

# 2006 CATHETER REDUCTION PROJECT

## Final Report

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*This report was developed under Contract Number HHSM-500-2006-NW011C sponsored by Centers for Medicare & Medicaid Services (CMS), Department of Health and Human Services. The content of this publication does not necessarily reflect the views or policies of the Department of Health and Human Services, nor does mention of trade names, commercial products, or organizations imply endorsement by the U.S. Government. The authors assume full responsibility for the accuracy and completeness of this report.*

# **Renal Network 11 2006 Catheter Reduction Project Final Report July 2007**

## **Background**

The National Kidney Foundation has published the Kidney Disease Outcome Quality Initiative (KDOQI) Clinical Practice Guidelines for Vascular Access since 1997, with the most recent update published in 2006. These guidelines recommend that less than 10% of chronic maintenance hemodialysis (HD) patients be maintained on catheters as their permanent dialysis access.

Network 11 conducted a quality improvement project in 2002 that targeted reduction of permanent catheters used for hemodialysis. This project included the collection of vascular access data for patients starting hemodialysis, an intervention using a model algorithm and protocol that was distributed to dialysis facilities, and post-intervention data collection. This improvement project was successful in decreasing the overall catheter rate in Network 11. The rate for catheters being used as sole access for greater than 90 days decreased from 22% to 8.9%.

In 2006, Network 11 collected and analyzed vascular access data to determine if the catheter reduction achieved in 2002 was sustained since the onset of the Fistula First initiative. At the end of 2003, nearly 17% of patients dialyzed with a catheter as sole access for greater than 90 days, and this percentage continued to rise in subsequent months. This rise in catheter usage was thought to be due to the drive for facilities to place more permanent access which required catheters to be placed during access maturation. In response to this increase of permanent catheter use, Network 11 designed a quality improvement project modeled after the catheter reduction project of 2002 to focus on decreasing catheter use as sole access for greater than 90 days.

## **Methods**

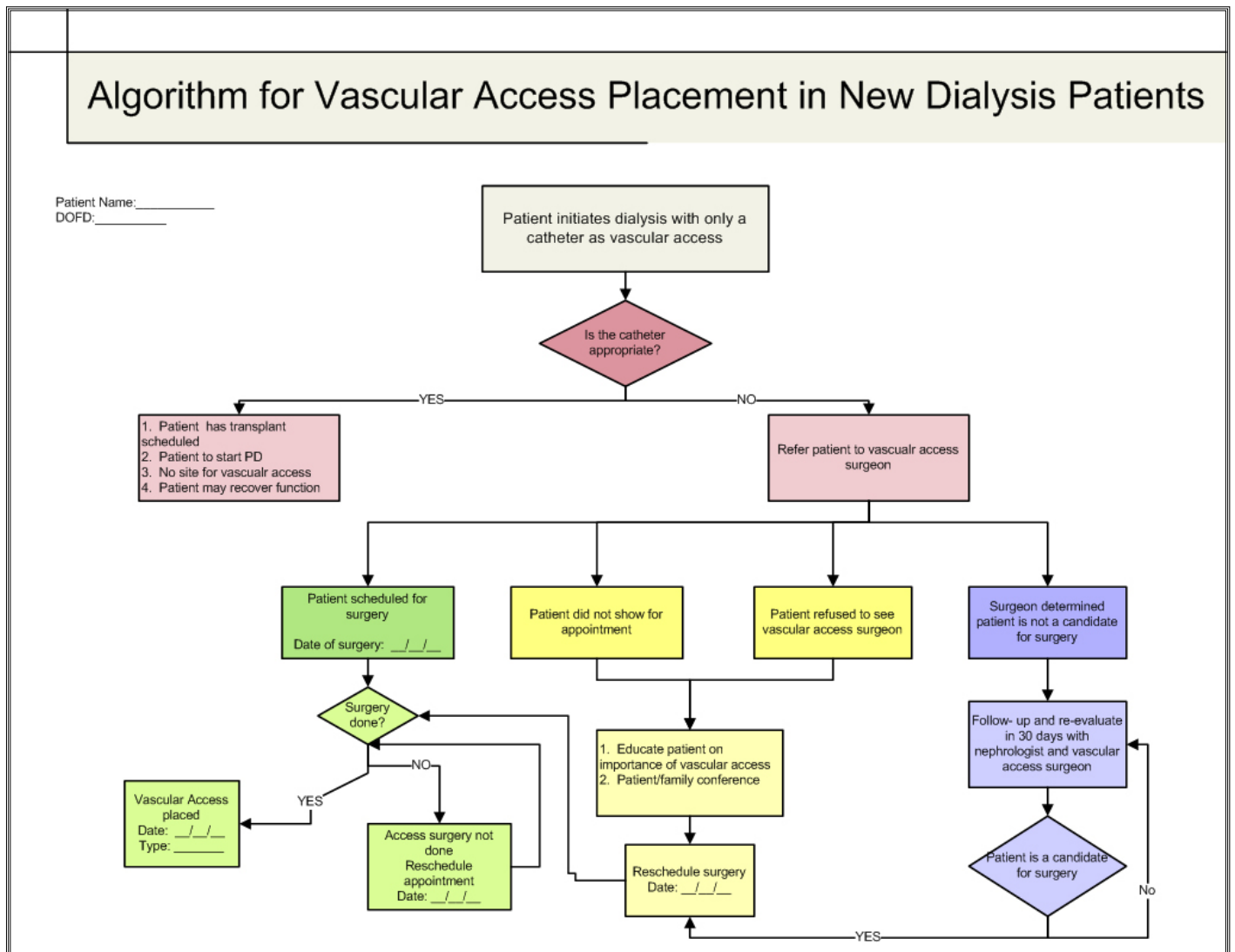
The project sample included all adult patients beginning in-center hemodialysis from June 1, 2006 to August 31, 2006 in Network 11. The patients were identified from the CMS Form 2728 submitted by facilities that were reported as initiating hemodialysis with a catheter and having no other maturing vascular access, as indicated in question 18d. Patients were assessed at three months for catheter status, and those who were still dialyzing with a catheter as sole access were identified for intervention. The intervention consisted of the protocol and model algorithm, developed by the Network 11 Medical Review Committee that was also used in the 2002 project mentioned above. Patients who died, transferred to peritoneal dialysis (PD), or underwent transplantation in this time were assessed as having appropriate catheters and were excluded from analysis.

