



THE --- **FINAL ROUNDUP** ---

Quality Improvement Project
*Can We Deliver Adequate Hemodialysis to 100%
of Our Patients?*

oooooooooooooooooooooooooooooooooooooooooooooooooooooooooooooooooooooooo

Project Findings & Lessons Learned



The End Stage
Renal Disease
Network Of Texas

Lessons Learned & Opportunities to Improve

- 6 CU appears to be correctable for some patients, but significant clinical or technical barriers exist placing some patients at higher risk of inadequate dialysis and subsequent concomitant morbidity.
- 6 Based on the number of patients remaining in the residual CU group and the unexpectedly high number of newly identified CU patients, it appears that improving adequacy in CU patients will continue to be an ongoing challenge to patients and professionals.
- 6 The dialysis community should focus QI efforts on methods to promote vascular access patency, including the goal of minimizing hemodialysis catheter usage.
- 6 Facility patient education initiatives need to be strengthened to ensure that both the importance of adequate dialysis and the medical consequences of under dialysis are emphasized and reinforced in a grade level and culturally appropriate manner.
- 6 Based on the high number of large body weight patients in this QIP and our society's increasing tendency to develop obesity and diabetes, fundamental changes will be needed to meet the unique dialytic needs of this population.
- 6 Variables that will need to be considered in meeting the needs of this population are increased treatment time and frequency. Both of these variables will require revisions to current facility operations and modification of payment practices to allow for longer or more frequent dialysis.

For additional information regarding this project or any of the QI/educational tools discussed, please contact the ESRD Network of Texas office.

The End Stage Renal Disease Network of Texas, Inc.(#14)
14114 Dallas Parkway #660
Dallas, Texas 75254
972-503-3215
www.esrdnetwork.org

The Network and MRB recognize the efforts expended by every dialysis facility to complete the data collection surveys. More importantly, we thank you for continuing to focus attention on helping your patients receive high quality care.

This material was prepared by the ESRD Network of Texas, Inc (#14) under contract with the Centers for Medicare & Medicaid (CMS)
#500-00-NW14



Project Background & Objectives

- 6 The Centers for Medicare & Medicaid Services (CMS) has identified as one national priority topic a goal that at least 80% of adult hemodialysis patients receive a delivered dialysis dose of $\geq 65\%$ as measured by a urea reduction ratio (URR) or a $Kt/V \geq 1.2$ (single-pool, variable volume).
- 6 The percent of patients with a $URR \geq 65\%$ in Network #14 has been trending upwards from 53% in 1993 to 92% in 2000. Notably, the 2000 CMS Clinical Performance Measures Report (CPM) revealed that Network #14 ranked first among ESRD Networks with 92% of patients attaining a $URR \geq 65\%$.
- 6 Based on the 2000 CPM Report, the adequacies of hemodialysis outcomes in Texas exceed the CMS national hemodialysis goal. However, a small subgroup of Texas patients, estimated at about 1,500 patients (8%), were unable to achieve a $URR \geq 65\%$ as of 12/31/2000. While the ESRD Network Medical Review Board (MRB) expects that additional patients will attain a URR of 65%, it is believed that the goal of 100% of Texas hemodialysis patients with a $URR \geq 65$ is untenable.
- 6 This opinion is based upon MRB empiric knowledge that numerous patient barriers and technical limitations exist to the delivery of adequate hemodialysis. Examples are patient non-compliance, vascular access and large body weight (>83 KG). Patient related barriers and technical limitations that impede the attainment of $URR > 65\%$ for a month or longer are real factors that may never be entirely eliminated. In addition, in the opinion of the MRB, for some patients a URR of $< 65\%$ may in reality be adequate given the inherent limitations of the URR model.
- 6 The MRB identified an opportunity for improvement in patients on chronic hemodialysis for six months who do not attain a URR of $>65\%$ for at least three consecutive months. Patients meeting this criterion were defined by the MRB as at risk of being “*chronically underdialyzed (CU)*” for the purposes of this project.
- 6 Network #14 and the MRB sought to examine the relationship between the CU subgroup of patients and barriers to the delivery of adequate hemodialysis. In the fall of 2000, the Network initiated a Quality Improvement Project (QIP) with the following objectives:
 - Identify and describe demographic and treatment characteristics of CU patients.
 - Determine the major barriers to the delivery of dialysis.
 - Propose potential intervention strategies to increase the dose of dialysis delivered for CU patient subgroup.

