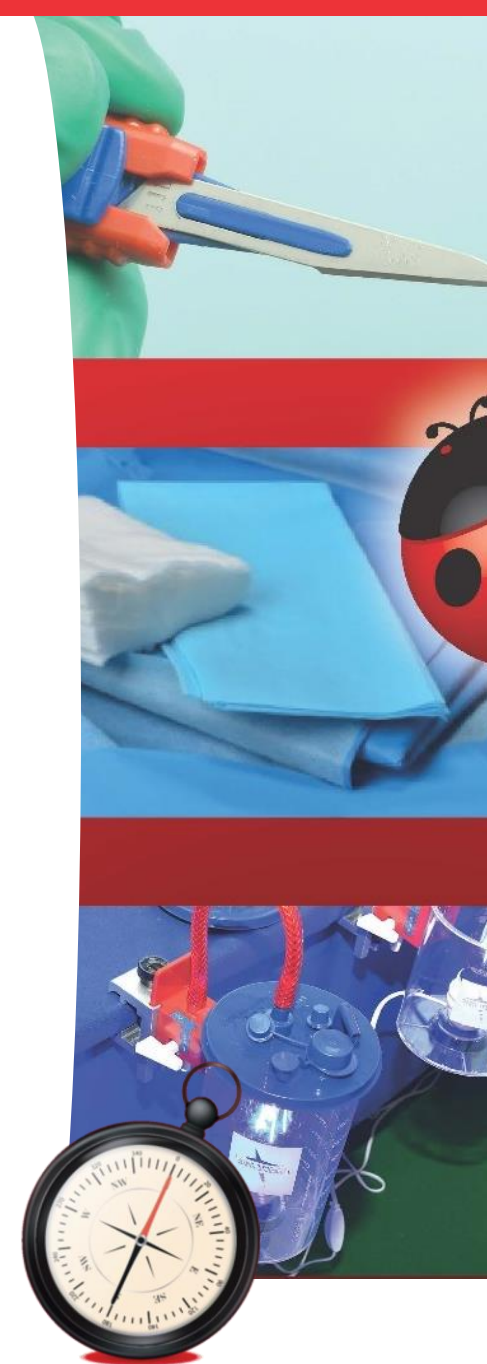


Techniques de dialyse

Docteur Marianne Renou



Déclaration liens d'intérêts

- Aucun



Dialyse

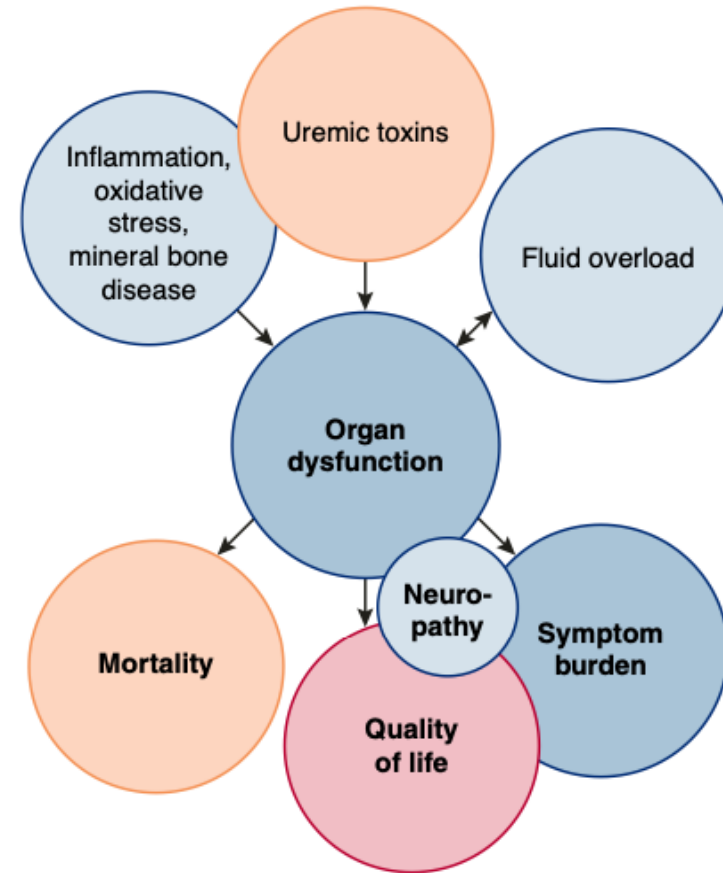


Figure 1. | Complex interplay between uremic toxins, fluid overload, and organ dysfunction in patients with