

National Vascular Access Improvement Initiative

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Preface

The Institute for Healthcare Improvement was asked by CMS to assist in developing the National Vascular Access Improvement Initiative. The initiative was launched to improve vascular access for dialysis patients, with the specific goal of increasing AV fistula use. Starting in January 2003, a team worked with representatives from CMS and the ESRD Networks along with clinicians, dialysis providers, patients, and others to understand the issues, develop high-impact change ideas, and propose a structure and strategy for implementing the intended improvements.

Vascular access is an issue that CMS and the ESRD networks have been addressing for many years. During the last scope of work, vascular access was the focus of three quality improvement projects, including one on increasing use of AV fistulas. The template generated for that project provided a solid starting point for the current undertaking, and it is our hope that the present document builds upon the strong foundation established by others.

The IHI team is indebted to many individuals who gave generously of their time and knowledge during this phase of the project. We specifically acknowledge the members of the Vascular Access Working Group:

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Mike Zecca, ESRD Patient

In addition to the working group, dozens of experts consented to be interviewed about their perspectives on the AVF challenge and how it can be met. One individual who provided extremely detailed feedback and suggestions was Jeff Sands, MD and we thank him for his interest and support.

Doug Marsh was the designated contact person for this project as the leader of the National Coordinating Center, and his leadership has been vital. Jefferson Rowland, Government Task Leader, provided ongoing project support and, with Doug, has been a most valuable and committed partner. Additional input and support were provided by David Hunt, MD, Medical Officer, Quality Improvement Group, CMS, Stephen Jencks,

MD, MPH, Director of the Quality Improvement Group, CMS, and Ida Sarsitis, ESRD Program Manager, CMS. Every ESRD Network participated by sharing their perspectives on the implementation challenges and opportunities in their regions, and many shared their specific experiences and results with AVF and other improvement projects.

We appreciate the commitment of this community to making a difference for ESRD patients and look forward to the successful implementation of the National Vascular Access Improvement Initiative.

The IHI Project Team

Project Charter: National Vascular Access Improvement Initiative (NVAII)

Problem Statement

Dialysis patients and the medical professionals who care for them recognize that vascular access is the patient's "lifeline." Having a successful access is a major contributor to patient well-being; conversely, access problems are seen as the major cause of illness and disability for those on dialysis (1).

While substantial progress has been made on key indicators of dialysis quality such as dialysis adequacy (Kt/V)(2), vascular access continues to present significant challenges (3,4,5). It is an important determinant of dialysis adequacy, and has significant implications for morbidity related outcomes such as infection and mortality rates, with higher mortality noted among patients using AV grafts and catheters for long-term dialysis (6,7,8).

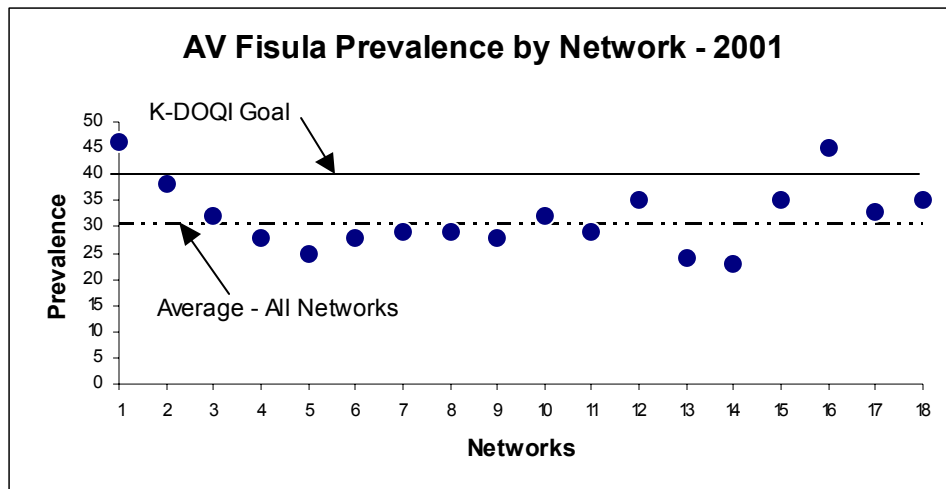
Among those responsible for the care of hemodialysis patients, there is agreement that the preferred type of vascular access is a native arterial venous fistula (AVF) (9,10,11,12). Compared to catheters and arterial venous grafts, native AVFs show significantly lower rates of complication (such as infection and clotting), longer patency, fewer hospitalizations, lower patient morbidity, and significantly lower costs (13,14,15).

The desirability of the AVF is reflected in the CMS ESRD Clinical Performance Measures (CPM) project:

Vascular Access CPM I—A primary arterial venous 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 (16).

This recommendation echoes that of the K/DOQI (Kidney Disease Outcomes Quality Initiative) practice guidelines for vascular access. K/DOQI is an initiative of the National Kidney Foundation that has led to a comprehensive set of practice guidelines for a wide range of dialysis care processes, including vascular access (17).

In the United States, rates of AVF use reported in 2001 were 29% for incident patients and 31% for prevalent patients. Among the 18 ESRD Networks, AVF use varies across region and over time. As of 2000, the regions with the highest AVF prevalence had rates of approximately 45%, whereas the region with the lowest rate showed approximately 23% of patients using AVFs for access (18).



Globally there is strong evidence that significantly higher rates of AVF use can be attained on a system-wide basis. Reported AVF rates for prevalent patients are 90% in Italy, 84% in Germany, 82% in Spain, 77% in France, and 67% in the UK (19). Even allowing for differences in the patient mix, it would appear that there is a significant gap between actual and potential rates of AVF use in the United States.

Patient Scenarios

To illustrate some of the ways in which patients receive suboptimal vascular access consider the following scenarios:

Patient A: A 55-year old African-American male was appropriately referred to a nephrologist when his primary care physician assessed his kidney disease as Stage 4 (20). The nephrologist was frank about the probable need for kidney dialysis, and recommended having an AVF placed in advance of the need for dialysis. The patient agreed to this plan. However, before the AVF could be placed, the patient’s condition worsened unexpectedly, leading to hospitalization and immediate need for hemodialysis. The patient received a catheter, and was referred to a vascular surgeon for permanent access. In the interest of transitioning the patient from the catheter as quickly as possible, the surgeon recommended placing a graft, even though there was no doubt about the patient’s suitability for an AVF.

Patient B: A 68-year-old diabetic Caucasian female was referred to a nephrologist and was informed that she would need dialysis in the near future. The nephrologist referred the patient to a vascular surgeon who recommended placing a graft because of doubts about whether her vasculature would support an AVF. No ultrasound or other venous mapping was performed. The nephrologist did not question the surgeon’s recommendation, request mapping, or seek a second opinion. The patient received a graft.

Patient C: A 48-year old uninsured Hispanic male arrived in the emergency room of a large urban hospital. He was severely uremic and the medical team recognized that he must receive hemodialysis immediately. A catheter was placed, he was dialyzed,

his condition stabilized, and he was released to outpatient dialysis care. No specific plans were made to establish permanent access.

