WHICH VASCULAR ACCESS FOR HOME HD?

Th LOBBEDEZ, Clémence BECHADE, M FICHEUX

Néphrologie-Dialyse-Transplantation,

CHU de CAEN

Bruxelles

06-07 Juin 2018

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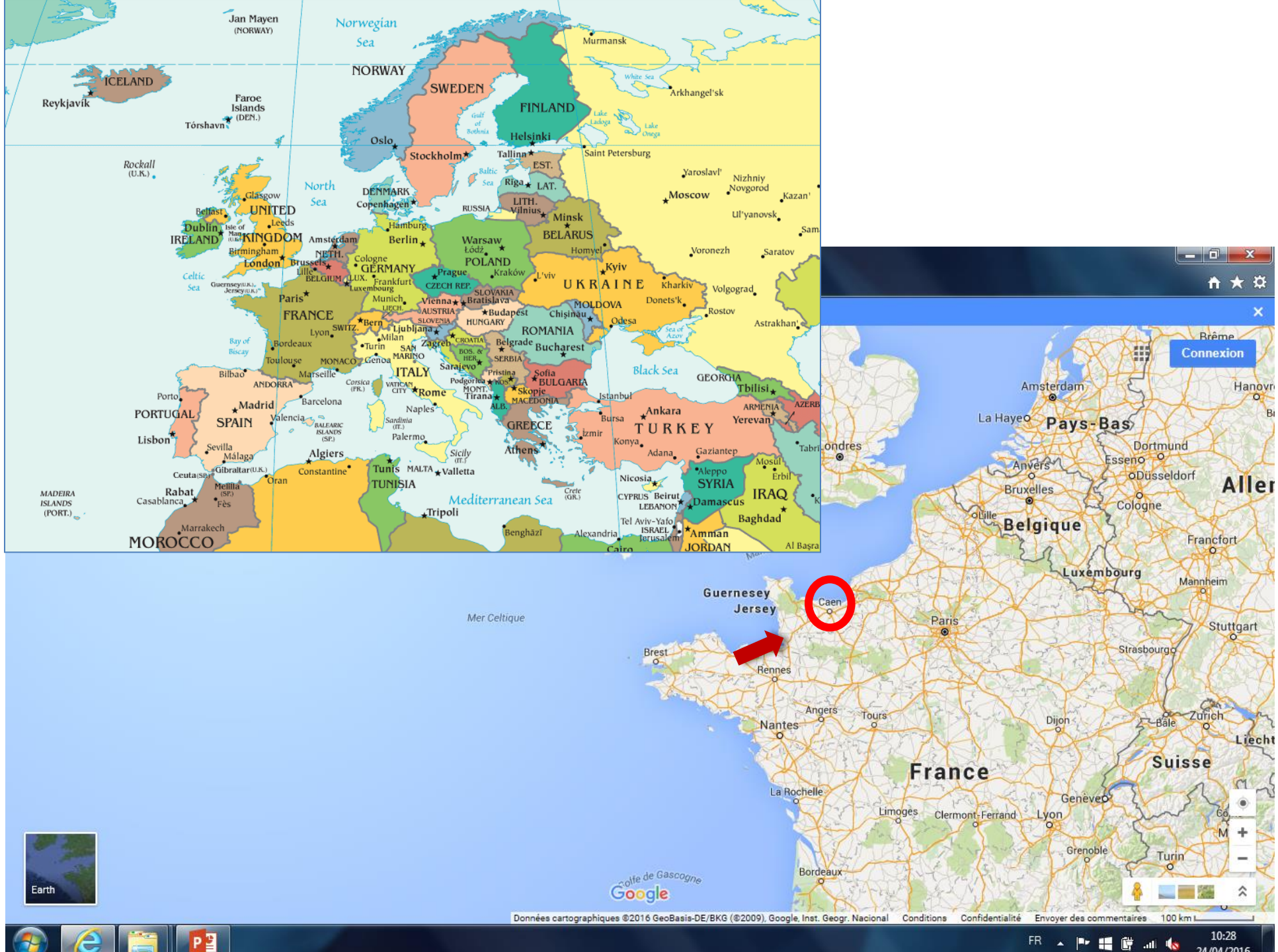
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CENTRE UNIVERSIT RE DES MALADIES RENALES

Why this question? Why am I asked to answer?

From PD to home hemodialysis ?

Peritoneal Dialysis International, Vol. 27, pp. 645–646
Printed in Canada.

0896-8608/07 $3.00 + .00

TRANSITIONS FROM PD ARE EXPECTED. WHY NOT CONTINUE AT HOME?

Peritoneal Dialysis International, Vol. 27, pp. 669–674
Printed in Canada.

0896-8608/07 $3.00 + .00

THE USE OF NOCTURNAL HOME HEMODIALYSIS AS SALVAGE THERAPY FOR PATIENTS EXPERIENCING PERITONEAL DIALYSIS FAILURE

Joseph H.S. Wong,[1] Andreas Pierratos,[2] Dimitrios G. Oreopoulos,[3] Reem Mohammad,[3]
Fatima Benjamin–Wong,[3] and Christopher T. Chan[3]

Peritoneal Dialysis International

IS TRANSITION BETWEEN PERITONEAL DIALYSIS AND HEMODIALYSIS REALLY A GRADUAL PROCESS?

Lucie Boissinot,[1] Isabelle Landru,[2] Eric Cardineau,[3] Elie Zagdoun,[4] Jean-Philippe Ryckelycnk,[1] and Thierry Lobbedez[1]

En Marche !

Should (or could) we use a HD catheter on Home HD?

Case report 1. A French story…in 2011

- Eva, 15 years old
- C3 deposit glomerulonephritis (C3 nef)
- Registered on the waiting list for renal transplantation
- On PD (APD) for 2 years, had to be transferred on HD

- **Personal expectation:** "I really want to go to school, I would like to study medicine after my bachelor. No doubt HHD is the best option for me"

Which answer would you provide to help Eva?

A. Sorry EVA, you are too young for HHD ☐

B. OK Eva, but we must prepare a fistula, you mum will have to prepare the machine and to insert the needles in your vascular access ☐

C. We will prepare the fistula, go on in center HD, it would be easier, I'll try to find a evening spot for you ☐

D. OK, one possibility is to use an HD line, you mum will not have to put the needles in your fistula. You could set up the machine by yourself if you want ☐

E. OK Eva, there are two options for you, B and D ☐

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E. OK Eva, there are two options for you, **B and D** ☒

Eva gave me her point of view…Case 1.

- I prefer to be on HHD, do not want to come to the hospital
- I do not want a fistula, that's too ugly, I'm too young
- I will be transplanted one day you told me..
- I do not want my mum to get more involved in my care..

Good…looked very easy, I just had to call Maxence Ficheux in charge of the HHD program…I thought that the problem would be sorted out quickly

Yes…but in the real life in France in 2011, French complexity:

- The administrative director and the medical director of the out-center dialysis facility did not agree (no HD line at home…did not want to take the responsibility)
- The regional Nephrologist committee in Normandy was reluctant (that's too risked)
- Finally we won…(French law do not provide any information regarding the vascular access for HHD)

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LE SERVICE PUBLIC DE LA DIFFUSION DU DROIT

