 17)
- Mean ± SD serum albumin was 3.8 ± 0.4/3.4 ± 0.5 g/dL (38 ± 4/34 ± 5 g/L) (BCG/BCP) (FIGURE 36)

Opportunity to Improve Serum Albumin

- 67% of patients did not have a mean serum albumin ≥ 4.0/3.7 g/dL (40/37 g/L) (BCG/BCP) during the three-month study period (FIGURE 40, TABLE 17)

[1]BCG = bromcresol green, BCP = bromcresol purple; these are two different laboratory methods for assaying serum albumin.

SELECTED SIGNIFICANT FINDINGS FROM THE NATIONAL 2006 ESRD CPM PROJECT

Random Sample of Adult Peritoneal Dialysis (PD) Patients (n=1,409 sample for analysis) The data are from OCT 2005–MAR 2006:

PD Adequacy

- Mean weekly Kt/V_{urea} for CAPD patients was 2.33 ± 0.61 (APPENDIX 8)
- Mean weekly Kt/V_{urea} for Cycler patients was 2.26 ± 0.62 (TABLE 21)

Opportunities to Improve Adequacy

- The adequacy of dialysis was not assessed during the 2006 study period for 20% of the sampled peritoneal dialysis patients (APPENDIX 8)
- 31% of CAPD patients did not achieve an adequate weekly Kt/V_{urea} and 41% did not achieve an adequate weekly CrCl. (APPENDIX 8) Likewise, 43% of cycler patients did not achieve an adequate weekly Kt/V_{urea} and 52% did not achieve an adequate weekly CrCl (TABLE 21)

Anemia Management (AM)

- 81% of patients had a mean hemoglobin ≥ 11 g/dL (FIGURES 8, 43)
- 85% of patients had a mean transferrin saturation ≥ 20% (FIGURE 44)
- 88% of patients had a mean serum ferritin concentration ≥ 100 ng/mL (FIGURE 44)
- Mean ± SD hemoglobin was 12.0 ± 1.3 g/dL (120 ± 13 g/L) (FIGURES 9, 42, TABLE 22)
- 16% of patients had a mean serum ferritin > 800 ng/mL (FIGURE 44)

Opportunities to Improve Anemia Management

- 19% of patients did not have a mean hemoglobin ≥ 11g/dL (110 g/L) in the 2006 study period (FIGURES 8, 43)
- 15% of patients did not have a mean transferrin saturation ≥ 20% and 12% of patients did not have a mean serum ferritin ≥ 100 ng/mL in the 2006 study period (FIGURE 44)

Serum Albumin

- 19% of patients had a mean serum albumin ≥ 4.0/3.7 g/dL (40/37 g/L) (BCG/BCP)[1] (FIGURE 45, TABLE 23)
- 62% of patients had a mean serum albumin ≥ 3.5/3.2 g/dL (35/32 g/L) (BCG/BCP) (FIGURE 45, TABLE 23)
- Mean ± SD serum albumin was 3.6 ±0.5/3.3 ± 0.6 g/dL (36 ± 5/33 ± 6 g/L) (BCG/BCP) (APPENDIX 8)

Opportunities to Improve Serum Albumin

- 81% of PD patients did not have mean serum albumin ≥ 4.0/3.7 g/dL (40/37 g/L) (BCG/BCP) during the six-month study period (FIGURE 45, TABLE 23)
- 38% of PD patients did not have mean serum albumin ≥ 3.5/3.2 g/dL (35/32 g/L) (BCG/BCP) during the six-month study period (FIGURE 45, TABLE 23)

[1]BCG = bromcresol green, BCP = bromcresol purple; these are two different laboratory methods for assaying serum albumin.

Using the 1997 NKF-DOQI guidelines (14): For cycler patients; weekly Kt/V_{urea} ≥ 2.1; weekly CrCl ≥ 66 L/week/1.73m²

SELECTED SIGNIFICANT FINDINGS FROM THE NATIONAL 2006 ESRD CPM PROJECT

100% Sample Pediatric In-Center Hemodialysis Patients (HD) (aged < 18 years) (n=743 sample for analysis) The data are from OCT–DEC 2005:

Clearance

- 88% of patients had a mean delivered, calculated, single-session adequacy dose of spKt/V ≥ 1.2 calculated using the Daugirdas II formula (26) (TABLE 24)
- Mean ± SD spKt/V was 1.58 ± 0.33 (FIGURES 10, 46)
- Mean ± SD dialysis session length was 202 ± 33 minutes

Opportunity to Improve Clearance

- 12% of patients did not have a mean spKt/V ≥ 1.2 during the three-month study period (TABLE 24)

Vascular Access

- 31% of patients were dialyzed using an AV fistula (AVF) (FIGURE 11, TABLE 25)
- 47% of patients were dialyzed with a chronic catheter continuously for 90 days or longer (FIGURE 11)
- 58% of patients with an AVF or an AV graft had their access routinely monitored for the presence of stenosis

Opportunity to Improve Vascular Access

- 42% of patients with an AVF or AV graft did not have this access routinely monitored for the presence of stenosis during the three-month study period

Anemia Management

- 68% of patients had a mean hemoglobin ≥ 11 g/dL (110 g/L)
- Mean ± SD hemoglobin was 11.5 ± 1.6 g/dL (115 ± 16) g/L (FIGURES 12, TABLE 27)
- 74% of patients had a mean transferrin saturation ≥ 20% (FIGURE 55)
- 83% of patients had a mean serum ferritin concentration ≥ 100 ng/mL (FIGURE 55)
- 17% of patients had a mean serum ferritin > 800 ng/mL (FIGURE 55)

Opportunity to Improve Anemia Management

- 32% of patients did not have a mean hemoglobin ≥ 11 g/dL (110 g/L) during the three-month study period (FIGURES 52, 53, 54)

Serum Albumin

- 44% of patients had a mean serum albumin ≥ 4.0/3.7 g/dL (40/37 g/L) (BCG/BCP)[1] (FIGURE 56, TABLE 28)
- 80% of patients had a mean serum albumin ≥ 3.5/3.2 g/dL (35/32 g/L) (BCG/BCP) (FIGURE 56, TABLE 28)
- Mean ± SD serum albumin was 3.9 ± 0.5 /3.5 ± 0.5 g/dL (39 ± 5/35 ± 5 g/L) (BCG/BCP)

Opportunity to Improve Serum Albumin

- 56% of patients did not have a mean serum albumin ≥ 4.0/3.7 g/dL (40/37 g/L) (BCG/BCP) during the three-month study period (FIGURE 56, TABLE 28)

[1]BCG = bromcresol green, BCP = bromcresol purple; these are two different laboratory methods for assaying serum albumin.

SELECTED SIGNIFICANT FINDINGS FROM THE NATIONAL 2006 ESRD CPM PROJECT

100% Sample Pediatric Peritoneal Dialysis Patients (PD) (aged < 18 years) (n=781 sample for analysis) The data are from OCT 2005 – MAR 2006:

Clearance

- 71% of cycler patients had a mean weekly $Kt/V_{urea} \geq 2.1$ (TABLE 29)
- Mean weekly Kt/V_{urea} for cycler patients was 2.53 ± 0.77 (TABLE 29)

Opportunities to Improve Clearance

- 29% of cycler patients did not have a mean weekly $Kt/V_{urea} \geq 2.1$ during the six-month study period

Anemia Management

- 71% of patients had a mean hemoglobin ≥ 11 g/dL (110 g/L) (TABLE 31, FIGURES 58, 59)
- Mean ± SD hemoglobin was 11.6 ± 1.5 g/dL (116 ± 15 g/L)
- 78% of patients had a mean transferrin saturation ≥ 20%
- 72% of patients had a mean serum ferritin concentration ≥ 100 ng/mL

Opportunity to improve Anemia Management

- 29% of patients did not have a mean hemoglobin ≥ 11 g/dL (110 g/L) during the six-month study period

Serum Albumin

- 26% of patients had a mean serum albumin ≥ 4.0/3.7 g/dL (40/37 g/L) (BCG/BCP) (TABLE 32)
- 63% of patients had a mean serum albumin ≥ 3.5/3.2 g/dL (35/32 g/L) (BCG/BCP) (TABLE 32)
- Mean serum albumin was 3.6 ± 0.6/3.4 ± 0.5 g/dL (37 ± 6/34 ± 6 g/L) (BCG/BCP)

Opportunity to Improve Serum Albumin

- 74% of patients did not have a mean serum albumin ≥ 4.0/3.7 g/dL (40/37 g/L) (BCG/BCP) during the six-month study period

IMPORTANT NOTE

The data in this Report are intended to stimulate the development of quality improvement (QI) projects in dialysis facilities. The data collected for this project were necessarily limited: not all dialytic parameters that influence patient care for these clinical measures were collected. In addition, the project did not attempt to develop facility-specific profiles of care.

As you review this Report, ask yourself questions about how your patients' clinical characteristics compare to these national hemodialysis and peritoneal dialysis patient profiles and Network hemodialysis patient profiles. Additional information must be collected at your facility if you wish to answer these questions and develop ways to improve patient care for your patients. Your ESRD Network staff and Medical Review Board members are available to assist you in using these data in your QI activities and in developing facility-specific QI projects.

V. ADULT IN-CENTER HEMODIALYSIS PATIENTS

This section describes selected CPM and other quality indicators for the sampled adult in-center hemodialysis patients related to adequacy of dialysis, vascular access, anemia management and serum albumin. Each of these subsections is further divided into three parts:

(1) National findings for selected CPMs for October–December 2005 (the serum albumin information is not considered a CPM for this report);

(2) A description of other quality indicators or data analyses for October-December 2005; and

(3) A comparison of CPM and/or other quality indicators results or findings for October–December 2005 and previous study periods.

A national random sample of adult (≥ 18 years) in-center hemodialysis patients, stratified by Network, who were alive on December 31, 2005, was selected (n=8,915). 8,609 patients (97%) were included in the sample for analysis.

A. ADEQUACY OF HEMODIALYSIS

1. CPM Findings for October–December 2005

The data for three hemodialysis adequacy CPMs included in this section (Hemodialysis Adequacy CPM I-III) were collected in 2006. The time period from which these data were abstracted was October-December 2005.

Hemodialysis Adequacy CPM I — The patient's delivered dose of hemodialysis is measured at least once per month.

FINDING: 81% of adult in-center hemodialysis patients in the sample for analysis had documented measurements of hemodialysis adequacy (URR and/or spKt/V) for each month during the three-month study period (October–December 2005). These measurements were recorded in the patient's chart, not calculated from individual data points. An additional 13% of the patients in the sample for analysis had documented adequacy measurements for two out of the three months, and another 5% of the patients had documented adequacy measurements for one of the three months.

Hemodialysis Adequacy CPM II — The patient's delivered dose of hemodialysis recorded in the patient's chart is calculated by using formal urea kinetic modeling (UKM) or the Daugirdas II formula (for spKt/V) (26).

FINDING: 76% of adult in-center hemodialysis patients in the sample for analysis had delivered hemodialysis doses reported as spKt/V calculated using formal UKM or the Daugirdas II formula.

Hemodialysis Adequacy CPM III — The patient's delivered dose of hemodialysis calculated from data points on the data collection form (monthly measurement averaged over the three-month study period) is spKt/V ≥ 1.2 using the Daugirdas II formula (26). This CPM is calculated on the subset of patients who had been on hemodialysis therapy for six months or longer and who were dialyzing three times per week (n=6,604).

FINDING: For the last quarter of 2005, 94% of the adult in-center hemodialysis patients who met the inclusion criteria (only those patients who had been on hemodialysis therapy for six months or longer and who were dialyzing three times per week [n=6,604]) had a mean delivered, calculated, single-session (hereafter referred to as delivered) hemodialysis dose of spKt/V ≥ 1.2.

2. Other Hemodialysis Adequacy Findings for October-December 2005

NOTE: The following findings apply to all adult in-center hemodialysis patients in the sample for analysis regardless of when they first initiated dialysis. Only 0.8% (n=67) of patients were dialyzed more than three times per week over the study period; these patients were included in the following hemodialysis adequacy findings.