- **Initial Data Collection:** Upon identification of a new patient starting dialysis between June 1, 2006 and August 31, 2006 using a catheter as sole access, the Initial Data Collection Form was faxed to the dialysis facility for completion. Questions on the form included the number of months the patient was initially seen by a nephrologist

before beginning dialysis, the number of months a patient was evaluated by a surgeon for vascular access placement before beginning dialysis, and the reason for a catheter being used as sole access. The dialysis facility was asked to complete the form and return to Network 11 via fax. A total of 1255 Initial Data Collection Forms were sent to facilities for completion, and 1,211 forms were completed and returned to the Network 11 office, a return rate of 96%. Submissions that included certain events such as death, modality change, and transplantation were excluded from the sample, leaving the final data sample to be 1109 patients for the initial data collection group.

- **Intervention:** The intervention phase began after the initial data collection identified the patient as having a catheter as sole access for greater than 90 days. The patient’s facility was sent a copy of the Network 11 Medical Review Committee model protocol and algorithm for implementation as shown in Figure 1. The model protocol and algorithm was also used in conjunction with the 2002 catheter reduction project to assist facilities to identify and overcome barriers for placement of permanent access.

Figure 1. Model algorithm for vascular access placement in new dialysis patients



- **Follow-up Data Collection:** Facilities were given three months to implement the model algorithm and protocol for each patient that started dialysis with a catheter as sole access. After the three-month intervention period, dialysis facilities received a Follow-up Data Collection Form via fax for each patient. The form asked if the patient was referred to a surgeon for vascular access placement, whether a permanent dialysis access was placed, and the type of access the patient currently used for hemodialysis. The dialysis facility was asked to complete the form and return to Network 11 via fax. A total of 1165 Follow-up Data Collection Forms were sent to facilities for completion, and 903 forms were completed and returned to the Network 11 office, a return rate of 78%. Submissions that included certain events such as patient death, modality change, and transplantation were excluded from the sample, leaving the final data sample to be 790 patients for the follow-up data collection group.

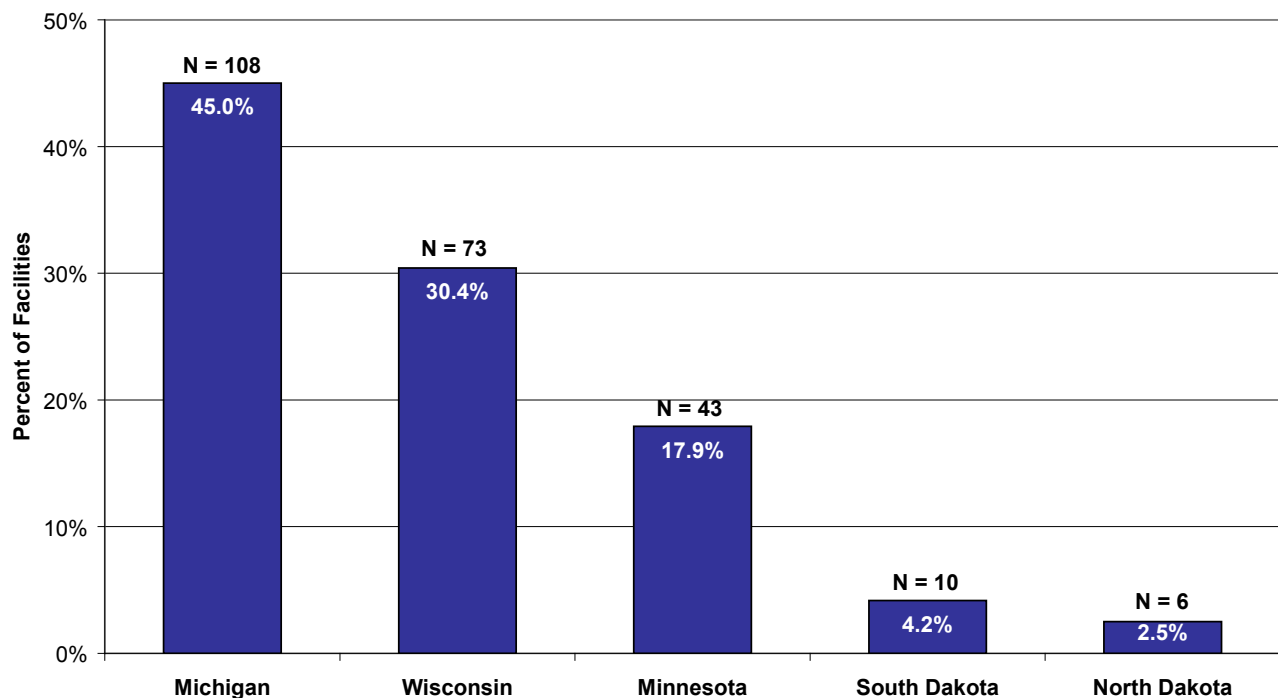
## Results

The final dataset included those patients who had completed both the initial and post intervention data collection forms and who were reported to have a catheter as sole access for greater than 90 days, totalling 766 patients. Both initial and post-intervention data sets were analyzed to determine the practices of dialysis facilities, nephrologists, and vascular access surgeons in achieving permanent vascular access placement for patients starting hemodialysis with a catheter as sole access.

### Initial Data Collection Analysis

- **Dialysis Facility Demographics:** All dialysis facilities within Network 11 that met the patient selection criteria were asked to participate in the project. A total of 240 facilities participated in the project with all five states in Network 11's represented, as shown in Figure 2. This facility participation accounts for approximately 75% of Network 11's total facilities.