The French regulation about Home HD

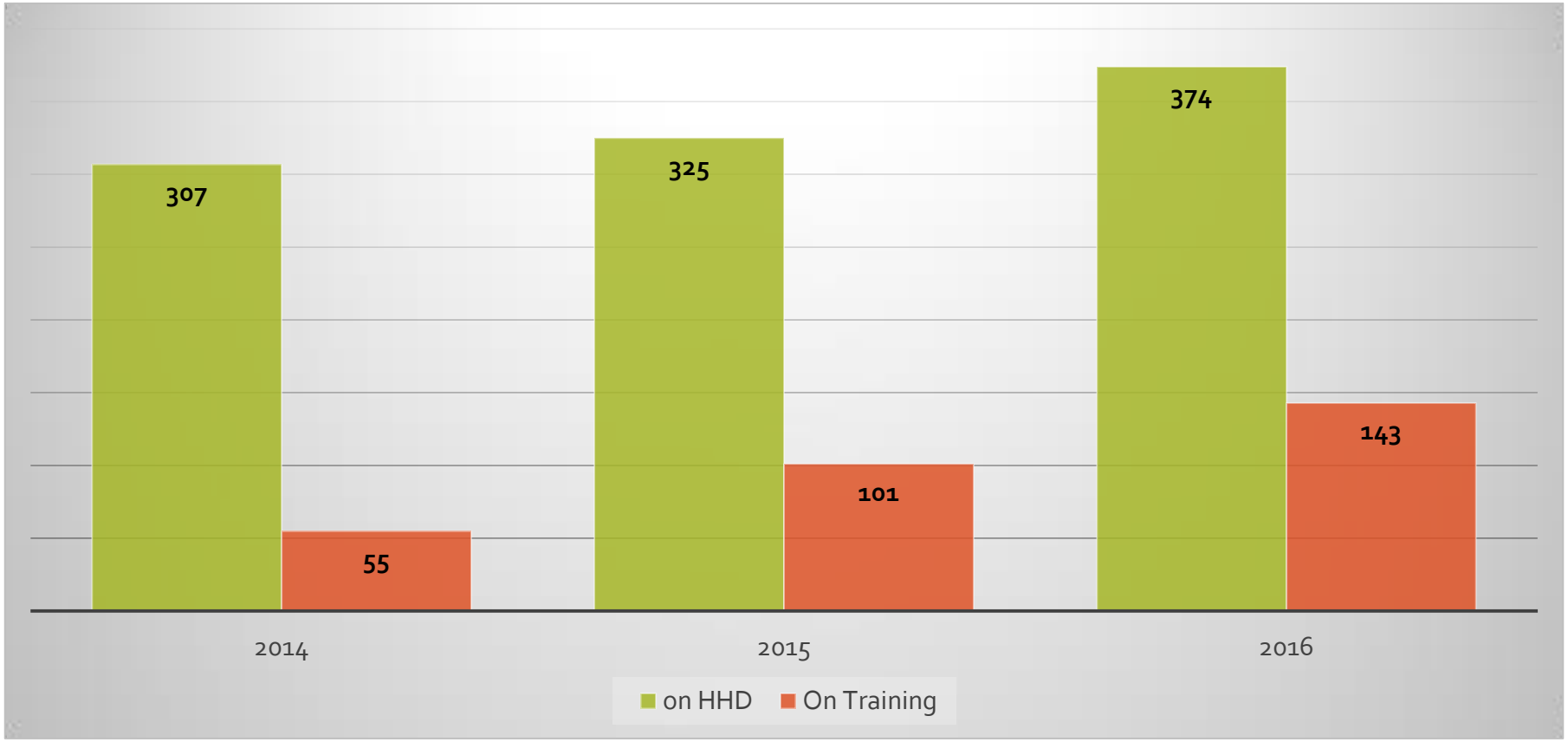
De l'hémodialyse à domicile
Article D. 712-147

« La mise en œuvre de l'hémodialyse à domicile, définie à l'article R. 712-105, est gérée par un établissement de santé, titulaire à cet effet de l'autorisation d'activité de traitement de l'insuffisance rénale chronique par la pratique de l'épuration extrarénale. Cet établissement de santé installe, au domicile du patient qu'il prend en charge, un générateur d'hémodialyse et un système produisant l'eau pour l'hémodialyse.
« Il fournit également les médicaments, les objets et produits directement liés à la réalisation du traitement par hémodialyse.
« L'hémodialyse à domicile est offerte à des patients, formés à cette technique, en mesure d'assurer habituellement eux-mêmes tous les gestes nécessaires à leur traitement, en présence d'une tierce personne de l'entourage habituel qui peut leur prêter assistance. Le domicile ou le lieu de résidence du patient doit être adapté à la pratique de l'hémodialyse dans des conditions suffisantes de sécurité et de confort. L'aide d'un infirmier ou d'une infirmière peut être sollicitée

Could we use HD catheter in home HD?

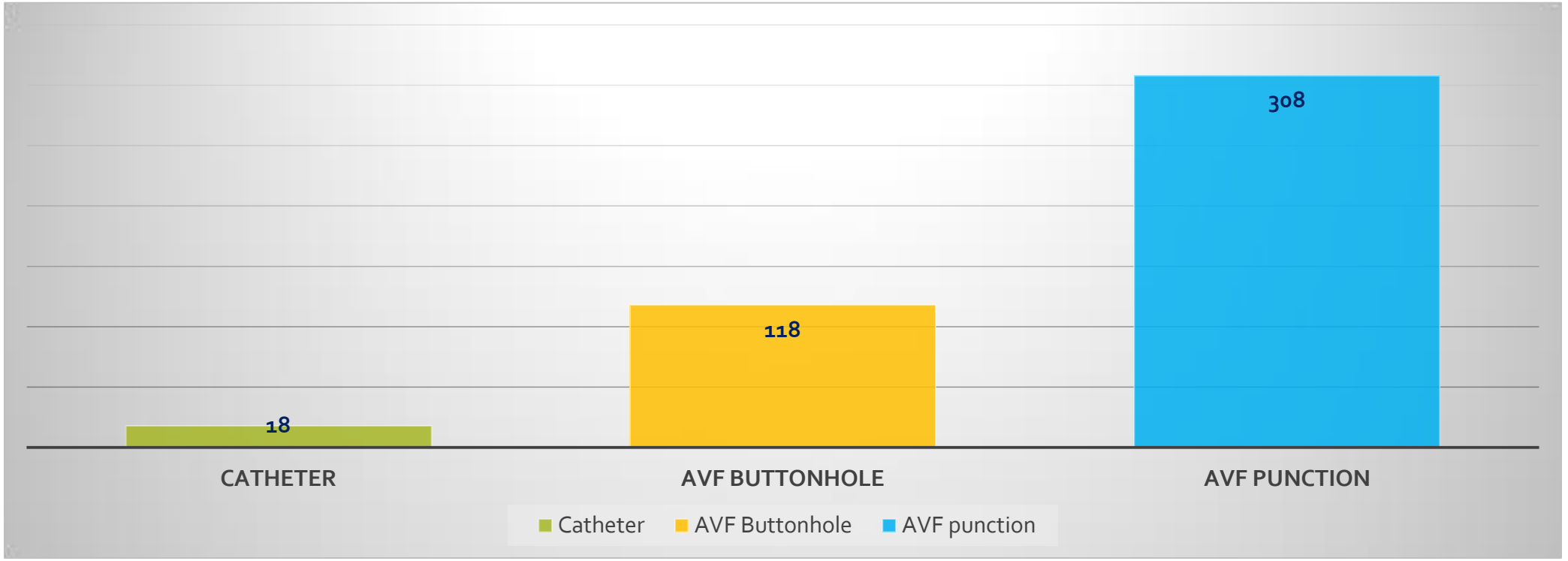
French centers…lack of experience on HHD?

