

Tri-Regional Dialysis Symposium

The Pathway to Independence

The New Home Hemodialysis Guidelines

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Credit Valley Hospital and Trillium Health Centre

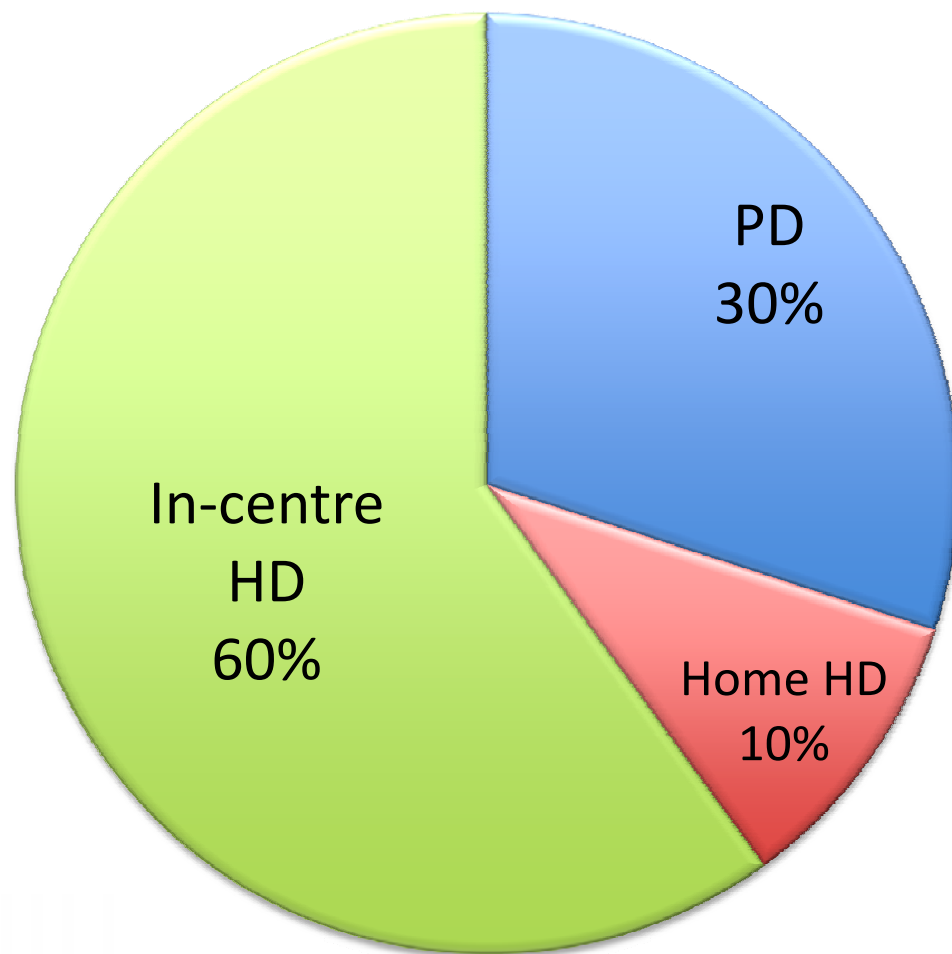
Mississauga, ON

October 20th, 2012

Benefits of Intensive Hemodialysis

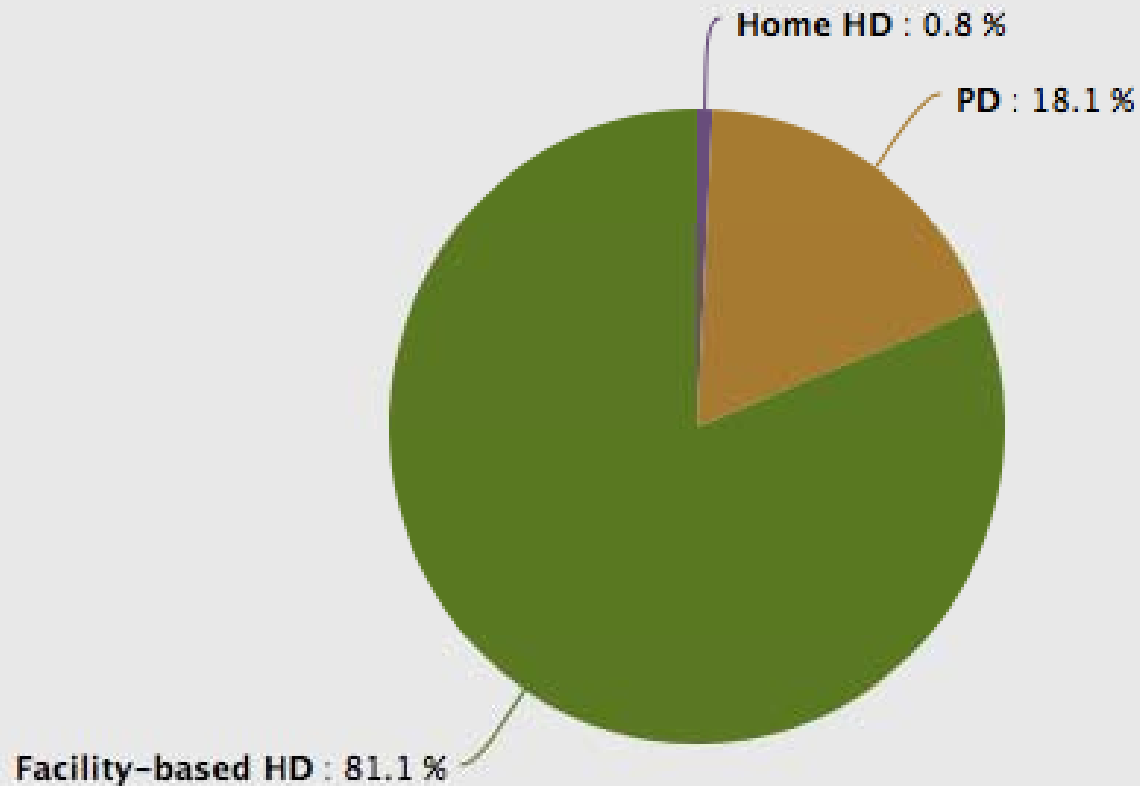
- Improved quality of life
- Regression of left ventricular hypertrophy
- Better blood pressure control with fewer BP drugs
- Reduction in intradialytic hypotension
- Enhanced clearance of several solutes (phosphates)
- Discontinue dietary restrictions and P-binders
- Improved fertility in females of childbearing age
- Reduced health-care system costs (Canada, USA)
- Improved patient survival (long, frequent HD)