Patient D: A 62 year-old diabetic Asian female received an AV forearm graft, which was initially successful. However, over a period of 18 months she experienced recurrent clotting problems requiring radiologic intervention and hospitalization. When her first forearm graft failed and could not be successfully revised, she was referred on an emergency basis to the surgeon who placed a second graft in the other arm. No one on her care team considered the possibility of placing an AVF in the upper arm nor did they prepare a specific access plan in anticipation of the eventual failure of her first graft.

Barriers and Opportunities

Certain system problems have been cited to explain low rates of AVF use including (21,22,23):

- Inadequate care of pre-ESRD patients, making early placement and maturation of AVF impossible.
- Lack of awareness among nephrologists and vascular surgeons about the current medical criteria for AVF.
- Poor communication between nephrologists and vascular surgeons about nephrologists' specific expectations regarding vascular access.
- Lack of training of vascular surgeons in placing AVFs successfully.
- Financial incentives for surgeons that encourage catheter and graft placement and discourage AVF placement.
- Patients not fully understanding the benefits of AVF and opting for catheters because of the less invasive surgical procedures necessary, and avoidance of needle "sticks."

Recommendations for improving rates of successful AVF placement have included the following (24,25,26,27,28,29,30,31):

- Multidisciplinary team approach ensuring coordination and consensus among the interested parties (nephrologists, surgeons, radiologists, dialysis nurses, and patients).
- Establishment of policies emphasizing preferential placement of AVFs
- Early referral of pre-ESRD patients to nephrology care, allowing for early evaluation and placement of AVFs when medically appropriate.
- Patient counseling regarding the advantages of AVFs and specific procedures to protect the vasculature of the arm selected for AVF.
- Good surgical judgment regarding location and technique used to place AVF and to make any needed revisions to ensure successful maturation.
- Referral of vascular access procedures to surgeons with demonstrable interest, skill, and experience.
- Routine preoperative mapping of the patient's arteries and veins.
- Understanding and supporting the maturation period for an AVF.
- Monitoring and documentation to ensure that the AVF is functioning properly and to detect any problems (infection, stenosis) at an early stage so that remedial steps can be taken.
- Timely intervention to correct any emerging problems that might endanger patient well-being or the patency of the access.

- Prospective tracking of outcomes with continuous improvement

Mission Statement

CMS, the ESRD Networks, the renal community, and IHI will work together to increase the likelihood that every eligible patient will receive the most optimal form of vascular access for that patient (in the majority of cases an arterial venous fistula, or AVF), and that vascular access complications will be avoided through appropriate access monitoring and intervention.

The intent is for CMS, the ESRD Networks, and the renal community to reach or surpass the goals set forth in the CMS Clinical Performance Measures project, that is, regional and national AVF rates of 50% or greater for incident patients, and at least 40% for prevalent patients undergoing hemodialysis. CMS has committed to a system-wide improvement project on vascular access over the course of the next three-year ESRD Network contract period, starting July 2003. CMS and the Networks will aim to ensure that every ESRD Network meets or exceeds its specific goal for vascular access improvement over the term of the 2003 Network contract.

The project will bring together the best of what is known about improving vascular access. By harnessing the knowledge of the many disciplines whose care influences vascular access choices for patients, we aim to create a new level of cooperation across professional disciplines and care settings.

The project will also support the ESRD Networks in enhancing their own improvement capabilities, and in transferring useful improvement skills to facilities and medical specialists. We envision the Networks using their collective knowledge and experience in new and expanded ways to generate significant national progress around this important issue.

Goals

Goals for the work that are consistent with this mission include:

- The United States renal care system as a whole will make significant progress toward attaining CPM and K/DOQI goals for AVF use (50% incidence; 40% prevalence) by the end of the upcoming ESRD Network contract period (2006).
- Several networks will meet or exceed the goal of 50% AVFs for incident patients by the end of the upcoming contractual period.
- Several networks will meet or exceed the goal of 40% AVFs for prevalent patients by the end of the upcoming contractual period.
- Networks that are currently operating at, or close to, the minimum standard for AVF use will establish stretch goals based on assessment of maximum feasible use of AVFs in their patient populations, and will make significant progress in meeting those stretch goals by the end of the upcoming contractual period.
- All networks will reduce to zero the number of patients with catheters or grafts who have not been appropriately assessed for possible AVF placement.

Principles for Developing Change Strategy

The NVAII aims to build on prior work, and to take advantage of system-level diagnosis and strategies for improvement. The following list summarizes the key principles that governed the development of change strategies for the project (see also Change Package document):

- Core strategies that address the fundamental “failure” points in the system and are operational enough to be adopted with manageable levels of external support
- Focus on “spread” of successful ideas on a Network and national scale
- Collaboration—among Networks, providers and key health professionals
- Leveraging of resources, including Network QI resources and other relevant sources of expertise and support
- Minimize burden on dialysis facilities

Appendix: Prior Improvement Initiatives

A substantial amount of work has already been done to analyze the causes for sub-optimal vascular access, and to propose avenues for improving vascular access practices and outcomes. Some successes in improving vascular access have been reported including:

ESRD Network 15 and Network 16: In the most recent scope of work, Network 15 (AZ, CO, NV, NM UT, WY) and Network 16 (AK, ID, MT, OR, WA) chose to implement projects to increase AV fistula use. Both focused on outreach to surgeons and nephrologists. Both provided tools to support physicians, dialysis staff, and patients. Both selected groups of intervention facilities with lower than average rates of AVF use. Network 15 focused on facilities in the greater Denver, CO area. Network 16 worked with facilities in four metropolitan areas: Seattle, WA; Portland, OR; Spokane, WA; and Boise, ID.

Key features of Network 15's program were (32):

- Personal outreach to key nephrologists and surgeons in the community to educate them about the importance of fistulas, and share current technical information about fistula options.
- Sharing of surgeon specific data on access placements allowing surgeons to see how their practices compared to their peers.
- Educational events with a nephrologist (Vo Nguyen, MD) a surgeon (Larry Spergel, MD), and a nurse (Kay Briegel, RN).
- A packet of educational materials including materials for patients .

Results: Between the baseline measurement period (Oct-Dec 2001) and the remeasurement period (Aug-Oct 2002), AVF rates in incident patients increased from 11.6% to 23.7%, $p=ns$; and rates in prevalent patients increased from 29.1% to 38.5%, $p<0.05$.

Special considerations: This project was focused on a specific metropolitan area, allowing Network staff to engage in significant personal outreach. Given the large geographical extent of Network 15, significant adaptation will be needed to make this approach "spreadable" throughout the region.

Key features of Network 16's program were (33):

- Outreach from Medical Review Board Chair to selected facility Medical Directors and administrators to ensure participation in workshops.
- Half-day educational workshops targeted primarily at nephrologists and surgeons (though also including dialysis center administrators and staff, specifically vascular access coordinators).
- Presentations from a nephrologist (Vo Nguyen) and a vascular surgeon (Chris Griffeth) who practice in Olympia, Washington. Together, they presented information on how they attained extremely high rates of fistula use in a population that would not ordinarily be considered ideal for this type of access (older, diabetic, etc.). They described how similar results can be attained through a combination of vein mapping, proactive vascular access planning, conversion of

AV grafts to AVFs, vein transposition, and a close working relationship between nephrologists and surgeons.

