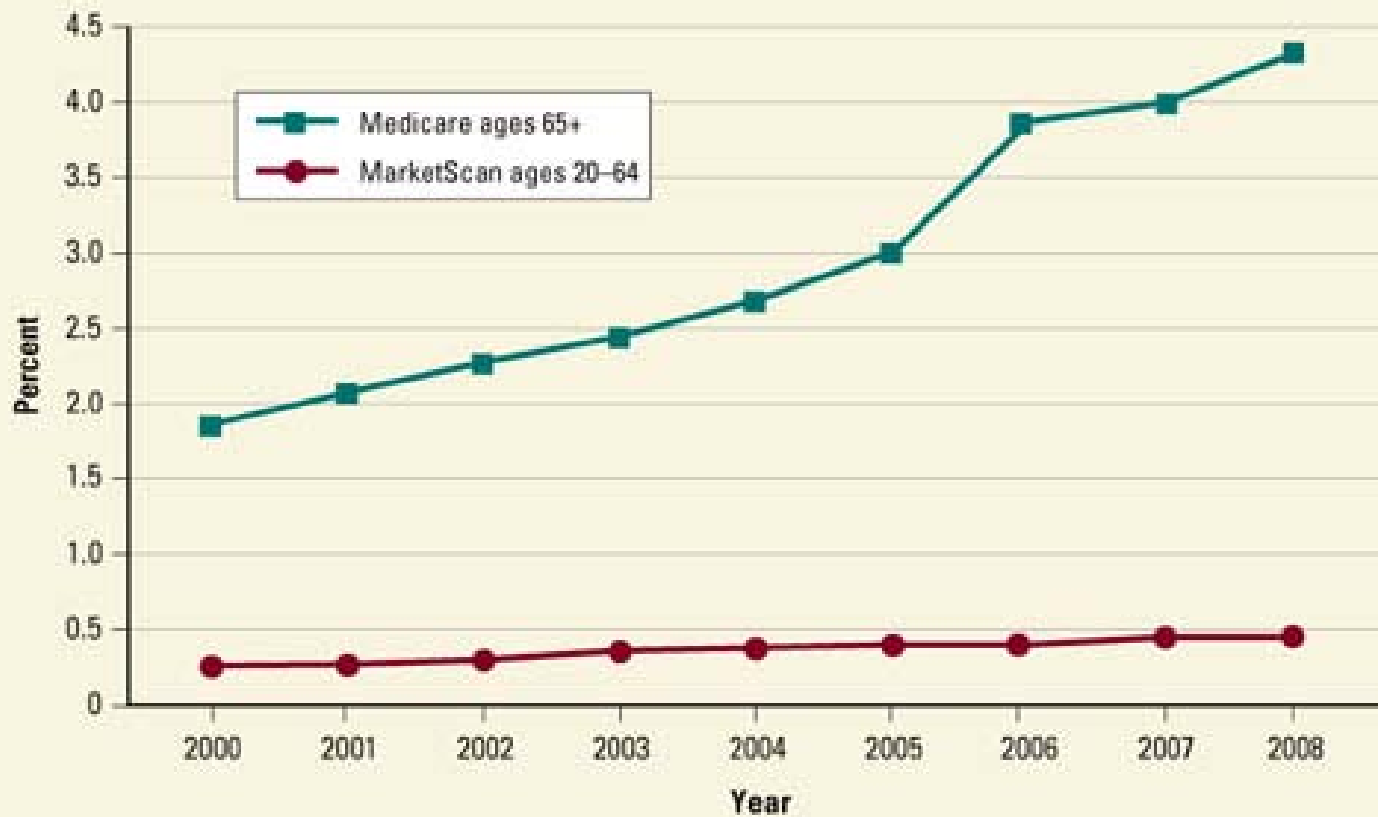


Vascular Access Review
NANT Regional Meeting
December 1-2, 2012

Marianne Neumann, RN, CNN
Clinical Manager
Albany Regional Kidney Center

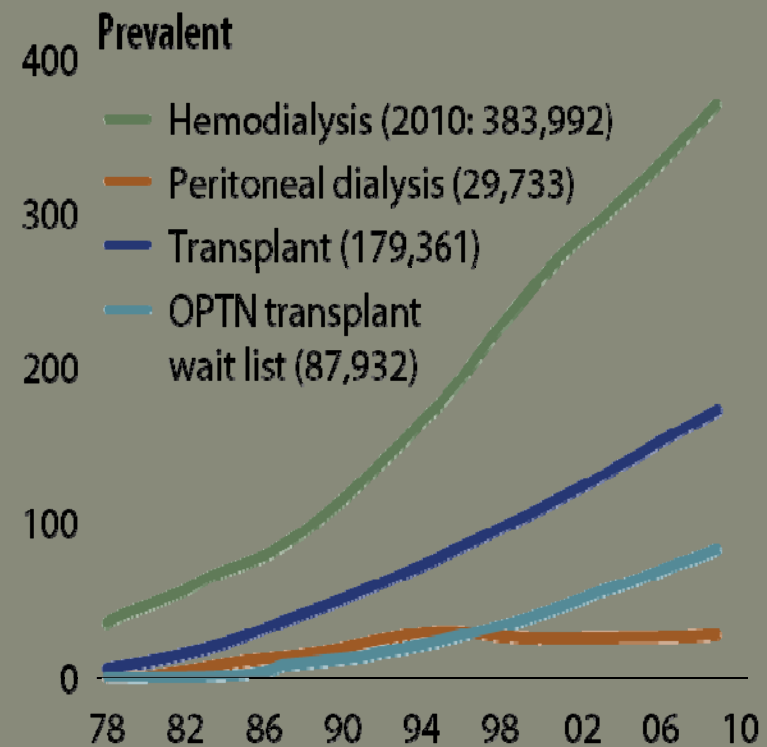
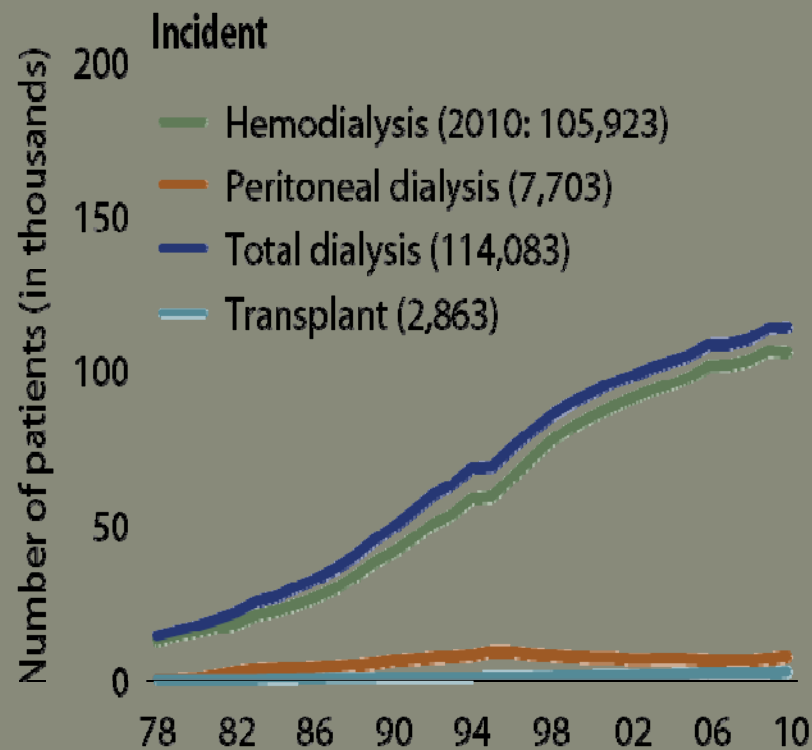
CKD Incidence