Project Data Collection and Intervention Description

All adult-based outpatient dialysis facilities completed a baseline facility specific data collection form for the period September-November 2000. Facility specific data and information on the following process and outcome indicators were collected:

- Number of patients with URR $\geq 65\%$ for the months September-November 2000.
- Number of patients meeting CU criteria.
- Dialysis prescription and treatment compliance monitoring processes.
- Processes for evaluating ongoing indications for hemodialysis catheter use.

Each facility reporting one or more patients meeting the CU criteria completed a Patient Specific Data Collection form on patient treatment prescription, vascular access type, perceived reason for URR $< 65\%$ and recent interventions attempted to correct dialysis prescription.

For the purposes of this project, facilities not reporting a CU patient at baseline were considered to be comparison units since there were no direct requests by the MRB for review of a specific treatment plan or corrective actions.

Interventions

A report of *Survey Results and Practice Recommendations* was produced from the baseline survey data. The 24-page color report was distributed to the Medical Director, Nurse Manager and Administrator of each Texas dialysis facility. The report highlighted:

- Demographics and dialysis treatment variables of CU patients compared to Texas hemodialysis population.
- Reported causes and interventions for underdialysis in CU patients.
- Percent facilities that:
 - 6 Calculate a prescribed Kt/V for each new patient.
 - 6 Evaluate for ongoing indications for continued catheter use and frequency of evaluation.
 - 6 Have a written process to intervene for patients who do not run prescribed time or miss treatments.

The report also included a list of proactive strategies and associated tools to assist facility staff minimize underdialysis. MRB-developed tools included an assessment tool for use with patients who shorten or skip treatments, prescribed hemodialysis adequacy worksheet, and indicators for continued hemodialysis catheter use checklist. In addition, a patient/staff education video in both English and Spanish titled *What is Adequate Dialysis?* was distributed along with a copy of the NKF-DOQI Clinical Hemodialysis Adequacy Practice Guidelines. Lastly, a survey was included to evaluate the report, strategies and Network #14 quality improvement tools.

Facilities that reported having a CU patient were provided with the patient name(s) and reported cause(s) along with a appeal from the MRB and Network #14 to review the patient's prescribed and delivered dialysis prescriptions, evaluate the provided proactive strategies and implement a process improvement plan. Network staff and MRB members were available to provide education or consultation to facility staff upon request.

Follow-up Measurement

Facilities were resurveyed using the same facility specific data collection form for the period July-September 2001. Facilities not in operation at the time of the baseline data collection were required to complete a collection form. Facilities not included in the baseline data collection or that had ceased operations after baseline data collections were censored from follow-up data analysis. Patients who expired, changed modality, transferred or were lost to follow-up were also censored from follow-up data analysis. All facilities with CU patients at baseline completed a revised *Patient Specific Data Collection Form* with patient demographic and treatment prescription information, patient modality status and actions taken by team to increase URR if below 65%.