Results: In the target facilities AVF prevalence increased from 31.4% to 40% over a period of 6-8 months, post intervention.

Special considerations: The strategy relied on the presence of local champions with a solid track record of success, and willingness to teach their peers. Significant organizational support was required of the Network to deliver workshops in four geographic areas.

Vo Nguyen, MD and Chris Griffeth, MD: (34) Dr. Nguyen is a nephrologist practicing in Olympia, Washington and serving a dialysis patient population that is predominantly diabetic and older. Dr. Griffeth is the vascular surgeon with whom he works most closely. Prior to 1996, most of Dr. Nguyen's patients were dialyzed using AV grafts, with typically high rates of clotting and need for radiological or surgical revision. With prodding from Dr. Griffeth, Dr. Nguyen changed his approach to vascular access, taking much more responsibility for knowing all the options by which patients could receive AVFs and proactively planning for conversion of AV grafts to AV fistulas. Through advance planning and the placement of upper-arm AVF's including vein transpositions, Dr. Nguyen's practice now approaches nearly 100% successful AVF use.

Results: Over a three year period, 17 patients were successfully converted from AV grafts to AVFs. 41% of conversions involved vein transposition. All were successfully cannulated at an average of 34.4 days after placement.

Special considerations: Both Dr. Nguyen and Dr. Griffith have taken an unusual degree of responsibility for ensuring that patients receive AVFs if at all possible. Not all nephrologists and surgeons will be willing to cooperate to this extent.

Akron, Ohio: (35) This project relied on a multidisciplinary team, was organized by a specific dialysis provider (Fresenius Medical Care) and involved 9 outpatient dialysis facilities. Key activities included education and outreach to nephrologists and surgeons, establishing and tracking access information in a database, providing surgeon-specific data on rates of AVF placement compared to peers, performing preoperative ultrasound imaging, and systematically investigating AVF options for patients with catheters.

Results: Overall AVF use (including both incident and prevalent patients) increased from 30.6% in 2000 to 53.3% in 2001, with significant increases in AVF placement for diabetic patients and female patients.

Special considerations: In this region there was a pool of vascular surgeons of sufficient size to make comparison of individual surgeons' results to their peers a meaningful exercise. In regions with fewer surgeons, this approach might not be appropriate.

Southeast Georgia: (36) An initiative sponsored by Gambro, this project was the first site in a national roll-out strategy for a “vascular access care program (VACP). Six dialysis facilities and one tertiary referral hospital participated in the project. The aims of the VACP were to improve all vascular access related outcomes, prolong vascular access life, and reduce hospitalization costs associated with vascular access. Key process elements included establishing a multidisciplinary team, which worked collaboratively to focus on specific outcomes data and to apply continuous quality improvement (CQI) methods.

Results: Based on pre-post intervention data, use of AVFs increased from 14.6% in 1997 to 25.2% for the post-intervention period (1/98-4/99). Graft and catheter use declined dramatically, as did hospital admissions related to vascular access problems, translating into fewer missed dialysis treatments for the provider.

Special considerations: The involvement of a tertiary medical center helped to unify the effort. Not all groups of facilities are organized in relation to such a center.

Southern California Kaiser Permanente: (37) Using a multidisciplinary team at the regional level, a managed care provider defined practice algorithms and established measurement strategies for 10 medical centers. Algorithms focused mainly on establishing AVFs as the preferred access, and monitoring all access modes allowing early intervention to prevent thrombosis. The algorithms were adapted to local needs. Data for measurement allowed comparison among all of the medical centers.

Results: Fistula prevalence increased from 28% in 1996 to 34% in 1999. Thrombosis rate fell from 0.97 episodes per patient per year to 0.41.

Special considerations: Integrated staff model health care delivery system may not be directly applicable outside managed care environments.

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Change Package

Vascular Access for Hemodialysis—Increasing the Incidence and Prevalence of AV Fistulas

Introduction

As part of the ESRD Network Scope of Work beginning July 2003, CMS, the ESRD Networks and key provider representatives jointly recommended adoption of a National Vascular Access Improvement Initiative (NVAII). The principal goal of the initiative is to increase the appropriate use of AV fistulas for hemodialysis access, reaching or exceeding the CPM and K/DOQI guidelines for AVF incidence and prevalence.

The pages that follow describe a set of change concepts for increasing AV fistula use among hemodialysis patients in the United States. Input to these change concepts was provided by a multi-disciplinary working group¹ with representation from the following groups: ESRD Network Executive Directors and Quality Improvement Directors, corporate and independent dialysis providers, nephrologists (including interventional nephrologists), nephrology nurses, vascular surgeons, interventional radiologists, patients, CMS project leaders and quality improvement staff, and the Institute for Healthcare Improvement. Lawrence Spergel, MD, a vascular access surgeon with substantial experience in clinical and quality improvement issues, chaired the working group.

The working group identified two main approaches to increasing AV fistula use—

1. Clinical and organizational changes that can be adapted and applied locally to improve AVF prevalence and success. These changes can be undertaken immediately.
2. System changes that must be implemented at a national level. These will require national leadership from CMS and should be expected to take longer to accomplish.

Many within the ESRD community have pointed out the need for system-level policy changes to encourage more AV fistula placement. These include reimbursing AVFs at a higher rate than AV grafts or catheters. Similarly, reimbursing venous mapping in limited and specific cases, for example, evaluation for a first AVF, would encourage AVF placement and improve the likelihood of success. CMS has stated its commitment to examining these issues carefully and considering appropriate changes.

National Vascular Access Improvement Initiative

The focus of the NVAII is on the first issue stated above—to address clinical and organizational improvements that will lead to more successful use of AV fistulas. ESRD Networks, dialysis providers, medical specialists, hospitals, and clinics, all share the responsibility for improving dialysis care by increasing appropriate and successful AVF placement. The ESRD Networks have a major role in catalyzing change, creating efficient ways to share knowledge and

¹ See list of Working Group members in Change Package appendix.

resources, and building strong alliances with the facilities and medical professionals in their regions. This document focuses on changes that can be made immediately to give all hemodialysis patients a better chance to receive an AV fistula.

Change Package Overview

Change concepts are ideas that have been used successfully, at least in some settings. They are presented to the ESRD Networks as a starting point in addressing the upcoming National Vascular Access Improvement Initiative. Network leaders and Quality Improvement staff in each region will need to develop their own strategies for implementation, addressing the opportunities and issues in their own regions.

The change package comprises two parts. The first provides a summary of the proposed change concepts. The second offers a list of resources including published references and available tools to support implementation.

Implementing the Change Package

Throughout the implementation process, the ESRD networks will function as leaders of the overall effort, establishing strategy, convening key stakeholders, providing education, disseminating practical tools and resources, and ensuring an open flow of information and feedback.

Regarding the clinical recommendations contained in the change package, Networks must draw upon the experience and expertise of their Medical Review Boards and medical experts in their community. Some change concepts may involve clinical approaches that are not currently common practice or about which there is a range of opinion. **Local clinical guidance is critical to selecting and implementing appropriate strategies.** Similarly, Networks must take into consideration the availability of local clinical resources and expertise in developing their own strategies.