**Percent of Population with
New Cases of CKD, by Age Group**



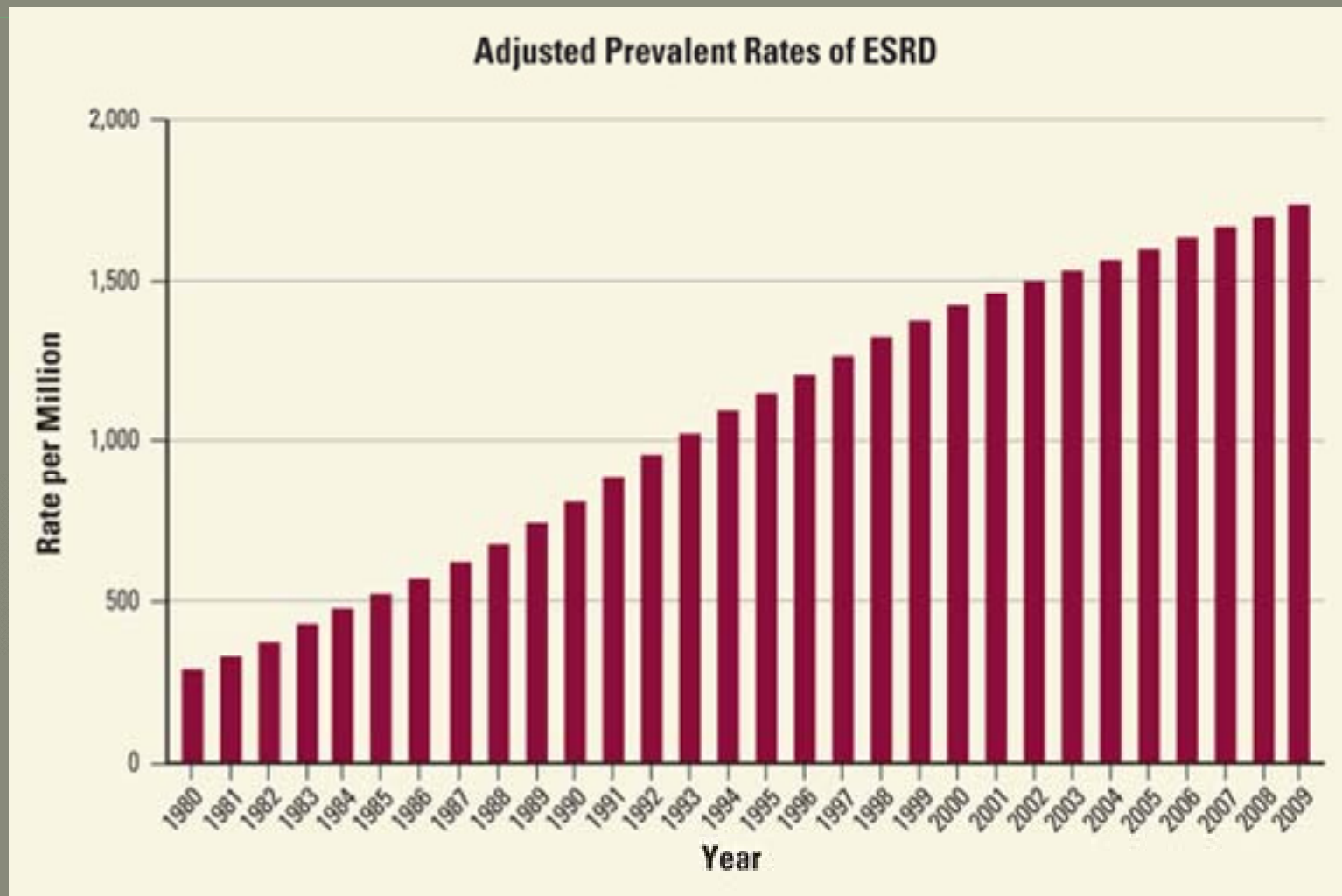
*MarketScan represents data from employer group health plans.