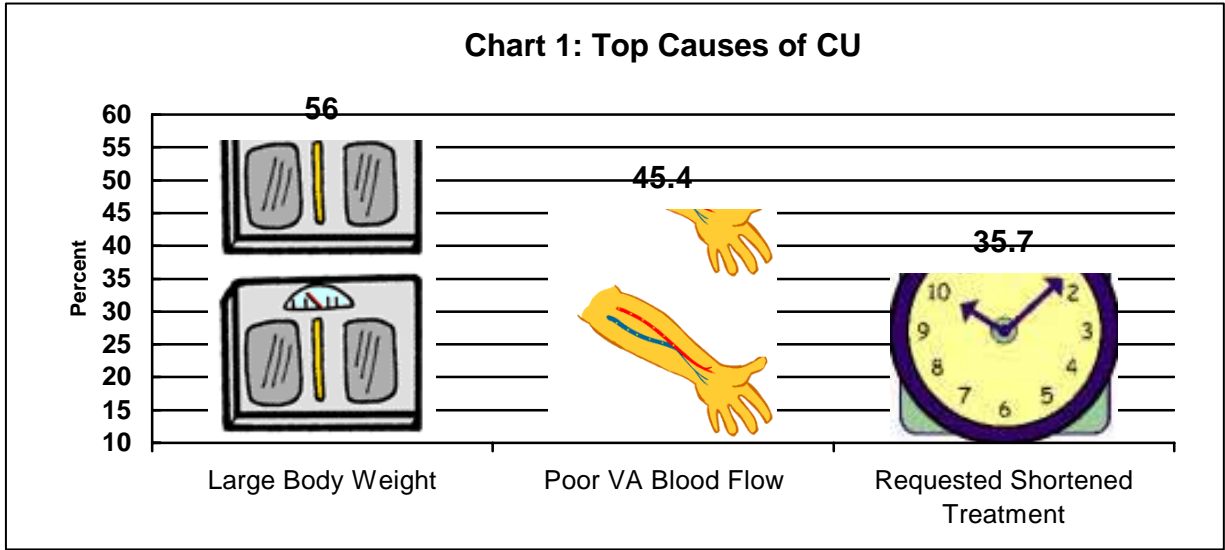
Results

Comparison of Demographic and Dialysis Treatment Characteristics Between Baseline CU Patients and Texas Dialysis Population

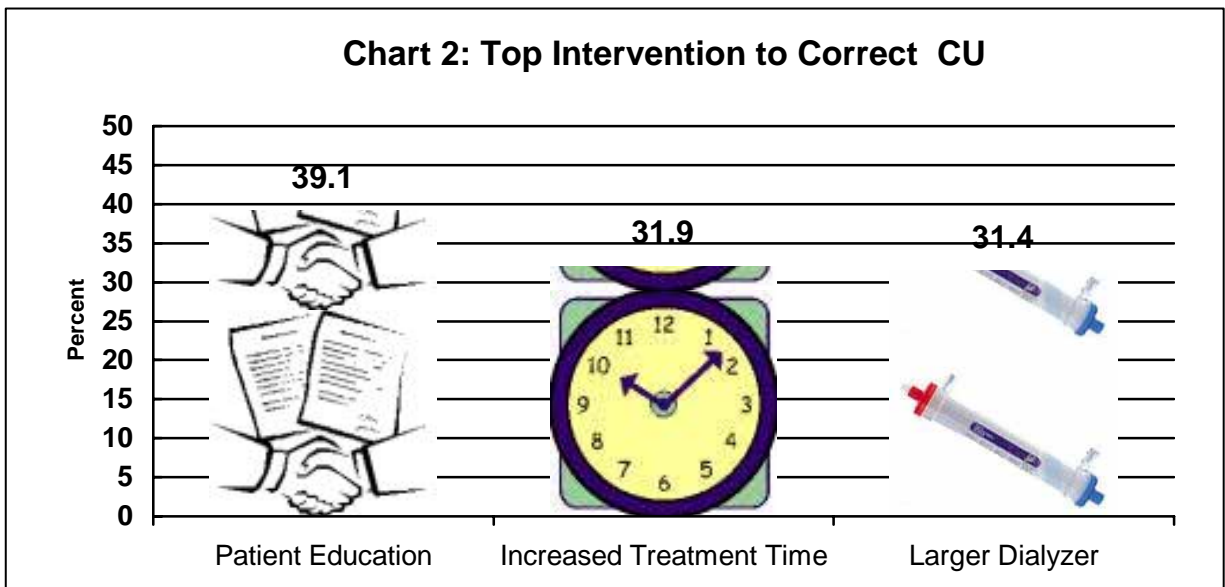
- 6 A total of **207** patients from **117** of **272** facilities met the CU criteria at baseline.
- 6 Demographics of the CU patient sample were different than the Network #14 population average for the same general time period.
- 6 The majority of CU patients were under 50 years of age, male, African-American, diabetic and larger in body weight.
- 6 Treatment characteristics varied in delivered treatment time, percent of patients with prescribed Kt/V less than 1.2, length of time with a URR less than six months and percent of patients using a hemodialysis catheter. (Table 1)