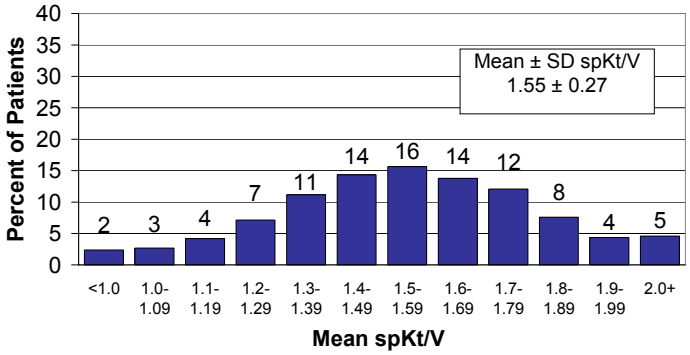
The mean ± SD delivered calculated spKt/V of all adult in-center hemodialysis patients in the sample for analysis in the last quarter of 2005 was 1.55 ± 0.27. The distribution of spKt/V values for these patients is shown in Figure 13. The mean ± SD delivered calculated URR for this sample was 72 ± 7%. 88% of patients had a mean delivered URR ≥ 65%. The mean delivered spKt/V and the percentages of patients with mean delivered spKt/V ≥ 1.2 and spKt/V ≥ 1.3 for gender, race, ethnicity, age, diagnosis, duration of dialysis, quintile of post-dialysis body weight, access type, and selected clinical parameters are shown in Table 7.

The percentage of patients in the sample for analysis with at least one calculated spKt/V measure available (n=8,301) who received adequate hemodialysis, defined as a mean delivered spKt/V ≥ 1.2, approximately equivalent to URR ≥ 65% (2), in the last quarter of 2005 was 91% (TABLE 7).

The percentage of patients receiving hemodialysis with a mean delivered spKt/V ≥ 1.2 was higher for women than for men, higher for Hispanics compared to non-Hispanics, higher for patients dialyzing six months or longer than for patients dialyzing less than six months, higher for patients in lower quintiles of body weight, and higher for patients ≥ 65 years of age than for younger patients. Whites and Blacks had the same rate of delivered Kt/V ≥ 1.2, while American Indians/Alaska Natives and Asians/Pacific Islanders had higher rates. Those of other or unknown race had a lower percent receiving delivered dialysis with Kt/V ≥ 1.2 (TABLE 7).

A higher percentage of patients with mean hemoglobin ≥ 11 g/dL (110 g/L) and mean serum albumin ≥ 3.5/3.2 g/dL (35/32 g/L) (BCG/BCP) had a mean spKt/V ≥ 1.2 compared to patients with lower mean hemoglobin and serum albumin values. A higher percentage of patients dialyzing with an AV fistula, an AV graft, or graft without AVF had a mean delivered spKt/V ≥ 1.2 compared to patients dialyzing with a catheter (93%, 97% and 96% vs. 81%, respectively) (TABLE 7).

Figure 13: *Distribution of mean delivered, calculated, single session spKt/V values for adult in-center hemodialysis patients, October–December 2005. 2006 ESRD CPM Project.*



The mean ± SD dialysis session length was 216 ± 31 minutes (FIGURE 18). The mean dialysis session length was somewhat longer for men than for women (223 minutes vs. 208 minutes), for Blacks than for Whites (222 minutes vs. 213 minutes), and for patients dialyzing six months or longer compared to patients dialyzing less than six months (217 minutes vs. 212 minutes). Patients in the highest quintile of post-dialysis body weight (kg) had longer dialysis session lengths compared to patients in the lowest quintile (236 minutes vs. 198 minutes). The mean dialysis session length was 218 minutes for patients dialyzing with an AVF, 213 minutes for graft with an AVF, 214 minutes for graft without an AVF, and 216 minutes for patients with a catheter access.

The percentage of patients who received adequate hemodialysis varied significantly from one geographic region to another. Table 8 shows, by gender, race, ethnicity, post-dialysis body weight, and dialysis session length the percentage of patients who received hemodialysis with a mean delivered spKt/V ≥ 1.2 in each Network area. The percentage of all patients with mean delivered spKt/V ≥ 1.2 ranged from 88% to 93% among the 18 Networks (FIGURES 14, 15).

Figure 14: *Percent of adult in-center hemodialysis patients receiving dialysis with a mean delivered, calculated single session spKt/V ≥ 1.2, by Network, October–December 2005. 2006 ESRD CPM Project.*

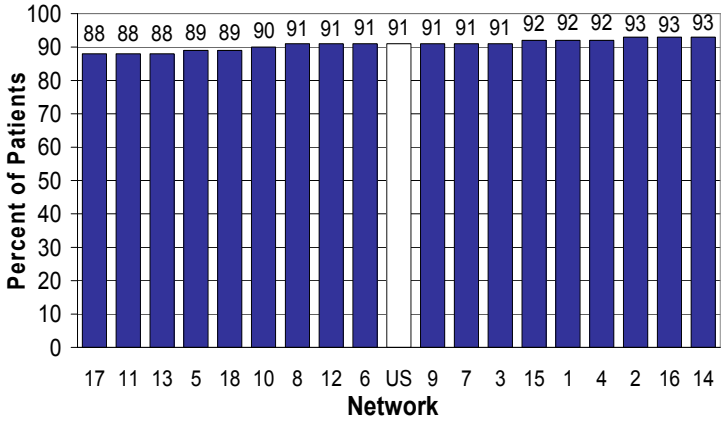


Figure 15: *Percent of adult in-center hemodialysis patients receiving dialysis with a mean delivered, calculated single session spKt/V ≥ 1.2, by Network, October–December 2005. 2006 ESRD CPM Project.*

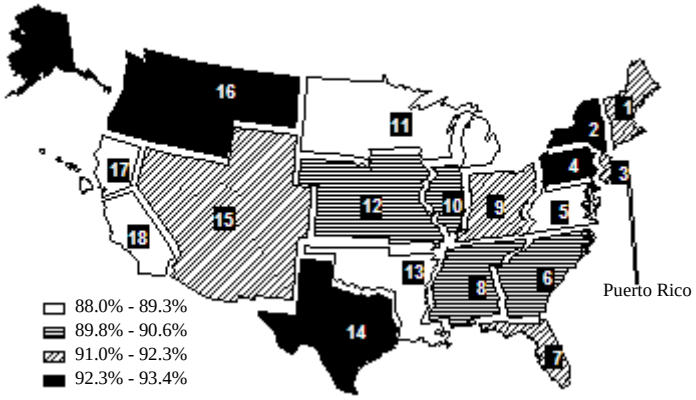


TABLE 7: *Mean delivered calculated, single session spKt/V and percent of adult in-center hemodialysis patients with mean delivered calculated, single session spKt/V ≥ 1.2 and ≥ 1.3 by patient characteristics, October-December 2005. 2006 ESRD CPM Project.*

Patient Characteristics	Mean spKt/v	Percent of Patients with spKt/V ≥ 1.2%	Percent of Patients with spKt/V ≥ 1.3%
ALL	**1.55**	**91**	**84**
GENDER			
Men	1.49	88	79
Women	1.62	94	89
RACE			
American Indian/Alaska Native	1.66	92	85
Asian/Pacific Islander	1.66	95	91
Black or African American	1.53	91	83
White	1.55	91	84
Other/Unknown	1.54	87	77
ETHNICITY			
Hispanic	1.60	92	87
Non-Hispanic	1.54	91	83
AGE GROUP (years)			
18-44	1.52	88	80
45-54	1.51	88	81
55-64	1.52	88	80
65-74	1.57	93	87
75+	1.61	95	90
CAUSE OF ESRD			
Diabetes Mellitus	1.53	90	82
Glomerulonephritis	1.55	89	83
Hypertension	1.57	92	85
Other/Unknown	1.57	92	85
DURATION OF DIALYSIS (years)			
< 0.5	1.39	73	59
0.5-0.9	1.50	88	78
1.0-1.9	1.57	93	86
2.0-2.9	1.58	94	87
3.0-3.9	1.58	94	88
4.0+	1.60	95	90
QUINTILE POSE-DIALYSIS BODY WEIGHT (kg)			
32.0 - 60.0	1.72	97	94
60.1 - 69.9	1.61	95	92
70.0 - 79.7	1.54	92	85
79.8 - 94.3	1.49	89	79
94.4 - 226.0	1.39	81	68
ACCESS TYPE			
AV Fistula	1.57	93	86
Graft with AVF	1.61	97	91
Graft without AVF	1.62	96	92
Catheter	1.45	81	70
MEAN Hgb (g/dL)			
≥ 11	1.56	92	85
< 11	1.49	83	75
MEAN SERUM ALBUMIN (g/dL)			
≥ 3.5/3.2 BCG/BCP^	1.56	92	85
< 3.5/3.2 BCG/BCP^	1.50	86	77

^ BCG/BCP = bromcresol green/bromcresol purple laboratory methods.

Note: To convert hemoglobin conventional units of g/dL to SI units (g/L), multiply by 10.

Note: To convert serum albumin conventional units of g/dL to SI units (g/L), multiply by 10.

TABLE 8: *Percent of adult in-center hemodialysis patients receiving dialysis with a mean delivered, single session spKt/V ≥ 1.2, by gender, race, ethnicity, body weight, dialysis session length and Network, October-December 2005. 2006 ESRD CPM Project.*

PATIENT CHARACTERISTIC	NETWORK																		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**U.S.**
ALL	**92**	**93**	**91**	**92**	**89**	**91**	**91**	**91**	**91**	**90**	**88**	**91**	**88**	**93**	**92**	**93**	**88**	**89**	**91**
GENDER																			
Men	89	94	88	91	85	87	89	88	87	88	82	89	85	90	90	90	84	85	**88**
Women	96	92	96	94	93	95	93	93	96	92	95	93	91	97	95	97	92	95	**94**
RACE																			
Black	92	95	91	89	88	92	93	90	91	89	84	91	89	90	86	94	90	96	**91**
White	93	90	91	94	90	90	89	91	91	90	90	91	86	95	92	93	84	88	**91**
ETHNICITY																			
Hispanic	96	95	91	*	*	75	91	*	*	96	93	*	*	95	93	90	93	89	**92**
Non-Hispanic	92	93	91	92	89	91	91	90	91	89	88	91	88	92	92	93	87	90	**91**
POST-DIALYSIS BODY WEIGHT^																			
< 74.83	97	96	95	95	96	94	97	95	96	95	95	97	95	97	96	97	94	95	**96**
≥ 74.83	87	89	86	90	83	87	85	86	87	86	82	85	83	90	88	89	80	83	**86**
DIALYSIS SESSION LENGTH^																			
< 212.67	92	90	91	88	87	89	91	88	86	89	88	90	87	90	90	95	86	89	**89**
≥ 212.67	93	97	91	95	91	92	91	92	95	90	89	91	89	95	94	92	94	91	**93**

* value suppressed because n<11

^ post-dialysis body weight (kg) and dialysis session length categories were created at the median value for the study period

Note: A delivered spKt/V of 1.2 does not necessarily correlated with a delivered URR of 65%.

3. CPM and other Findings for October-December 2005 compared to previous study periods

Note: The following findings apply to all adult in-center hemodialysis patients in the sample for analysis regardless of when they first initiated dialysis.

The mean ± SD delivered spKt/V in October-December 2005 was 1.55 ± 0.26, an increase from previous study years. The percentage of patients receiving dialysis with a mean delivered spKt/V ≥ 1.2 increased significantly from 86% in late 2000 to 91% in late 2005 (FIGURE 5). This significant improvement occurred for both men and women, and for both White and Black patients (FIGURES 16, 17).