Incident & prevalent patient counts (USRDS), by modality

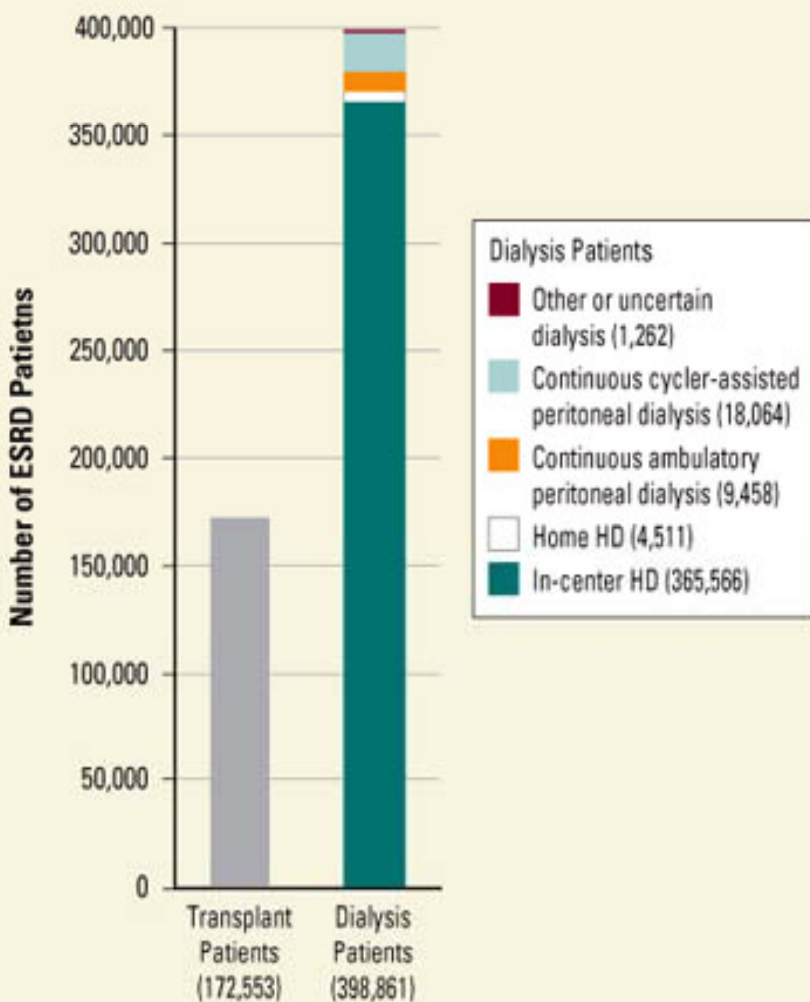


Incident & December 31 point prevalent patients.

ESRD Prevalence & Prevalence Rate



Number of ESRD Patients by Treatment Modality

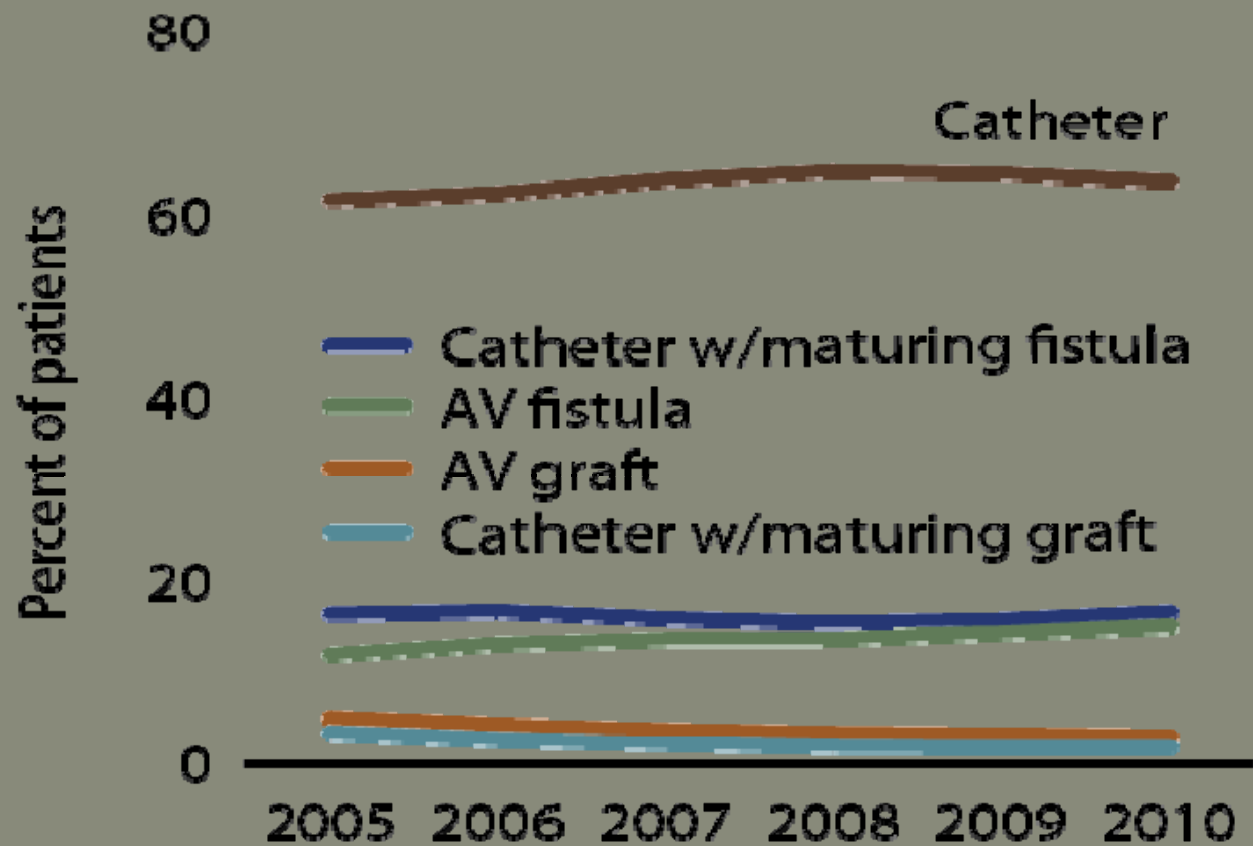


ESRD Treatment Modality

At the end of 2009, 398,861 ESRD patients were being treated with some form of dialysis; 172,553 ESRD patients had a working transplanted kidney.