Number of patients on home HD in France by year [<0.7%]



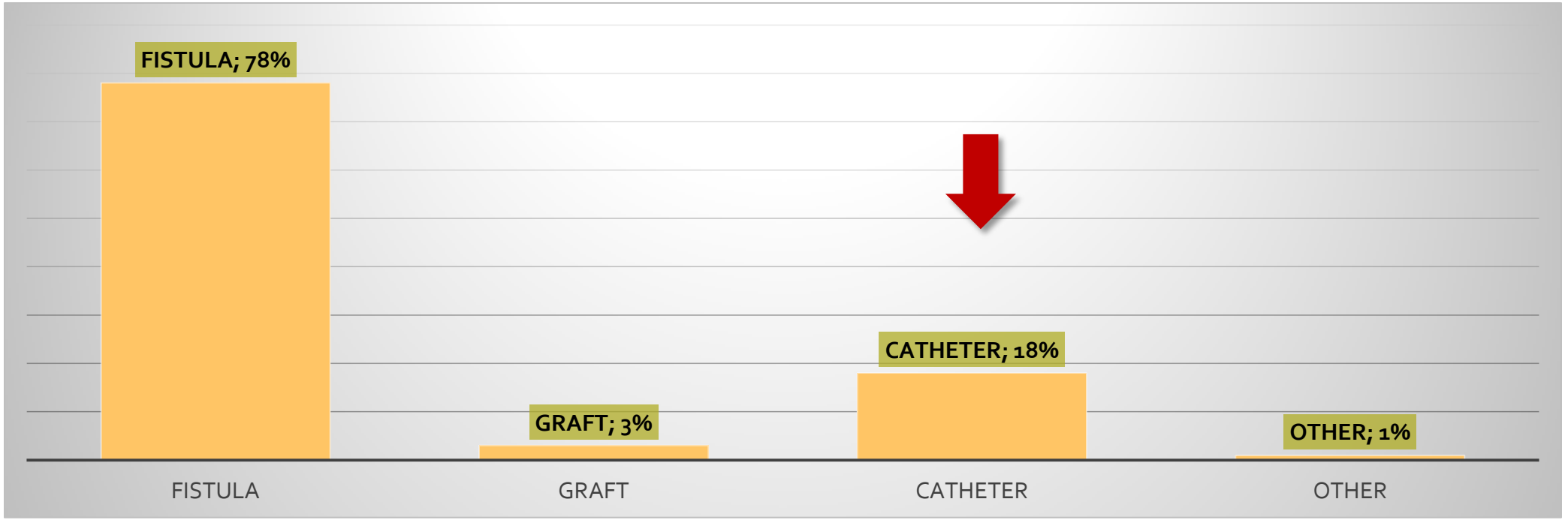
Vascular access in home HD in France

Type of vascular access [Theradial database]



Vascular access on hemodialysis in France

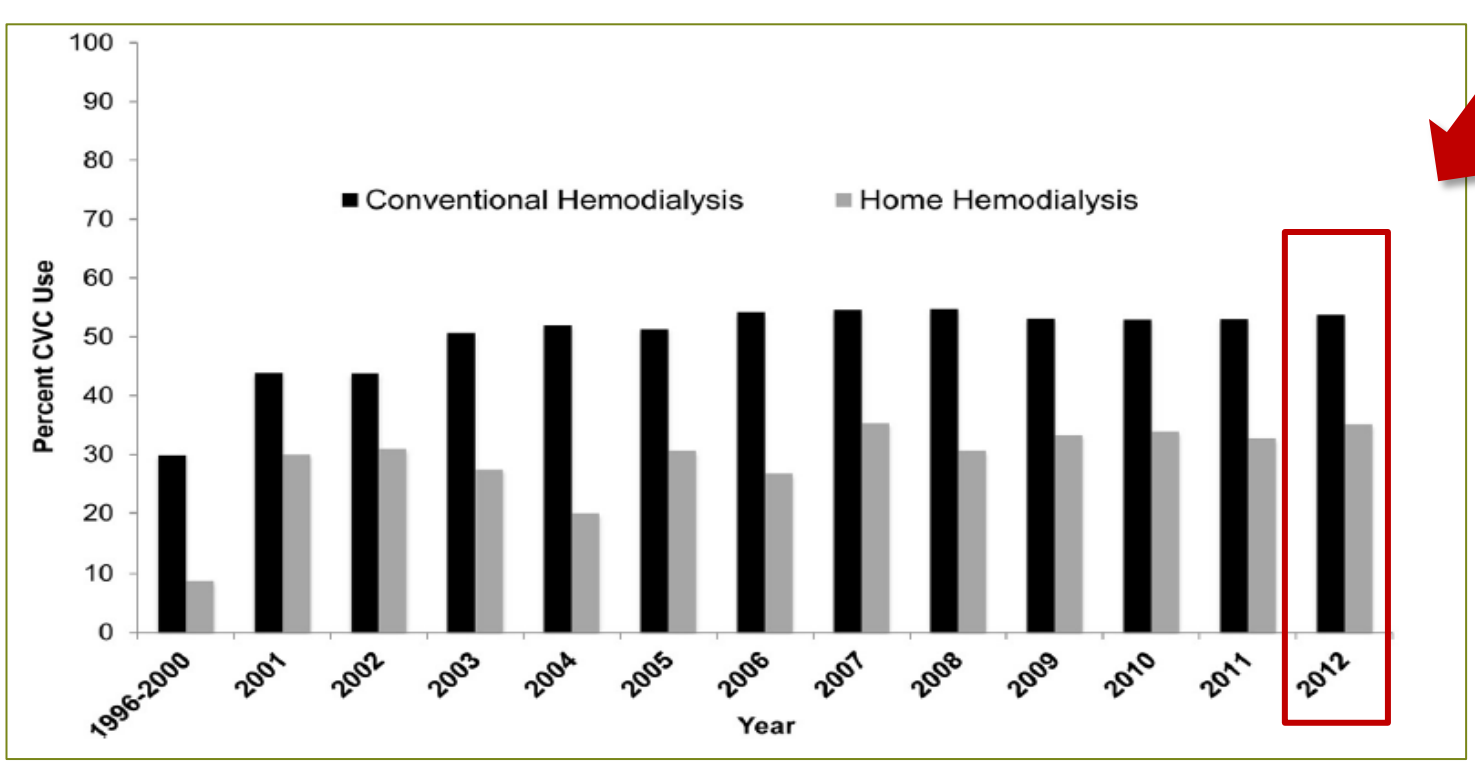
Vascular access in prevalent dialysis patient [2016]



[Annual report of the French Registry REIN]

Vascular access on home HD in Canada

Type of vascular access by HD modality



[J Perl; Am J Kidney Disease 2016; 67: 251-259]

Patients characteristics by vascular access

	AVF/AVG (n = 694)	CVC (n = 523)	*P*
Age, y	51.8 ± 13.4	51.7 ± 14.8	0.9
Male	73.0	53.9	<0.001
Race			0.8
White	70.3	67.5	
Asian	7.2	7.8	
Black	5.3	6.5	
Other	11.5	11.7	
Unknown	5.6	6.5	
Primary diagnosis			<0.001
Failed transplant	8.9	5.7	
Glomerulonephritis	19.5	16.8	
Diabetes	21.6	27.5	
Renal vascular disease	11	10.3	
Polycystic kidney disease	16.1	7.3	
Drug induced	1.7	2.7	
Pyelonephritis	3.5	1.9	
Other	7.3	16.1	
Unknown	10.4	11.7	
Comorbid condition			
Stroke	4.3	6.1	0.2
PVD	5.0	8.4	0.03
Hypertension	78.5	81.5	0.2
Diabetes	6.9	9.9	0.06
CAD	11.2	13.4	0.3
Current smoker	9.2	9.4	0.9

CVC on Home HD and center experience

	AVF/AVG (n = 694)	CVC (n = 523)	P
Region			<0.001
Atlantic	5	2.9	
Ontario	61	73.6	
West/Prairie	34	23.5	
Facility size			0.007
Small: 1-4 patients	4.5	2.9	
Medium: 5-9 patients	19.6	13.8	
Large: 10-43 patients	75.9	83.4	

[J Perl; Am J Kidney Disease 2016; 67: 251-259]

CANADIAN JOURNAL OF KIDNEY HEALTH AND DISEASE
Journal Canadien de la Santé et de la Maladie Rénale

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Programmatic variation in home hemodialysis in Canada: results from a nationwide survey of practice patterns