kidney failure. As compared with hemodialysis, hemodiafiltration lowers middle molecular weight uremic toxins more effectively and appears to be related to better survival (circles in orange).

Rôle de la dialyse

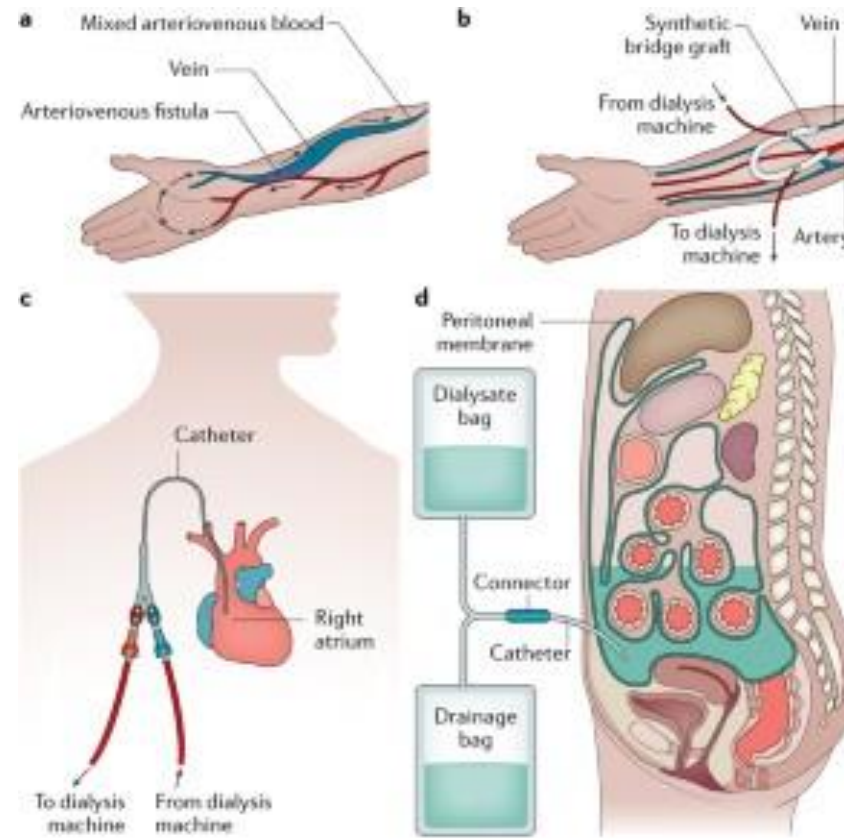
Maintien homéostasie (eau, ions)