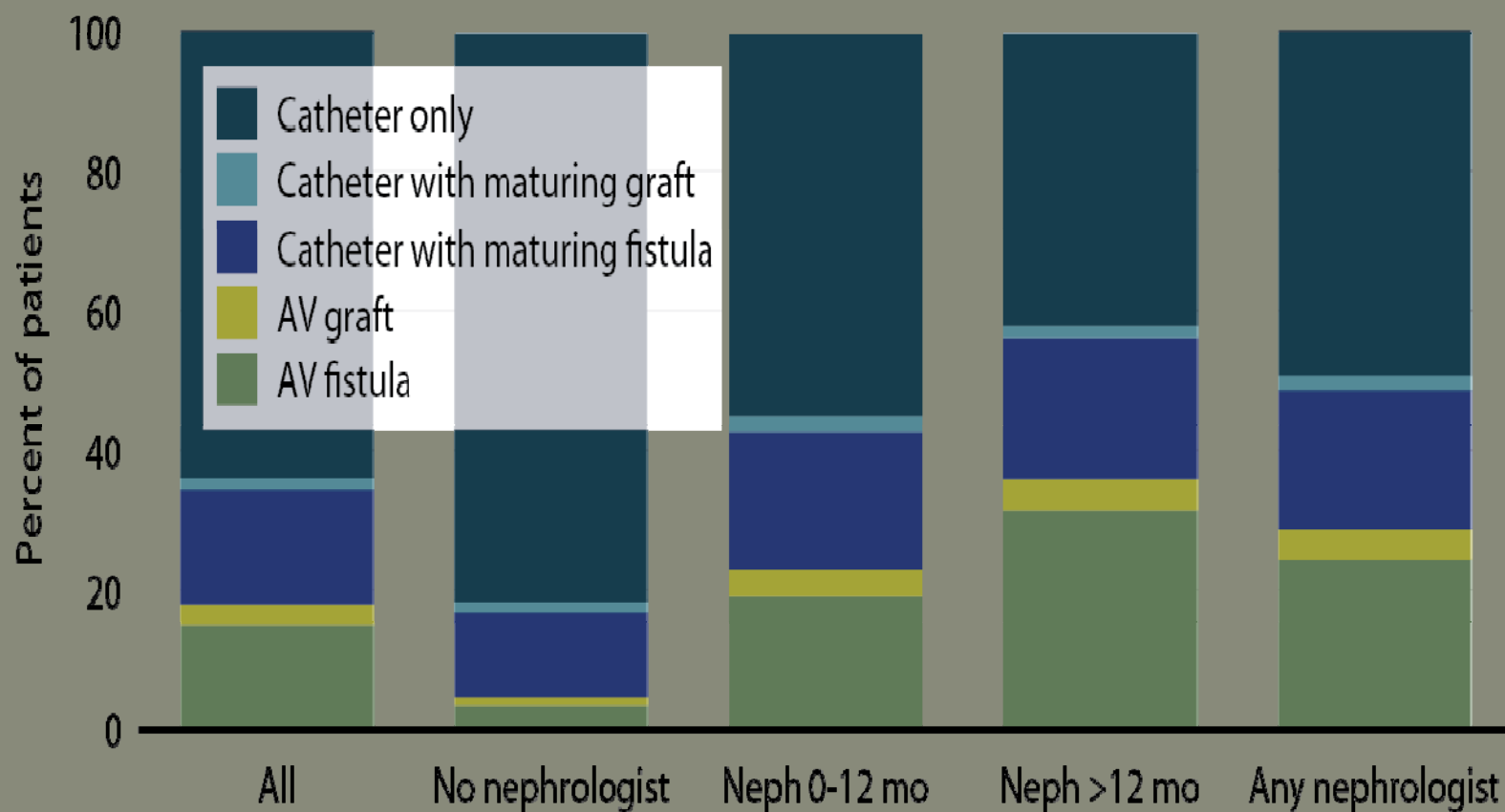
More than 10 times as many ESRD patients receive hemodialysis (HD) treatments at a clinic as those who do peritoneal dialysis (PD) and home HD combined.