Table 1. Baseline CU Demographic & Dialysis Treatment Characteristics Compared to Network #14	Baseline Pre-intervention CU Patient Cohort November 2000	Network #14 HD Cohort December 2000
Facilities	117	285
Patients	207	22,000
Average Age (years)	49.7 (\pm 13.3)	60
% Male	84.1	50
Average Months on HD	45.8 (\pm 51.3)	42
% African-American	51.2	31.5
% Diabetic	45.4	47.4
Dry Weight (kg)	104.5 (\pm 33.0)	75.1 ¹
% Greater than 83 kg	72.8	nr
Average delivered treatment minutes	235.2(\pm 41.2)	214 ¹
% Prescribed Kt/V \geq 1.2	71.9	90 ¹
% Delivered Kt/V \geq 1.2	63.8	nr
Average URR	57 (\pm 6.1)	68.2
% Pts with URR <65% for \geq 6 months	52.2	nr
Weight loss during Tx.(kg)	4.0(\pm 2.1)	nr
% Catheters	31.4	17.4
% Fistulas	36.7	20.5
Source: ESRD Network #14 database ¹ Other source: 2000 CPM Annual Report nr = data not reported Continuous data is mean (standard deviation \pm) Categorical data is n (%) with property		

Causes and Interventions for CU Patients



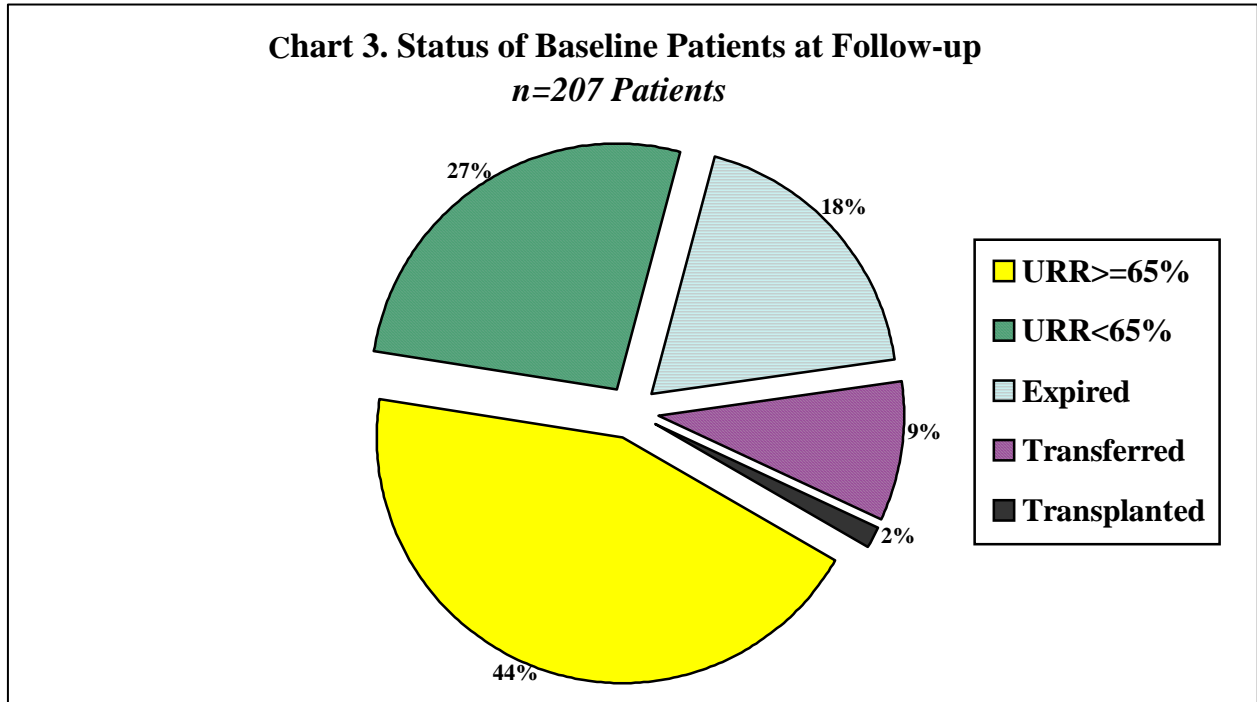
Reported <u>Causes</u> for Baseline Patient CU (Chart 1)	Reported <u>Interventions</u> to Correct CU (Chart 2)
<ul style="list-style-type: none"> • Large body weight (56%) 	<ul style="list-style-type: none"> • Patient education (39.1%)
<ul style="list-style-type: none"> • Inadequate access blood flow (44.9%) 	<ul style="list-style-type: none"> • Increased treatment time (31.9%)
<ul style="list-style-type: none"> • Requested shortened treatment time (35.7%) 	<ul style="list-style-type: none"> • Changed to larger dialyzer (31.4%)
<ul style="list-style-type: none"> • Refused prescription change (21.7%) 	<ul style="list-style-type: none"> • Increased blood flow rate (30%)
<ul style="list-style-type: none"> • Prescribed Kt/V < 1.2 (14.5%) 	<ul style="list-style-type: none"> • Revised vascular access (30%)
<ul style="list-style-type: none"> • Exhausted available treatment shift time (7.2%) 	<ul style="list-style-type: none"> • Increased dialysate flow (14.5%)
More than one cause or intervention could have been reported	