Robert P Pauly[1†], Paul Komenda[2†], Christopher T Chan[3], Michael Copland[4], Azim Gangji[5], David Hirsch[6], Robert Lindsay[7], Martin MacKinnon[8], Jennifer M MacRae[9], Philip McFarlane[10], Gihad Nesrallah[11], Andreas Pierratos[12], Martin Plaisance[13], Frances Reintjes[1], Jean-Philippe Rioux[14], John Shik[15], Andrew Steele[16], Rod Stryker[17], George Wu[18] and Deborah L Zimmerman[19*]

Survey among the Canadian dialysis centers

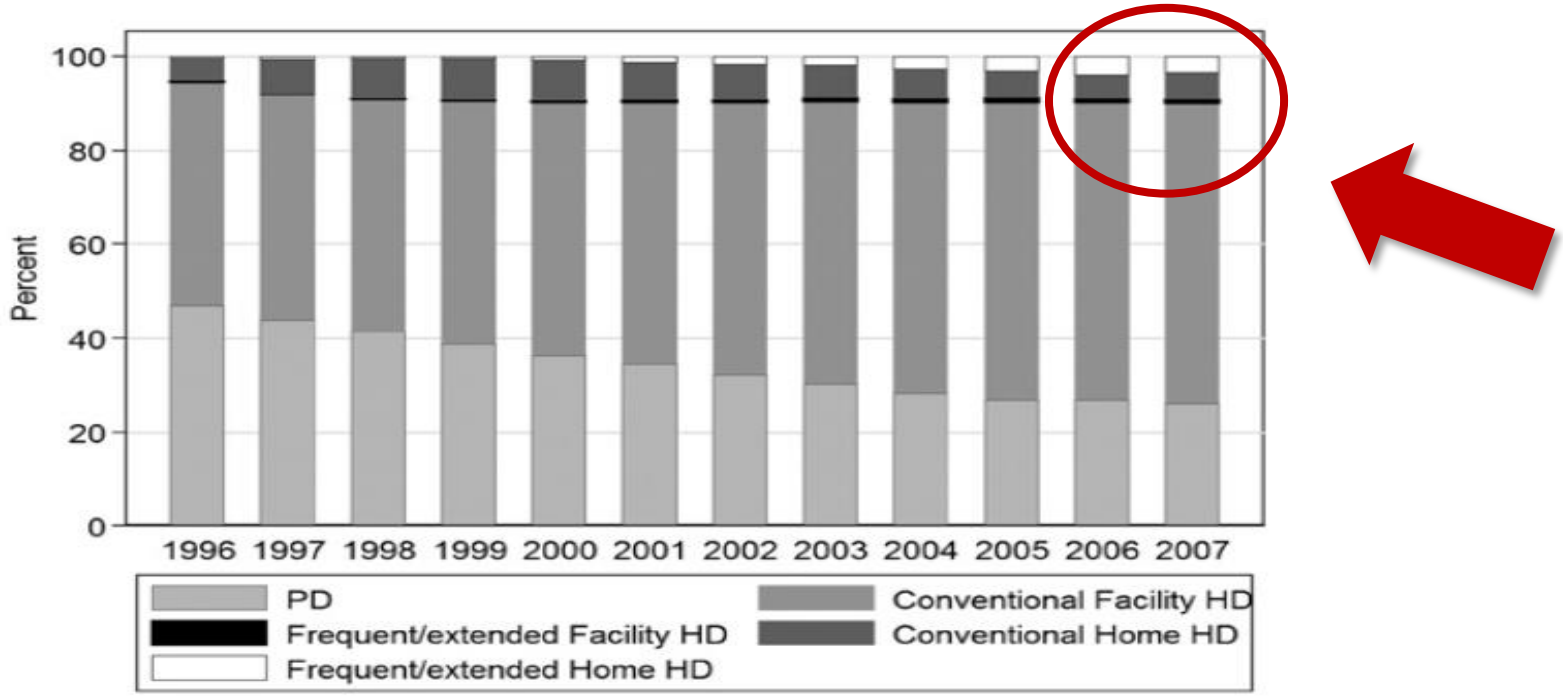
Vascular access

The arteriovenous fistula (AVF) was the preferred access for 88.2% of the programs; 11.8% of programs did not identify any type of access as preferable over another. The absence of an AVF did not preclude HHD in any program though it may delay initiation of HHD training in 37.5% of programs. In 8 of 17 programs, buttonhole cannulation

[RP Pauly, Canadian Journal of Kidney and health Disease 2014; 1:-11]

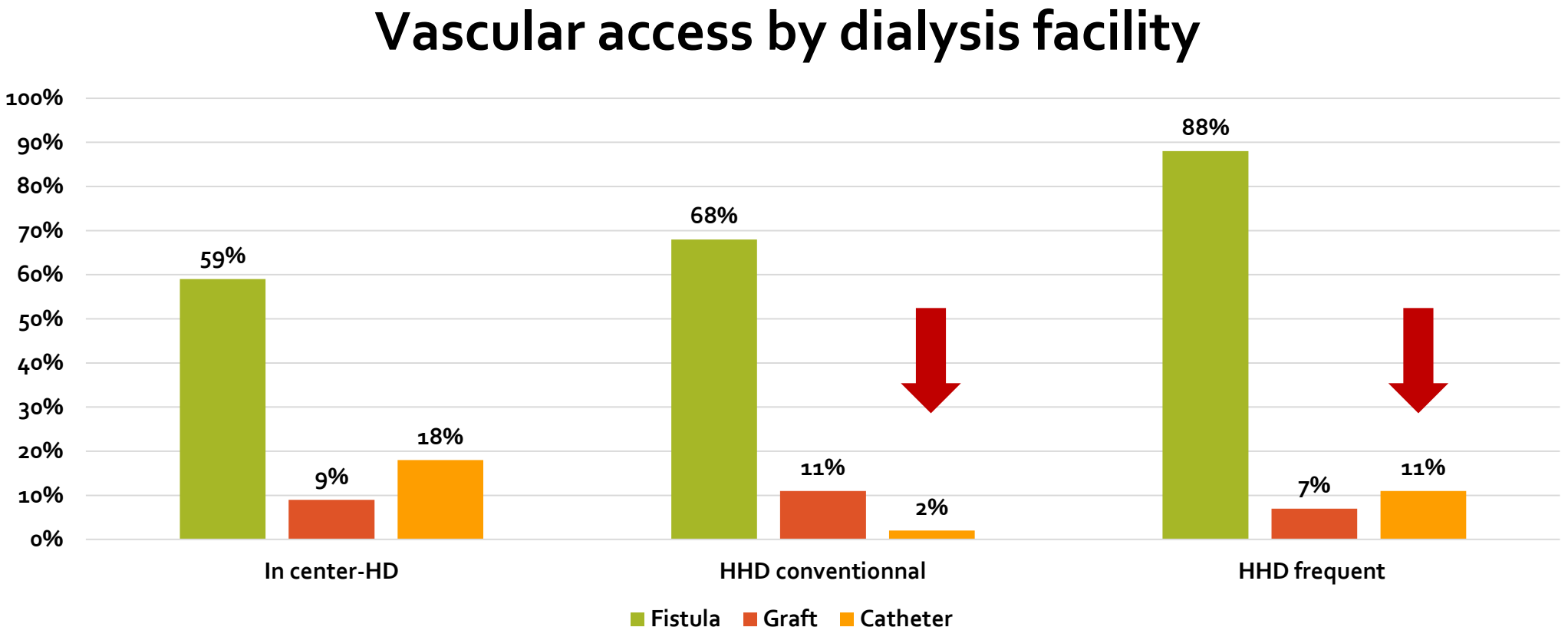
Home hemodialysis in New Zealand

Distribution of the dialysis modality



[MP Marshall; Am J Kidney Disease 2011; 58: 782-793]

Vascular access on HD in New Zealand



[MP Marshall; Am J Kidney Disease 2011; 58: 782-793]

The patient opinion about vascular access?