Figure 2. 2006 catheter reduction project facility participation



- Patient Demographics:** The initial dataset included 1109 incident dialysis patients after excluding patients who did not meet the inclusion criteria. Patients beginning dialysis with a catheter as sole access overall showed similar trends in gender and age when compared to the total number of patients receiving incenter hemodialysis in Network 11, but some differences were evident in race. Figure 3 shows the difference in race for the catheter reduction group. Where there was a greater proportion of white patients and a smaller proportion of African American patients. Figure 4 shows that the differences in age groups were not significant. For gender, both

Figure 3. Network 11 catheter reduction project: Comparison of race

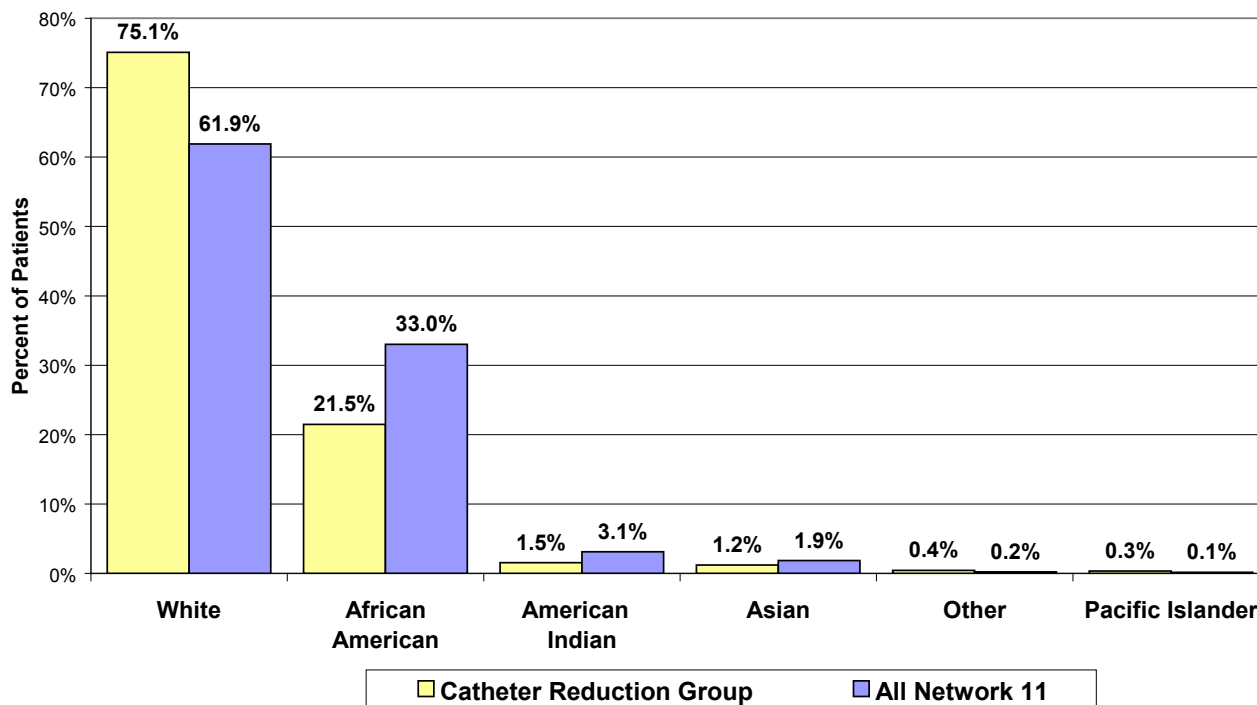
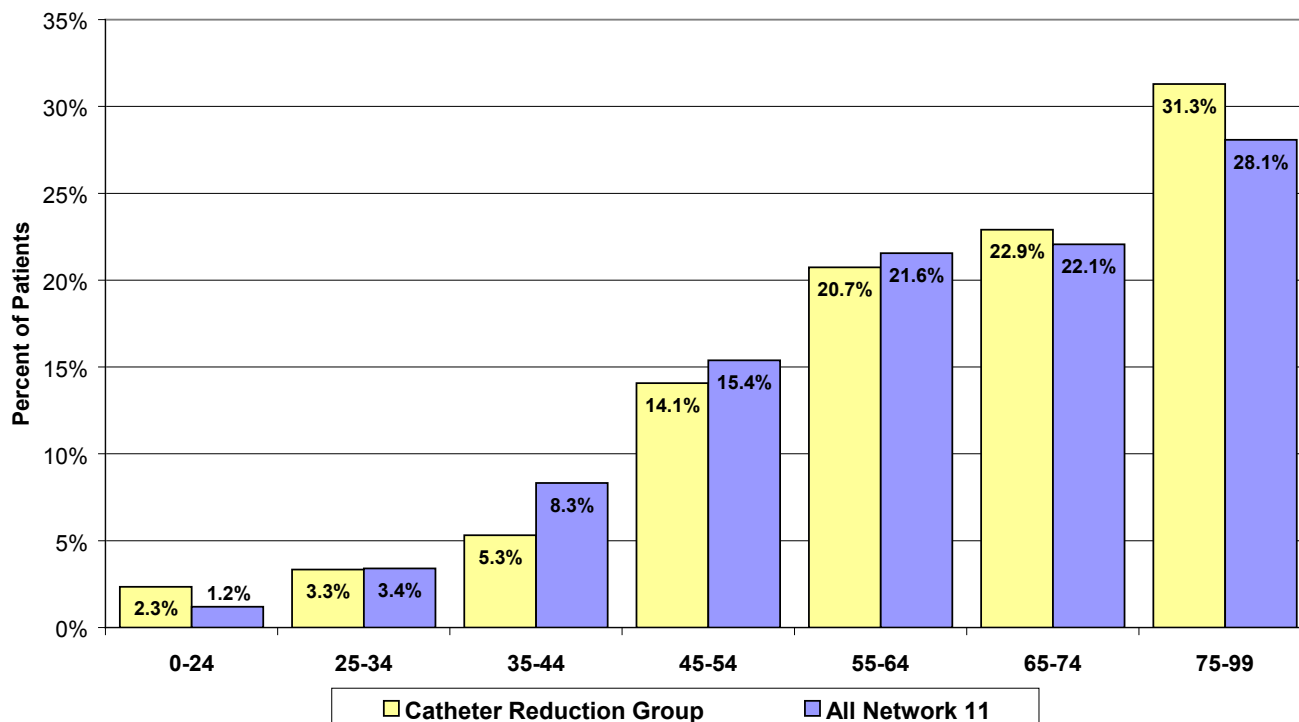