Provincial Target for Dialysis Delivery



Ontario Renal Network

Proportion of Incident Dialysis Patients by Treatment Type in Ontario
FY2010/11

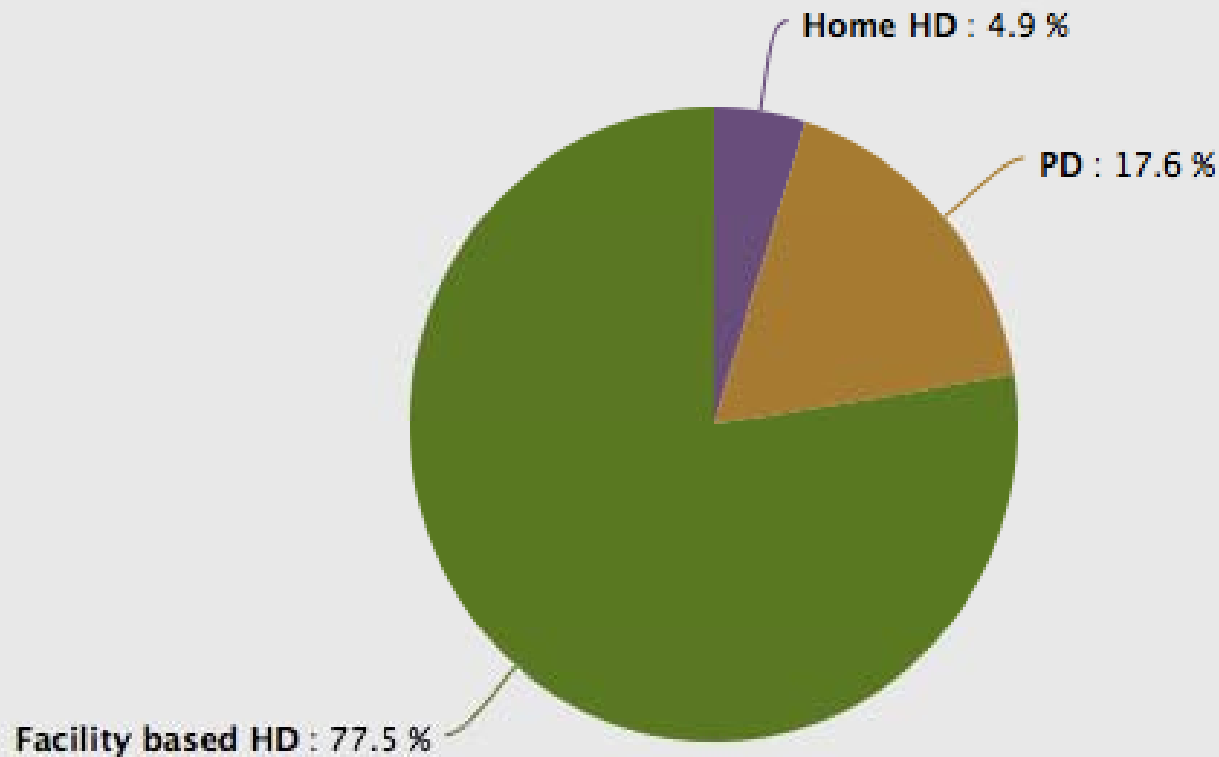


Source: ORRS 2011

<http://www.renalnetwork.on.ca> (accessed October 9, 2012)

Ontario Renal Network

Proportion of Prevalent Dialysis Patients by Treatment Type in Ontario
FY2010/11



Source: ORRS 2011

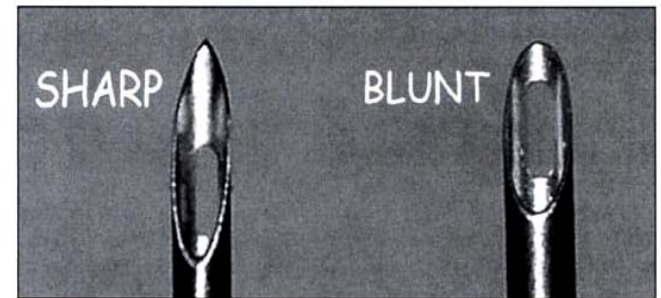
<http://www.renalnetwork.on.ca> (accessed October 9, 2012)

Buttonhole cannulation

(same-site or constant-site cannulation)

- First used in the 1970s (Dr. Twardowski, Poland)
- Key to the growth of home hemodialysis programs
- Advantages include:
 - Less painful cannulation
 - Fewer infiltrations, hematomas
 - Faster cannulation, fewer missed needle sticks
 - Helpful for fistulas with tortuosity or short length for cannulation
 - Less aneurysm development

Sharp Vs. Blunt Needles



CASE 1:

D.L.Z. – 46 yr-old male, lives alone

- ESRD (IgA Nephropathy) on cyclical PD x 6 yrs
- Recurrent peritonitis, poor ultrafiltration
- Doing a masters degree; tends to skip dialysis
- He chooses home HD.... AV fistula ready
- Keen to perform buttonhole cannulation

- Question: Would you try to sway him to rope-ladder cannulation?