What Happened to the Baseline CU Patients at Follow-up?

At follow-up, the 207 original CU patients were reported as: Chart 3.

- 6 Achieved URR \geq 65% (44%)
- 6 Remained with a $<$ 65% (27%)
- 6 Expired (18.3%)
- 6 Transferred (9%)
- 6 Transplanted (2%)



Differences Between Unresolved CU Patient Demographics and Treatment Characteristics and Resolved CU Patients

In comparison to patients who did achieve a URR of 65% for at least one month at follow-up (Resolved CU), the residual **55** CU patients showed a notable difference in a number of demographic characteristics. Specifically, unresolved CU patients had the following characteristics: (Table 2)

- 6 Significantly younger in age
- 6 Larger body weight
- 6 Treatments varied in the number of months on dialysis
- 6 Prescribed and delivered lower dose of dialysis
- 6 Higher catheter utilization

Table 2. Highlight Patient Demographic and Treatment Comparisons at Follow-up	Unresolved CU Patients with URR <65% N=#55	Resolved CU Patients with URR ≥65% N=#91	P-value
Dry weight (kg)	120.8 (±36.8)	95.5 (±28)	0.0001
% Greater than 83KG	47(88.7)	56(63.6)	0.0015
Months on dialysis	53.1 (±48)	39.8 (±45.4)	0.0559
Male (%)	92.7	81.3	0.0867
Age Group			0.0122
0-45	27(50)	35 (38.5)	-
46-60	23 (42.6)	32(35.2)	-
61+	4(7.4)	24(26.4)	-
Average months on dialysis	46.5 (±10.7)	50.9 (±14.1)	0.0326
Diagnosis			0.0957
Diabetes	17(31.5)	48(52.8)	-
Access			0.0798
Catheters	20(37.7)	17(19.3)	-
Prescribed minutes	263(±34.7)	251.5(±26.1)	0.0378
% Pts URR <65% for >6 Months	34(61.8)	43 (47.2)	0.1233
% Prescribed Kt/V ≥ 1.2	27(61.4)	64 (82)	0.0168
% Delivered Kt/V ≥1.2	21(46.7)	59 (76.6)	0.0014
Reasons for CU²			
Large body weight	41(74.6)	43(47.2)	0.0018
Requested shortened treatment	26(47.3)	29(31.9)	0.0784
Inadequate VA blood flow	18(32.7)	50(55.0)	0.0105
Prescribed Kt/V <1.2	10(18.2)	13(14.3)	0.6401
Actions² taken to correct CU			
Changed to higher clearance dialyzer	18(32.7)	34(37.4)	0.5975
Increased Treatment Time	18(32.7)	32(35.2)	0.8577
Revised/New Vascular Access	12(21.8)	31(34.1)	0.1360
Education/Behavior Contracting	27(49.1)	31(34.1)	0.0827
Increased Blood Flow Rate	16(29.1)	27(29.7)	1.0000
Categorical data is n (%) with property			
<i>More than one reason or intervention could have been reported</i>			
² Reasons and actions for CU for resolved patients collected at baseline only			