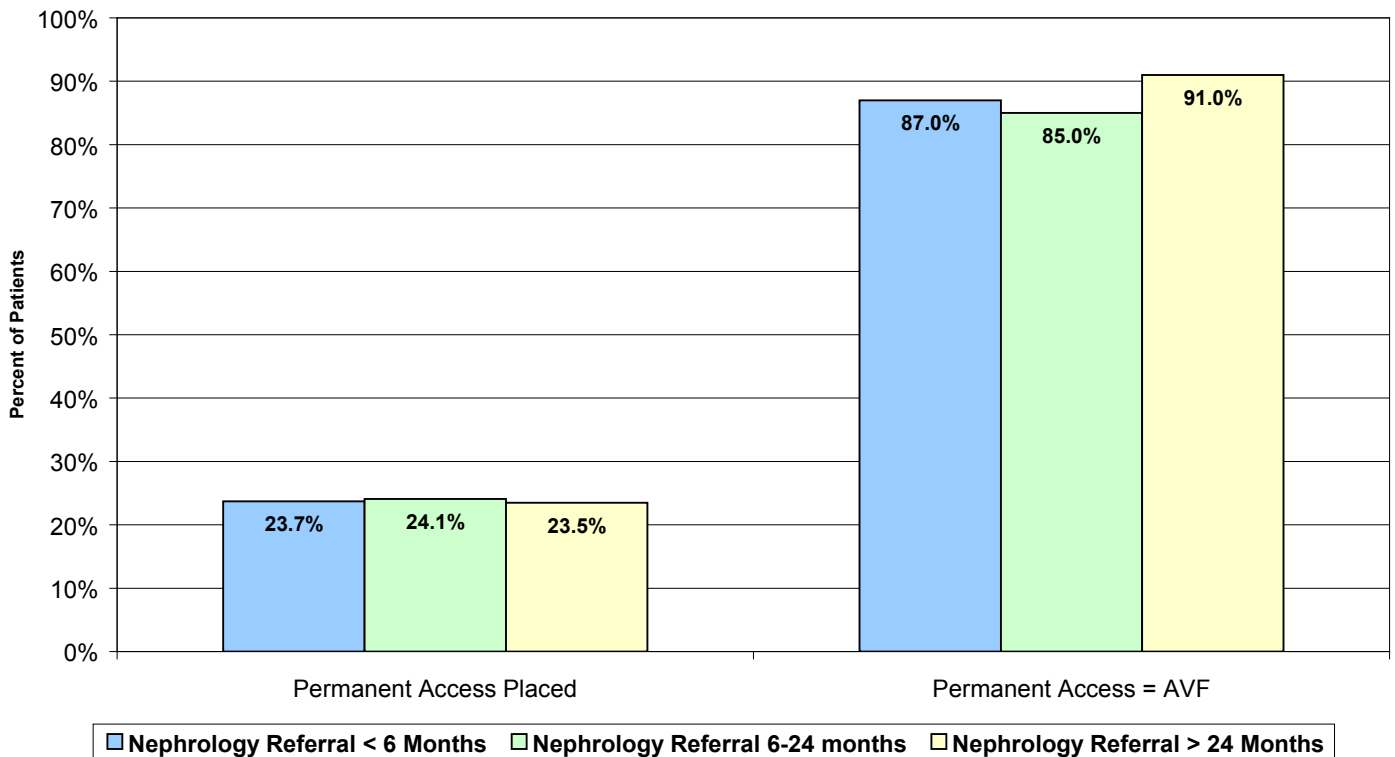
Figure 4. Network 11 catheter reduction project: Comparison of age



the intervention group of patients and the Network 11 incenter hemodialysis group showed approximately 55% of patients being male and 45% female.

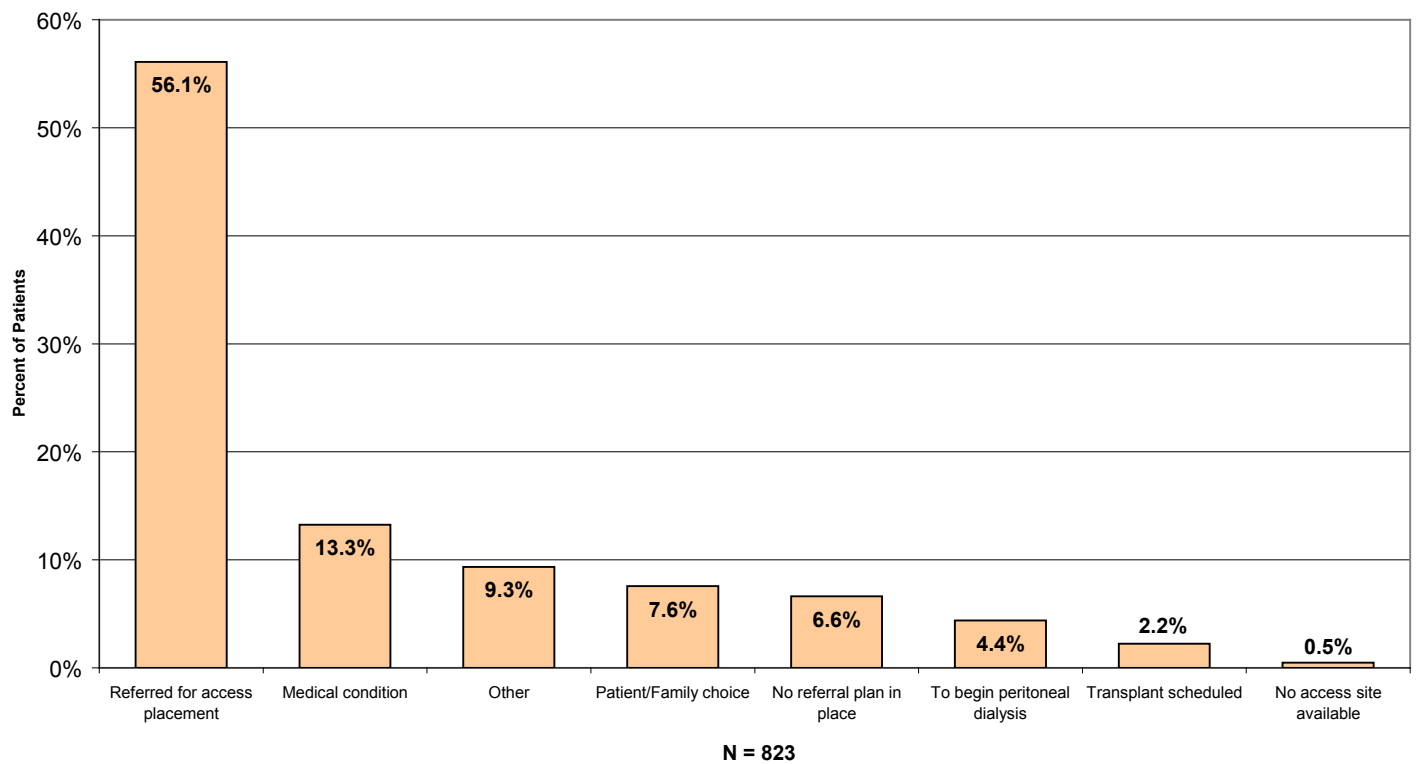
- **Nephrologist Referral:** Nearly half (42%) of the patients beginning dialysis with a catheter as sole access were referred to a nephrologist less than three months before starting dialysis. Of those patients who were seen by a nephrologist 6-24 months before beginning dialysis, only 24.1% had a permanent access placed by the onset of hemodialysis. Patients who were seen by a nephrologist less than 6 months, 6 - 24 months, or greater than 24 months before starting dialysis had no greater likelihood of beginning dialysis with a permanent access, as shown in Figure 5.
- **Surgeon Referral:** The percent of patients who were referred to a vascular access surgeon for permanent access placement prior to beginning dialysis was only 7% (77 out of 1109 patients). Of these patients, 57 were referred less than three months before beginning dialysis, and only 20 patients were referred to a surgeon more than three months before beginning dialysis.