CASE 2:

66 yr-old female, lives with husband

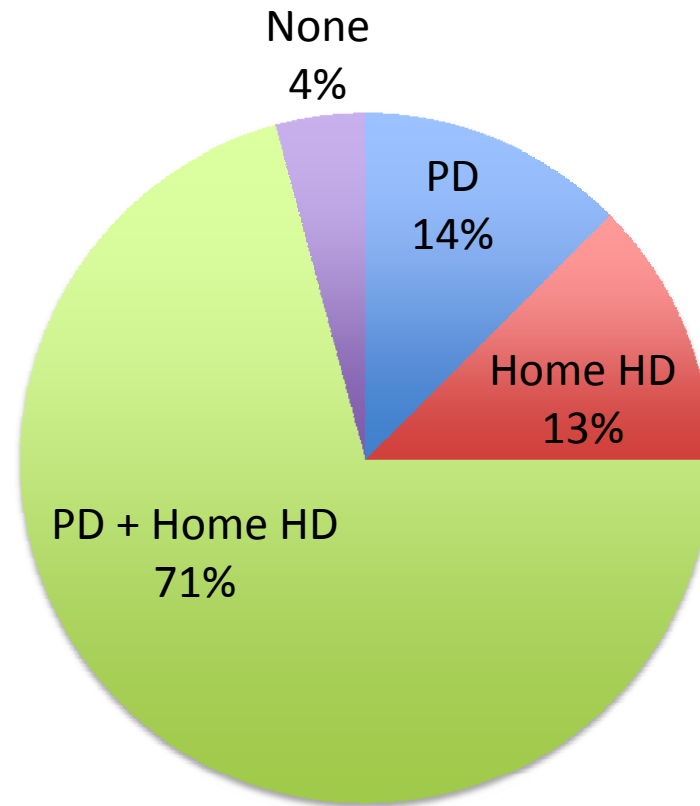
- ESRD (Chronic GN) on in-centre HD using AV fistula
- Access is tortuous; rope-ladder technique used
- Highly functioning; keen on changing to home HD
- Patient won't self-needle
- Husband: "I will only do buttonhole cannulation – looks easy"
- Patient: "My husband does not always follow instructions.... he has his own ideas... Home care RN's invasion of privacy "
- Question: Would you sway husband to learn rope-ladder technique?

CROSS-CANADA VASCULAR ACCESS COORDINATOR SURVEY



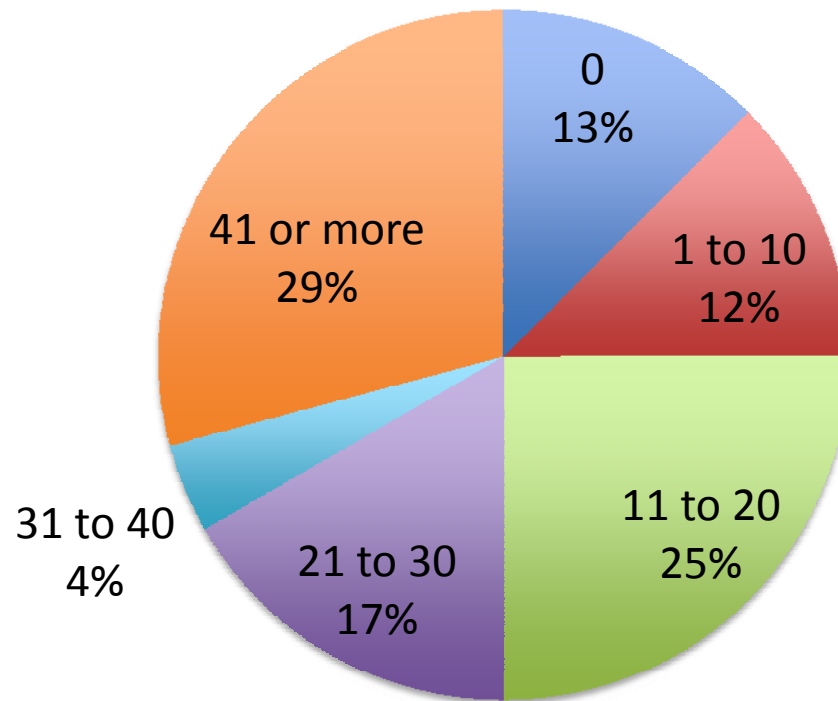
Thanks for all your help!

Which of the following home dialysis modalities does your program offer?



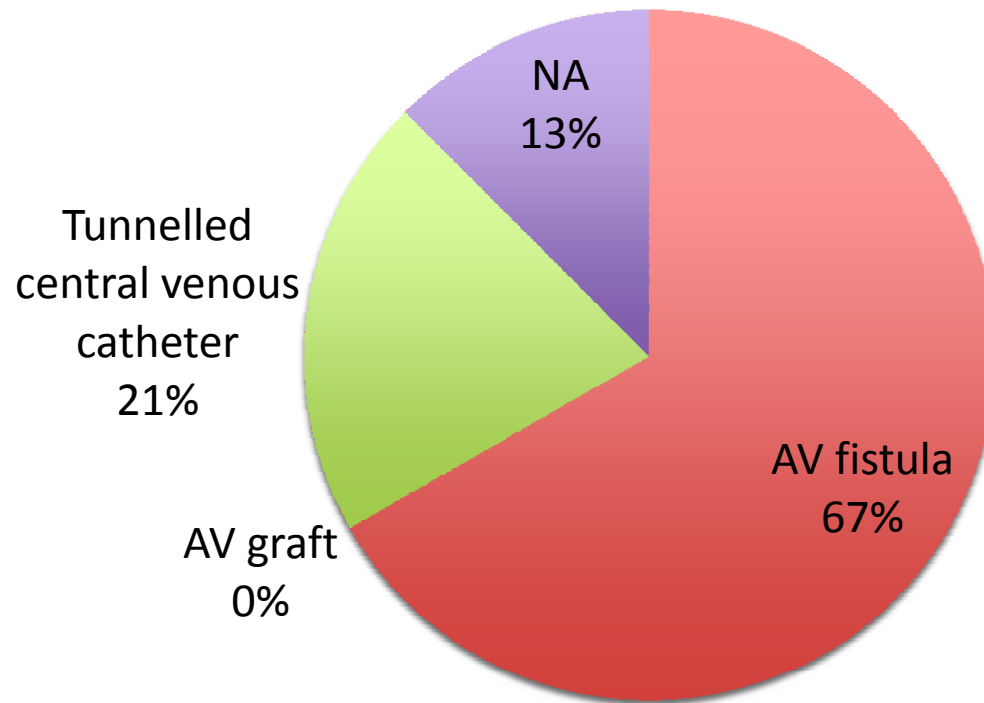
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How many home hemodialysis patients does your program have?