Patients opinion regarding HHD in Canada

Patient perception about home hemodialysis

Domains	In-center HD	Home HD
Self cannulation "I will feel uncomfortable inserting the needles by myself"	2.11 ± 1.55*	3.57 ± 1.44
Quality of care "I will receive as good care as I would in the hospital"	2.34 ± 1.48*	4.10 ± 1.29
Self-efficacy "I will be able to perform the treatment properly"	2.57 ± 1.52*	4.37 1 ± .19
Fear of a catastrophic event "I worry that something will go wrong during the treatment"	3.72 ± 1.54*	2.94 ± 1.47

[JA Cafazzo; Clin J Am Soc Nephrology 2009; 4: 784-789]

Patient perception about the self cannulation

Fear of Self-Cannulation

Interviewer: So, with the proper training you think you could do it, you could manage doing the needles yourself, setting up the machine?

Patient CHD2: Oh, I'm afraid of needles.

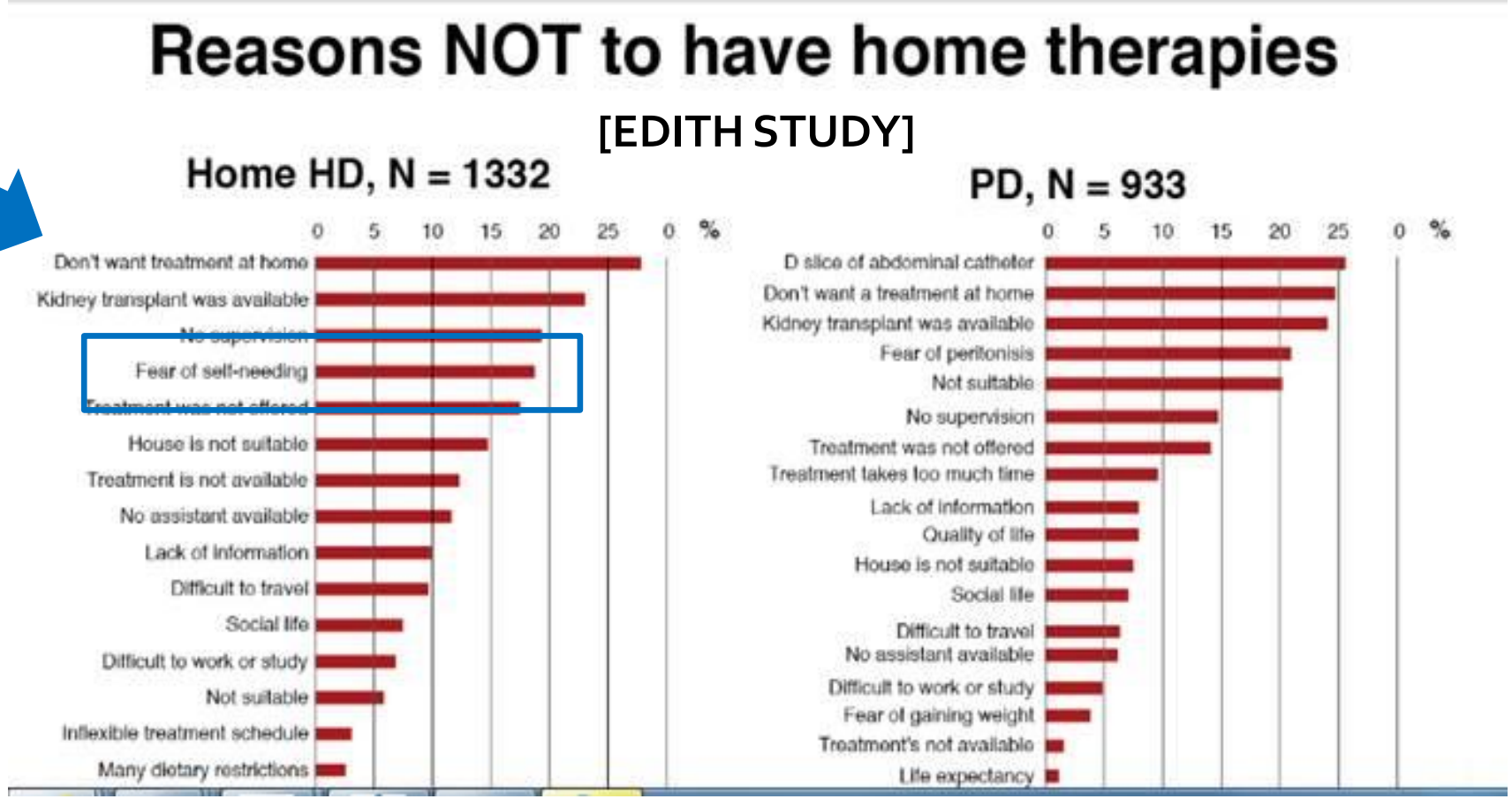
Interviewer: You're afraid of needles so that would be a problem for you doing the needles?

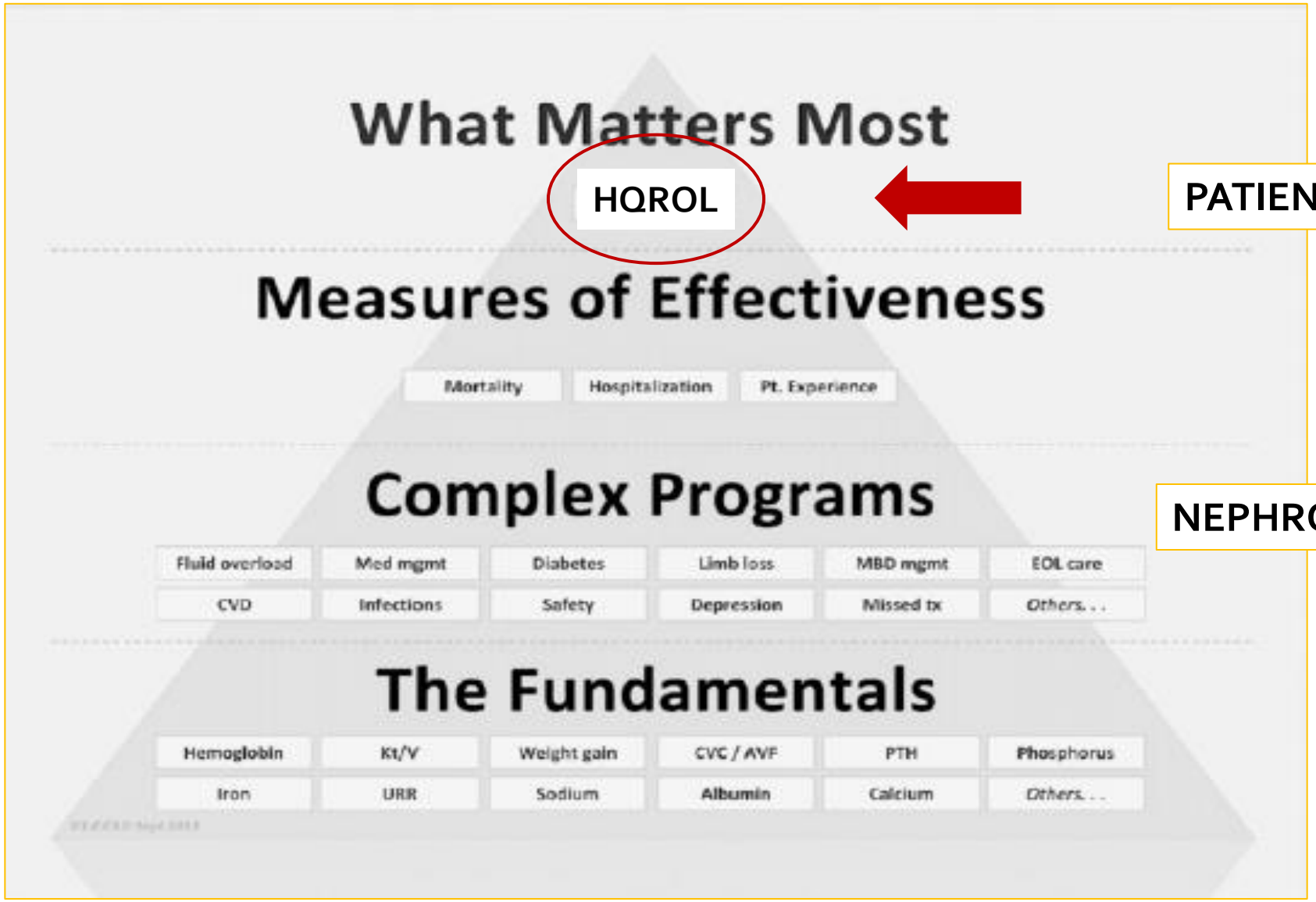
Patient CHD2: Yeah, I don't like needles.