Together, the ESRD Networks, dialysis providers and medical specialists comprise a complex and sophisticated system for serving hemodialysis patients. By working together within a common framework, professionals in the field of hemodialysis can be certain that their efforts will lead to better care and better outcomes for the most important group of stakeholders—ESRD patients.

Change Concepts for Increasing the Prevalence of AV Fistulas for Hemodialysis

Here are 11 key clinical and organizational changes for increasing AV fistula use and improving hemodialysis patient outcomes:

1. Routine CQI review of vascular access
 - Designate staff member in dialysis facility (RN if feasible) responsible for vascular access CQI.
 - Assemble multi-disciplinary vascular access CQI team in facility or hospital.
 - Minimally: Medical Director and RN (VA CQI Coordinator).
 - Ideally: Representatives of all key disciplines including access surgeons and interventionalists.
 - Investigate and track all non-AVF access placements, and AVF failures.
2. Timely referral to nephrologist
 - Primary care physicians utilize ESRD/CKD referral criteria to ensure timely referral of patients to nephrologists.
 - Establish meaningful criteria for PCPs who may not perform GFR or creatinine clearance testing.
 - Nephrologist documents AVF plan for all patients expected to require renal replacement therapy.
 - Designated nephrology staff person educates patient and family to protect vessels, when possible using bracelet as reminder.
3. Early referral to surgeon for “AVF only” evaluation and timely placement
 - Nephrologist/skilled nurse performs appropriate evaluation and physical exam prior to surgery referral.
 - Nephrologist refers for vessel mapping where feasible, prior to surgery referral.
 - Nephrologist refers patients to surgeons for “AVF only” evaluation, no later than Stage 4 CKD (GFR<30). Surgery scheduled with sufficient lead-time for AVF maturation.
 - Nephrologist defines AVF expectations to surgeon, including vessel mapping (if not already performed).
 - If timely placement of AVF does not occur, nephrologist ensures that patient receives AVF evaluation and placement at the time of initial hospitalization for temporary access (e.g. catheter).
4. Surgeon selection based on best outcomes, willingness, and ability to provide access services
 - Nephrologists communicate standards and expectations to surgeons performing access, e.g., K/DOQI minimal standards for AVF placement, and training in current techniques for AVFs.
 - Nephrologists refer to surgeons willing and able to meet the standards and expectations.
 - Surgeons are continuously evaluated on frequency, quality and patency of access placements. Data collection ideally is initiated and reported at the dialysis center as part of ongoing CQI process, and can be aggregated at the Network level.

5. Full range of appropriate surgical approaches to AVF evaluation and placement
 - Surgeons utilize current techniques for AVF placement including vein transposition.
 - Surgeons ensure mapping is performed for any patient not clearly suitable for AVF based only on physical exam.
 - Surgeons work with nephrologists to plan for and place secondary AVFs in suitable AV graft patients.

6. Secondary AVF placement in patients with AV grafts
 - Nephrologists evaluate every AV graft patient for possible secondary AV fistula conversion, including mapping as indicated, and document the plan in the patient's record.
 - Dialysis facility staff and/or rounding nephrologists examine outflow vein of all graft patients ("sleeves up") during dialysis treatments (minimum frequency, monthly). Identify patients who may be suitable for elective secondary AVF conversion in upper arm and inform nephrologist of suitable outflow vein.
 - Nephrologists refer to surgeon for placement of secondary AVF before failure of AVG.

7. AVF placement in patients with catheters where indicated
 - Regardless of prior access (e.g. AV graft), nephrologists and surgeons evaluate all catheter patients as soon as possible for AVF, including mapping as indicated.
 - Facility implements protocol to track all catheter patients for early removal of catheter.

8. Cannulation training for AV fistulas
 - Facility uses best cannulators and best teaching tools (e.g., videos) to teach AVF cannulation to all appropriate dialysis staff.
 - Dialysis staff use specific protocols for initial dialysis treatments with new AVFs and assign the most skilled staff to such patients.
 - Facility offers option of self-cannulation to patients who are interested and able.

9. Monitoring and surveillance to ensure adequate access function
 - Nephrologists and surgeons conduct post-operative physical evaluation of AVFs in 4 weeks to detect early signs of failure and refer for intervention as indicated.
 - Facilities adopt standard procedures for monitoring, surveillance, and timely referral for the failing AVF.
 - Nephrologists, interventional radiologists, and surgeons adopt standard criteria, and a plan for each patient, to determine the appropriate extent of intervention on an existing access before considering placing a new access.

10. Education for care-givers and patients
 - Routine facility staff in-servicing and education program in vascular access.
 - Continuing education for all caregivers to include periodic in-services by nephrologists, surgeons, and interventionalists.
 - Facilities educate patients to improve quality of care and outcomes (e.g., prepping puncture sites, applying pressure at needle sites, etc.).

11. Outcomes feedback to guide practice

- Networks work with dialysis providers to give specific feedback to all decision-makers on incident and prevalent rates of AVF, AVG, and catheter use.
- Review data monthly or quarterly in facility staff meetings. Present and evaluate data trended over time for incident and prevalent rates of AVF, AVG, and catheter use.

References and Resources²

General

U.S. Department of Health and Human Services. *Healthy People 2010: Understanding and Improving Health*. 2nd ed. Chapter 4: Chronic Kidney Disease Washington, DC: U.S. Government Printing Office, November 2000.

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Allon M, Robbins ML: Increasing arteriovenous fistulas in hemodialysis patients: problems and solutions. *Kidney Int* 2002 Oct;62(4):1109-24

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1. Routine CQI review of vascular access

Rationale

The use of CQI teams has led to documented increases in AV fistula use and produced better vascular access-related outcomes for patients.

Resources

Role descriptions for Vascular Access Manager/Coordinator and other CQI team members
Sample CQI tools and processes
Sample invitation letter to initiate multidisciplinary CQI team

References

Allon M, Bailey R, Ballard R, Deierhoi MH, Hamrick K, Oser K, Rhyne VK, Robbins ML, Saddekni S, Zeigler ST: A multidisciplinary approach to hemodialysis access: prospective evaluation. *Kidney Int* 1998 Feb; 53(2):473-9

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Duda CR, Spergel LM, Holland J, Tucker CT, Bander SJ, Bosch JP: Lessons learned. Implementing a vascular access quality improvement program. Part II. *Nephrol News Issues*. 2000 May;14(6):29-32,37

2. Timely referral to nephrologist

Rationale

Permits thorough evaluation of all AV fistula options, and allows time for placement and maturation of a fistula before hemodialysis is initiated.

Resources

Sample letter to primary care providers from nephrologists

² Resources should be collected during the implementation phase of the project and shared in electronic format

Sample patient education materials on benefits and risks of access types
Guideline for physical exam (nephrologist/RN)

References

Gibson KD, Capt MT, Kohler TR, Hasukami TS, Gillen DL, Aldassy M, Sherrard DJ, Stehman-Breen CO. Assessment of a policy to reduce placement of prosthetic hemodialysis access. *Kidney Int* 2001 Jun;59(6):2335-45.