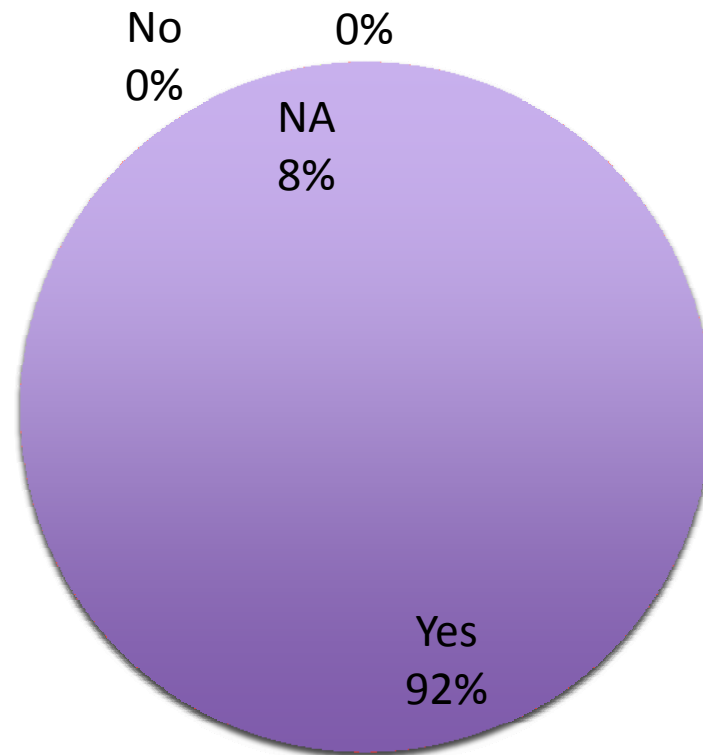
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What is the most common vascular access used in your home hemodialysis patients?



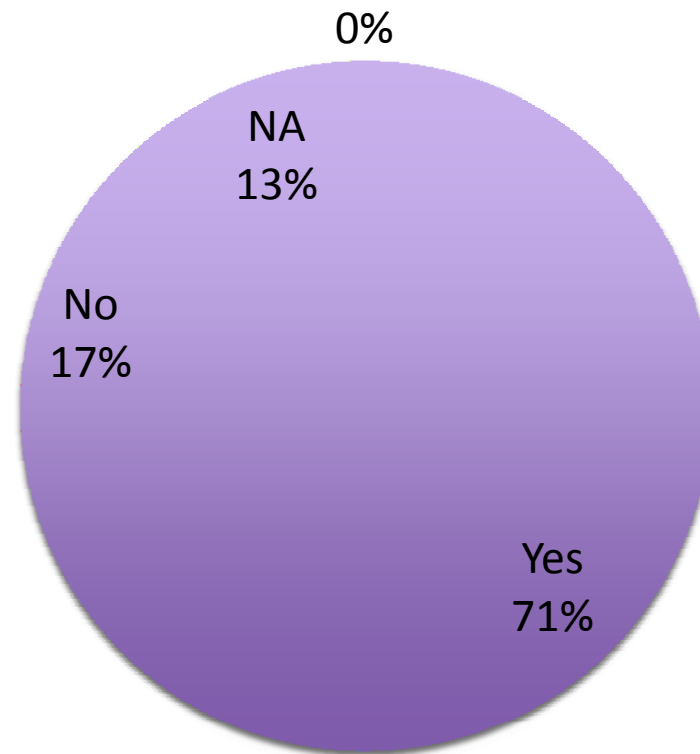
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Does your program offer buttonhole cannulation of AV fistulas in home hemodialysis patients?



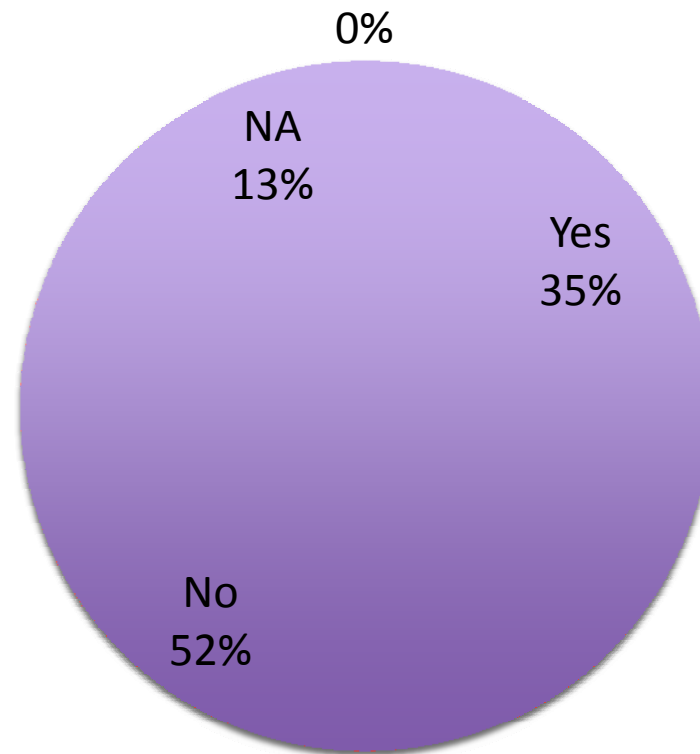
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Do you inform patients of the much higher infection risk associated with the buttonhole cannulation method?