Élimination des déchets

Ne substitue pas les fonctions endocrines du rein

Grooteman, CJASN 2021

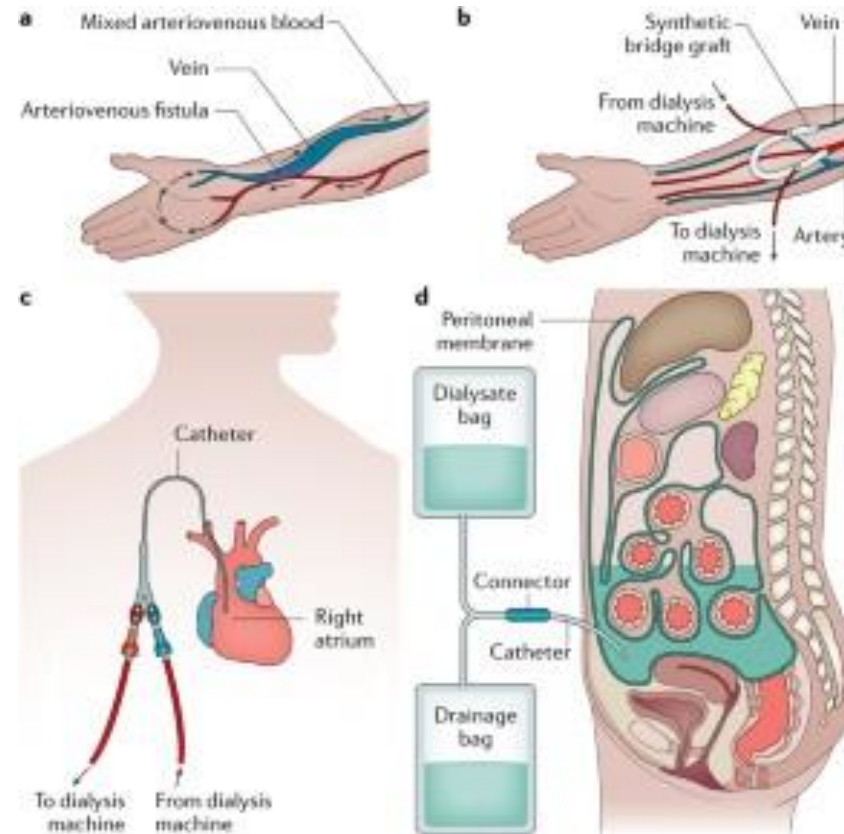
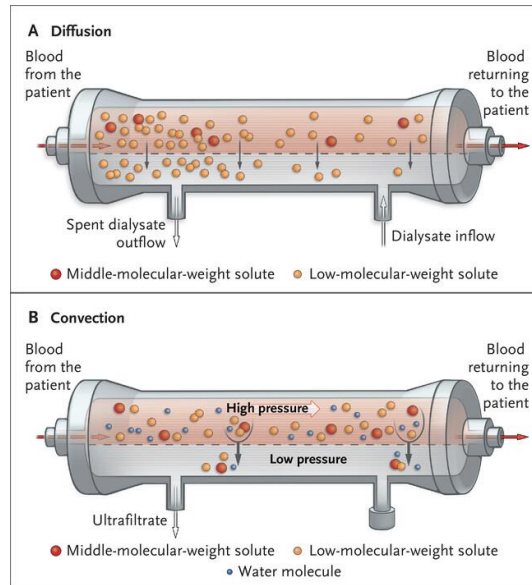
Hémodialyse et dialyse péritonéale