Figure 5. Comparison of nephrology referral and permanent access placement



- **Catheter as Sole Access Analysis:** Facilities were asked to select a reason why each patient used a catheter as sole access for dialysis. Figure 6 shows the reasons named for catheter use. The majority of patients (56.1%) were using catheters while awaiting their appointment to be evaluated by a surgeon for vascular access placement. Medical contraindications were also reported for 13.3% of patients. Approximately 7.6% of patients refused to attend the appointment with the surgeon either because of choice or because the patient or family postponed vascular access placement while making a decision about other renal replacement therapies. Those pa-

Figure 6. Reasons for catheter as sole access use



tients who anticipated changing modalities or receiving a transplant that was already scheduled only accounted for 6.6% of patients. The majority (92%) of patients who fell into the “other” category were recovering kidney function as determined by their nephrologist. The remaining patients in the “other” category delayed vascular access placement due to no insurance coverage.

### Post Intervention Data Collection Analysis

- **Post Intervention Surgeon Referral:** The percent of patients referred to a vascular access surgeon for placement of a permanent access during the follow-up period was 48%. Patient choice was the highest ranking reason for not having surgeon referral in place, with 30.7% of patients electing not to attend a surgeon appointment. Another 26.8% of patients were not referred due to medical contraindications, and 22.2% were scheduled for a transplant or peritoneal dialysis. Other reasons reported included lack of insurance reimbursement, surgeon appointments not currently available, and the potential for the patient to regain kidney function. See Figure 7.
- **Vascular Access Placement:** Of the patient group included in the follow-up data collection, 35.1% had either an arteriovenous fistula (AVF) or an arteriogenous graft (AVG) placed. Figure 8 shows the breakdown of reasons for a vascular access not being placed. Analysis of vascular access placement shows similar trends of patients not referred for surgeon evaluation with 28.0% of patients that refused permanent vascular access placement, 19.9% had an appointment scheduled to be evaluated by a surgeon, 18.2% reported medical contraindications for permanent access placement, and 14.0% delayed vascular access placement due to evaluation for transplantation or peritoneal dialysis.