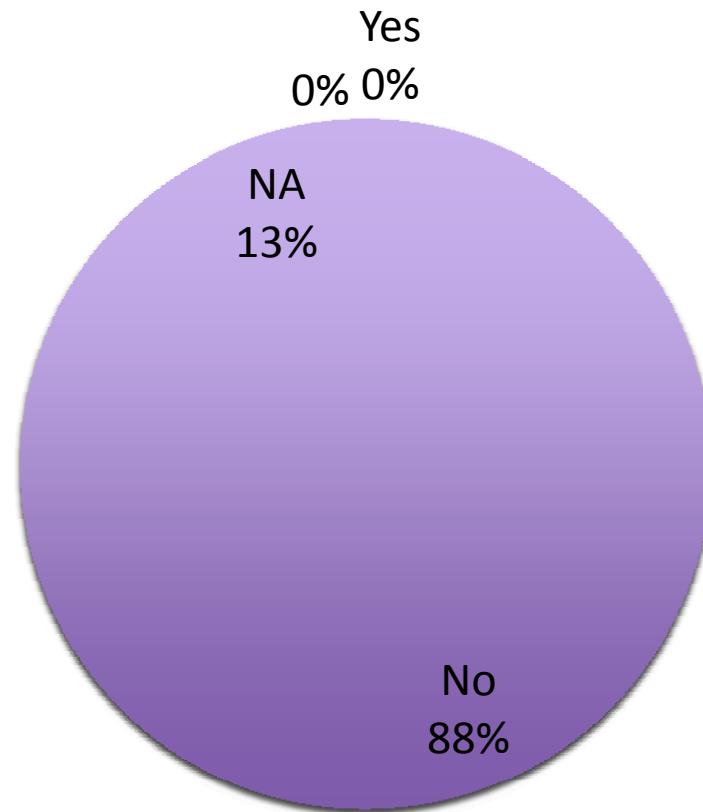
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Does your program recommend rope-ladder over buttonhole cannulation to your home hemodialysis patients with AV fistulas?



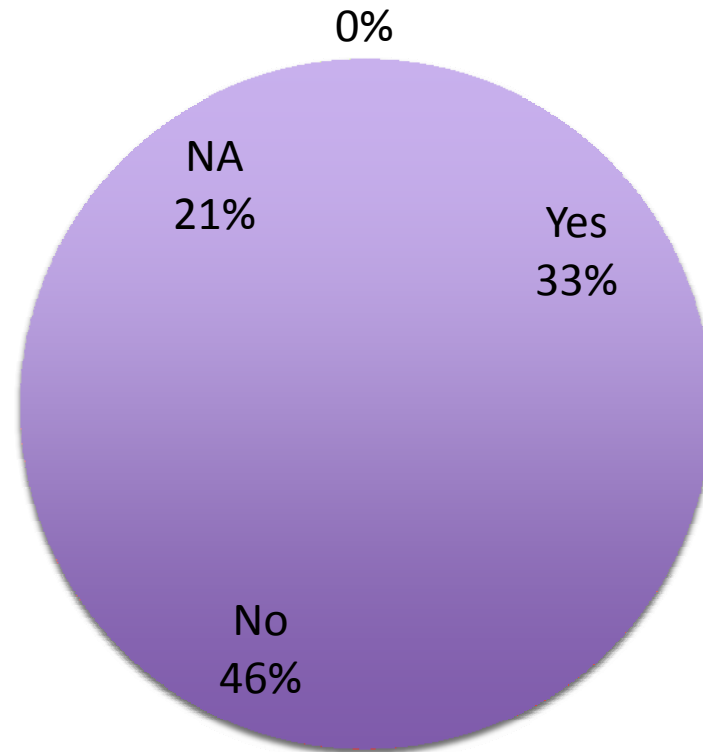
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For home HD patients with an AV fistula: Does your program use consent forms explaining much higher infection risk with buttonhole?



N=24

Have you noticed more sepsis cases in your home HD patients using buttonhole versus rope-ladder cannulation for their AV fistulas?

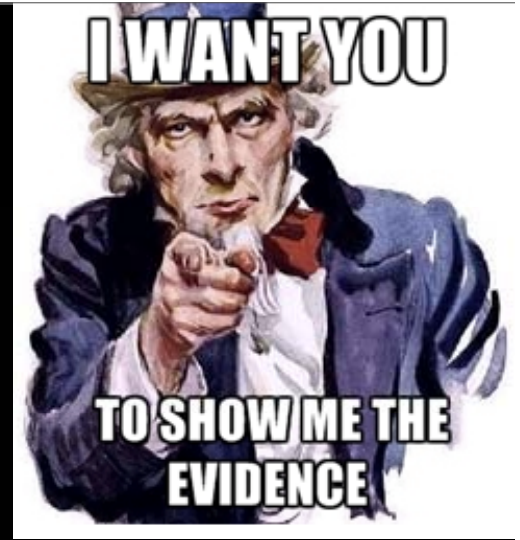


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Nurses are the heart of healthcare
– Donna Wilk Cardillo, RN

Nurses dispense comfort, compassion, and caring
without even a prescription - Val Saintsbury, RN

Medicine is a science of uncertainty and an art
of probability - Sir William Osler, MD



HEAL ME



Health Canada Santé Canada

Canada



Why is this not enough?

In the 1970's and 1980's:

- Evidence of substantial practice variations
- Medicine often more art than science
- Evidence-based medicine emerged
- Rapidly rising health care costs



A space-themed background featuring a bright blue and white light source in the center, surrounded by purple and blue nebulae. A planet is visible on the right side, and a small satellite or probe is on the left. The text "Clinical Practice Guidelines" is overlaid in the center in a bold, red font with a blue outline.

Clinical Practice Guidelines

Why do we need Clinical Practice Guidelines (CPGs)?