Perhaps, the most often reported perceived barrier was the act of self-cannulation. Patients recognized the need of frequent cannulation when adopting NHHD. The fear of self-cannulation extended beyond the perception of pain to include the potential occurrence of mishaps and complications.

[JA Cafazzo; Clin J Am Soc Nephrology 2009; 4: 784-789]

Patients opinion regarding HHD in Europe





PATIENTS

NEPHROLOGISTS

[Nissenson AR, Clin J Am Soc Nephrol 2014; 9: 430-434]

Good arguments in favor of the HD catheter in home HD?

Effect of the AVF on cardiac function

Eva would be transplanted one day…

Transplant International

Cardiac impact of the arteriovenous fistula after kidney transplantation: a case-controlled, match-paired study

Joëlle Cridlig,[1] Christine Selton-Suty,[2] François Alla,[3] Anne Chodek,[2] Alice Pruna,[2] Michèle Kessler[1] and Luc Frimat[1,3]

Effect of the AVF on cardiac function

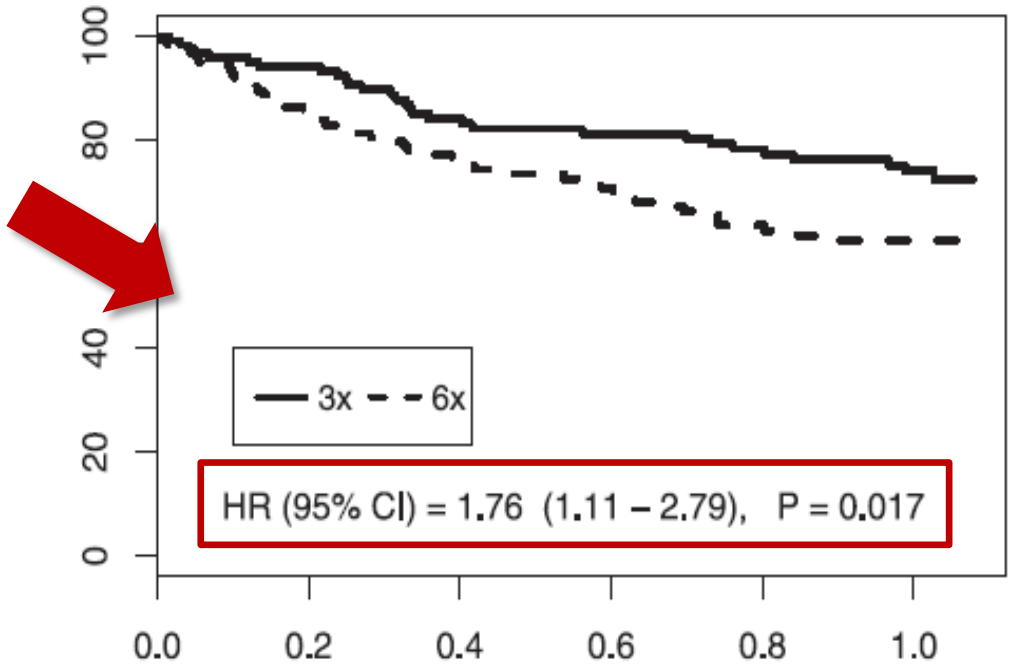
Echocardiographic parameters after transplantation

	Patients with AVF (38)	Patients wo AVF (38)	p value
LVMI	135±30	112±28	<0.01
LVD LVED LVES	 52± 71 34±6	 48 ±6 30±5	<0.05

[J Cridlig, Transplant Int 2008]

Effect of the number of session on the AVF survival

Survival free of repair by number of HD session per week



[RS Sury, J Am Soc Nephrol 2013; 24:498-505]

Short daily Home HD with buttonhole cannulation

Buttonhole Cannulation and Clinical Outcomes in a Home Hemodialysis Cohort and Systematic Review

Christopher A. Muir,[*†‡] *Sradha S. Kotwal,*[*‡] *Carmel M. Hawley,*[§] *Kevan Polkinghorne,*[‖¶] *Martin P. Gallagher,*[*‡**] *Paul Snelling,*[††] *and Meg J. Jardine****

Conclusion Buttonhole cannulation was associated with higher rates of infectious events, increased staff support requirements, and no reduction in surgical arteriovenous fistula interventions compared with rope ladder in home hemodialysis patients. A systematic review of the published literature found that buttonhole is associated with higher risk of arteriovenous fistula-related infections.

Clin J Am Soc Nephrol 9: 110–119, 2014. doi: 10.2215/CJN.03930413

Advantages of the HD catheter in HHD

- Easy to connect to the dialysis circuit
- No need to put needle into the vascular access
- No dislocation during the dialysis session
- No regulation about the vascular access
- Except in France HD lines are frequently used in home HD

HD line at home…does it sound reasonable?

Event rate in home HD by type of access

TYPE of ACCESS	Per access	Per 1000 HD	Pt year 1 event	HD year 1 event
AVF	0.049	0.208	20	4,83
AVG	0.015	0.068	67	11,798
Catheter	0.022	0.087	45	11,545

Conclusions: Serious adverse technical events in home hemodialysis are relatively rare. Strategies to further prevent these events may include patient retraining and periodic vascular access technique audit.
Am J Kidney Dis. ■(■):■-■. © *2014 by the National Kidney Foundation, Inc.*

[KK Kenankore; Am J Kidney Diasease 2014]

HD line at home…does it sound reasonable?

Type of technical problems by vascular access

FISTULA complications type	N	CATHETER complications type	N
Needle dislodge	17	Cut dialysis catheter	1
Air embolism	4	Dislodged dialysis catheter	1
Cut the AVF catheter	2	Connection error	1

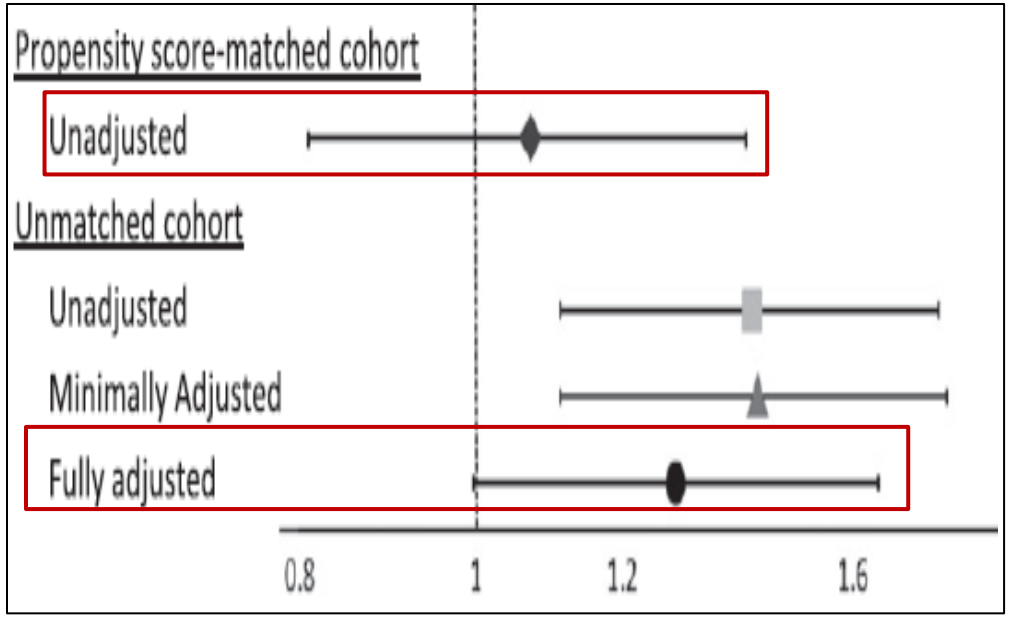
[KK Kenankore; Am J Kidney Diasease 2014]

The risk of air embolism on Home HD

The TEGO device on Home HD

HD line at home…does it sound reasonable?