Figure 16: *Percent of adult male in-center hemodialysis patients with mean delivered, single session spKt/V ≥ 1.2, by race, October–December 2005 compared to previous study periods. 2006 ESRD CPM Project.*

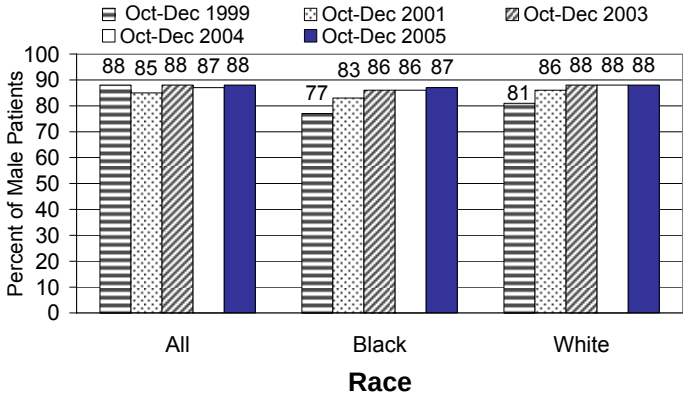


Figure 17*: Percent of adult female in-center hemodialysis patients with mean delivered, single session spKt/V ≥ 1.2, by race, October–December 2005 compared to previous study periods. 2006 ESRD CPM Project.*

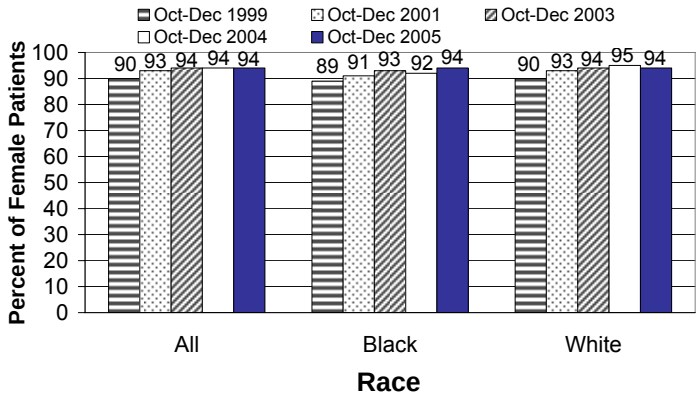
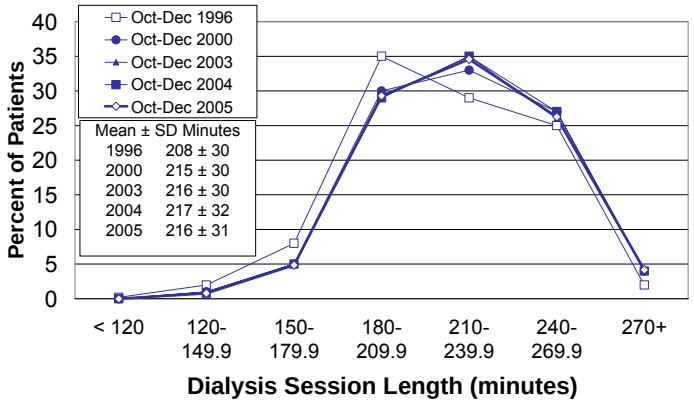


Figure 18 shows a trend for slight increases in dialysis session lengths from late 1996 to late 2005.

Figure 18*: Distribution of mean dialysis session length (minutes), October–December 2005 compared to previous study periods. 2006 ESRD CPM Project.*



B. VASCULAR ACCESS

1. CPM Findings for October-December 2005

Data to assess three vascular access CPMs included in this report were collected in 2006. The time period from which these data were abstracted was October–December 2005.

Vascular Access CPM I — A primary arteriovenous fistula (AVF) should be the access for at least 50% of all new patients initiating hemodialysis. A native AVF should be the primary access for 40% of all prevalent patients undergoing hemodialysis.

FINDING: 54% of incident patients (initiating their most recent course of hemodialysis on or between January 1, 2005 and August 31, 2005 [n = 1,362]) were dialyzed using an AVF on their last hemodialysis session during October–December 2005 (TABLE 9).

44% of all prevalent patients in the sample for analysis were dialyzed using an AVF during their last hemodialysis session October–December 2005 (TABLE 9).

TABLE 9: *Vascular access type for incident^ and all adult in-center hemodialysis patients during the last hemodialysis session of the study period, by selected patient characteristics, October-December 2005. 2006 ESRD CPM Project.*

	Incident (n=1,362)				Prevalent (n=8,609)			
Patient Characteristic	**AVF %**	**Graft w/ AVF %**	**Graft w/o AVF %**	**Catheter %**	**AVF %**	**Graft w/ AVF %**	**Graft w/o AVF %**	**Catheter %**
Total	**54**	*****	**10**	**36**	**44**	**3**	**26**	**27**
GENDER								
Men	59	*	7	33	53	2	21	24
Women	46	*	14	40	33	3	32	32
RACE								
American Indian/Alaska Native	61	*	*	*	53	*	22	22
Asian/Pacific Islander	58	*	*	37	47	4	26	23
Black or African American	50	*	14	35	38	3	34	25
White	55	*	8	37	47	2	21	29
Other/Unknown	*	*	*	*	49	*	19	29
ETHNICITY								
Hispanic	63	*	6	31	51	4	22	23
Non-Hispanic	52	*	11	37	42	2	27	28
AGE GROUP (years)								
18-44	51	*	6	41	52	3	20	25
45-54	59	*	9	33	45	3	26	26
55-64	55	*	10	34	44	3	26	27
65-74	54	*	12	34	41	2	30	27
75+	50	*	11	39	40	2	27	31
CAUSE OF ESRD								
Diabetes Mellitus	55	*	11	34	41	3	28	28
Hypertension	51	*	13	36	44	2	28	25
Glomerulonephritis	62	*	*	32	52	3	23	23
Other/Unknown	51	*	6	42	44	3	22	32
DURATION OF DIALYSIS (years)								
< 0.5	47	*	7	47	26	*	8	66
0.5-0.9	56	*	11	33	56	*	11	33
1.0-1.9	N/A	N/A	N/A	N/A	48	3	26	24
2.0-2.9	N/A	N/A	N/A	N/A	47	2	29	21
3.0-3.9	N/A	N/A	N/A	N/A	44	3	33	20
4.0+	N/A	N/A	N/A	N/A	43	4	36	18

^An incident patient is defined as a patient initiating in-center hemodialysis on or between January 1, 2005 and August 31, 2005.

Note: Percentages may not add up to 100% due to rounding.

*Value suppressed because n < 11.

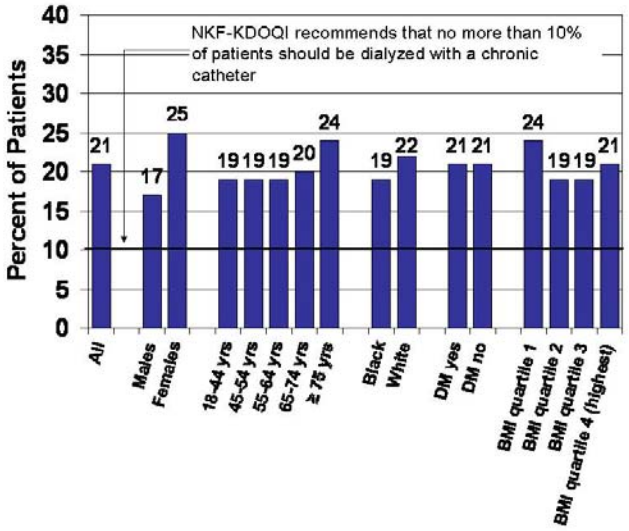
Vascular Access CPM II — Less than 10% of chronic maintenance hemodialysis patients should be maintained on catheters (continuously for 90 days or longer) as their permanent chronic dialysis access.

FINDING: 21% of all patients in the sample for analysis were dialyzed with a chronic catheter continuously for 90 days or longer during October–December 2005 (FIGURE 19).

Vascular Access CPM III — A patient's AV graft should be routinely monitored for stenosis. (See Vascular Access CPM III in Appendix 1 for a list of techniques and frequency of monitoring used to screen for the presence of stenosis).

FINDING: 69% of patients with an AV graft (n=2,385) had this graft routinely monitored for the presence of stenosis during October–December 2005.

Figure 19: *Percent of all adult in-center hemodialysis patients dialyzed with a catheter continuously for 90 days or longer as their vascular access on their last hemodialysis session during October-December 2005, by patient characteristics. 2006 ESRD CPM Project.*



Post-dialysis BMI quartiles: 1) <22.7, 2) 22.7-26.4, 3) 26.5-31.3, 4) >31.3

2. Other Vascular Access Findings for October-December 2005

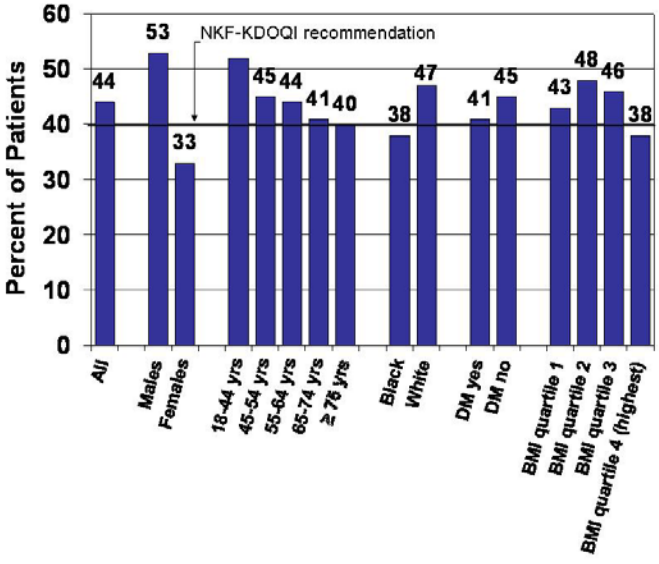
Among prevalent patients, males, Whites, American Indian/Alaska Natives, unknown/other races, Hispanics, patients 18-44 years old, patients with causes of ESRD other than diabetes mellitus, and patients dialyzing six months or longer were more likely to be dialyzed with an AVF compared to women, Blacks, non-Hispanics, patients older than 44 years, patients with diabetes mellitus as the cause of ESRD, and patients dialyzing less than six months (TABLE 9). Many patient groups examined did not meet the current NKF-KDOQI recommendation of 40% of prevalent patients having an AVF as their vascular access (4) (TABLE 9 and 10, FIGURE 20). The percentage of prevalent patients with a catheter as their vascular access, by several patient characteristics, is shown in Table 9 and Figure 21. More women, Whites, American Indian/Alaska Natives, unknown/other races, and patients ≥ 75 years old, had a catheter access compared to men, Blacks, and younger patients.

More women were dialyzed with a catheter for 90 days or longer compared to men (FIGURE 19). None of the patient groups examined met the current NKF-KDOQI recommendation of less than 10% of chronic hemodialysis patients with a catheter as their vascular access (4).

There was wide geographic variation in the percentage of all patients dialyzing with an AVF; the percentage ranged from 36% to 58% among the 18 Network areas (FIGURE 22, TABLE 10). This geographic variation in AVF use was also noted for incident patients, ranging from 45% to 66% among the 18 Network areas (FIGURE 23).

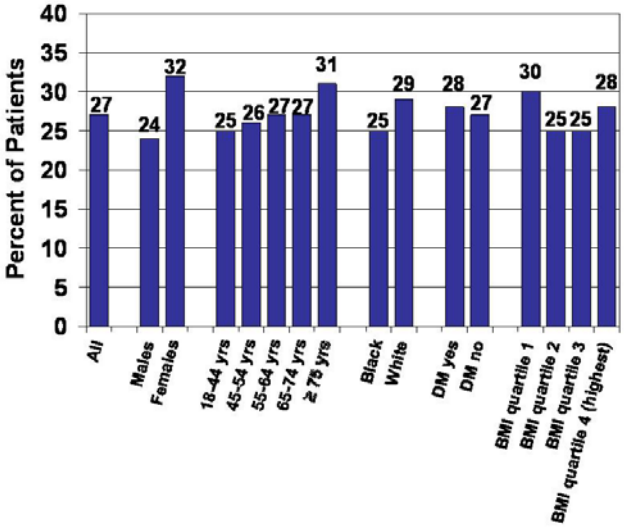
The percentage of patients dialyzed with a catheter exhibited geographic variation, ranging from 22% to 35% among the 18 Network areas (FIGURE 24, TABLE 11). Chronic catheter use (90 days or more) was 21% nationally, and ranged from 17% to 29% across the 18 Network areas (FIGURE 25).