- Tools to support clinical decision-making and quality health care delivery
- Help optimize management of a given condition, problem, or patient population by identifying best care practices
- CPGs are a key tool for improving the quality, outcomes and cost effectiveness of health care
- Better patient care means better patient outcomes

Key Points about CPGs

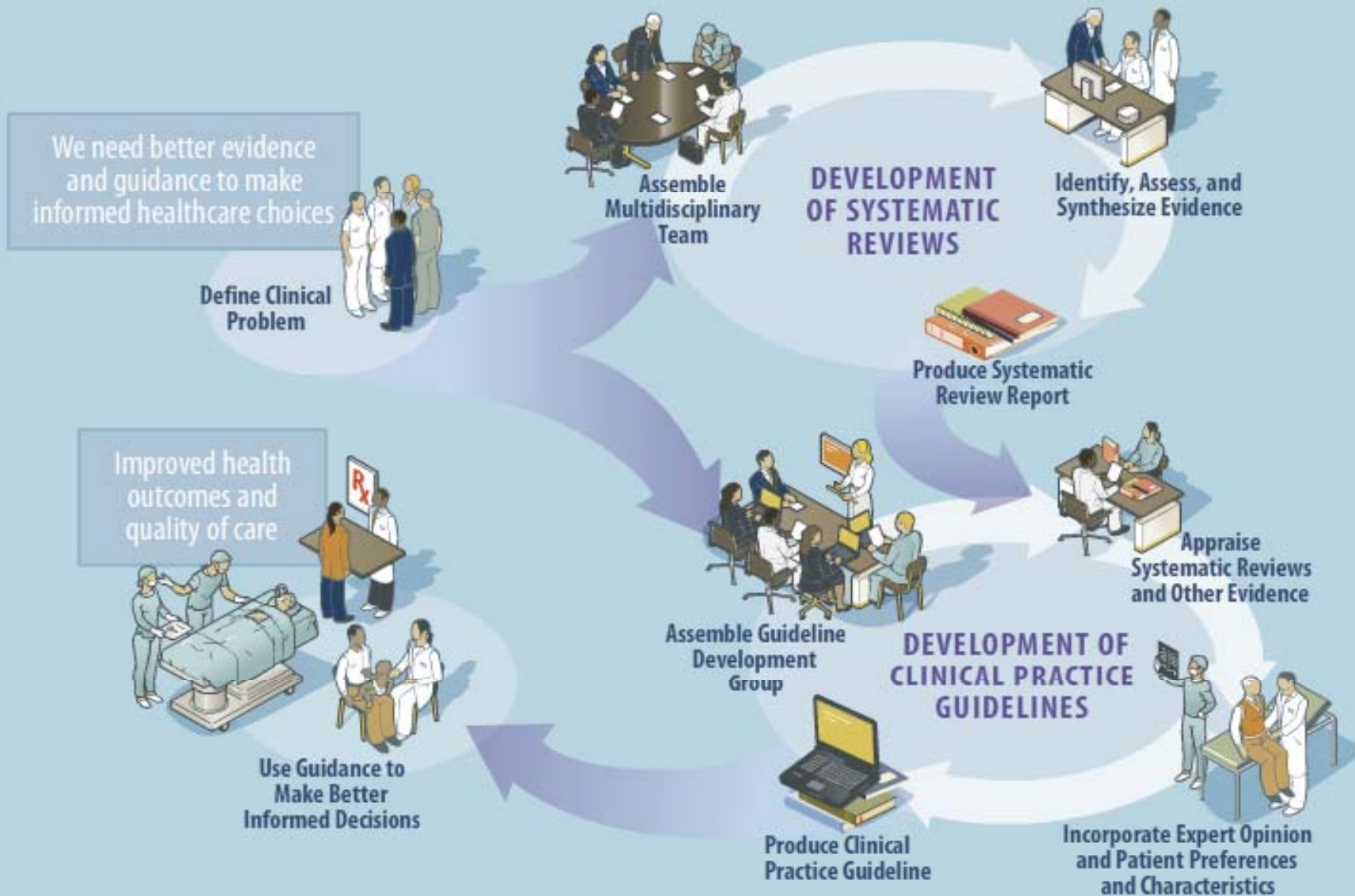
- CPGs are only as good as the evidence on which they are based
- They should be viewed as a resource, not a dictate
- There must always be room for clinical judgment and patient preference in medical decision-making
- Quality care is reflected in patient outcomes and should be the basis for professional accountability

Key Points about CPGs

- Better patient outcomes often go hand in hand with improvements in efficiency and cost-effectiveness
- BUT achieving savings is not the primary motivation for implementing practice guidelines
- CPG implementation is often the most challenging step to do well (multiple barriers)
 - Lack of knowledge or “buy-in”, inadequate staffing, lack of technology, facility design and conflicting financial incentives

Systematic Reviews and Clinical Practice Guidelines Improve Healthcare Decision Making

Click on any text for more information



State of Home Dialysis Therapies in Canada in 2010?

Canadian Intensive Home HD Working Group
CSN Annual Scientific Meeting (St. John's, NFLD)

Home Dialysis in Canada in 2010

- Increased uptake of both home HD and PD in both academic and community programs (successful co-existence)
- Significant variability in staffing of home HD programs
- Variety of strategies used to recruit home HD patients
 - Most patients originate from prevalent ESRD population
- Heterogeneity in intensity and duration of home HD patient (and caregiver) training
- Informed patients permitted to make their own decisions regarding safety in performing home HD
 - Variable thresholds for involuntarily removing patients from this modality

Home Dialysis in Canada in 2010

- Substantial variability among vascular access type, cannulation approaches, and utilization of access safety devices
 - AV fistula is the preferred vascular access
 - Majority of programs are using the buttonhole technique for AV fistula cannulation
 - For patients with CVCs, most use lockboxes or devices like the TEGO
 - Citrate used more often than heparin for locking solution

Home Dialysis in Canada in 2010

- Significant variability with respect to water sources; testing for microbial contamination, endotoxin units (EU), organics/inorganics; responsibility for water sampling
- Variable starting dialysate prescription for nocturnal HHD
 - sodium (136-140mmol/L), potassium (2-3mmol/L), bicarbonate (28- 37mmol/L), calcium (1.5-1.75mmol/L), magnesium (0.5-0.75mmol/L), glucose (5.55- 11.1mmol/L)
 - Dialysate flow varied from 150-500 mls/min
 - Most used high-flux dialyzers