Vascular access at first outpatient dialysis



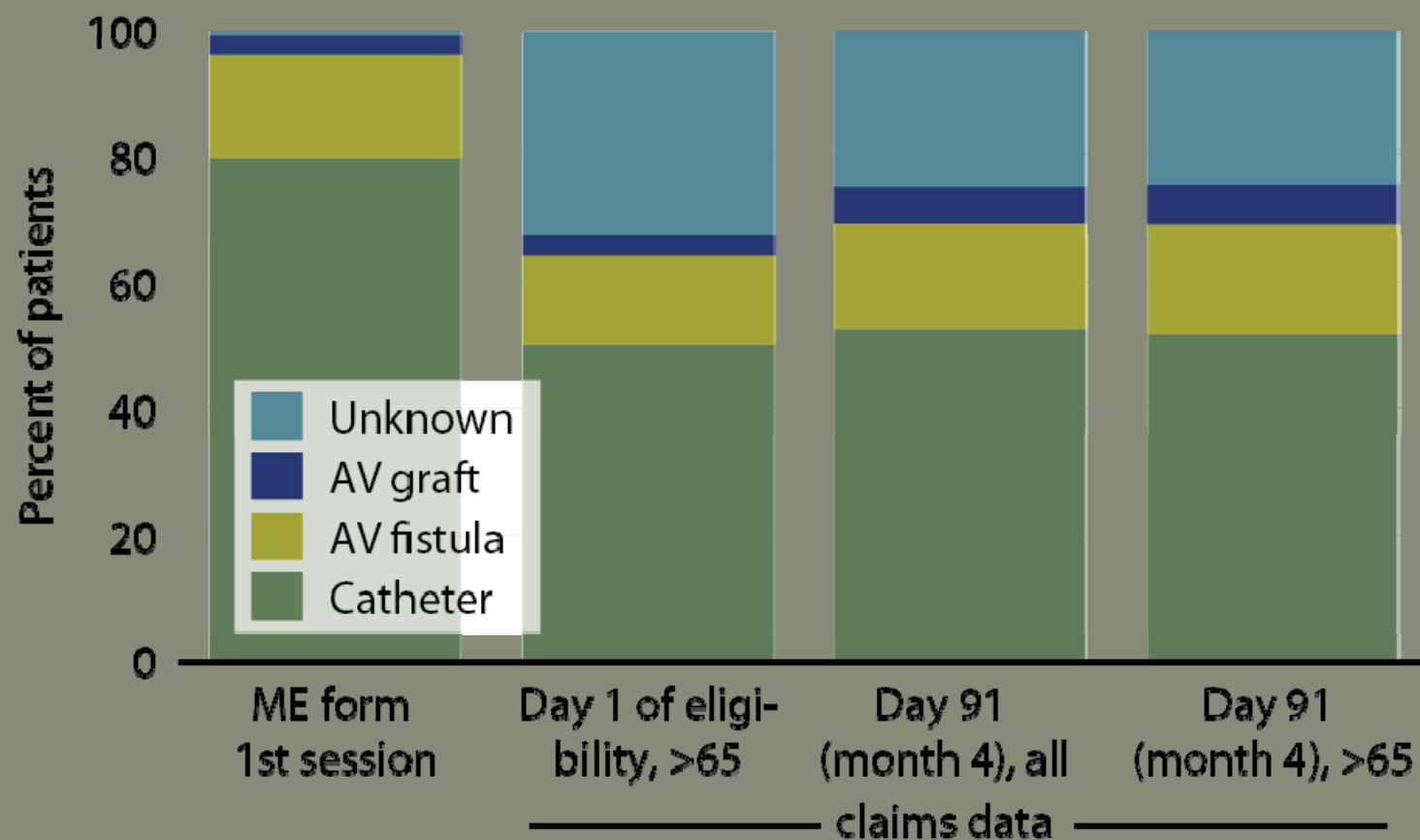
Incident hemodialysis patients.

Access use at first outpatient hemodialysis, by pre-ESRD nephrology care, 2010



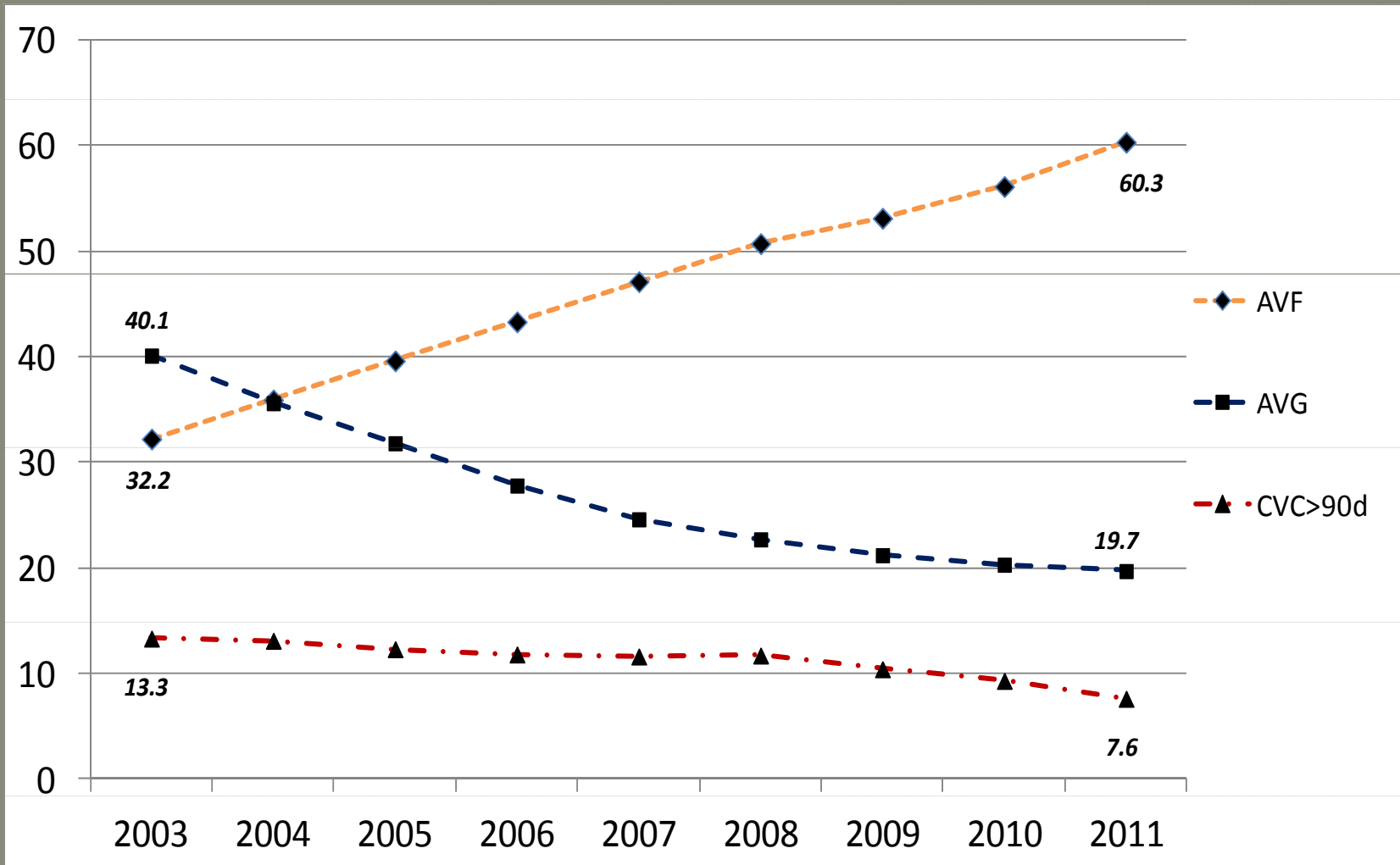
Incident ESRD patients, 2010.