Figure 20: *Percent of all adult in-center hemodialysis patients dialyzed with an AV fistula as their vascular access on their last hemodialysis session during October-December 2005, by patient characteristics. 2006 ESRD CPM Project.*



Post-dialysis BMI quartiles: 1) <22.7, 2) 22.7-26.4, 3) 26.5-31.3, 4) >31.3

Figure 21: *Percent of all adult in-center hemodialysis patients dialyzed with a catheter as their vascular access on their last hemodialysis session during October–December 2005, by patient characteristics. 2006 ESRD CPM Project.*



Post-dialysis BMI quartiles: 1) <22.7, 2) 22.7-26.4, 3) 26.5-31.3, 4) >31.3

Figure 22: *Percent of all adult in-center hemodialysis patients dialyzed with an AV fistula as their vascular access on their last hemodialysis session during October–December 2005, by Network. 2006 ESRD CPM Project.*

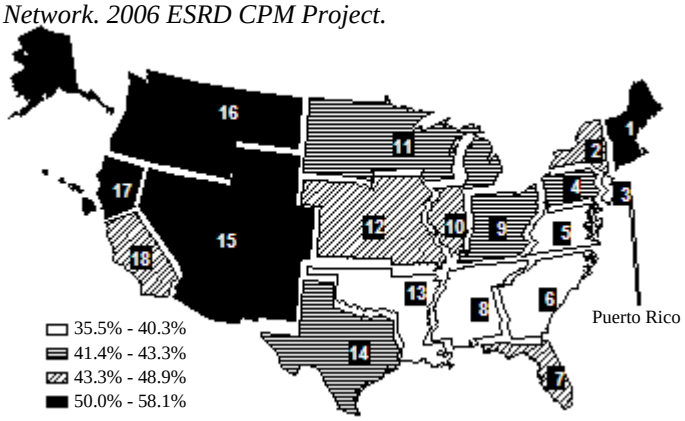
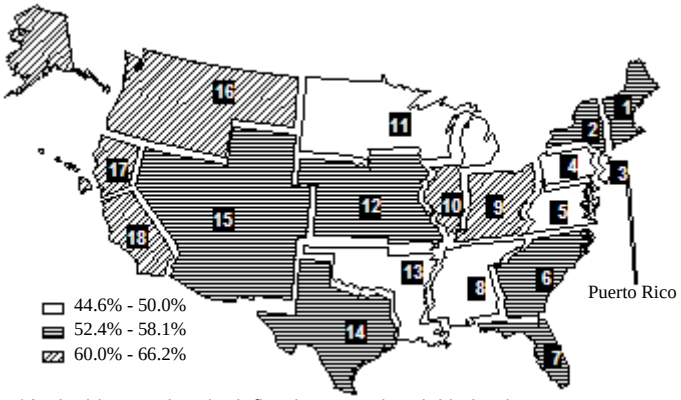


Figure 23: *Percent of incident* adult in-center hemodialysis patients dialyzed with an AV fistula as their vascular access on their last hemodialysis session during October–December 2005, by Network. 2006 ESRD CPM Project.*



*An incident patient is defined as a patient initiating in-center hemodialysis on or between January 1, 2005 and August 31, 2005.

Figure 24: *Percent of all adult in-center hemodialysis patients dialyzed with a catheter as their vascular access on their last hemodialysis session during October–December 2005, by Network. 2006 ESRD CPM Project.*

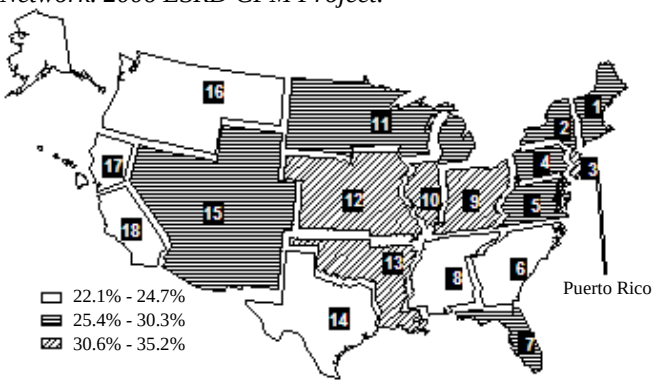
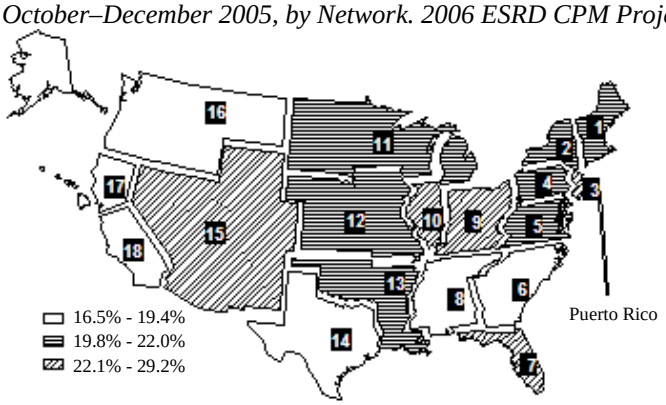


Figure 25: *Percent of all adult in-center hemodialysis patients dialyzed with a catheter continuously for 90 days or longer as their vascular access on their last hemodialysis session during October–December 2005, by Network. 2006 ESRD CPM Project.*



27% (n=2,373) of all patients in the sample for analysis were dialyzed with a catheter during their last hemodialysis session of the study period (TABLES 9, 11). The most common reasons for catheter placement were: no fistula or graft surgically planned (19%), the fistula was maturing, not ready to cannulate (21%), and no fistula or graft surgically created at this time (19%) (TABLE 12). 18% of patients were not candidates for fistula or graft placement as all sites had been exhausted.

Sixty nine percent of patients with an AVF or AV graft (n=6,167) had their vascular access monitored for stenosis during the study period. For this subset of patients, 48% were monitored with dynamic venous pressure, 8% with static venous pressure, 7% with the dilution technique, 3% (with Color-flow Doppler, and 20% with "Other" techniques (groups not mutually exclusive).

18% of incident patients had an AVF as their vascular access upon initiation of maintenance hemodialysis; 31% of incident patients had an AVF as their vascular access 90 days later (FIGURE 26). 71% of incident patients had a catheter as their vascular access upon initiation of maintenance hemodialysis; 53% of incident patients had a catheter as their vascular access 90 days later (FIGURE 26).

Table 10: *Percent of all adult in-center hemodialysis patients with an AV fistula access on their last hemodialysis session during October-December 2005, by gender, race, ethinicity, age, cause of ESRD, and Network. 2006 ESRD CPM Project*

PATIENT CHARACTERISTIC	NETWORK																		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**U.S.**
ALL	**51**	**48**	**39**	**42**	**36**	**40**	**43**	**36**	**42**	**45**	**41**	**43**	**39**	**43**	**51**	**58**	**50**	**49**	**44**
GENDER																			
Men	60	57	43	50	47	50	53	46	54	57	50	56	48	52	56	66	53	58	**53**
Women	38	36	33	33	22	30	32	25	30	33	32	29	30	34	45	49	46	36	**33**
RACE																			
Black	41	47	37	38	32	42	39	35	43	39	33	39	34	34	43	53	41	33	**38**
White	53	48	40	45	38	38	47	38	41	51	46	45	42	47	52	57	58	52	**47**
ETHNICITY																			
Hispanic	48	59	42	*	*	41	44	*	*	57	*	*	*	44	66	*	64	55	**51**
Non-Hispanic	51	46	38	42	35	40	43	36	42	44	42	43	39	43	46	58	46	44	**42**
AGE GROUP (years)																			
18-44	52	68	55	47	41	58	43	43	49	51	47	60	41	50	60	66	60	53	**52**
45-54	51	49	41	40	39	30	45	32	47	46	45	48	48	58	56	61	50	48	**45**
55-64	57	46	29	43	40	44	48	38	40	43	39	51	38	39	50	54	52	54	**44**
65-74	53	45	41	43	26	33	40	34	44	50	33	37	34	35	52	61	50	50	**41**
75+	45	40	37	41	33	37	41	34	36	40	45	34	34	39	44	53	43	41	**40**
CAUSE OF ESRD																			
Diabetes Mellitus	52	49	32	40	31	37	37	32	35	44	35	39	38	43	52	59	44	52	**41**
Other Causes Combined	50	47	45	44	38	42	48	39	48	46	46	48	40	43	51	58	55	46	**45**

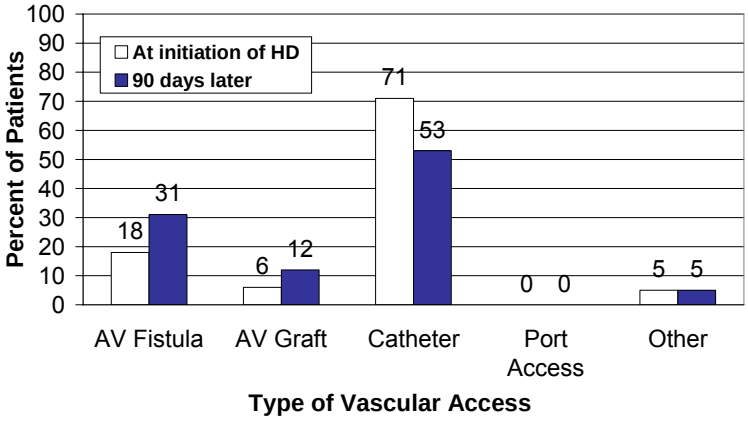
* value suppressed because n<11

Table 11: *Percent of all adult in-center hemodialysis patients with a catheter access on their last hemodialysis session during October-December 2005, by gender, race, ethinicity, age, cause of ESRD, and Network. 2006 ESRD CPM Project.*

PATIENT CHARACTERISTIC	**NETWORK**																		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**U.S.**
ALL	**25**	**26**	**35**	**30**	**30**	**25**	**30**	**24**	**32**	**33**	**27**	**32**	**31**	**23**	**29**	**23**	**24**	**22**	**27**
GENDER																			
Men	22	23	32	26	25	23	26	21	26	27	24	25	28	21	28	20	21	16	**24**
Women	30	30	40	34	36	26	35	27	39	39	30	40	33	25	30	27	27	30	**32**
RACE																			
Black	23	22	34	21	28	19	30	21	27	33	26	26	28	23	41	*	26	24	**25**
White	26	30	36	34	34	36	30	28	35	32	28	35	36	23	29	24	23	22	**29**
ETHNICITY																			
Hispanic	*	23	34	*	*	*	28	*	*	29	*	*	*	24	22	*	18	18	**23**
Non-Hispanic	26	27	36	30	30	25	31	24	32	33	27	32	31	23	32	23	26	26	**28**
AGE GROUP (years)																			
18-44	*	19	30	39	30	17	31	25	26	26	33	29	31	24	*	*	*	21	**25**
45-54	*	21	36	27	28	30	30	28	31	35	22	*	27	17	28	*	27	23	**26**
55-64	24	28	40	24	33	26	28	20	34	35	28	*	32	22	27	*	21	20	**27**
65-74	23	20	35	27	29	25	32	25	30	28	26	40	29	24	28	22	22	21	**27**
75+	29	35	33	33	29	26	30	22	36	38	27	42	34	29	36	25	30	26	**31**
CAUSE OF ESRD																			
Diabetes Mellitus	23	23	39	29	31	25	36	26	35	34	28	35	30	22	29	21	27	19	**28**
Other Causes Combined	27	28	33	30	30	25	26	22	30	31	26	29	31	24	29	24	21	26	**27**

* value suppressed because n<11

Figure 26: *Percent of incident* adult in-center hemodialysis patients with different types of vascular access upon initiation of a maintenance course of hemodialysis and 90 days later. 2006 ESRD CPM Project.*



*An incident patient is defined as a patient initiating in-center hemodialysis on or between January 1, 2005 and August 31, 2005.