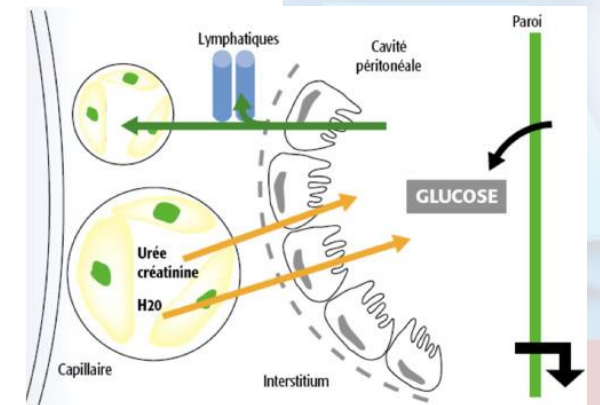
Nature Reviews | Disease Primers

Romagnani, Nature Reviews 2017

Hémodialyse et dialyse péritonéale



Nature Reviews | Disease Primers



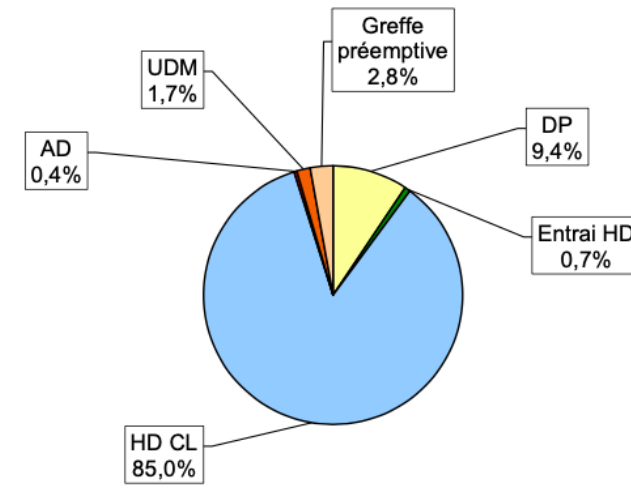
Romagnani, Nature Reviews 2017
Gaudry, NEJM 2022
Vrtovnik, 2022

Dialyse

Tableau 2-6. Prévalence de la maladie rénale chronique stade 5 au 31/12/2021 par modalité de traitement selon la région (par million d'habitants)
Prevalence of treated ESRD on December 31 2021, by treatment modality and by region (per million population)

	Hémodialyse			Dialyse péritonéale			Transplantation		
	n	%	Taux brut	n	%	Taux brut	n	%	Taux brut
Alsace	1 460	54,2	752	152	5,6	78	1 084	40,2	558
Champagne-Ardenne	911	51,9	675	97	5,5	72	747	42,6	553
Lorraine	1 898	56,4	812	131	4,0	56	1 331	39,6	569
Grand Est	4 269	54,6	758	380	4,9	67	3 162	40,5	561
Aquitaine	2 325	50,0	659	108	2,3	31	2 225	47,7	631
Limousin	481	49,8	647	70	7,2	94	415	43,0	558
Poitou-Charentes	1 009	44,9	537	74	3,6	39	1 158	51,5	616
Nouvelle-Aquitaine	3 815	48,5	620	252	3,3	41	3 798	48,2	618
Auvergne	884	50,3	629	125	7,1	89	747	42,5	531
Rhône-Alpes	3 989	46,0	581	301	3,5	44	4 380	50,5	638
Auvergne-Rhône-Alpes	4 873	46,8	589	426	4,1	52	5 127	49,2	620
Basse-Normandie	892	45,7	602	110	5,8	74	947	48,5	639
Haute-Normandie	1 211	49,0	641	100	4,1	53	1 159	46,9	614
Normandie	2 103	47,5	624	210	4,9	62	2 106	47,6	625
Bourgogne	1 036	51,3	628	91	4,5	55	894	44,2	542
Franche-Comté	582	41,7	478	88	6,3	72	725	52,0	596
Bourgogne-Franche-Comté	1 618	47,4	564	179	5,2	62	1 619	47,4	565
Languedoc-Roussillon	2 430	56,6	836	149	3,5	51	1 718	40,0	591
Midi-Pyrénées	2 170	53,7	689	101	2,5	32	1 773	43,8	563
Occitanie	4 600	55,1	759	250	3,0	41	3 491	41,9	576
Nord-Pas-de-Calais	3 514	61,1	853	254	4,4	62	1 981	34,5	481
Picardie	1 433	57,6	730	30	1,2	15	1 023	41,2	521
Hauts-de-France	4 947	60,1	813	284	3,4	47	3 004	36,5	494
Bretagne	1 951	48,3	565	116	2,9	34	1 971	48,8	571
Centre	1 884	50,8	718	61	1,6	23	1 765	47,6	673
Corse	240	57,6	699	11	2,6	32	166	39,8	484
Ile-de-France	8 604	48,6	697	374	2,1	30	8 738	49,3	708
Pays de la Loire	2 032	43,6	519	187	4,0	48	2 441	52,4	624
Provence-Alpes-Côte d'Azur	4 421	58,0	871	200	2,6	39	3 000	39,3	591
Total Hexagone	45 357	51,1	685	2 930	3,3	44	40 388	45,5	610
Guadeloupe									
Guyane	286	85,9	1 006	0	0,0	0	47	14,1	165
Martinique	661	73,1	1 832	17	1,9	47	226	25,0	626
Mayotte	243	99,2	938	0	0,0	0	2	0,8	8
Réunion	1 773	74,6	2 058	58	2,4	67	547	23,0	635
Total Outre Mer	2 963	76,8	1 678	75	1,9	42	822	21,3	466
Total Pays	48 320	52,2	711	3 005	3,3	44	41 210	44,5	606