Figure 7. Reasons for no surgeon referral in follow-up period

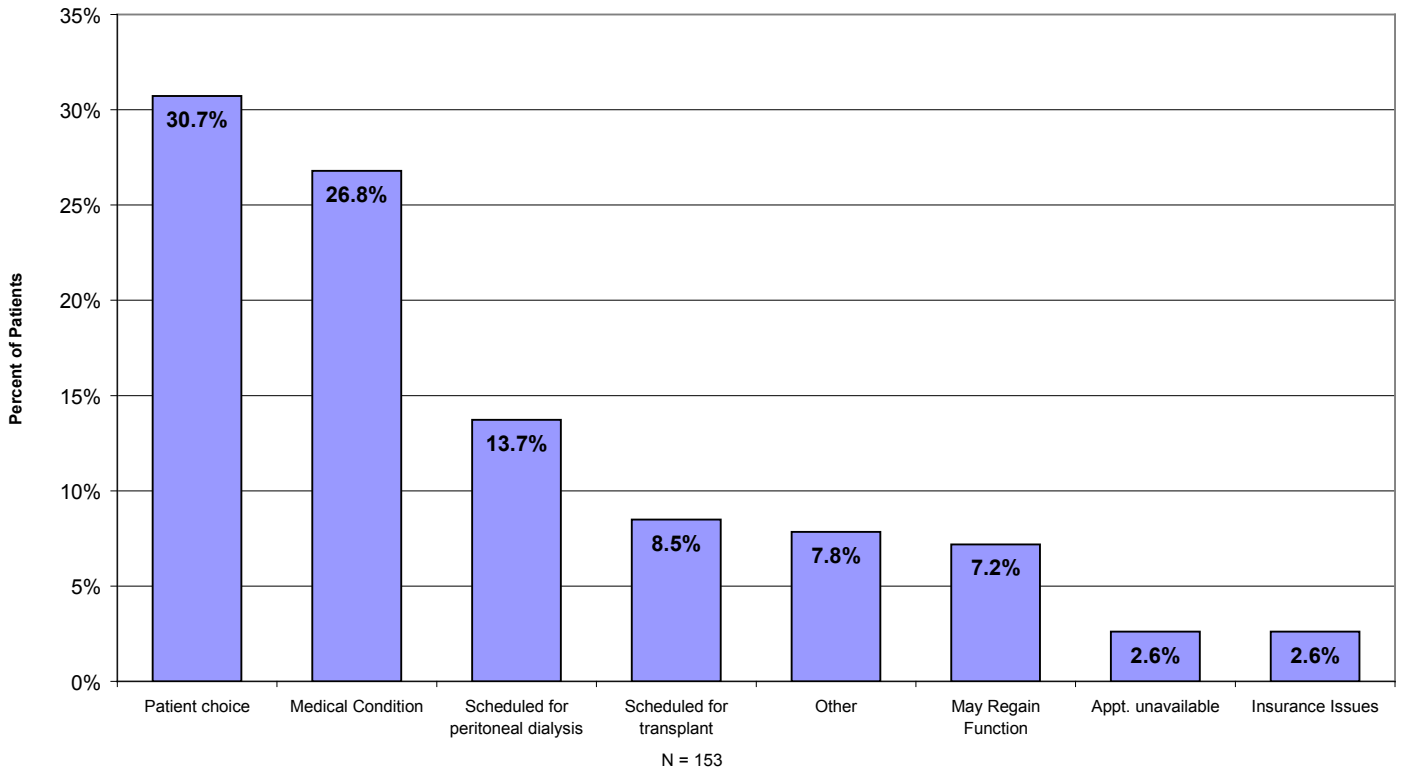
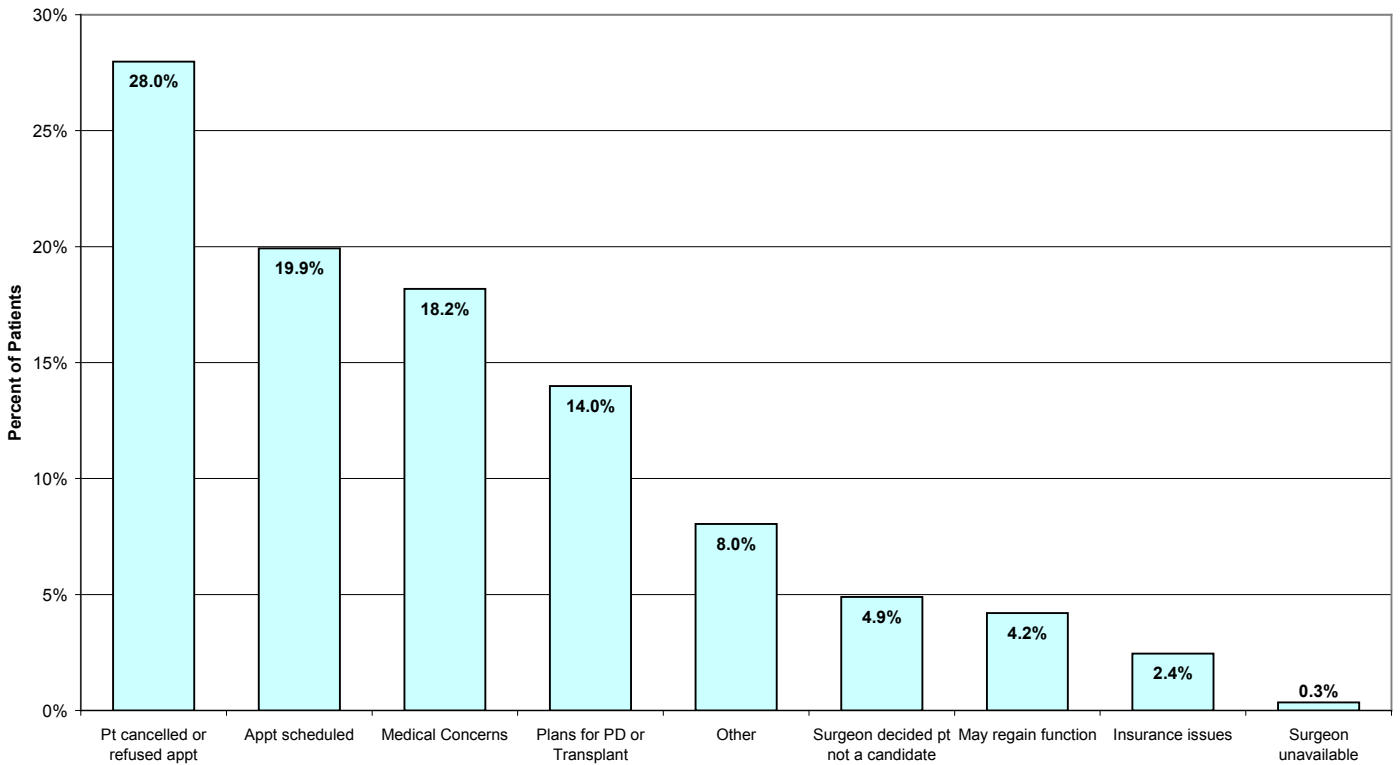
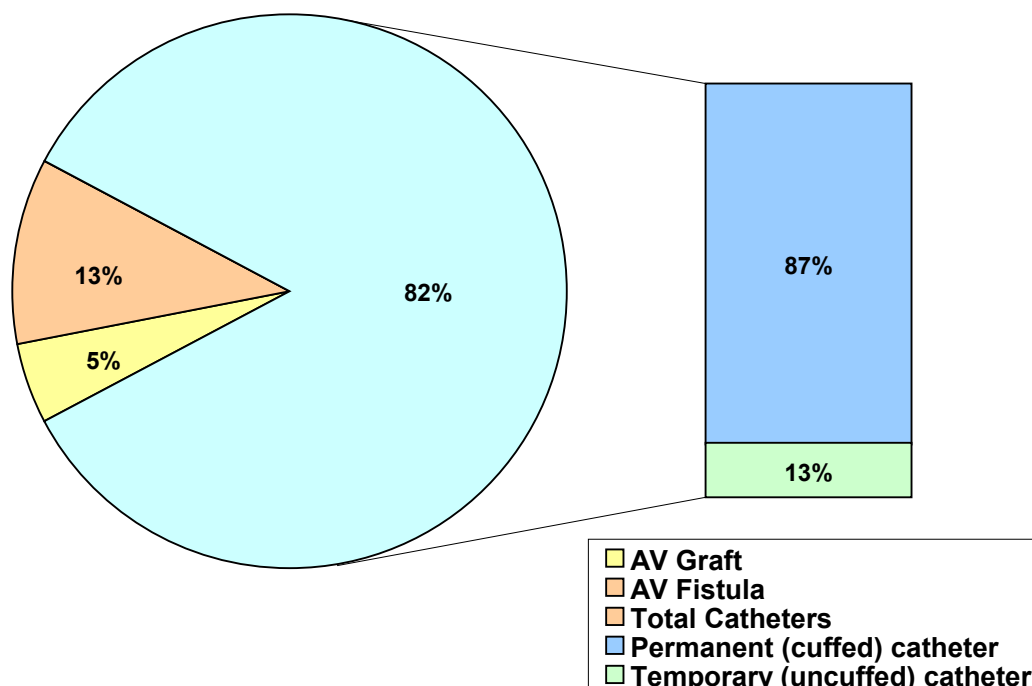