TABLE 12: *Reasons for catheter placement in adult in-center hemodialysis patients using catheters on their last hemodialysis session during October-December 2005. 2006 ESRD CPM Project.*

Reason	n	%
Total	**2,376**	**(100)**
No fistula or graft surgically planned	451	(19)
Patient size too small for AV fistula/graft	29	(6)
Peripheral vascular disease	95	(21)
Patient preference	293	(65)
Physician/Surgeon preference	92	(20)
Renal transplantation scheculed	15	(3)
Fistula maturing, not ready to cannulate	506	(21)
Graft maturing, not ready to cannulate	77	(3)
No fistula or graf surgically created at this time	440	(19)
Useable fistula or graft sites have been exhausted	418	(18)
Temporary interruption of fistula due to clotting or revisions	125	(5)
Temporary interruption of graft due to clotting or revisions	107	(5)
Other	249	(10)

*Note: Subtotals may not add up to 2,376 as respondents could choose multiple reasons.

Percents may not add up to 100% due to rounding.

3. CPM and other Findings for October-December 2005 compared to previous study periods

The percentage of patients incident to dialysis (initiating in-center hemodialysis on or between January 1, 2005 and August 31, 2005) with a catheter for vascular access on their last hemodialysis session during the fourth quarter of the calendar year has remained constant at 27% from 2002 to 2005, lower than 2000 when 37% of incident patients used a catheter at their last hemodialysis session during October-December.

Among prevalent patients, the fraction with a catheter at their last hemodialysis session during October-December decreased somewhat in 2005 to 36%, from 40% in 2003 and 2004 (FIGURE 27).

There has been some improvement in the percentage of all patients dialyzing with an AVF on their last hemodialysis session from late 2000 to late 2005 (30% vs. 44%, respectively) (FIGURE 28). 27% of incident patients were dialyzed with an AVF on their last hemodialysis session in late 2000 compared to 54% in late 2005 (FIGURE 28).

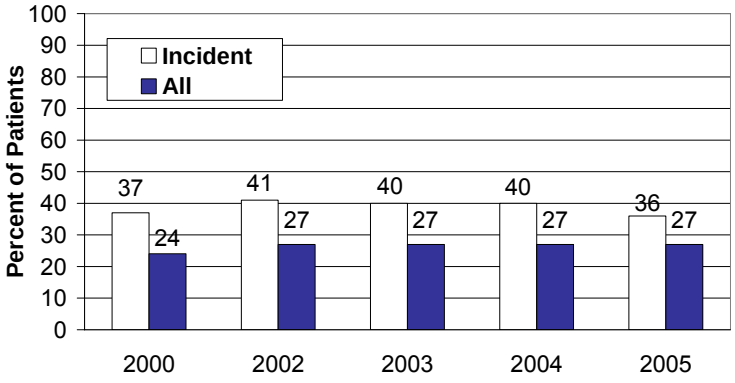
Fourteen percent of all patients were dialyzed with a chronic catheter continuously for 90 days or longer during late 1998 and 1999, compared to 20% of all patients during October-December 2005 (FIGURE 2).

There was little change in the percentage of reported surveillance techniques for patients with either an AVF or an AV graft as their vascular access from late 2001 to late 2005 (FIGURE 29).

TABLE 13: *Reasons for catheter placement in adult in-center hemodialysis patients using catheters on their last hemodialysis session during October-December 2005 compared to previous study periods. 2006 ESRD CPM Project.*

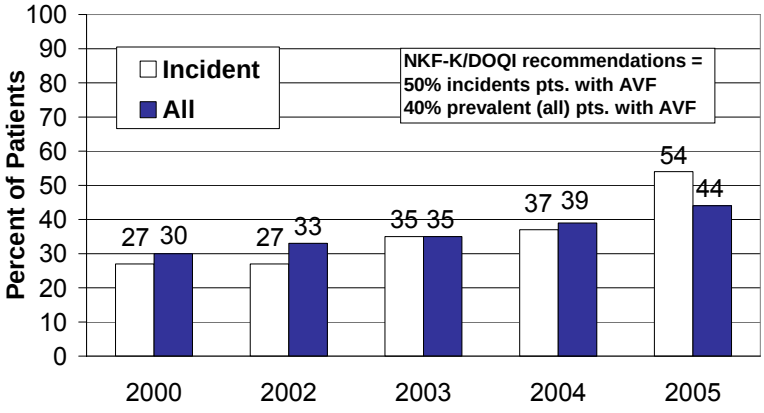
	2002	2003	2004	2005
No fistula or graft surgically planned	22	24	27	19
Fistula or graft maturing, not ready to cannulate	27	23	26	25
Temporary interruption of fistula or graft due to clotting or revisions	14	12	11	10
No fistula or graft surgically created at this time	18	22	21	19
All fistula or graft sites have been exhausted	12	13	11	18

Figure 27: *Percent of adult in-center hemodialysis patients (all and incident*) dialyzed with a catheter as their access on their last hemodialysis session during October-December 2005 compared to previous study periods. 2006 ESRD CPM Project.*



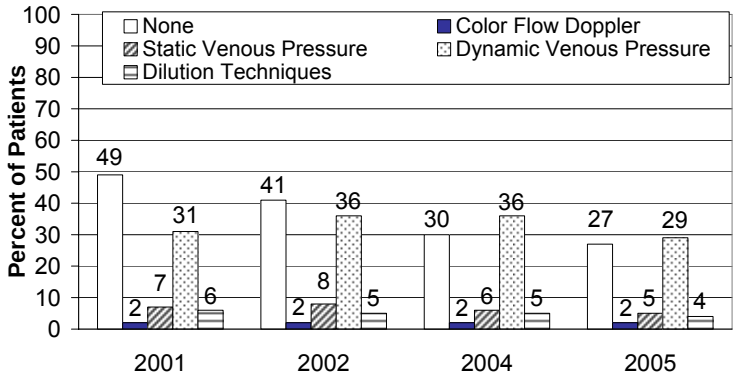
*An incident patient is defined as a patient initiating in-center hemodialysis on or between January 1, 2005 and August 31, 2005.

Figure 28: *Percent of adult in-center hemodialysis patients (all and incident*) dialyzed with an AV fistula as their vascular access on their last hemodialysis session during October-December 2005 compared to previous study periods. 2006 ESRD CPM Project.*



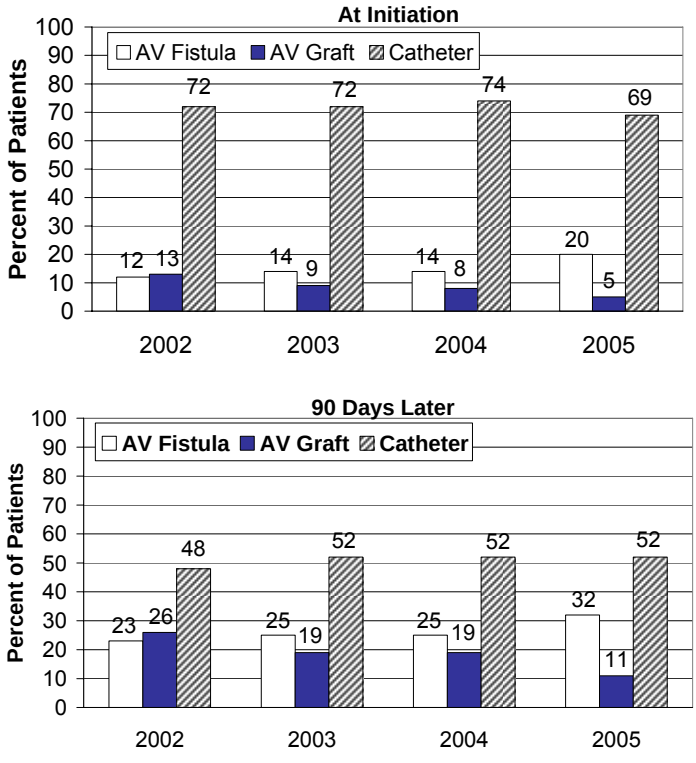
*An incident patient is defined as a patient initiating in-center hemodialysis on or between January 1, 2005 and August 31, 2005.

Figure 29: *Types of stenosis surveillance reported for adult in-center HD patients with either an AV fistula or an AV graft as their vascular access on their last hemodialysis session during October-December 2005 compared to previous study periods. 2006 ESRD CPM Project.*



See Appendix 1 for a complete description of the types of stenosis monitoring.

Figure 30: *Percent of incident* adult in-center hemodialysis patients with different types of vascular access upon initiation of a maintenance course of hemodialysis and 90 days later, late 2005 compared to previous study periods. 2006 ESRD CPM Project.*



*An incident patient is defined as a patient initiating in-center hemodialysis on or between January 1, 2005 and August 31, 2005.

There has been a slight decrease in the reason for a catheter access being "no fistula or graft surgically planned" from late 2002 to late 2005 (22% vs. 19%, respectively) (TABLE 13). There has been a trend for a slightly larger percentage of incident patients to have an AV fistula as their vascular access 90 days after initiation of a maintenance course of hemodialysis over this period (23% vs. 32%, respectively) (FIGURE 30).

C. ANEMIA MANAGEMENT

1. CPM Findings for October–December 2005

Data were collected to assess three anemia management CPMs. The time period from which these data were abstracted was October–December 2005.

Anemia Management CPM I — The target hemoglobin is 11–12 g/dL (110-120 g/L). Patients with a mean hemoglobin > 12 g/dL (120 g/L) and not prescribed epoetin were excluded from analysis for this CPM.

FINDING: For the last quarter of 2005, 35% of the in-center hemodialysis patients who met the inclusion criteria (n=8,141) had a mean hemoglobin 11–12 g/dL (110-120 g/L).

Anemia Management CPM IIa — For all anemic patients (hemoglobin < 11 g/dL [110 g/L]) or patients prescribed epoetin, the percent transferrin saturation and the serum ferritin concentration are assessed (measured) at least once in a three-month period.

FINDING: For the last quarter of 2005, 95% of the in-center hemodialysis patients who met the inclusion criteria (n=8,060) had at least one documented (measured) transferrin saturation value and at least one documented (measured) serum ferritin concentration value during the study period.

Anemia Management CPM IIb — For all anemic patients (hemoglobin < 11 g/dL [110 g/L]) or patients prescribed epoetin, at least one serum ferritin concentration ≥ 100 ng/mL and at least one transferrin saturation ≥ 20% were documented during the three-month study period.

FINDING: For the last quarter of 2005, 80% of the in-center hemodialysis patients who met the inclusion criteria (n=8,060) had at least one documented transferrin saturation ≥ 20% and at least one documented serum ferritin concentration ≥ 100 ng/mL during the study period.

Anemia Management CPM III — All anemic patients (hemoglobin < 11 g/dL [110 g/L]), or patients prescribed epoetin, and with at least one transferrin saturation < 20% or at least one serum ferritin concentration < 100 ng/mL during the study period are prescribed intravenous iron; UNLESS the mean transferrin saturation was ≥ 50% or the mean serum ferritin concentration was ≥ 800 ng/mL; UNLESS the patient was in the first three months of dialysis and was prescribed a trial dose of oral iron.

FINDING: 81% of the in-center hemodialysis patients who met the inclusion criteria (n=2,963) were prescribed intravenous iron in at least one month during October–December 2005.