Vascular access use at initiation and on day of eligibility, 2010



Incident hemodialysis patients, July-December, 2010

National Prevalent Vascular Access Rates July, 2003 – December, 2011



Nephrologist role in AVF planning

Early Referral

- Document an AV fistula plan for all patients expected to require renal replacement therapy (RRT), regardless of the type of RRT being considered.
- Prepare the patient and the family for an AV fistula before they see a surgeon. Designate a nephrology staff person to educate patients and families on the benefits of AV fistulae and protecting vessels.



LETTER TO Primary Care Providers (PCP)
Personal phone calls
Medical Education to PCP
Communication with surgeon

Patient Education.....Start Early!!

Up to 30% of eligible patients still refuse creation of AVF even though they know AVFs are associated with lower rates of morbidity and mortality.

WHY??????

1. Poor previous experiences
2. Listen to other patients
3. Not worried about future

Nephrol Dial Transplant, March 2011, Xi W, et al

Vascular Access: Risk/Benefit and Essential Iatrogenicity

- Type of VA depends upon the diagnosis and prognosis as well as the anatomic and physiologic potential and limitations of the patient
- The ideal blood flow through a patient's fistula or graft is a flow sufficient to achieve prescribed blood flow rates through the dialyzer without compromising cardiac output or flow to the extremity distal to the access.

Autogenous Access Options

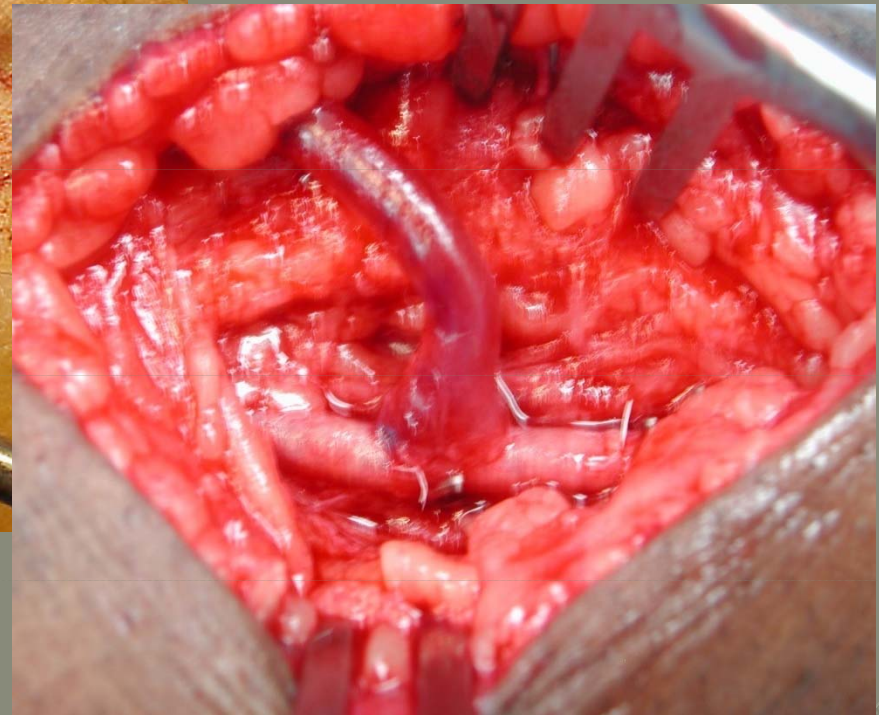
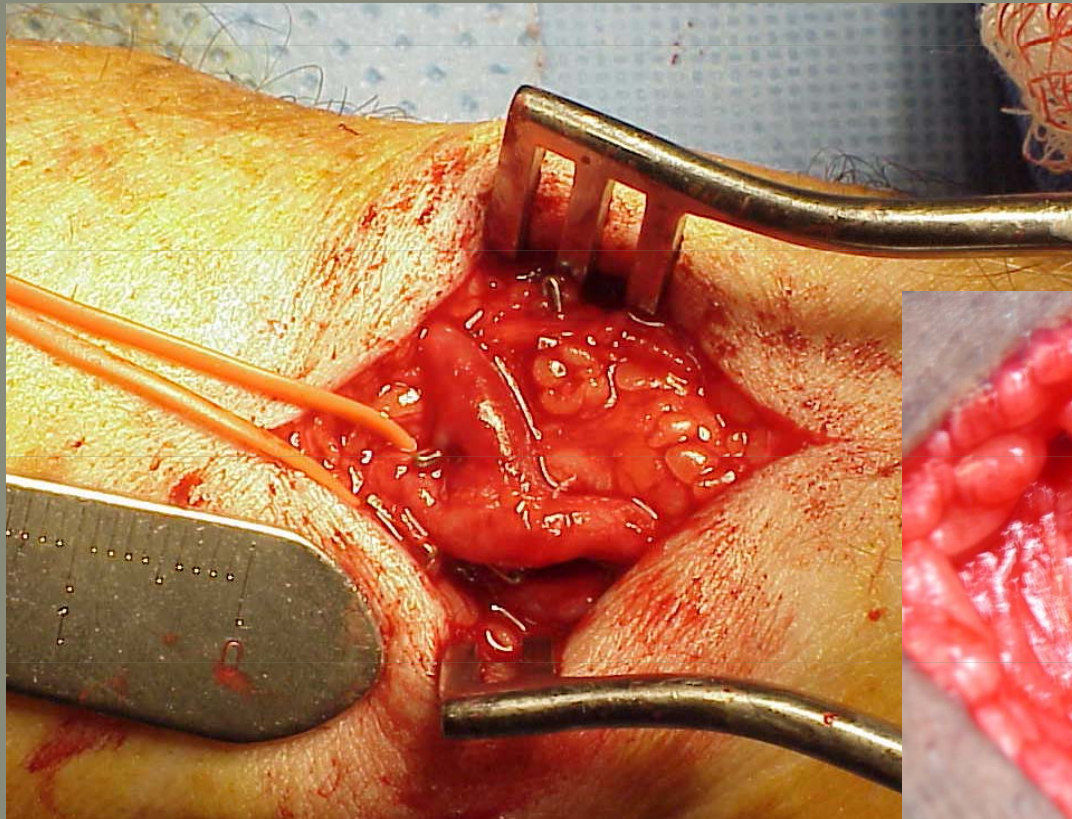
- Radiocephalic AVF
- Mid-arm AVF
 - Brachial artery inflow
 - Proximal radial artery inflow (with bidirectional flow if feasible)
- Upper extremity transposition AVF
 - Basilic or brachial vein...primary or staged
- Lower extremity transposition AVF
 - Saphenous or femoral vein
- Translocation and other AVFs