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National Kidney Foundation. K/DOQI Clinical Practice Guidelines for Vascular Access 2000. *Am J Kidney Dis* 37;S137-S181, 2001 (supl 1). Introduction.

3. Early referral to surgeon for “AVF only” evaluation and timely placement

Rationale

Early referral for evaluation maximizes patient’s likelihood of receiving a timely fistula and having adequate time for maturation, without need to place catheter or graft.

Resources

Guideline for physical exam (vascular access surgeon)

Protocol for vessel mapping by nephrologist or surgeon

Referral protocols and forms for “AVF only” evaluation and placement

References

Allon M, Lockhart ME, Lillo RZ, Gallichio MJ, Young CJ, Barker J, Deierhoi MH, Robbin ML: Effect of preoperative sonographic mapping on vascular access outcomes in hemodialysis patients. *Kidney Int* 60(2001):2013-2020

Beathard GA. Strategy for maximizing the use of arteriovenous fistulae. *Seminars in Dialysis* 2000 Sep-Oct;13(5):291-296

Brimble KS, Rabbat CG, Schiff D, Ingram AJ. The clinical utility of Doppler ultrasound prior to arteriovenous fistula creation. *Seminars in Dialysis* 2002 Sep-Oct;14(5):314-317.

Caplin N, Sedlacek MD, Teodorescu V, Falk A, Uribarri J. Venous access: women are equal. *Am J Kidney Dis* 2003 Feb;41(2):429-432.

Dalman RL, Harris EJ Jr, Victor BJ, Coogan SM. Transition to all-autogenous hemodialysis access: the role of preoperative vein mapping. *Ann Vasc Surg* 2002 Sep;16(5):624-30.

Robbin ML, Gallichio MH, Dieirhoi MH, Young CJ, Weber TM, Allon M. US vascular mapping before hemodialysis access placement. *Radiology* 2000 Oct;217(1):83-8.

Silva MB, Jobson RW, Pappas PJ, Jamil Z, Araki CT, Goldberg MC, Gwertzman G, Padberg FT. A strategy for increasing use of autogenous hemodialysis access procedures: Impact of preoperative noninvasive evaluation. *J Vasc Surg* 1998;27:302-8.

Vassalotti JA, Falk A, Cohl ED, Uribarri J, Teodorescu V. Obese and non-obese hemodialysis patients have a similar prevalence of functioning arteriovenous fistula using pre-operative vein mapping. *Clin Nephrol* 2002 Sep;58(3): 211-4.

4. Select surgeons based on best outcomes and greatest willingness to provide access services.

Rationale

In order for AV fistula rates to improve, nephrologists will need to be more informed about surgical options, and will need to select surgeons based on their demonstrated ability to place fistulas successfully.

Resources

Survey tool/questionnaire for surgeons
Tracking tool for surgical outcomes (see also #11)
Selection criteria for surgeons

5. Full range of appropriate surgical approaches to AVF evaluation and placement

Rationale

A wide variety of surgical approaches have shown value in successful placement of AVFs. However, many are not yet standard practice.

References

Bender MH, Bruyninckx CM, Gerlag PG: The Bracz arteriovenous fistula evaluated. Results of the brachiocephalic elbow fistula in haemodialysis angio-access. *Eur J Vasc Endovasc Surg* 1995 Oct;10(3):294-7

Bender MH, Bruyninckx CM, Gerlag PG: The brachiocephalic elbow fistula: A useful alternative angioaccess for permanent hemodialysis. *J Vasc Surg* 1995 Aug;22(2):195-96.

Butterworth PC, Doughman TM, Wheatley TJ, Nicholson ML. Arteriovenous fistula using transposed vasilic vein. *Br J Surg* 1998 Dec;85(12):1721-2.

Dagher FJ. The upper arm AV hemoaccess: long-term follow-up. *J Cardiovasc Surgery* 1986 Jul-Aug;27(4):447-9.

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Oliver MJ, McCann RL, Indridason OS, Butterly DW, Schwab SJ. Comparison of transposed braciobasilic fistulas to upper arm grafts and brachiocephalic fistulas. *Kidney Int* 2001;60:1532-1539.

Silva MB, Hobson RW, Pappas PJ, Haser PB, Araki CT, Goldberg MC, Jamil Z, Padberg FT. Vein Transposition in the forearm for autogenous hemodialysis access. *J Vasc Surg* 2002 Dec;26(6):981-8

6. Secondary AVF placement in patients with AV grafts

Rationale

This strategy represents the greatest single opportunity for increasing AVFs among prevalent patients. In addition it opens the option for an AVF to patients who might not have been considered eligible when their initial permanent access was placed.

Resources

Planning tools for secondary AVF conversion
“Sleeves up” protocol

7. AVF placement in patients with catheters where indicated

Rationale

There is still a significant rate of catheter use for permanent access leading to greater morbidity, mortality and cost. Efforts to establish AVFs will lead to better patient outcomes.

Resources

Protocol for tracking catheter patients, both short- and long-term
Early evaluation of all catheter patients

8. Cannulation training for AV fistulas

Rationale

Many dialysis staff are not familiar with, or skilled in, AVF cannulation. Without good cannulation skills, the AVF can be damaged or destroyed.

Resources

Protocol for AVF cannulation
Protocol for initial dialysis treatments with new AVFs
Protocol for “buttonhole” cannulation of AV fistulas
Protocol and educational materials for patient self-cannulation

References

Brouwer DJ, Peterson P: The arteriovenous graft: How to use it effectively in the dialysis unit. *Neph News Issues* 2002 Nov;41-49

Peterson P. Fistula cannulation: the buttonhole technique. *Neph Nursing J* 2002 Apr;29(2):195.

Rayner HC, Pisoni RL, Gillespie BW, Goodkin DA, Akiba T, Akizawa T, Saito A, Young EW, Port FK. Creation, cannulation and survival of arteriovenous fistulae: Data from the Dialysis Outcomes and Practice Patterns Study. *Kidney Int* 2003 Jan;63(1):323-330

9. Monitoring and surveillance to ensure adequate access function

Rationale

Early identification of dysfunction and appropriate intervention avoids inadequate dialysis and prolongs AVF survival.

Resources

Flow chart on monitoring and surveillance with commentary on AVF-specific issues

References

Besarab A, Lubkowski T, Frinak S, Ramanathan S, Escobar F: Detecting vascular access dysfunction. *ASAIO J* 1997 Sep-Oct;43(5):M539-43

Bethard GA. Physical examination of the dialysis vascular access. *Seminars in Dialysis* 1998 Jul-Aug;11(4):231-236.

Dinwiddie LC. Interventions to promote fistula maturation. *Neph Nursing J* 2002 Aug;29(4):377, 402.

Hingorani A, Ascher E, Kallakuri S, Greenberg S, Khanimov Y. Impact of reintervention for failing upper extremity arteriovenous autogenous access for hemodialysis. *J Vasc Surg* 2001;34:1004-9

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10. Education for care-givers and patients

Rationale

Knowledge is changing rapidly, and requires all caregivers to continue to learn and to share their knowledge, in order for patients to receive optimal care.