CVC and the risk of transfer to in-center HD [n=1052, US cohort]



Propensity matched cohort

1.07 [0.81-1.40]

Un-matched cohort

1.41 [1.11-1.78]

1.42 [1.11-1.80]

1.28 [0.99-1.65]

[MB Rivara, Clin J Am Soc Nephrol 2016; 298-307]

HD line at home…does it sound reasonable?

Risk of technique failure associated with CVC [Canadian cohort]

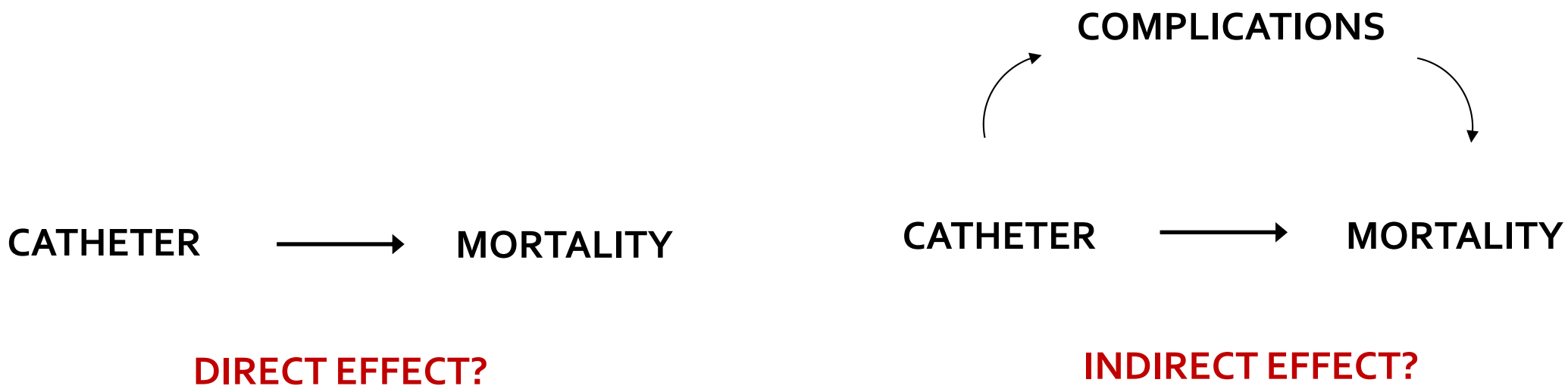
Type of access	within 1 year (1217)	within 90 days (663)	iptcw analysis (1217)
Catheter	ref	ref	ref
AVF or AVG	0.84 [0.67-1.05]	0.94 [0.70-1.26]	0.84 [0.65-1.10]

[J Perl, Am J Kidney Disease 2016; 67:251-259]

Given that…HD catheter in home HD for all?

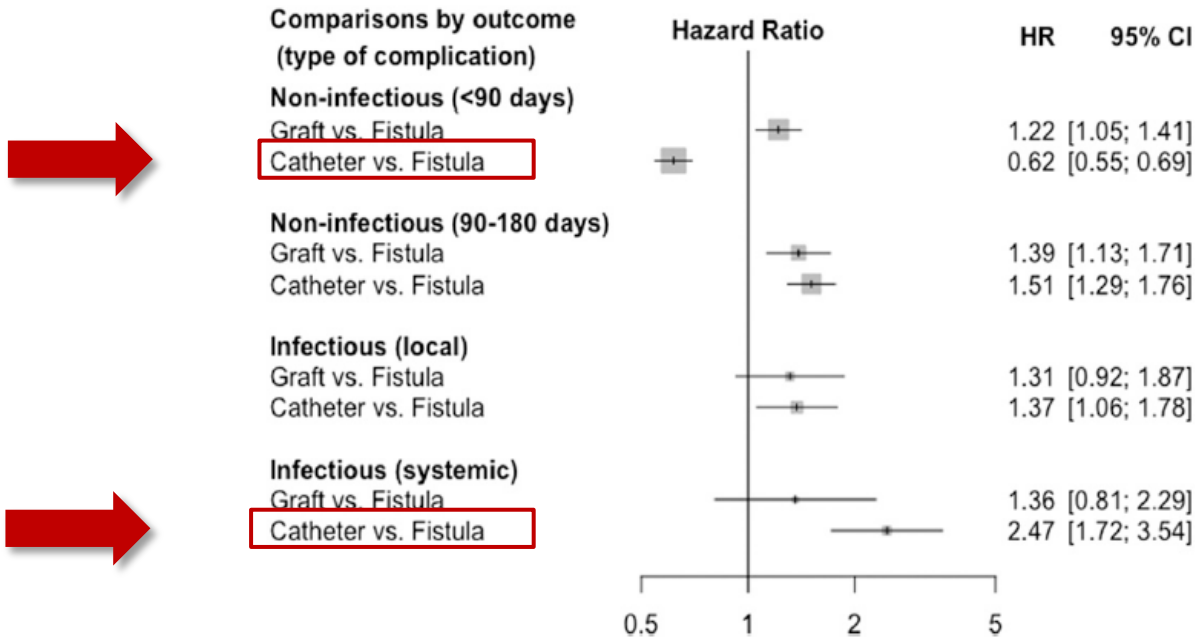
HD line at home…does it sound reasonable?

Is there an effect of the HD catheter on the outcome?



Access type and mortality on hemodialysis

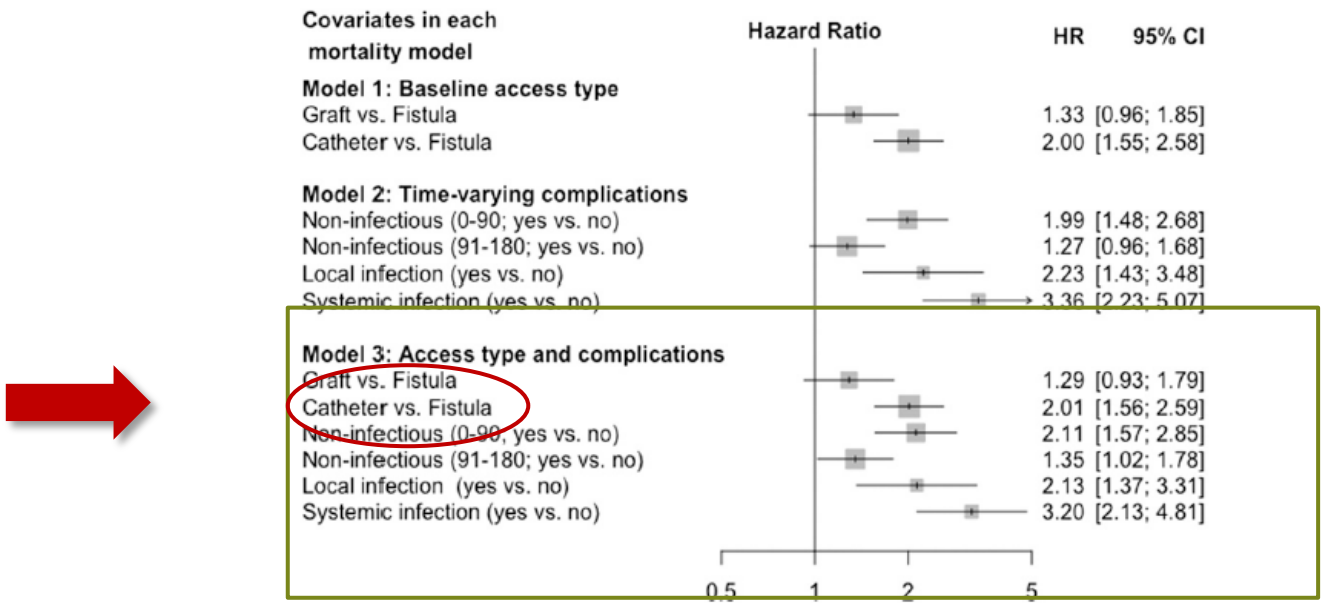
Complications by access type [n=6619]