Figure 8. Reasons for no vascular access placement in follow-up period



- **Current Vascular Access Used:** Overall, 82.4% of patients continued to use a catheter for dialysis in the follow-up period, with 87% of the catheters being permanent. As shown in Figure 9, the percent of patients using a permanent vascular access for dialysis in the follow-up period was 18%, with 13% of patients using an AVF.

Figure 9. Analysis of vascular access used in follow-up period



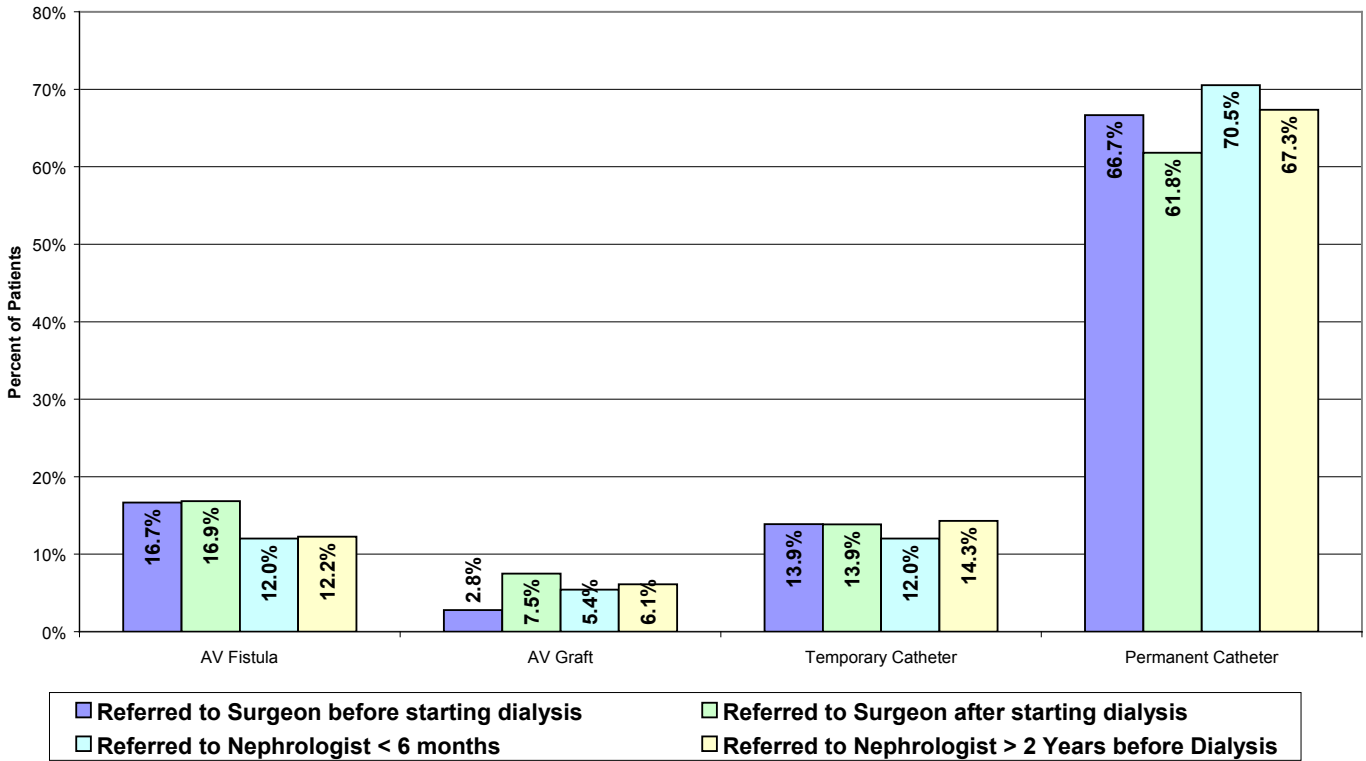
### Merged Pre/Post Data Collection Analysis

A final data analysis was conducted to include data from both the initial and post-intervention data set to evaluate vascular access outcomes for patient along the continuum of care. The dataset included 766 patients after excluding patients without follow-up data or who had appropriate catheter placement. Aggregate trends were analyzed to report patient final vascular access outcomes at the completion of the project. Figure 10 shows a comparison of the total numbers of patients referred to a nephrologist before initiating dialysis, surgeon referrals for vascular access placed, and actual placement rates of vascular access.

- **Surgeon Referral:** Both patient groups were analyzed to identify the total numbers of patients that were referred to a surgeon for vascular access placement. A total of 44 patients were referred to surgeon for permanent access placement prior to beginning dialysis, and 65.9% of these patients were still using a catheter as sole access for dialysis after the three-month intervention period. A total of 367 patients were referred for permanent access placement after beginning dialysis, and 55% of these patients were still using a catheter as sole access after the three month intervention period. Whether referred to a surgeon before or after beginning dialysis, approximately 17% of both patient groups had an AVF placed during the intervention period and were using a catheter while awaiting maturation of the permanent access.
- **Nephrologist Referral:** Of the patients that were referred to a nephrologist more than two years before beginning dialysis, about half of the patients were still using a per-

manent catheter as sole access after the three-month intervention period, and 10.5% of these patients were using temporary catheters for dialysis. Similar trends were also observed for patients having less time to see a nephrologist before beginning dialysis. Approximately 9% of these patients had an AVF placed and were awaiting maturation.