Arteriovenous Fistulas (AVF)



- Preferred dialysis access because of a lower incidence of associated morbidity and mortality.
- Surgically created by connecting the artery and vein.
- Approximately 8-12 weeks are required for an AVF to mature completely.
- The sites available for creating an AVF are limited, requiring proper handling and care during hemodialysis therapy.

Radio-cephalic AV Fistulas



Slide courtesy of Dr. Wm. Jennings

Upper extremity transposition AVFs



Staged basilic vein transposition



Primary basilic vein transposition

Brachial vein transposition



Endoscopic basilic vein transposition

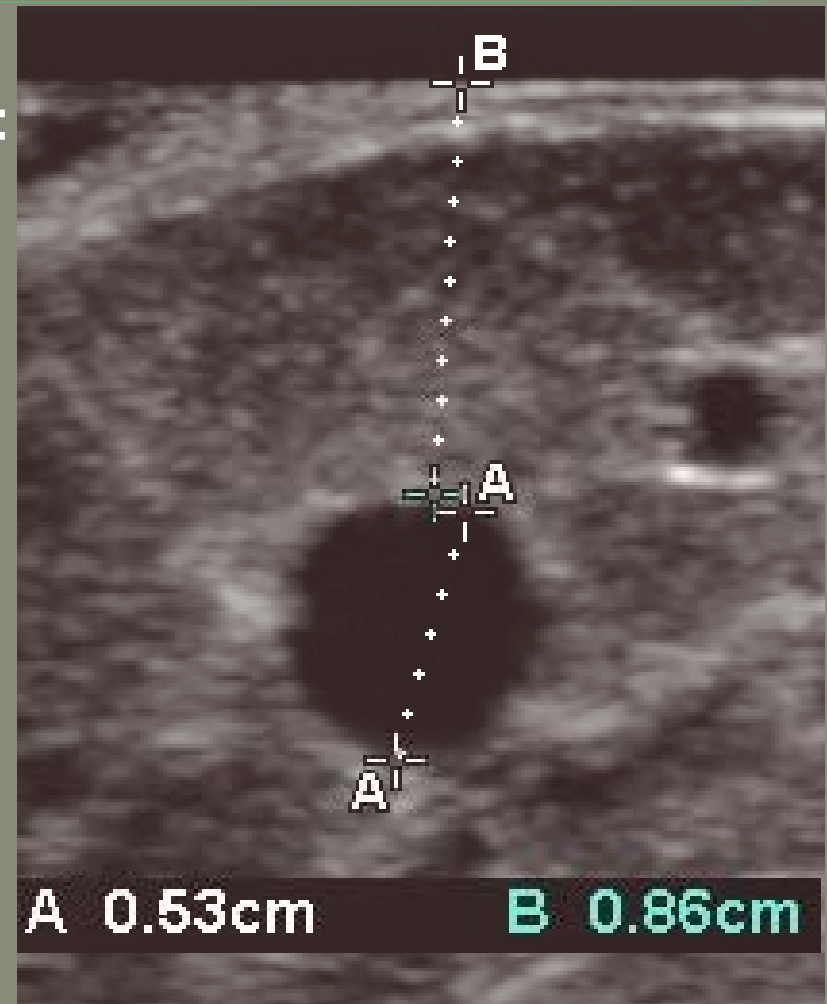


- Primary and staged transposition arteriovenous fistulas. J Vasc Surg 2008 Jun;47(6):1279-83.
- The difficult hemodialysis access extremity: proximal radial arteriovenous fistulas and the role of angioscopy and valvulotomes. Am J Surg. 2005 Dec;190(6):869-73.
- Brachial vein transposition arteriovenous fistulas for hemodialysis access. J Vasc Surg. 2009 May; 49(5) (suppl):S5-S6.
- Endoscopic Basilic Vein Transposition for Upper Extremity Hemodialysis Access in Primary and Staged Operations., J Vasc Surg, in press

Criteria of Success

- To be successful, a fistula must support effective hemodialysis:
 - At least 300 ml/min flow
 - Low venous resistance
 - Easy, safe cannulation & hemostasis
- A working fistula must have:
 - blood flow > 600 mL/min
 - diameter > 0.6 cm,
 - depth ~ 0.6 cm (0.5-1.0 cm)

“the Rule of 6s”
- “Maturation” of native AVFs
 - Vein dilation
 - Vein wall thickening
 - Increased flow



Strategies to increase AVF prevalence

- Evaluate all HD patients for AVF
 - Incident (new)
 - Prevalent (on HD now) with need for new access
- Maximize construction of AVF
 - Vein/vessel mapping
 - Transposition techniques
- Maximize utility of AVF
 - Reduce early thrombosis rate
 - Increase maturation rate through
 - Early intervention
 - Salvage procedures
- Early recognition of impending access failure and placement of new autogenous access

Secondary AVF

Basic definition:

- AVF constructed following an AVG by:
 - Conversion of an existing AVG outflow vein to a direct AVF where feasible (made possible by arterialization of the outflow vein)

Alternative secondary AVF sites



Failed forearm loop graft following multiple PTA's & revisions. Fistulogram revealed unsuitable outflow veins.

New transposed Basilic vein AVF—planned & constructed prior to loss of left forearm AVG

Courtesy of L. Spergel

Not Everyone is suitable for an AVF

Patient selection is critical!