CSN Guidelines for Intensive Hemodialysis

- Purpose:
 - Develop clinically useful guideline for managing ESRD patients who choose more intensive hemodialysis as their treatment modality
- Focused on ***intensive*** hemodialysis
 - Short-daily: < 3 hours, 5-7 days per week
 - Long: often nocturnal; ≥ 5.5 hours, 3-4 sessions per week
 - Long frequent: often nocturnal; ≥ 5.5 hours, 5-7 sessions per week
- 3 areas of systematic review undertaken

CSN Guidelines for Intensive Hemodialysis

- Majority of studies were small, observational, lacked parallel control groups
 - Several case reports and case series
 - Very few published RCTs were directly applicable
- No studies identified that directly evaluated patient's values and preferences
 - These were inferred based on collective experience of the CPG panel
- The CPG panel discussed the resource implications of the guidelines
 - Final recommendations were not affected by cost

CSN Guidelines for Intensive Hemodialysis

A. Risks and benefits of buttonhole cannulation

1. In ESRD patients receiving intensive HD that have AVF, what are the effects of the buttonhole cannulation technique as compared to the rope-ladder technique?
2. In ESRD patients receiving intensive HD that adopted the buttonhole technique, what are the effects of topical antibiotic prophylaxis compared to no antibiotic prophylaxis?

Table 1: Critical and Important Outcomes

OUTCOMES for Question 1 (BHC vs. RLC with no antimicrobial prophylaxis)

CRITICAL - Local Infection risk, Access related systemic infection risk, Access longevity, Access intervention rates, Access-related hospitalization

IMPORTANT - Mortality, Hospitalization for any cause, Training time, Patient Quality of Life, pain

OUTCOMES for Question 2 (BHC with antimicrobial prophylaxis vs. BHC without)

CRITICAL - Local Infection risk, Access related systemic infection risk, Access longevity, Access-related hospitalization, Development of bacterial resistance

IMPORTANT - Local Infection risk, Access related systemic infection risk, Access longevity, Access-related hospitalization, Development of bacterial resistance

CSN Guidelines for Intensive Hemodialysis

A. Risks and benefits of buttonhole vs. rope-ladder cannulation

- Bacteremia rates

Cannulation technique/ HD site	Bacteremia rates per 1,000 patient days
Buttonhole intensive home HD	0.15-0.60
Rope-ladder conventional in-centre HD	0.005

30-120 x bacteremia risk with buttonhole intensive home HD

- No difference in pain score or fistula survival
- One study showed mupirocin reduces bacteremia in patients on intensive home HD using buttonhole cannulation

CSN Guidelines for Intensive Hemodialysis

A. Risks and benefits of buttonhole cannulation

- **Recommendation 1**

For adult ESRD patients receiving intensive HD with an AVF we suggest against the use of buttonhole cannulation over rope-ladder cannulation, if antimicrobial prophylaxis is not to be used. (Weak recommendation; very low quality evidence)

- **Recommendation 2**

For adult ESRD patients receiving intensive HD with an AVF that adopted the buttonhole cannulation technique we suggest the use of mupirocin antibacterial cream to reduce the risk of infection. (Weak recommendation; very low quality evidence)

CSN Guidelines for Intensive Hemodialysis

B. Vascular Access in Intensive Hemodialysis

1. In ESRD patients receiving intensive HD, what are the effects of the tunnelled central venous catheters as compared to arteriovenous access for vascular access?
2. In ESRD patients receiving intensive HD that have CVC for hemodialysis access what are the effects of CVC “connectology” compared to usual care?
 - Due to lack of data, the panel members also conducted a survey of 23 Canadian intensive HD programs

OUTCOMES for Question 1 (AVG/AVF vs. CVC)

CRITICAL - Mortality, Infections, Hospitalizations, Access Longevity, Number of Interventions

IMPORTANT - Patient comfort, Quality of Life, Training time for home hemodialysis, patient perception of safety with vascular access

OUTCOMES for Question 2 (Connectology devices vs. usual care)

CRITICAL - Air embolism, hemorrhage/exsanguination

IMPORTANT - Access related infections, patient perception of safety with vascular access, hospitalization, training time for home hemodialysis

CSN Guidelines for Intensive Hemodialysis

B. Vascular Access in Intensive Hemodialysis

- AVF/AVG vs. CVC
 - Reduced risk of infection and access loss
 - Increased risk of access interventions
- CVC connectology devices
 - No increased thrombotic occlusions or infections
 - Canadian survey: 14/23 programs responded
 - 2 cases of air embolism prevented due to use of connectology devices

Table 1: Complication rates per access type

Outcome	Author/Year	N	Total Follow-up (Patient Years)	Access	Rate (per 100 years)*
Exit site infection	Ouwendyk 1996	5	5.3	CVC	38.6
	Pipkin 2004	11	NR	AVF/AVG	5.8
Bacteremia	Perl 2006	33	NR	CVC	60.9
	Ouwendyk 1996	5	5.3	CVC	19.3
	Pipkin 2004	11	NR	AVF/AVG	0
Access Loss or Thrombosis	Kjellstrand 2003	4	4.3	CVC	48.0
	Perl 2006	33	NR	CVC	45.6
	Kjellstrand 2003	5	8.8	AVG	11.0
	Kjellstrand 2003	14	21.0	AVF	5.0
	Castro 2006	23	72.7	AVF	4.0
	Kooistra 1999	12	6.5	AVF	0
	Rondini 2000	23	96.0	AVF	2.1
	Quintaliani 2000	24	NR	AVF	2.2
"Access Failure or Intervention"	Lindsay 2003	3	NR	AVG	158 +/- 180
	Lindsay 2003	15	NR	AVF	52 +/- 147
	Goldfarb-Rumantyzev 2006	11	7.3	AVF	13.6
	Piccoli 2003	23	34.1	AVF	33.6
Bleeding	Lockridge 2011	62	197.9	CVC	0.5
	Lockridge 2011	4	11.7	AVG	0
	Lockridge 2011	31	74.8	AVF	1.4
	Kooistra 1999	13	6.5	AVF	0
Air embolism	Ouwendyk 1996	5	5.3	CVC	77.2
	Lindsay 2003	6	NR	CVC	0