Resources

Sources of educational materials and resources

Examples and sources of patient education materials

References

Accreditation Council for Continuing Medical Education: Definition of CME (Policies 1821-B-03; 1998-C-02; 2002-B-09), Chicago IL. Web: <http://www.accme.org/index.asp>

American Nursing Association: American Nurses Credentialing Center, Washington DC. Web: <http://www.nursecredentialing.org/index.htm>

11. Outcomes feedback to guide practice

Rationale

Using data to track outcomes allows targeting of improvement efforts and operates as a powerful motivator of improvement.

Resources

Data collection forms

Standard reports

References

Spuhler CL, Schwarze KD, Sands JJ, Increasing AV fistula creation: the Akron experience. *Nephrol News Issues*, May 2002, 44-49

Vascular Access Working Group Members

Chair

Larry Spergel, MD, Dialysis Management Medical Group (Vascular Access Surgeon)

Network/Forum Members

Jeanette Cain, QI Director, Network 9/10

Janet Crow, MBA, Administrator, Forum of ESRD Networks

Jennie Kitsen, ED ESRD Network 1

Doug Marsh, ED ESRD Network 18 (Network Coordinating Center)

Provider Representatives

Maureen Herget, RN, VP CQM, Fresenius Medical Care (designated by Michael Lazarus, MD)

John Sadler, MD, Pres. & CEO, Independent Dialysis Foundation

Patient Representative

Mike Zecca, ESRD Patient

Clinicians

Deborah Brouwer, RN, Allegheny General Hospital (Nephrology Nurse)

Richard Gray, MD, Medstar Health (Interventional Radiologist)

Vo D. Nguyen, MD, Renal Care Group of the Northwest (Nephrologist)

Jack Work, MD, Emory University (Interventional Nephrologist)

Bessie Young, MD, MPH, VA Puget Sound Health Care (Nephrologist)

CMS

Jefferson Rowland, Government Task Leader

David Hunt, MD, Medical Officer, Quality Improvement Group

Institute for Healthcare Improvement

Carol Beasley, Project Director

Kevin Nolan, Improvement Advisor

Rebecca Steinfield, Project Manager

Measurement Strategy

The proposed measurement strategy was designed to support improvement activities at the facility and medical practitioner level.

The aims in developing the strategy were:

- Focus on relevant process and outcome measures that will be useful at the facility and Network levels
- Flexibility, allowing use of pre-existing data collection systems where feasible
- Simplicity and ease of use
- Fast collection and straightforward analysis so that data can be tracked monthly and reported to Networks quarterly.

The measurement strategy has two components:

- Vascular access prevalence and incidence tracking. To support the improvement effort, facilities must be able to track the prevalence of vascular access types on a monthly basis, and report it quarterly to the Networks. Ideally they should also track incidence and report it quarterly. A sample form showing how incidence could be tracked is attached. This tool makes a distinction between patients who are using a temporary access while a permanent one matures, and patients starting dialysis with only a single access. This specific tool would **not be required** of facilities; interested facilities would be encouraged to collect these data either using their own system, or with a tool similar to the one shown.
- Implementation tracking tool. This tool allows assessment of “spread,” that is, how fully facilities and their associated medical specialists have adopted the practices described in the Change Package. Dialysis facilities should use it as part of their CQI meetings. It follows behavioral change theory, recognizing that the change process may be underway for a period of time before new behavior can be observed. The tool allows tracking of a range of improvements including those that facilities control or influence directly, as well as those that facilities can observe among the medical specialists who care for their patients.

As the project moves forward it will be important to stay in close contact with the ESRD Core Data Set initiative and make sure that the two projects are aligned. Also these tools will be adapted with the help of the Networks into final versions that are ready for use in the field.

Vascular Access Incidence and Prevalence: Facility Summary

YEAR: 2003

MONTH

Jan

Feb

Mar

Apr

May

Jun

Jul

Aug

Sep

Oct

Nov

Dec

of Patients

All HD patients

8

50

NEW HD patients

4

4

All HD patients dialyzing via AVF

#

3

12

%

38%

24%

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NEW HD patients with AVF in place **whether or not used for dialysis** (Incidence I)

#

2

3

%

50%

75%

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NEW HD patients with an AVF being **used for dialysis** (Incidence II)

#

1

1

%

25%

25%

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National Vascular Access Quality Improvement Initiative: Implementation Tracking Tool

<u>Information about facilities</u>		Rating*	Comments:
All non-AVF accesses are investigated as part of CQI			
Routine in-servicing of staff in AVF cannulation techniques			
Screening of AV graft patients for possible 2 ⁰ AVF; documenting and communicating with nephrologist/surgeon			
Screening all catheter patients for AVF options; documenting and communicating with nephrologist/surgeon			
<u>Information about nephrologists</u>		<i>Subtotal</i>	
Nephrologists document AVF plans for all potentially eligible patients			
Nephrologists specify “AVF only” in referrals to surgeons for evaluation and placement			
Nephrologists select surgeons based on willingness, skill, and outcomes with AVFs			
<u>Information about surgeons and interventional radiologists</u>		<i>Subtotal</i>	
Surgeons receive and track data on their vascular access rates and outcomes			
Interventional radiologists and surgeons utilize specific criteria to determine allowable degree of intervention before referring for new access			
Surgeons are supportive and skilled in placing 2 ⁰ AVFs			
*Rating: Select the score that best matches the current situation: 1 = Not under consideration 2 = Under consideration, not started 3 = In start-up process 4 = Working, at least in part 5 = Working well		<i>Subtotal</i>	
		TOTAL	

Comments on Implementation Tracking Tool:

Purpose of the tool:

- To assess the spread of the recommendations in the Vascular Access Change Package
- To support the process of improvement by giving facilities and Networks a clear picture of current practice
- To identify barriers to change that might require additional support or problem solving.
- To provide a clearer understanding of what behaviors are producing the strongest improvements in vascular access outcomes.

Suggestions for use:

- Choose an interval for measurement, generally once per quarter.
- Discuss in facility CQI meetings
- Share findings with Network

Other comments:

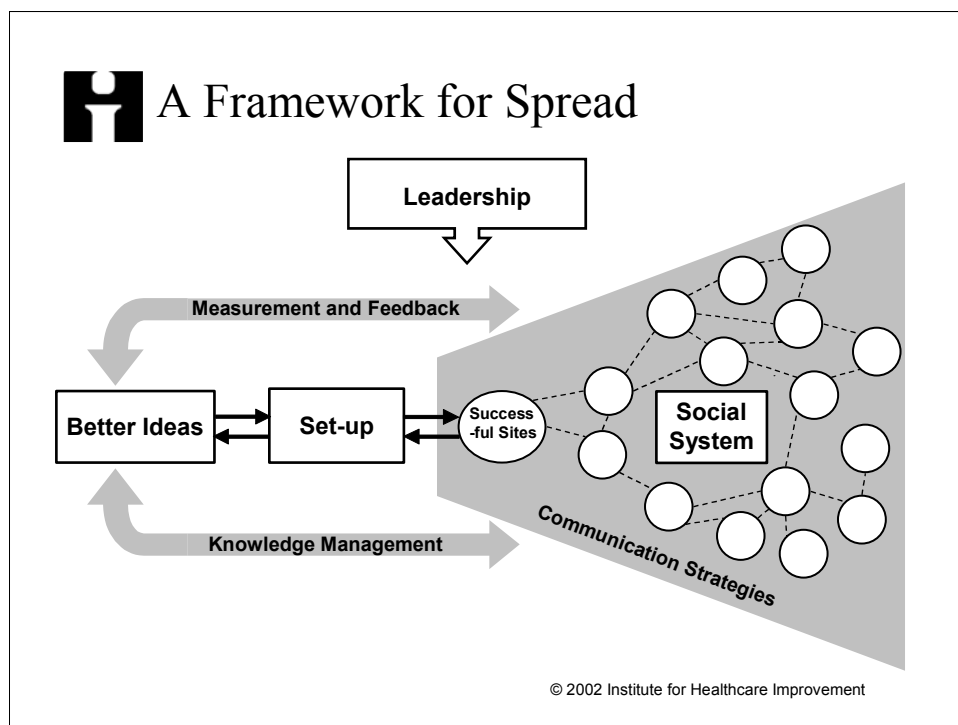
- The tool contains questions that relate to things that the facility **does**, and things that the facility might want to **understand** about the activities of its affiliated nephrologists and surgeons. The facility cannot be responsible for the actions of outside medical specialists, but should have an interest in knowing whether their affiliated professionals are adopting practices that benefit dialysis patients.
- The tool is a way to learn about the progress of the vascular access initiative, and the needs of the major participants. It is not a “report card”
- The tool is **not required** of facilities, but it is encouraged as a source of useful learning.

NVAII Strategy Recommendations

The following pages describe a recommended strategy for achieving the aims set forth in the National Vascular Access Improvement Initiative (NVAII) Charter: Network and national AVF rates of 50% or greater for incident patients, and 40% or greater for prevalent patients undergoing hemodialysis. The principal focus of this implementation strategy is to establish the clinical and organizational changes for increasing AV fistula use described in the Change Package as normal practice as quickly as possible.

Method – A Framework for Spread

A simple definition of “spread” is “better ideas communicated through a social system.” To create a system that encourages placement of AV fistulas requires spreading new practices to all of the thousands of dialysis facilities, nephrologists, vascular access surgeons, interventional radiologists, and others providing care to patients.



The proposed spread strategy is based on the theory of diffusion and prior work by the Institute for Healthcare Improvement (1-17). It includes the following elements:

1. **Organizational Infrastructure:** An infrastructure to support spread includes:
 - Leadership commitment and support at all levels—national, Network, facility, medical practice, etc.
 - A strategy to reach all sites

- Technical support to ensure that providers and health care professionals have the knowledge and tools they need to make the changes
 - Knowledge management system to document information, progress, issues, and questions as they arise
 - Measurement system that monitors progress and provides feedback to providers, the Networks, and CMS about progress.
2. **“Better Ideas”:** Ideas for improvement are contained in the Change Package along with rationales for why they should be adopted. In addition to the clinical recommendations, “better ideas” also includes practical knowledge and experience about how to successfully implement the change ideas. The collection of “better ideas” will grow over time as stakeholders gain experience in using the Change Package.
 3. **Communication Strategy:** Successful communication entails using a variety of methods and messages to spread broad awareness of AVF issues, opportunities for improvement, examples of successful applications, and technical information throughout the system. Successful communication strategies are tailored to the needs of various medical professionals and other stakeholders, and assist those on the front lines to understand how the changes relate to their own settings.
 4. **The Social System:** Facilities, Networks, and medical specialists are linked to each other through a complex structure of relationships, both professional and personal. The NVAII recognizes the importance of these relationships and uses them to foster change and improvement. Examples include: identifying who can best teach others about increasing AVFs; building connections among Networks, providers medical professionals, and other stakeholders so that they can learn from each other; and recognizing and acknowledging existing motivations and incentives among providers and medical professionals that either support or undermine the implementation of changes.

The sections that follow incorporate the ideas listed above into two broad topics: Leadership Structure and Project Strategy

Recommended Leadership Structure

An effective leadership structure will have elements that operate at national and Network levels. The following descriptions are approximate. Deliberation among CMS, the Networks, and other stakeholders will determine the final structure and right mix of members.

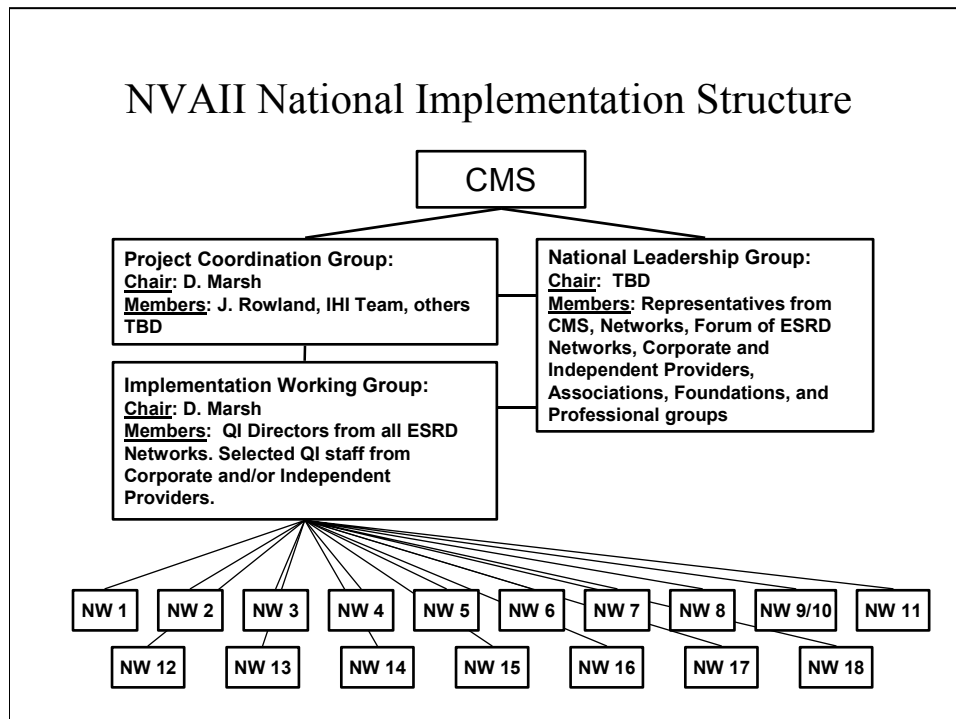
National Project Leadership

Project Coordination Group: Similar to the small coordinating group that guided the project through Phase I (Doug Marsh, Jefferson Rowland, and the IHI team), this group will talk on a weekly basis and make sure that the working groups are on track. They will be the administrative “hub” of the project, ensuring that meetings and conference calls are scheduled and organized, and that communication among the National Leadership Group, the Implementation Working Group, and the Networks is working smoothly.