[P Ravani, Clin J Am Soc Nephrol 2017; 12:955-964]

Access type and mortality on hemodialysis

Mortality by access type [n=6619]

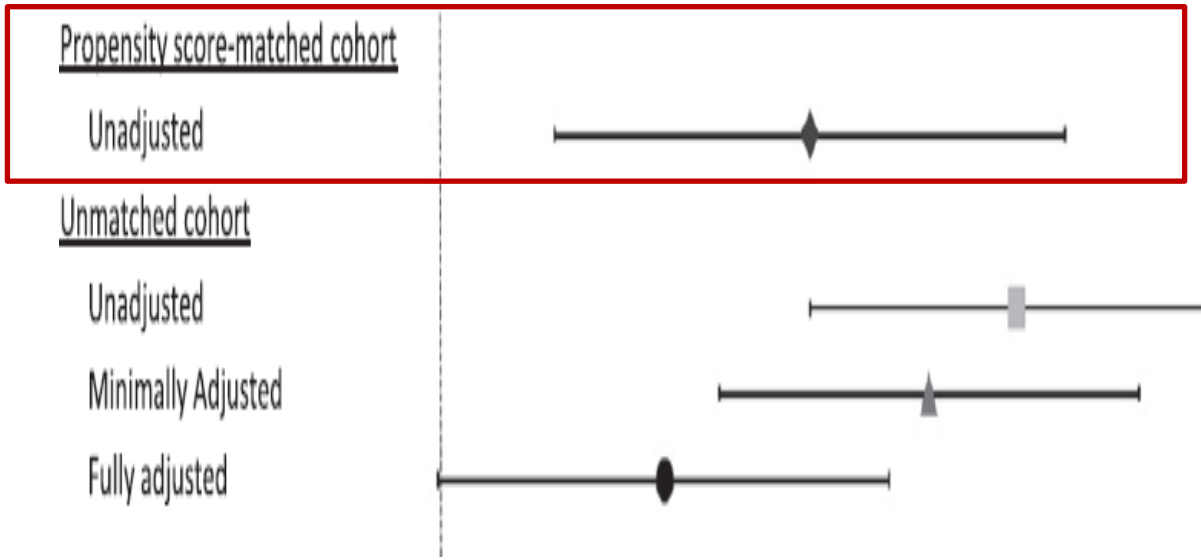


[P Ravani, Clin J Am Soc Nephrol 2017; 12:955-964]

OK,… but is it also true in home HD?

HD line at home…does it sound reasonable?

Mortality risk associated with the CVC in HHD in the US



Propensity matched cohort

1.73 [1.18-2.54]

Un-matched cohort

2.36 [1.73-3.22]

2.07 [1.51-2.84]

1.39 [0.99-1.95]

[MB Rivara, Clin J Am Soc Nephrol 2016; 298-307]

HD line at home…does it sound reasonable?

Risk of death associated with CVC in the Canadian cohort

Type of access	within 1 year (1217)	within 90 days (663)	iptcw analysis (1217)
Catheter	ref	ref	ref
AVF or AVG	0.63 [0.43-0.91]	0.51 [0.30-0.89]	0.42 [0.28-0.65]

[J Perl, Am J Kidney Disease 2016; 67:251-259]

Which answer would you provide to help Eva?

A. Sorry EVA, the HD line is too risked, you must go for a fistula ☐

B. You must learn the self cannulation if you do not want you mum to be involved ☐

C. Go on in center HD, it would be easier, I'll try to find a evening spot for you ☐

D. OK, one possibility is to use an HD line, you mum will not have to put the needles in your fistula. You could set up the machine by yourself if you want ☐

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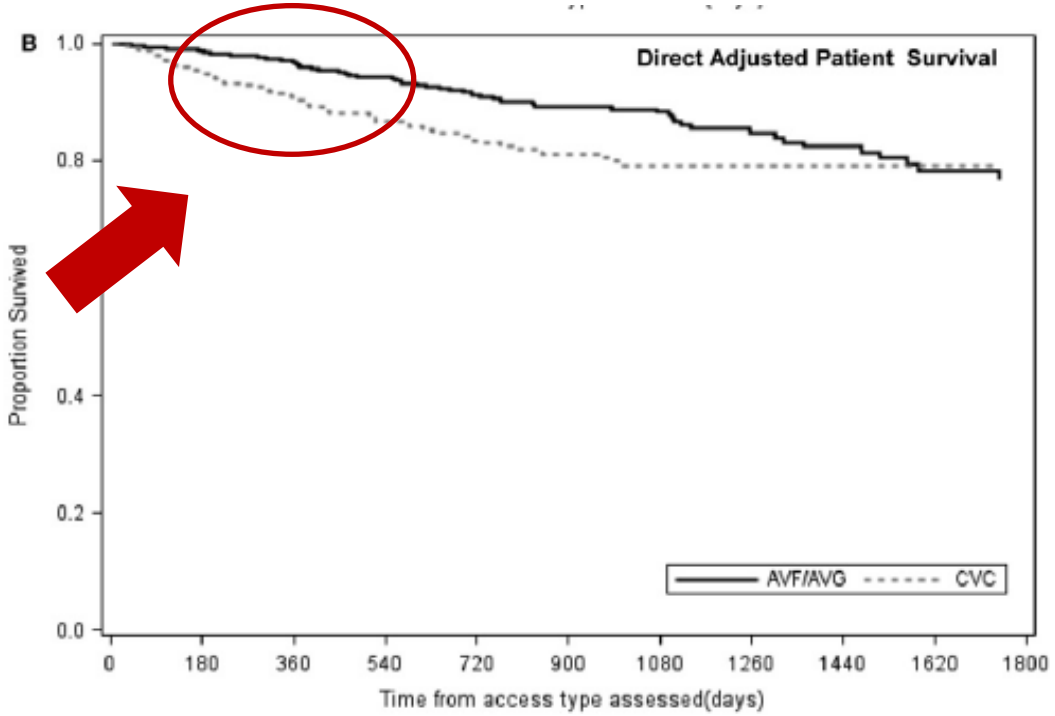
Mortality and CVC in home HD



[J Perl, Am J Kidney Disease 2016; 67:251-259]

Risk of mortality estimation

HR (risk ratio) $\frac{87}{90}$=0.96

RA (risk difference) 87-90=3%

Eva will be transplanted in priority

Good…looked very easy, I just had to call Maxence Ficheux in charge of the HDD program…I thought that the problem would be sorted out quickly

Yes…but there were technical points that needed to be addressed with the new machine

"You must be sure that the machine is in conformity with the European regulation, that means authorized for Home HD with an HD line"

Peritoneal Dialysis cycler

Home Hemodialysis

Outcome of Eva?

- Home HD with an HD line during 6 months
- HD line had to be changed (catheter dysfunction)
- Received a deceased donor transplantation
- Doing well, medical school

Conclusion

- HD catheter can be used in Home HD
- Especially for a short term course
- Or when an AVF can not be created
- AVF is better than a catheter in the long term
- Must fit with the patient expectation

New vascular devices for Home HD