* No confidence intervals reported except in Lindsay 2003, N: number of patients, NR: not reported, CVC: tunneled central venous catheters, AVF: arteriovenous fistulae, AVG: arteriovenous grafts

CSN Guidelines for Intensive Hemodialysis

B. Vascular Access in Intensive Hemodialysis

- **Recommendation 3**

For adult ESRD patients receiving intensive HD we suggest the use of arteriovenous access (AVF or AVG) versus tunnelled CVC for vascular access (Weak recommendation; very low quality evidence)

- **Recommendation 4**

For adult ESRD patients receiving intensive HD using a CVC for access we suggest the use of “connectology” devices compared to usual care (Weak recommendation, very low quality evidence)

CSN Guidelines for Intensive Hemodialysis

C. Mineral Metabolism Outcomes in Intensive Hemodialysis

1. In ESRD patients receiving long (>5.5hours, 3-4 days per week) and long frequent hemodialysis (>5.5 hours, ≥ 5 days per week) what are the effects of a strategy aimed at maintaining a neutral calcium balance (adding a calcium spike to the 1.25mmol/L calcium dialysate) compared to no calcium spike?
2. In ESRD patients receiving long or long frequent HD what are the effects of a strategy that include the addition of phosphate to the dialysate to maintain a normal pre and post dialysis phosphate?

Table 1: Critical and Important Outcomes

OUTCOMES for Calcium

CRITICAL - Fragility Fracture, Peripheral arterial disease, coronary artery disease

IMPORTANT - Calcific uremic arteriopathy, Mortality, Intradialytic hypotension, Parathyroidectomy, Extraosseous calcification, Mineral metabolism markers (Ca, Alk P, PTH)

OUTCOMES for Phosphate

CRITICAL - Fragility Fracture, Coronary artery disease

IMPORTANT - Peripheral arterial disease, Calcific uremic arteriopathy, Liberalization of diet, Mortality, Extraosseous calcification, Number of phosphate binders, Improved muscle mass, Mineral metabolism markers (P, Alk P, PTH), Parathyroidectomy

CSN Guidelines for Intensive Hemodialysis

C. Mineral Metabolism Outcomes in Intensive Hemodialysis

- Very few studies compared long and long frequent HD with and without increased dialysate calcium
 - No information available for the critical and most of important outcomes
 - Available evidence suggests that an increased dialysate calcium is required to prevent increases in PTH
 - When compared to conventional HD, a higher dialysate calcium for long and long frequent HD did not appear to increase the risk of peripheral arterial disease, coronary calcification or extraosseous calcification
- No studies directly compared long and long frequent HD with and without adding phosphate to the dialysate
 - No information available on the critical or important outcomes
- For the indirect comparison of long and long frequent to conventional HD
 - Serum phosphate improves, phosphate binders are reduced or discontinued and phosphate intake increases

CSN Guidelines for Intensive Hemodialysis

C. Mineral Metabolism Outcomes in Intensive Hemodialysis

- **Recommendation 5**

For patients with ESRD treated with long or long frequent hemodialysis, we suggest maintaining a neutral calcium balance by using a dialysate calcium of 1.5mmol/L assuming that this is warranted based on a low or normal predialysis calcium and PTH values that are not over-suppressed (<2x the normal value for the lab) (*Weak recommendation, very low quality evidence*).

- **Recommendation 6**

For patients with ESRD treated with long or long frequent HD, we suggest using a phosphate dialysate additive to maintain the pre-dialysis and post-dialysis phosphate in the normal range if hypophosphatemia persists after stopping phosphate binders and liberalizing diet (*Weak recommendation, very low quality evidence*).

Is offering buttonhole cannulation ethical?

- How do we pick the winners? -

- Ethical principles – autonomy, beneficence, non-maleficence, justice
- Similar scenarios in medicine
 - Wearing a helmet while riding a bike or motorcycle
 - Offering in-centre HD when social factors would totally support home therapies
 - Prescribing cyclophosphamide to reproductive-aged adults
 - Keeping patient on life-support in ICU when care appears futile
- Has your program been using buttonhole cannulation technique as a selling point to grow your home HD population?
- How do we monitor compliance with prescribed frequency, duration and meticulous cannulation technique in our home HD patients?

CASE 1:

D.L.Z. – 46 yr-old male, lives alone

- ESRD (IgA Nephropathy) on cyclical PD x 6 yrs
- Recurrent peritonitis, poor ultrafiltration
- Doing a masters degree; tends to skip dialysis
- He chooses home HD.... AV fistula ready
- Keen to perform buttonhole cannulation

- Question: Would you try to sway him to rope-ladder cannulation?

[Question for CASE 1:
Which HD option would you
recommend to him?]

- A. [In-centre HD with rope-ladder cannulation]
- B. [Home HD with rope-ladder cannulation]
- C. [In-centre HD with buttonhole cannulation]
- D. [Home HD with buttonhole cannulation]

CASE 2:

66 year-old female, lives with husband

- ESRD (Chronic GN) on in-centre HD using AV fistula
- Access is tortuous; rope-ladder technique used
- Highly functioning; keen on changing to home HD
- Patient won't self-needle
- Husband: "I will only do buttonhole cannulation – looks easy"
- Patient: "My husband does not always follow instructions.... he has his own ideas... Home care RN's invasion of privacy "
- Question: Would you sway husband to learn rope-ladder technique?

[Question for CASE 2:
Which HD option would you
recommend to them?]

- A. [Continue in-centre HD with rope-ladder cannulation]
- B. [Home HD with husband doing rope-ladder cannulation (education, encouragement)]
- C. [Home HD with CCAC cannulation support]
- D. [Home peritoneal dialysis (+/- CCAC support)]

THE END

QUESTIONS??