Figure 10. Comparison of vascular access outcome based on nephrologist and surgeon referral



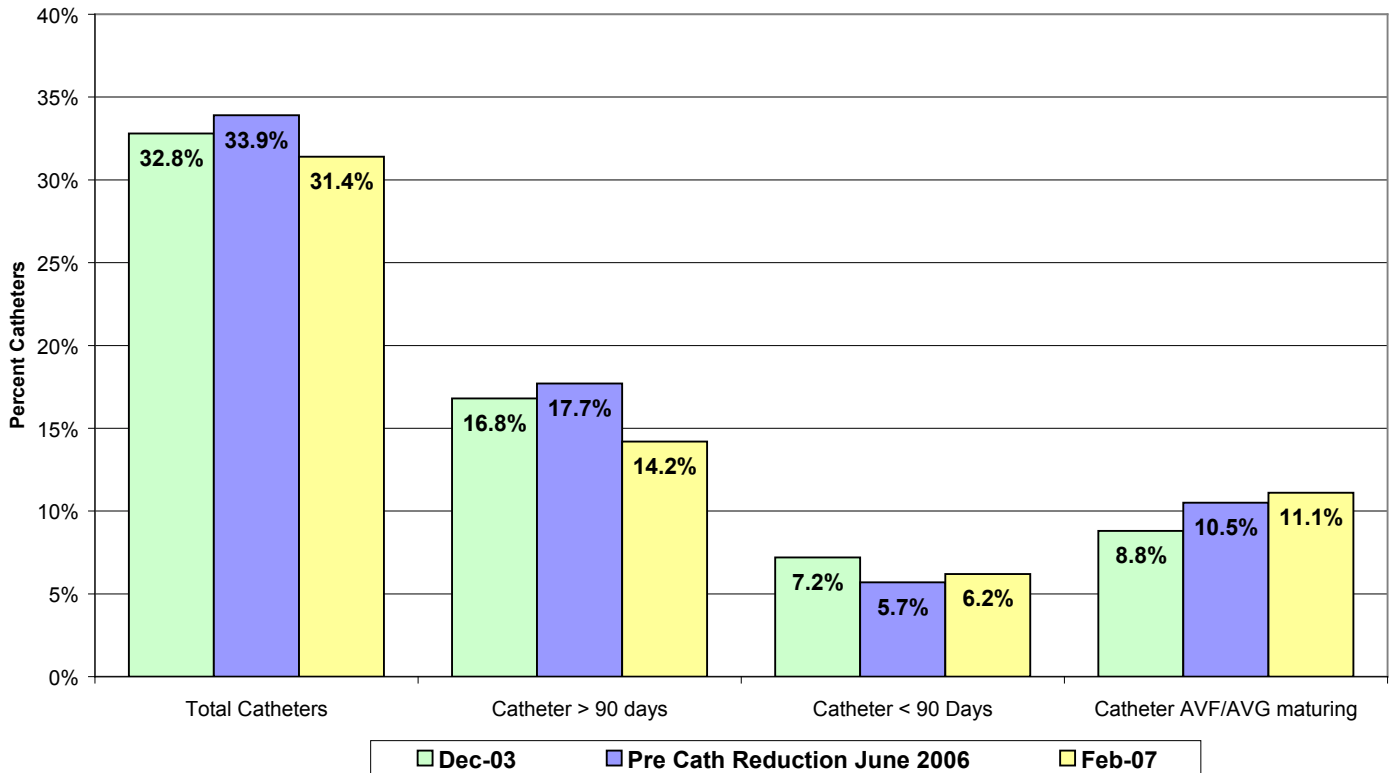
- Catheter Rate Reduction:** Both datasets showed continued high prevalence of catheters as sole access for dialysis. Vascular access data was also reviewed at the close of the data collection to evaluate if overall reduction in catheters occurred. Figure 11 shows that through this project, Network 11 did succeed in reducing its region’s overall catheter rates, as well as the rate for catheters greater than 90 days. Improvement was also observed in catheters used while awaiting maturing of an AVF or AVG.

## Conclusions

The goal of this project was to reduce the catheters being used as sole access for patients initiating dialysis. Data analysis showed that Network 11 was successful in reducing the overall catheter rate from 33.9% in June 2006 to 31.4% in February 2007, a 2.5% improvement. The rate for catheters as sole access for greater than 90 days also improved from 17.7% in June 2006 to 14.2% in February 2007, a 3.5% improvement. The project also showed improvement in the placement and maturation of permanent accesses. Even with this initial improvement, several themes were identified as areas needing further improvement in Network 11.

Patterns of patient referral to a nephrologist were shown to have little impact on permanent vascular access placement in this project. Patients referred to a nephrology more

Figure 11. Comparison of catheter rate reduction over time



than two years or less than 6 months have comparable rates of permanent access placement. Education efforts toward nephrologists and physician extenders to refer patients earlier to the surgeon needs to expand to greater numbers of nephrology practices. Also, strategies to educate surgeons, interventional radiologists, and nephrologists to place permanent access within same hospitalization as catheter placement could also benefit those patients with little or no nephrology evaluation time prior to starting dialysis.

Data analysis showed that only half of patients beginning dialysis with a catheter as sole access were referred to a surgeon for permanent access placement within the first three months of dialysis. The data also showed that when permanent accesses were placed, an AVF was more likely to be placed than an AVG. Education efforts for the dialysis facilities need to continue toward assisting nephrologists to refer patients who start dialysis with a catheter as sole access to a surgeon within the first month of dialysis.

Efforts should continue toward educating patients on options for vascular access placement. This project showed that one of the highest barriers to AVF placement was patient choice or refusal to have access placed. Further education of the patients will assist in removing the barriers that currently contribute to a high rate of patients refusing surgeon evaluation and permanent access placement.