2. Other Anemia Management Findings for October-December 2005

NOTE: The following findings apply to all the adult in-center hemodialysis patients in the sample for analysis regardless of when they first initiated dialysis.

The mean ± SD hemoglobin value for all patients in this sample was 12.0 ± 1.2 g/dL (120 ±12 g/L). The mean hemoglobin values for gender, race, ethnicity, age, diagnosis, duration of dialysis, and selected clinical parameters are shown in Table 14.

The mean hemoglobin value was lower for patients dialyzing less than six months compared to patients dialyzing six months or longer.

The mean hemoglobin value was higher for patients with a mean spKt/V ≥ 1.2 compared to patients with a mean spKt/V < 1.2, higher for patients with higher mean serum albumin values, and higher for patients dialyzing with an AVF or AV graft compared to patients dialyzing with a catheter (TABLE 14).

The prevalence of patients with mean hemoglobin < 10 g/dL (100 g/L) was 5% nationally and ranged from 2% to 7% among Networks. The prevalence of patients with mean hemoglobin < 10 g/dL (100 g/L) was higher in patients 18-54 years and patients dialyzing for less than six months compared to older patients and those dialyzing six months or longer, respectively (TABLE 14).

A higher proportion of patients with a mean spKt/V < 1.2 compared to patients with higher mean spKt/V values had a mean hemoglobin value <10 g/dL (100 g/L). A higher proportion of patients dialyzing with a catheter had a mean hemoglobin < 10 g/dL (100 g/L) compared to patients dialyzing with either an AVF or an AV graft. A higher proportion of patients with a mean serum albumin < 3.5/3.2 g/dL (35/32 g/L) (BCG/BCP) compared to patients with higher mean serum albumin values had a mean hemoglobin < 10 g/dL (100 g/L) (TABLE 14).

TABLE 14: *Mean hemoglobin values (g/dL) for adult in-center hemodialysis patients in the U.S., by patient characteristics, October–December 2005. 2006 ESRD CPM Project.*

Patient Characteristic	Mean hemoglobin (g/dL)	Percent of patients with hemoglobin values					
		<10	10-10.9	11-11.9	12-12.9	13-13.9	14+
ALL	**12.0**	**5**	**11**	**32**	**35**	**13**	**4**
GENDER							
Males	12.0	5	11	30	36	13	5
Females	11.9	5	12	34	35	12	2
RACE							
American Indian/Alaska Native	11.9	*	11	35	31	9	*
Asian/Pacific Islander	12.0	*	10	37	38	9	*
Black or African American	12.0	5	12	33	34	12	4
White	12.0	5	11	31	36	13	4
Other/Unknown	12.2	*	*	20	33	23	*
ETHNICITY							
Hispanic	12.1	3	11	30	36	16	4
Non-Hispanic	12.0	5	11	32	35	12	4
AGE GROUP (years)							
18-44	12.0	7	11	27	34	15	6
45-54	12.0	6	12	32	32	13	5
55-64	12.0	5	12	32	37	11	3
65-74	12.0	5	11	34	35	12	3
75+	12.0	4	10	33	38	13	3
CAUSE OF ESRD							
Diabetes Mellitus	12.0	4	12	33	36	12	3
Hypertension	12.0	5	10	33	36	13	4
Glomerulonephritis	12.0	6	11	30	36	11	6
Other/Unknown	12.0	6	12	30	34	14	4
DURATION OF DIALYSIS (years)							
< 0.5	11.5	16	21	25	23	11	4
0.5-0.9	12.2	3	8	28	41	16	5
1.0-1.9	12.1	3	9	31	40	14	3
2.0-2.9	12.0	3	13	34	36	12	2
3.0-3.9	12.0	2	10	36	36	12	3
4.0+	12.0	4	10	34	35	12	5
MEAN spKt/V							
≥ 1.2	12.0	4	11	33	36	13	4
< 1.2	11.7	12	17	26	28	11	5
MEAN SERUM ALBUMIN (g/dL)							
≥ 3.5/3.2 BCG/BCP ^	12.1	3	9	32	38	14	4
< 3.5/3.2 BCG/BCP	11.4	13	20	32	26	8	2
ACCESS TYPE							
AV Fistula	12.1	3	10	31	38	14	4
Graft with AVF	12.1	*	11	29	42	13	*
Graft without AVF	12.0	4	11	36	36	10	4
Catheter	11.8	10	15	29	30	13	3

* Value suppressed because n < 11.

^ BCG/BCP = bromcresol green/bromcresol purple laboratory methods.

Note: Percentages may not add up to 100% due to rounding.

Note: To convert hemoglobin conventional units of g/dL to SI units (g/L), multiply by 10.

Note: To convert serum albumin conventional units of g/dL to SI units (g/L), multiply by 10.

Table 15: *Percent of all adult in-center hemodialysis patients with mean hemoglobin ≥ 11 g/dL, by gender, race, ethinicity, age, access type, mean serum albumin, and Network. October - December 2005. 2006 ESRD CPM Project.*

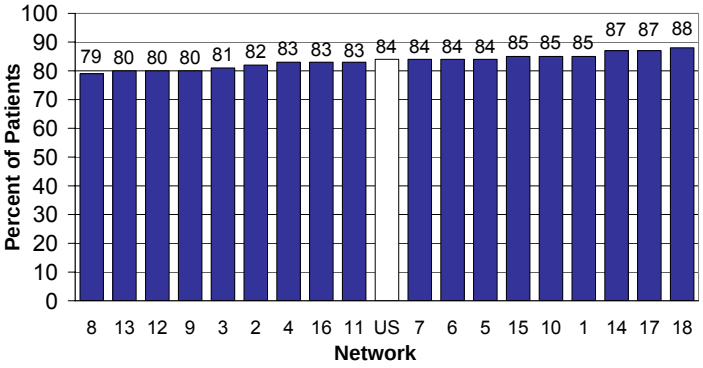
PATIENT CHARACTERISTIC	NETWORK																		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**U.S.**
ALL	**85**	**82**	**81**	**83**	**84**	**84**	**84**	**79**	**80**	**85**	**83**	**80**	**80**	**87**	**85**	**83**	**87**	**88**	**84**
GENDER																			
Men	88	81	79	84	83	83	84	83	80	85	85	84	81	89	83	84	88	88	**84**
Women	81	83	84	81	86	86	84	76	81	84	81	76	79	84	87	82	86	89	**83**
RACE																			
Black	79	83	80	88	85	86	84	77	84	83	76	78	81	82	77	79	89	95	**83**
White	87	81	82	80	84	83	84	83	79	86	86	80	79	89	85	85	84	88	**84**
ETHNICITY																			
Hispanic	80	79	82	*	*	82	91	*	*	92	88	*	*	88	88	81	88	86	**86**
Non-Hispanic	86	82	80	83	84	85	83	79	80	84	83	80	80	86	83	83	86	91	**83**
AGE GROUP (years)																			
18-44	82	78	83	70	81	80	82	86	80	81	85	84	81	76	85	83	83	85	**81**
45-54	81	87	79	83	82	80	87	76	77	85	77	70	84	84	83	82	85	89	**82**
55-64	85	80	76	90	81	85	81	78	84	77	85	86	74	90	86	79	93	90	**84**
65-74	86	78	83	83	89	89	83	76	82	88	78	77	86	89	82	83	86	86	**84**
75+	88	86	84	83	88	88	86	85	77	91	89	81	76	92	86	87	86	91	**86**
ACCESS TYPE																			
AV Fistula	90	85	88	87	84	87	89	83	87	89	87	86	83	91	88	86	91	90	**88**
Graft with AVF	*	90	*	*	*	80	92	*	83	*	92	*	*	*	*	*	*	90	**88**
Graft without AVF	88	83	84	89	88	87	83	81	78	87	84	82	85	88	91	85	92	91	**86**
Catheter	72	73	70	70	81	78	77	70	74	78	76	69	70	76	74	73	75	81	**75**
MEAN SERUM ALBUMIN																			
≥ 3.5/3.2 BCG/BCP^	89	84	86	86	90	88	89	85	86	88	88	86	85	91	87	87	89	90	**88**
< 3.5/3.2 BCG/BCP	71	71	66	72	64	66	60	55	57	69	66	61	60	69	73	66	78	79	**67**

* value suppressed because n<11

Note: To convert hemoglobin conventional units of g/dL to SI units (g/L), multiply by 10.

Note: To convert serum albumin conventional units of g/dL to SI units (g/L), multiply by 10.
^ bromecresol green/bromcresol purple laboratory methods

Figure 31: *Percent of adult in-center hemodialysis patients with mean hemoglobin ≥ 11 g/dL, by Network, October–December 2005. 2006 ESRD CPM Project.*

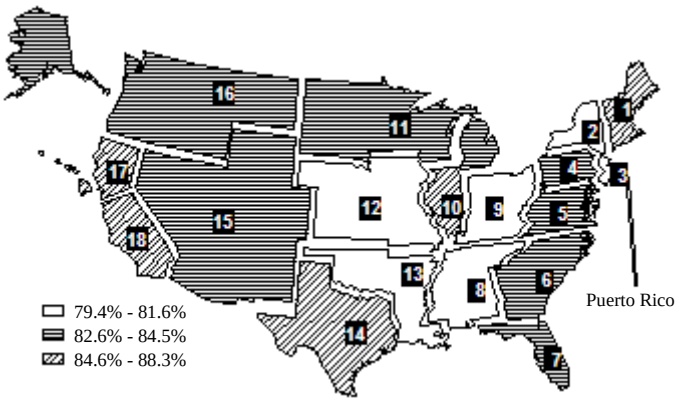


Note: To convert hemoglobin to conventional units of g/dL to SI units (g/L), multiply by 10.

The percentage of all patients with mean hemoglobin ≥ 11 g/dL (110 g/L) was 84% nationally and ranged from 79% to 88% by Network (TABLE 15, FIGURES 31, 32).

The percentage of patients with mean hemoglobin ≥ 11 g/dL (110 g/L) by selected patient characteristics and clinical parameters is shown in Figure 33. More patients dialyzing for six months or longer had a mean hemoglobin ≥ 11 g/dL (110 g/L) compared to patients dialyzing less than six months (87% vs. 63%, respectively). A higher percentage of patients dialyzing with an AVF, Graft with AVF, or Graft without AVF met this threshold compared to patients dialyzing with a catheter (88%, 88% and 86% compared to 75%, respectively). Patients with higher mean spKt/V and serum albumin values were more likely to meet this hemoglobin target than patients with lower spKt/V and serum albumin values.

Figure 32: *Percent of adult in-center hemodialysis patients with mean hemoglobin ≥ 11 g/dL, by Network, October–December 2005. 2006 ESRD CPM Project.*



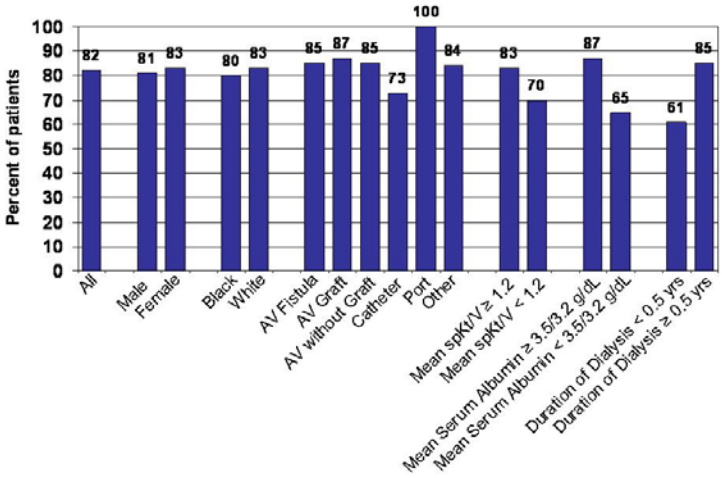
Note: To convert hemoglobin conventional units of g/dL to SI units (g/dL), multiply by 10.

During this study period, data were collected on additional measures related to anemia management (TABLE 16).