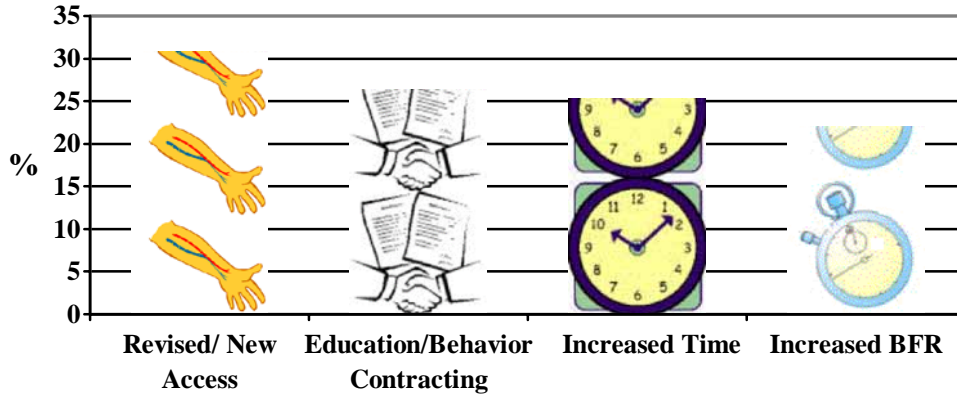
Facility Actions Taken to Resolve CU

Chart 4 displays the reported actions that were successful in improving dialysis adequacy in 91 resolved CU patients. Seventy-nine percent (79%) of the resolved CU patients had at least one intervention attempted during intervention period. The most common interventions were:

- 6 Revising or placing new vascular access (30.8%)
- 6 Education or behavior contracting (26.4%)
- 6 Increasing treatment time (25.3%)
- 6 Increasing blood flow rate (22%)

Chart 4. Successful Interventions To Correct CU

More Than One Intervention Could Have Been Marked



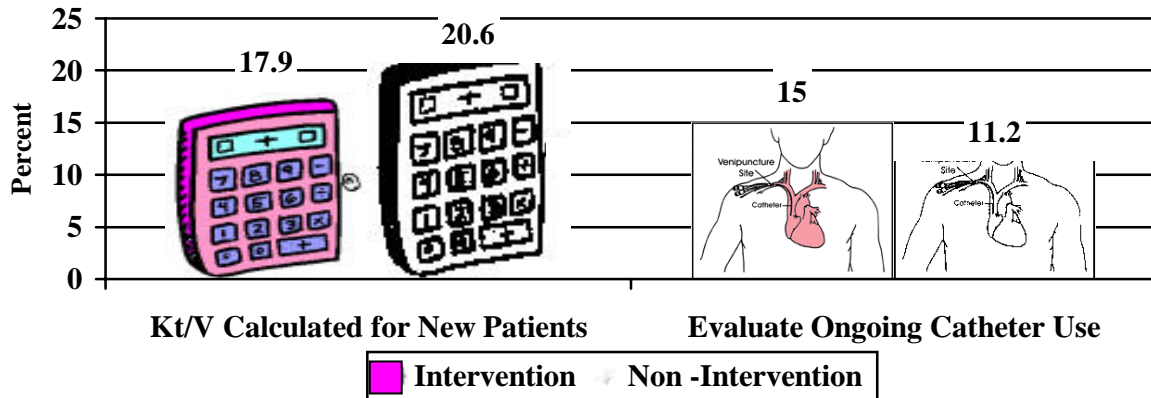
Implementation of Recommended CU Reduction Process

Implementation of facility processes to assist in the identification and correction of CU was evaluated in intervention facilities (Table 3). On follow-up:

- 6 18 (17.9%) additional intervention facilities reported calculating a prescribed Kt/V for each new patient.
- 6 15 (15%) additional facilities implemented a written process to intervene for patients who do not run prescribed time or miss treatments.
- 6 8 (2.9%) additional facilities began evaluating hemodialysis catheter use

Analysis of the effect of each proposed intervention on correcting or preventing the incidence of CU showed no statistically significant difference between facilities that implemented one or more of the processes and facilities that did not.