Prévalence DP 5,85%



Part de la dialyse péritonéale selon l'âge

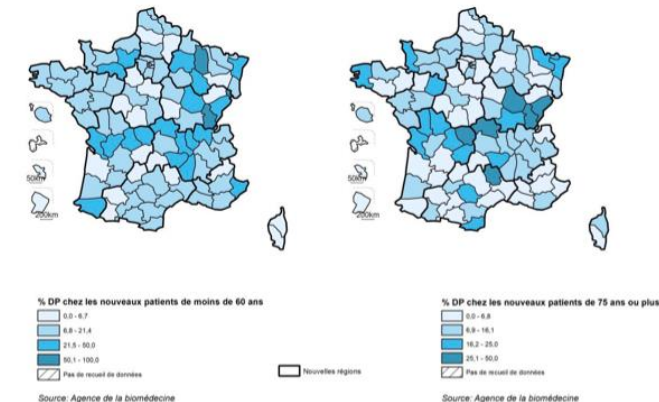
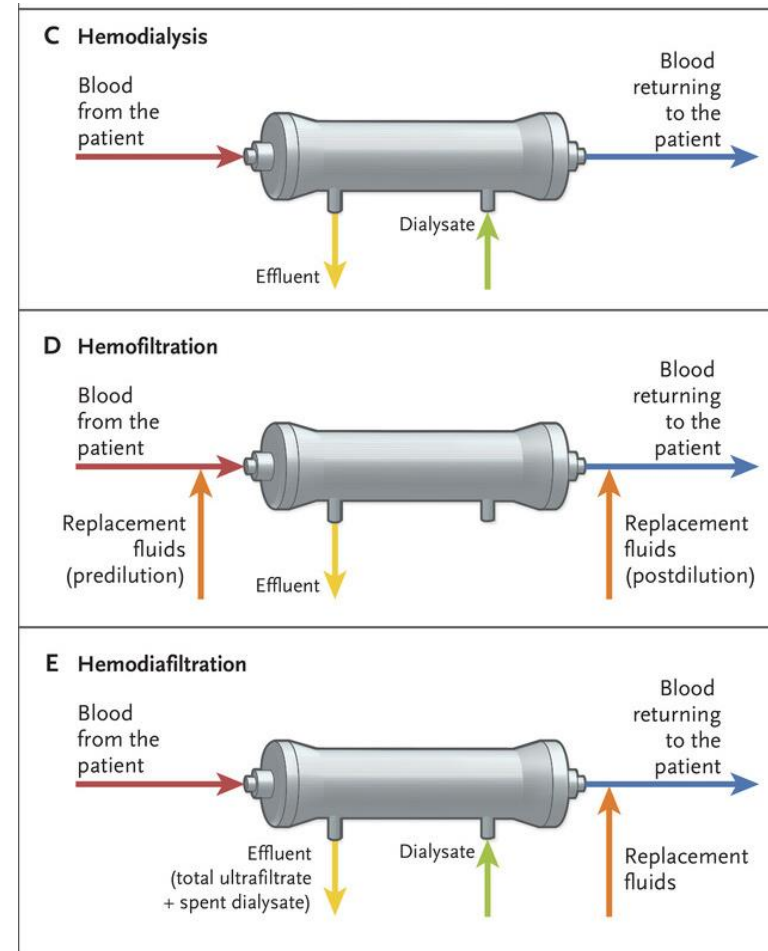
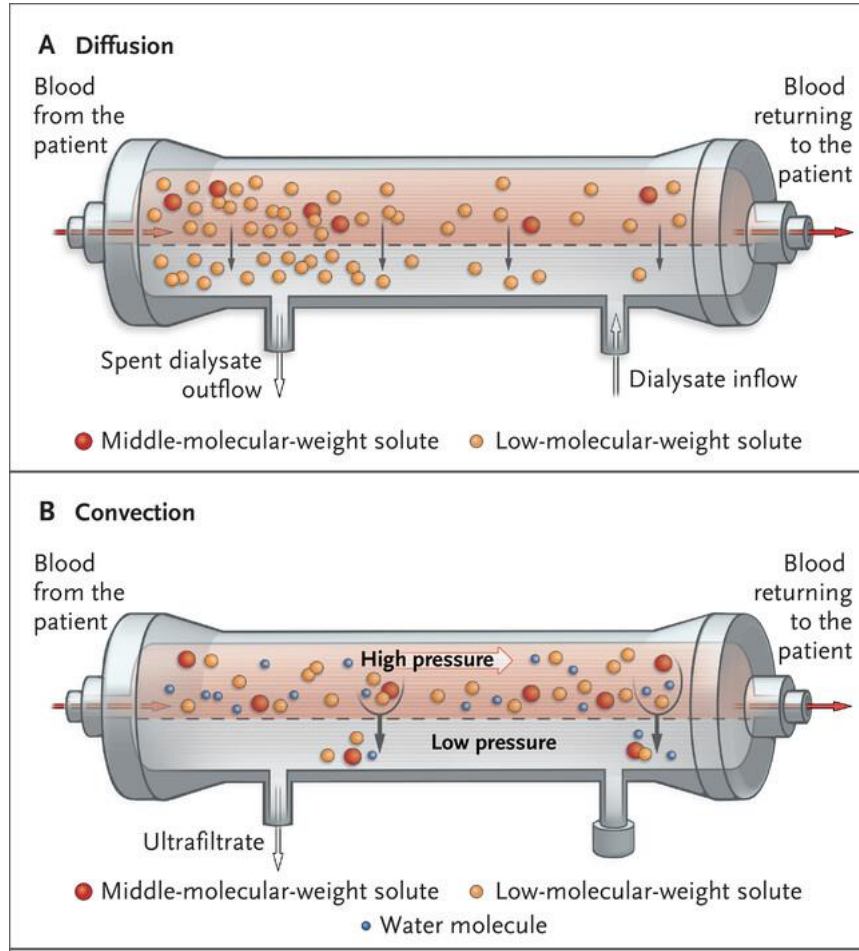