The national average ± SD transferrin saturation for the patients in the sample was 28 ± 12% and ranged from 25% to 30% among the 18 Network areas (TABLE 16). Table 16 also provides the percentage of patients with mean transferrin saturation ≥ 20% nationally (78%) and by Network area, ranging from 68% to 83%.

The national average ± SD serum ferritin concentration for the patients in the sample was 593 ± 405 ng/mL and ranged from 491 to 659 ng/mL among the 18 Network areas. The percentage of patients with a mean serum ferritin concentration ≥ 100 ng/mL nationally was 95%, ranging from 92% to 97% among the 18 Network areas (TABLE 16).

Figure 33*: Percent of adult in-center hemodialysis patients with mean hemoglobin ≥ 11 g/dL, by selected patient characteristics and clinical parameters, October-December 2005. 2006 ESRD CPM Project.*



Note: To convert hemoglobin conventional units of g/dL to SI units (g/L), multiply by 10.

Note: To convert serum albumin conventional units of g/dL to SI units (g/L), multiply by 10.

75% of all patients in the sample were prescribed either intravenous (IV) or oral iron at least once during the three-month study period. The percentage of patients with IV iron prescribed nationally was 69%, ranging from 63% to 76% among the 18 Network areas (TABLE 16).

For the subset of patients with both mean transferrin saturation < 20% and mean serum ferritin concentration < 100 ng/mL (n=193 or 2% of patients), only 73% were prescribed IV iron at least once during the three-month study period.

Table 16: *Regional variation for various anemia management measures for adult in-center hemodialysis patients including the percent of patients with mean hemoglobin ≥ 11 g/dL, mean hemoglobin (g/dL), and mean serum albumin ≥ 4.0 (BCG)^ for these patients nationally and by Network. October - December 2005. 2006 ESRD CPM Project.*

ANEMIA MANAGEMENT MEASURE:	NETWORK																		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**U.S.**
Percent of patients with mean hemoglobin ≥ 11 g/dL	85	82	81	83	84	84	84	79	80	85	83	80	80	87	85	83	87	88	**84**
Mean hemoglobin (g/dL)	11.9	11.9	12.0	12.0	12.0	12.0	12.0	11.9	11.9	12.0	12.1	11.8	11.9	12.1	12.1	12.0	12.0	12.0	**12.0**
Percent of patients with mean serum albumin ≥ 4.0g/dL (BCG)^	32	33	34	29	36	32	36	34	28	32	30	25	31	31	35	31	37	39	**33**
Average transferrin saturation (TSAT) (%)	27	29	28	27	29	29	29	27	26	27	28	26	27	29	27	25	27	30	**28**
Percent of patients with mean TSAT ≥ 20%	76	79	78	78	81	83	81	76	75	77	77	73	77	82	77	68	71	83	**78**
Average serum ferritin concentration (ng/mL)	567	593	584	541	596	608	624	578	601	601	563	558	622	659	538	491	555	639	**593**
Percent of patients with mean serum ferritin concentration ≥100 ng/mL	96	92	95	93	94	97	93	96	94	94	95	95	95	95	93	94	95	95	**95**
Percent of patients with mean serum ferritin concentration ≥ 800 ng/mL	22	25	24	19	24	24	28	21	25	22	20	22	28	31	18	13	19	28	**24**
Percent of all patients with IV iron prescribed	72	63	71	76	69	69	66	75	69	72	69	66	68	69	70	69	69	67	**69**
Percent of patients prescribed ESA^^	96	96	96	97	97	96	96	96	94	96	91	97	97	96	94	96	95	96	**95**
Percent of patients with mean hemoglobin <11 g/dL with ESA prescribed	99	97	96	100	99	97	95	96	93	94	91	100	97	94	92	96	89	98	**96**

* value suppressed because n<11

^For subset of patients with serum albumin tested by the bromcresol green (BCG) laboratory method

^^ESA - Erythropoetin Stimulating Agents

Note: To convert serum albumin conventional units of g/dL to SI units (g/L), multiply by 10.

Note: To convert hemoglobin conventional units of g/dL to SI units (g/L), multiply by 10.

3. CPM and other Findings for October-December 2005 compared to previous study periods

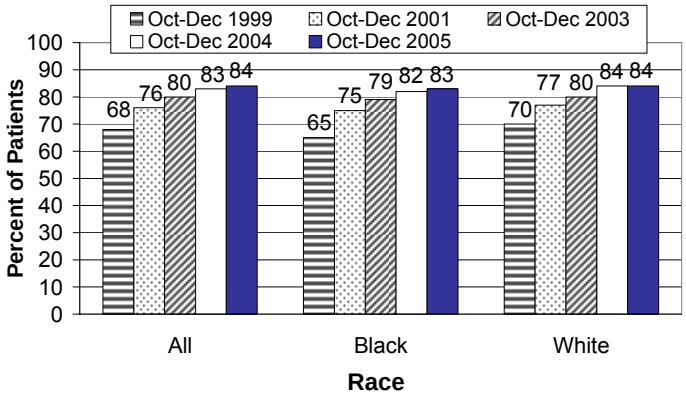
NOTE: The following findings apply to all the adult in-center hemodialysis patients in the sample for analysis regardless of when they first initiated dialysis.

The mean ± SD hemoglobin from October–December 2001 to October–December 2005 increased from 11.7 ± 1.2 g/dL (117 ± 12] g/L to 11.9 ± 1.2 g/dL (119 ± 12 g/L) (FIGURE 7), and the percentage of patients with a mean hemoglobin ≥ 11 g/dL (110 g/L) increased significantly from 76% to 84% (FIGURES 6, 34).

In addition to the improvement in the percentage of patients with mean hemoglobin ≥ 11 g/dL (110 g/L), there was also a decrease in the percentage of patients with mean hemoglobin < 10 g/dL (100 g/L). In October–December 2005, 5% of Black patients and 5% of White patients had a mean hemoglobin < 10 g/dL (100 g/L).

Figure 35 depicts the status of iron stores for the sampled patients in late 2005 compared to selected previous study periods. 69% of patients were prescribed IV iron in late 2005 compared to 59% in late 1998. Within the subgroup of patients with mean transferrin saturation < 20% and mean serum ferritin concentration < 100 ng/mL, 73% of patients were prescribed IV iron at least once over the three-month study period in late 2005, compared to 37% in late 1996.

Figure 34: *Percent of adult in-center hemodialysis patients with mean hemoglobin values ≥ 11 g/dL, by race, October–December 2005 compared to previous study periods. 2006 ESRD CPM Project.*



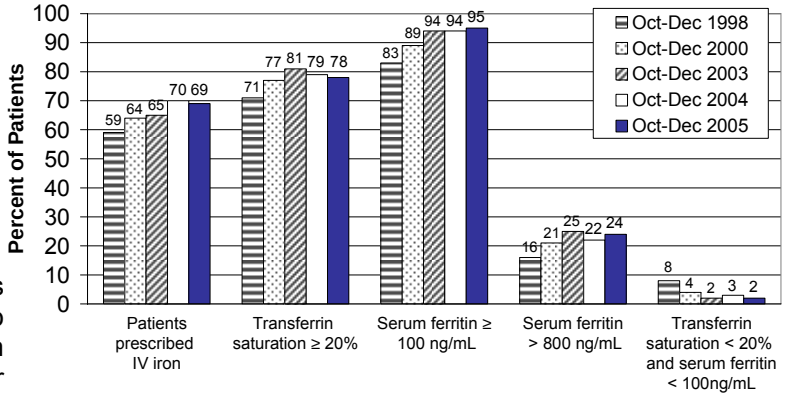
Note: To convert hemoglobin conventional units of g/dL to SI units (g/L), multiply by 10.

D. SERUM ALBUMIN

1. CPM Findings for October–December 2005

Because serum albumin is not considered to be an official CPM for this project, there are no CPM findings to report for this section.

Figure 35: *Percent of adult in-center hemodialysis patients with specific anemia management indicators, October–December 2005 compared to selected previous study periods. 2006 ESRD CPM Project.*



2. Other Serum Albumin Findings for October–December 2005

The two commonly used laboratory methods for determining serum albumin values, bromcresol green (BCG) and bromcresol purple (BCP), have been reported to yield systematically different results (6). Therefore, we assessed the serum albumin values reported for these two methods separately. The mean ± SD serum albumin value for patients whose value was determined by the BCG method (n=8.163) was 3.8 ± 0.4 g/dL (38 ± 4 g/L), and by the BCP method (n=445) was 3.4 ± 0.5 g/dL (34 ± 5 g/dL) (FIGURE 36).

Lower serum albumin values have been shown to be associated with diminished survival (29-31). Figure 36 displays the distribution of serum albumin values by laboratory method.

The percentages of patients with mean serum albumin ≥ 4.0/3.7 g/dL (40/37 g/L) (BCG/BCP) and ≥ 3.5/3.2 g/dL (35/32 g/L) (BCG/BCP) by gender, race, ethnicity, age, diagnosis, duration of dialysis, and selected clinical parameters are shown in Table 17. Higher percentages of men, Blacks, patients 18-44 years old, patients with causes of ESRD other than diabetes mellitus, and patients dialyzing six months or longer had a mean serum albumin ≥ 4.0/3.7 g/dL (40/37 g/L) (BCG/BCP) compared to women, Whites, patients older than 44 years, patients with diabetes mellitus as the cause of ESRD, and patients dialyzing less than six months (TABLES 17, 18, FIGURES 37, 38). Only 15% of patients dialyzing less than six months achieved a serum albumin that met the outcome goal of ≥ 4.0/3.7 g/dL (40/37 g/L) (BCG/BCP) compared to 35% of patients dialyzing six months or more.

TABLE 17: *Percent of adult in-center hemodialysis patients with mean serum albumin values ≥ 4.0/3.7 g/dL (BCG/BCP)* and ≥ 3.5/3.2 g/dL (BCG/BCP) in the U.S., by patient characteristics, October-December 2005. 2006 ESRD CPM Project.*

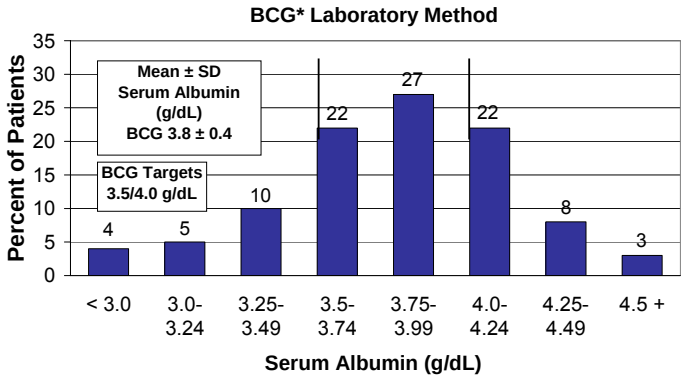
Patient Characteristic	Percent of Patients with Mean ≥ 4.0/3.7 g/dL	≥ 3.5/3.2 g/dL
TOTAL	**33**	**80**
GENDER		
Men	37	82
Women	27	78
RACE		
American Indian/ Alaska Native	19	72
Asian/Pacific Islander	39	85
Black or African American	36	83
White	30	78
Other/Unknown	30	81
ETHNICITY		
Hispanic	37	81
Non-Hispanic	32	80
AGE GROUP (years)		
18-44	51	88
45-54	37	83
55-64	33	81
65-74	29	79
75+	20	75
CAUSE OF ESRD		
Diabetes Mellitus	26	77
Hypertension	37	84
Glomerulonephritis	47	86
Other/Unknown	35	79
DURATION OF DIALYSIS (years)		
< 0.5	15	60
0.5-0.9	26	75
1.0-1.9	36	84
2.0-2.9	32	84
3.0-3.9	36	85
4.0+	39	85
MEAN spKt/V		
≥ 1.2	33	82
< 1.2	26	71
MEAN Hgb (g/dL)		
≥ 11	35	84
< 11	18	61
ACCESS TYPE		
AV Fistula	39	86
Graft with AVF	37	84
Graft without AVF	34	85
Catheter	21	67

*Note: BCG/BCP = bromcresol green/bromcresol purple laboratory methods.