○ Clinical Condition

- Poor overall prognosis
- Poor/exhausted vasculature
- No suitable upper extremity superficial veins & questionable transposition veins

○ Alternatives

- AVG before CVC
- PD before CVC
- Initial forearm AVG as 1st stage, then AVF as 2nd stage later

Arteriovenous Graft (AVG)

Pictures courtesy of Dr. T. Vachharajani – Atlas of Dialysis Vascular Access



Arteriovenous grafts (AVG) are used for patients who do not have adequate native veins for creating a fistula.



Forearm loop AVG is the most common.

Upper arm grafts are generally placed as a straight connection between the brachial artery and the basilic or axillary vein.



A thigh AVG is generally a last resort when all other options in the upper torso are unavailable.

Arteriovenous Graft

Common problems associated with an AVG are:

- Venous anastomotic stenosis
- Development of pseudoaneurysms
- Thrombosis
- Infection
- Central vein stenosis, especially with history of multiple central venous catheters



Pseudoaneurysms

- Development in AVG not uncommon
- Develop from “one-site-itis”
 - Worsen with presence of proximal stenosis
- Tend to develop clots & can lead to thrombosis of the access
 - Bleeding risk higher if cannulated for dialysis

Pictures courtesy of Dr. T. Vachharajani



Patients with central stenosis

Collateral veins noted on shoulder and chest.



Severely swollen arm and shoulder

Graft Infection



Fistula First Recommends:

- Nephrologist evaluates every failing AV graft patient for possible secondary AVF.
- Dialysis facility staff and/or rounding nephrologist examine outflow vein of all graft patients (“sleeves up”) monthly.
- Nephrologist communicates with interventionalist & surgeon after every graft failure... and refers to surgeon for construction of secondary AVF *prior* to loss of AVF.

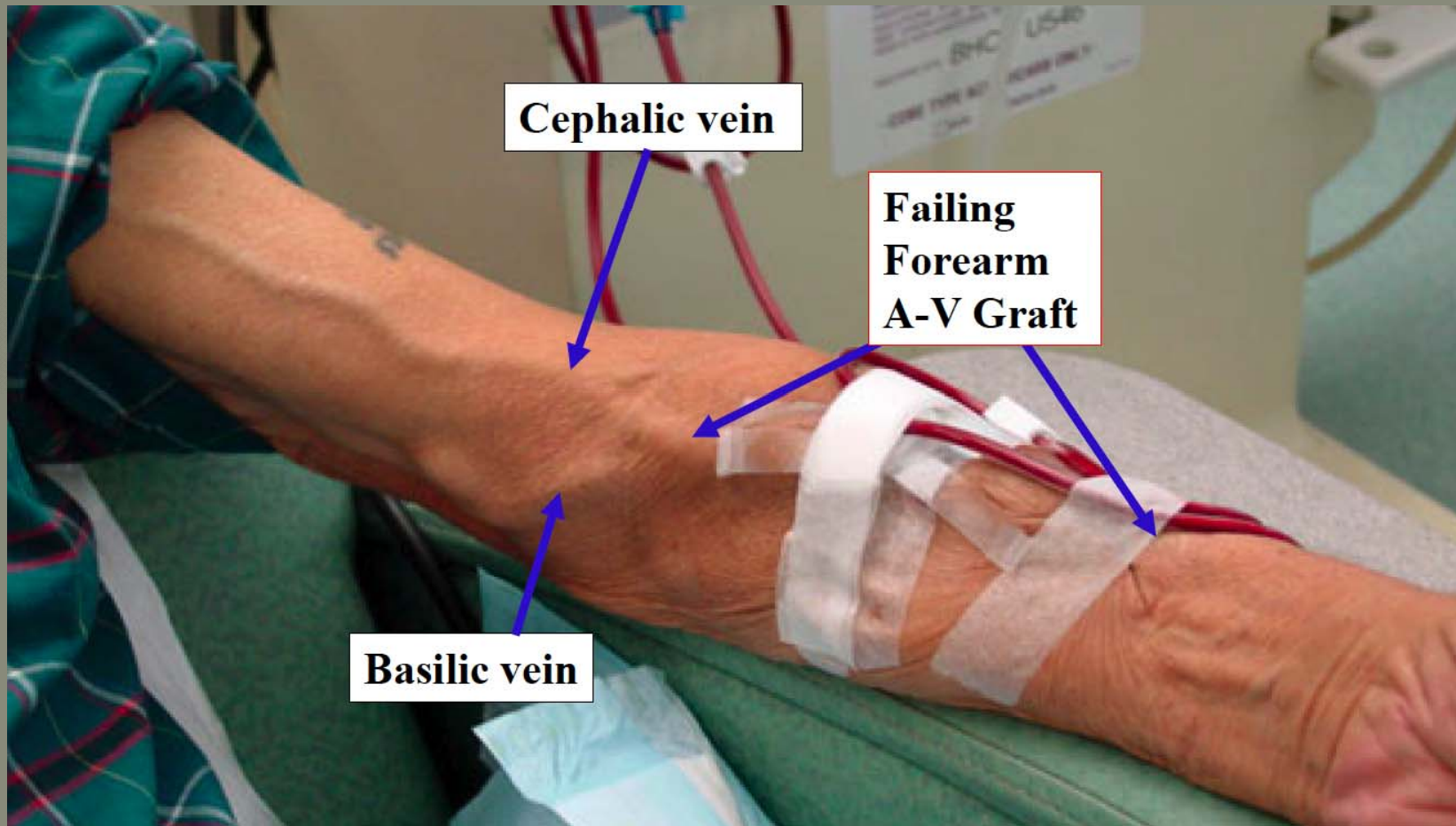
“Sleeves Up” Exam

Once a month, clinic rounds should include an examination of the AV graft extremity to the shoulder, by rolling sleeves up

Secondary AVF evaluation should be done no later than the first signs of AVG failure by monitoring an surveillance or thrombosis



Sleeves up



Courtesy of L. Spergel