Chart 5. Percent Change in Number of Facilities Implementing Recommended CU Reduction Process



Demographic and Treatment Characteristics of Newly Identified CU Patients at Follow-up

On follow-up:

- 6 **239** additional patients from **120** facilities met the CU criteria.
- 6 When added to the 55 residual CU patients, a total of **294** CU patients being treated in **132** facilities existed at follow-up.
- 6 These new patients had similar demographic and treatment characteristics as the baseline patient group. (Table 4)

Table 4. Highlight Differences between Baseline and New CU Patients	<i>Baseline CU Patients N=#207</i>	<i>New CU Patients N=#239</i>	<i>P- value</i>
Average months on dialysis	45.8 (±51.3)	40.3(±12.7)	0.0021
Average dry weight	104.5(±33.0)	97.6(±30.6)	0.0247
Average prescribed blood flow rate	413(±70.7)	397.5 (±65.4)	0.0163
Continuous data is mean (standard deviation ±)			

Conclusions

This quality improvement project identified that even though greater than 90% of the Texas hemodialysis patient population has attained recommended adequacy levels, a small percentage (<1%) of Texas hemodialysis patients have significant barriers to attaining a URR $\geq 65\%$.

Characteristics of patients at greatest risk of CU are:

- 6 Under the age of 50
- 6 African-American
- 6 Large body weight
- 6 Hemodialysis catheter as vascular access
- 6 Prescribed a Kt/V of less than 1.2
- 6 Unable or unwilling to fulfill prescribed time

At follow-up many patients remained at risk for CU. However, nearly half attained a URR $\geq 65\%$ as a result of one or more interventions. The primary interventions responsible for the attainment of URR $\geq 65\%$ in these patients were revising/replacing vascular accesses, patient education and increasing treatment time.

One possible explanation for why some patients remained at risk for CU at follow-up can be attributed to the group's higher percentage of patients with one or more of these factors: weight greater than 83Kg body weight, reliance on catheters or the inability or unwillingness to fulfill prescribed treatment time.

Each of the above barriers has its own set of potential causes within individual facilities. For example, patient barriers for large body weight individuals include: unwillingness to lose weight, be treated for longer than 4-5 hours or be scheduled for more than three weekly treatments. Patients using catheters may be reluctant to have a permanent access placed or may have exhausted all graft/fistula sites. Shortened treatment time may be attributable to a lack of

understanding of benefits of full treatment time, psychosocial factors or transportation/scheduling limitations.

Facility barriers may include inability or unwillingness on the part of the facility to extend dialysis treatment time for large body weight patients or to provide more than three weekly treatments due to operational and financial constraints. Increased catheter utilization may be a result of facility staff not referring patients in a timely manner for permanent access placement and/or failure to educate patients on the benefits of permanent access. Shortened treatment times may be due to staff failure to identify and resolve patient medical concerns during treatment and/or lack of facility processes for addressing the issue of patients who consistently sign off early. Failure to adequately prescribe dialysis may be a factor not only in patients with large body weight, but also in patients with inadequate vascular access.

One of the goals of the QIP was to assist facilities in the recognition and implementation of processes that are beneficial in minimizing the incidence of chronic underdialysis in their patient population. Network #14 and MRB-developed quality improvement tools to address the most likely causes of CU were distributed to all facilities. These tools included a catheter indication checklist, interventions for shortened treatment worksheet and a Kt/V calculation template. On the follow-up data collection and Network #14 QIP QI tool evaluation, the majority of intervention and non-intervention facilities reported adoption of the QIP quality improvement tools for use with CU patients.

Although a significant number of facilities adopted one or more of the QIP QI tools, the QIP findings demonstrated no statistically significant correlation between facilities' utilization of processes to correct underdialysis and their ability to resolve or prevent CU in residual or newly identified patients. However, it would be expected that a facility treatment team implementing one or more of the tools would be better prepared to proactively identify and intervene with patients having risk factors for CU.