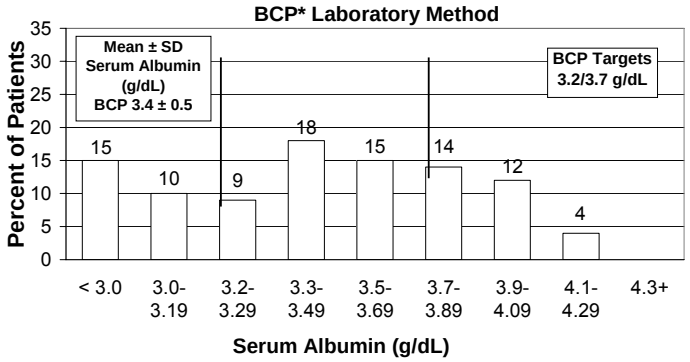
Note: To convert serum albumin conventional units of g/dL to SI units (g/L), multiply by 10.

Note: To convert hemoglobin conventional units of g/dL to SI units (g/L), multiply by 10.

Figure 36: *Distribution of mean serum albumin for adult in-center hemodialysis patients, by laboratory method, October–December 2005. 2006 ESRD CPM Project.*



*Note: BCG=bromcresol green laboratory method.
Note: To convert serum albumin conventional unites of g/dL to SI units (g/L), multiply by 10.



*Note: BCP=bromcresol purple laboratory method.
Note: To convert serum albumin conventional unites of g/dL to SI units (g/L), multiply by 10.

A higher percentage of patients with higher mean hemoglobin and mean spKt/V values had a mean serum albumin ≥ 4.0/3.7 g/dL (40/37 g/L) (BCG/BCP) compared to patients with lower mean hemoglobin and mean spKt/V values. More patients dialyzing with either an AVF, graft with AVF, or graft without AVF compared to patients dialyzing with a catheter had a mean serum albumin ≥ 4.0/3.7 g/dL (40/37 g/L) (BCG/BCP) (39%, 37%, and 34% vs. 21% respectively) (TABLES 17, 18).

TABLE 18: *Percent of adult in-center hemodialysis patients with mean serum albumin ≥ 4.0/3.7 g/dL (BCG/BCP method)** by gender, race, ethnicity, age, cause of ESRD, access type, mean spKt/V, mean hemoglobin, and Network. October - December 2005. 2006 ESRD CPM Project.*

PATIENT	NETWORK																		
CHARACTERISTIC	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**U.S.**
ALL	**32**	**31**	**33**	**28**	**36**	**33**	**36**	**35**	**28**	**32**	**31**	**25**	**31**	**31**	**35**	**31**	**37**	**39**	**33**
GENDER																			
Men	36	37	36	32	40	40	40	39	33	35	34	29	37	37	38	35	41	42	**37**
Women	26	23	29	23	31	24	30	30	23	30	27	21	26	25	29	26	32	35	**27**
RACE																			
Black	34	38	36	30	38	35	34	39	33	34	43	29	36	34	39	*	36	46	**36**
White	30	26	30	27	32	27	38	29	26	31	25	23	26	30	36	32	37	37	**30**
ETHNICITY																			
Hispanic	*	35	39	*	*	*	44	*	*	41	*	*	*	31	38	*	41	39	**37**
Non-Hispanic	32	30	30	27	35	33	34	35	28	31	30	24	31	31	33	30	36	38	**32**
AGE GROUP (years)																			
18-44	54	54	53	32	61	52	46	51	48	50	52	39	49	53	56	63	49	56	**51**
45-54	44	46	44	41	38	25	48	39	34	29	40	36	31	34	36	*	38	40	**37**
55-64	36	34	31	31	32	34	31	36	26	37	28	32	32	27	31	25	45	45	**33**
65-74	28	19	35	24	36	24	34	30	26	31	27	*	27	33	38	*	38	36	**29**
75+	18	18	17	20	20	28	26	21	18	19	20	17	22	12	23	28	21	23	**20**
CAUSE OF ESRD																			
Diabetes Mellitus	28	26	26	25	29	21	25	26	20	23	27	23	23	27	29	23	33	29	**26**
Other Causes Combined	34	34	39	30	40	40	43	42	35	40	34	28	38	36	41	36	40	48	**38**
ACCESS TYPE																			
AV Fistula	41	40	42	33	42	42	43	42	35	38	33	34	38	39	41	34	39	44	**39**
Graft with AVF	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	40	**37**
Graft without AVF	33	24	31	32	39	32	36	35	26	31	38	30	38	32	37	*	43	42	**34**
Catheter	*	22	25	16	25	20	24	25	19	24	17	*	17	18	22	24	24	24	**21**
MEAN spKt/V																			
≥ 1.2	32	31	34	29	36	33	36	37	29	32	32	27	32	32	35	30	38	39	**33**
< 1.2	*	*	*	*	40	27	31	*	*	37	23	*	*	*	*	*	31	37	**26**
MEAN Hb (g/dL)																			
≥ 11	34	32	36	31	39	35	39	39	32	35	34	29	34	34	37	34	40	40	**35**
< 11	*	24	24	*	18	18	18	21	11	*	16	*	20	15	20	*	*	29	**18**

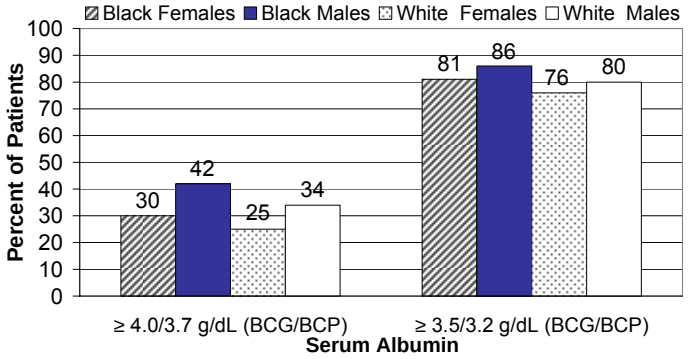
* value suppressed because n<11

**Note: BCG/BCP = bromcresol green/bromcresol purple laboratory methods

Note: To convert serum albumin conventional units of g/dL to SI units (g/L), multiply by 10.

Note: To convert hemoglobin conventional units of g/dL to SI units (g/L), multiply by 10.

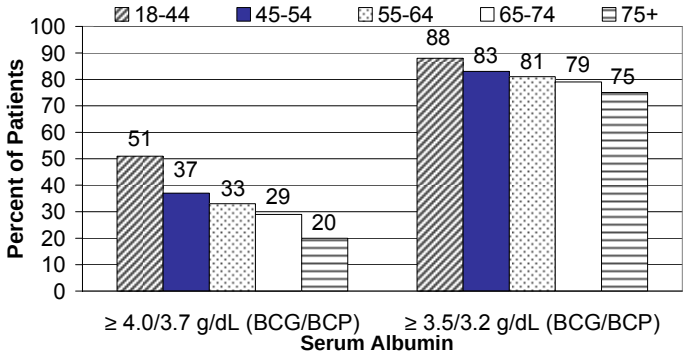
Figure 37: *Percent of adult in-center hemodialysis patients with mean serum albumin ≥ 4.0/3.7 g/dL (BCG/BCP)* and ≥ 3.5/3.2 g/dL (BCG/BCP), by race and gender, October–December 2005. 2006 ESRD CPM Project.*



*Note: BCG/BCP = bromcresol green/bromcresol purple laboratory methods.

Note: To convert serum albumin conventional units of g/dL to SI units (g/L), multiply by 10.

Figure 38: *Percent of adult in-center hemodialysis patients with mean serum albumin ≥ 4.0/3.7 g/dL (BCG/BCP)* and ≥ 3.5/3.2 g/dL (BCG/BCP), by age, October–December 2005. 2006 ESRD CPM Project.*

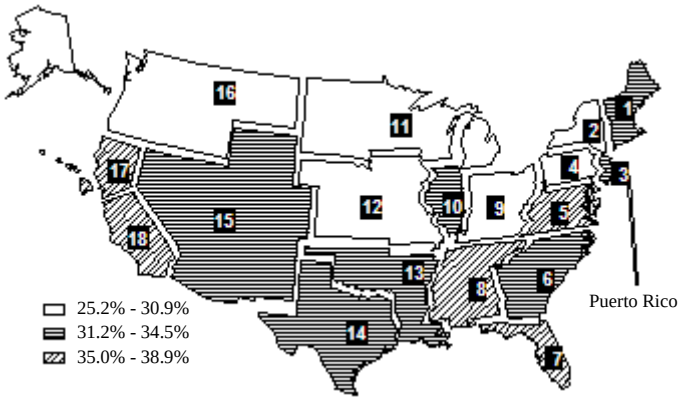


*Note: BCG/BCP = bromcresol green/bromcresol purple laboratory methods.

Note: To convert serum albumin conventional units of g/dL to SI units (g/L), multiply by 10.

Nationally, 33% of patients had mean serum albumin ≥ 4.0/3.7 g/dL (40/37 g/L) (BCG/BCP) ranging from 25% to 39% among the 18 Networks (FIGURE 39, TABLE 18); 80% of patients had mean serum albumin ≥ 3.5/3.2 g/dL (35/32 g/L) (BCG/BCP) ranging from 75%-84% among the 18 Networks (APPENDIX 6). The percentage of patients in each Network area with mean serum albumin ≥ 4.0/3.7 g/dL (40/37 g/L) (BCG/BCP), by gender, race, ethnicity, age group, cause of ESRD, and selected clinical parameters is shown in Table 18.

Figure 39: *Percent of adult in-center hemodialysis patients with mean serum albumin ≥ 4.0/3.7 g/dL (BCG/BCP)* by Network, October–December 2005. 2006 ESRD CPM Project.*



*Note: BCG/BCP = bromcresol green/bromcresol purple laboratory methods.

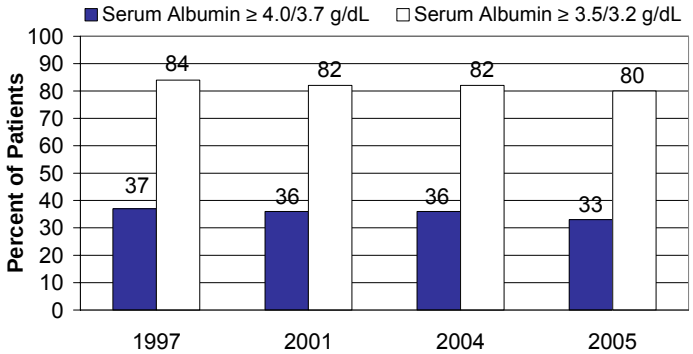
Note: To convert serum albumin conventional units of g/dL to SI units (g/L), multiply by 10.

3. Findings for October–December 2005 compared to previous study periods

No clinically important changes or improvements were noted in the proportion of adult in-center hemodialysis patients with a serum albumin that met the outcome goal of ≥ 4.0/3.7 g/dL (40/37 g/L) (BCG/BCP) during October–December 2005 compared to previous study periods.

Figure 40 shows the percentage of patients with mean serum albumin ≥ 4.0/3.7 g/dL (40/37 g/L) (BCG/BCP) and the percentage of patients with mean serum albumin values ≥ 3.5/3.2 g/dL (35/32 g/L) (BCG/BCP) during October–December 2005 compared to selected previous study periods.

Figure 40: *Percent of adult in-center hemodialysis patients with mean serum albumin ≥ 4.0/3.7 g/dL (BCG/BCP)* and ≥ 3.5/3.2 g/dL (BCG/BCP), October–December 2005 compared to selected previous study periods. 2006 ESRD CPM Project.*



*Note: BCG/BCP = bromcresol green/bromcresol purple laboratory methods.

Note: To convert serum albumin conventional units of g/dL to SI units (g/L), multiply by 10.