National Leadership Group: This group is analogous to the “Working Group” that guided the development of the project content in Phase I. In Phase II the group will provide input and assistance in implementing the Change Package, and should be broadly representative of all the major stakeholder groups. This group will ensure that the project is taking advantage of opportunities to bring the AV fistula issue onto the agenda of key professional groups at the national level, and will be responsible for helping to develop coherent national approaches to system-wide issues and opportunities.

Implementation Working Group: Comprising the Quality Improvement Directors from all of the ESRD Networks, this group is the “engine” of implementation. The group should meet in person 3-4 times per year, and have conference calls at least once per month. As needed, additional conference calls may be developed to address specific issues or interests within the group (e.g. addressing needs in rural areas). The Quality Improvement Directors will be responsible in their respective Networks for devising appropriate implementation strategies that address their specific opportunities and challenges. The Implementation Working Group members are responsible for executing the strategy, finding partners who can share in the execution, tracking the progress of the project, both quantitatively and qualitatively, and sharing implementation knowledge and innovative solutions with the group as a whole.

Communications Infrastructure: The working groups should be connected electronically (e.g., via listservs). There will be regularly scheduled in-person meetings and teleconferences for the National Leadership Group and the Implementation Working Group (see timeline).



Network Project Leadership

Implementation at the Network level requires a team structure under the direction of the most senior quality improvement staff member in each Network. Members of the team will typically include the full Network QI staff, appropriate data and statistical experts, one or more representatives from the MRB, selected representatives from the renal community. Options include medical specialists, dialysis facility Medical Directors, key facility or provider QI staff, or other leadership staff as appropriate.

Recommended Project Strategy

Assessing Readiness for Spread:

At the national level, the National Leadership Group will assess the readiness of national-level participants (e.g. professional societies, corporate dialysis providers, etc.) to adopt the AVF issue as a strategic priority. They will identify organizational and opinion leaders willing and able to advance the issue nationally. They will also address systemic factors that could impede progress and work with appropriate partners to resolve these.

At the Network level, QI leaders will assess the readiness of their own providers and medical communities to make the AVF issue a strategic priority. Network teams will identify facilities and medical practitioners that are currently showing success in applying key strategies from the Change Package or appear willing to tackle these changes. They will identify individuals in facilities and in the medical community willing to be responsible for the day-to-day implementation of key Change Package recommendations.

Developing an Initial Plan for Spread:

Networks will predict which of their regions or groups of facilities are most ready to implement change and produce positive results. These could be sites that are “early adopters” of key change strategies, or sites that have shown willingness to innovate. Based on these predictions, the Networks will plan the first “wave” of spread activities. The entire spread effort will be organized in a series of waves, eventually reaching every site. This way, the networks will be able to deliver technical, educational, data, and other support effectively and efficiently. This model also allows each Network to refine and adapt its strategy over time. Potential areas of high leverage include:

- Presence of successful, experienced sites
- Interrelationship among sites, for example geographic clusters, or organizational groupings (i.e., corporate dialysis providers)
- Availability of effective champions
- Presence of external resources that can be marshaled in support of the project.
- Coordination with key social networks, for example regional chapters of professional or renal issue organizations.

Communication Plan

Awareness: National and Network leaders will determine how best to foster *awareness* of the NVAII. The National Leaders will develop a coordinated set of messages and materials conveying the rationale and evidence for the Change Package recommendations. At the national level, there may be value in generating a set of standard communication resources, e.g. videotapes or standardized PowerPoint presentations. Standardized communications can be targeted to meet the needs of specific key disciplines, such as nephrologists, and vascular access surgeons. At the Network level, project leaders will consider the available communication channels (e.g. workshops, teleconferences, mailings, websites and other electronic communication) and make efficient choices. Communications will be targeted, where feasible, to the organizations and individuals identified in the initial plan for spread.

Technical Knowledge: National and Network-level leaders will identify the technical knowledge needed to support the project and jointly develop a plan to deliver the technical information. Options include:

- Establishing a team to oversee the assembly of a Resource Kit to support the initiative. The resource kit would include tools, protocols, helpful forms, journal articles, etc.
- Setting up a series of advanced learning sessions for clinicians. Monthly teleconferences can be a very effective way to reach large numbers of key physicians, surgeons, and other medical professionals. Network staff would actively recruit participants. Dr. Lawrence Spergel has indicated an interest in hosting this series of educational teleconferences.
- Training a group of clinical “coaches,” clinicians in the Networks who are willing to work with and mentor their peers on key technical aspects of successful AVF placement and use.

Measurement and Feedback System

A measurement strategy has been designed as part of Phase I of the NVAII. The National Project Leaders, with input from Network QI and data experts, will translate the strategy into practical procedures for collecting and analyzing data that minimize complexity and burden on facilities and Networks whenever possible. Measures will include both outcomes and processes. The aim is to collect critical outcome measures frequently enough, and with rapid turnaround, so that the measures provide maximum support to the improvement effort. The recommended interval for data collection is at least once per quarter.

Knowledge Management System

To succeed in this project, Networks must develop efficient and effective ways to share their knowledge. It will be important to establish clear responsibility for the administrative, technical, and content review responsibilities related to knowledge management. At a minimum, a project support person (perhaps located in the National Coordinating Center) should be tasked with collecting tools and resources from Networks and making them available across the system. A website can be a very useful aid in collecting and disseminating information. Another easy way to distribute tools is on CD so that facilities and medical professionals can easily adapt the tools to their own use.

In addition, at each meeting of the Implementation Working Group, a person should be designated to capture in writing the key “learnings” from the group so that these too can be incorporated into the Change Package and Implementation Tips and Tactics.

Draft Project Timeline:

The following timeline is indicative of the kinds of tasks that must be managed within the project and approximate timeframes. The Project coordination group in consultation with the other project leadership groups should develop the actual project timeline.

	2003			2004				2005				2006	
	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2
<i>Create NVAI National Implementation Structure</i>													
▪ Outreach to specific stakeholder groups	◆												
▪ Determine locus of responsibility for all key tasks	◆												
<i>Project Coordination Group</i>													
▪ Weekly conference calls and actions as agreed	→												
<i>National Leadership Group</i>													
▪ Working meetings		◆		◆				◆				◆	
▪ Quarterly conference calls			◆		◆	◆	◆		◆	◆	◆		◆
▪ Execution of agreed national strategies			→										
<i>Implementation Working Group</i>													
▪ Working Meetings	◆	◆		◆	◆	◆		◆	◆	◆		◆	◆
▪ Monthly conference calls (more often as needed)	→												
▪ Broad distribution of Change Package and supporting materials		◆	◆										
▪ Development of region specific strategies for communication, staging plan, and measurement	→												
▪ Begin quarterly collection of process and outcome data		◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
<i>Communication</i>													
▪ Establish team to oversee creation of Resource Kit	→												
▪ Schedule series of clinical educational teleconferences		◆◆	◆◆	◆◆	◆◆	◆◆	◆◆						
▪ Generate national-level communication tools	→												◆
<i>Data and Measurement</i>													
▪ Collect national CPMs and/or new Core Data System			◆				◆				◆		
▪ Develop and implement Network project reporting process			◆		◆		◆		◆		◆		◆
<i>Knowledge Management</i>													
▪ Develop and implement processes for knowledge collection, review and distribution	→												

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