Figure 3-4. Pourcentage de dialyse péritonéale comme première modalité de traitement chez les nouveaux cas selon l'âge et la région de résidence
Percentages of new patients starting with peritoneal dialysis, by age and region

REIN 2021
REIN 2022

Techniques d'hémodialyse



Gaudry, NEJM 2022

Techniques d'hémodialyse

4 | B. Canaud et al.

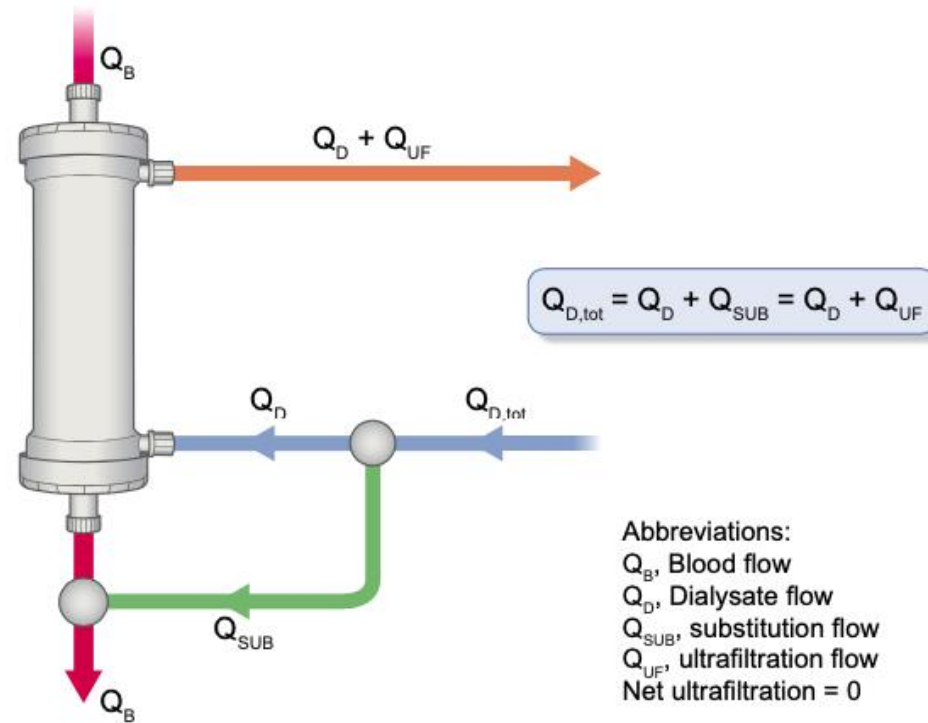


Figure 1: Schematic description of the online HDF system (postdilution), highlighting the fluid balancing system (Q_D inlet/outlet), which is ensured by the ultrafiltration control on the HD monitor. As not reflected in this cartoon, it must be noted that the substitution and dialysate flow passing through the dialyzer can be managed independently by the HDF monitor, as is the case with FMC machines.



Techniques d'hémodialyse

HEMODIAFILTRATION Dose convective

4 | B. Canaud et al.

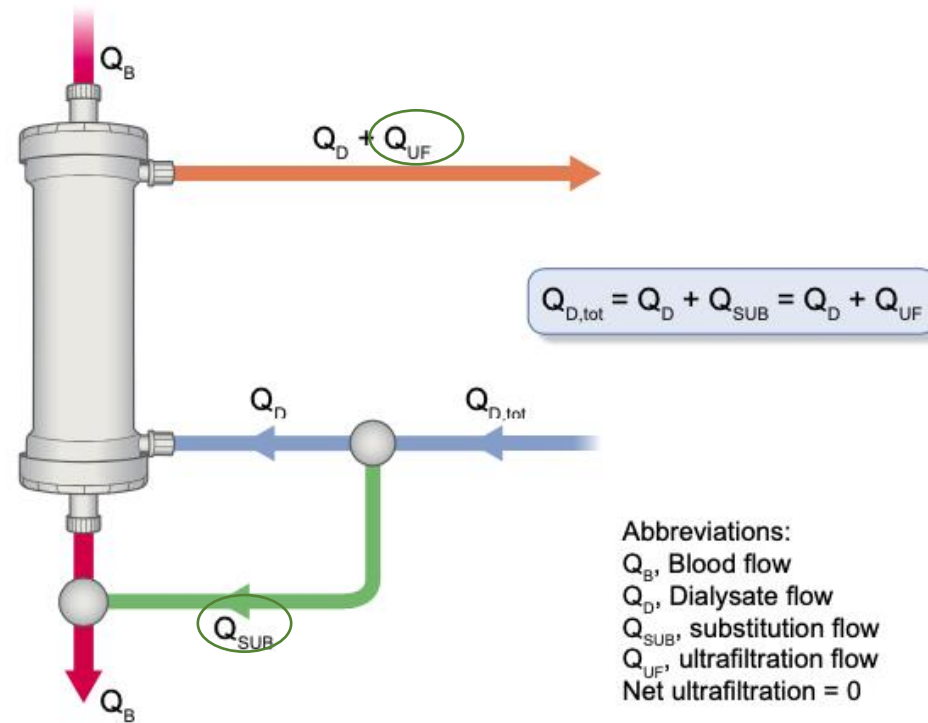
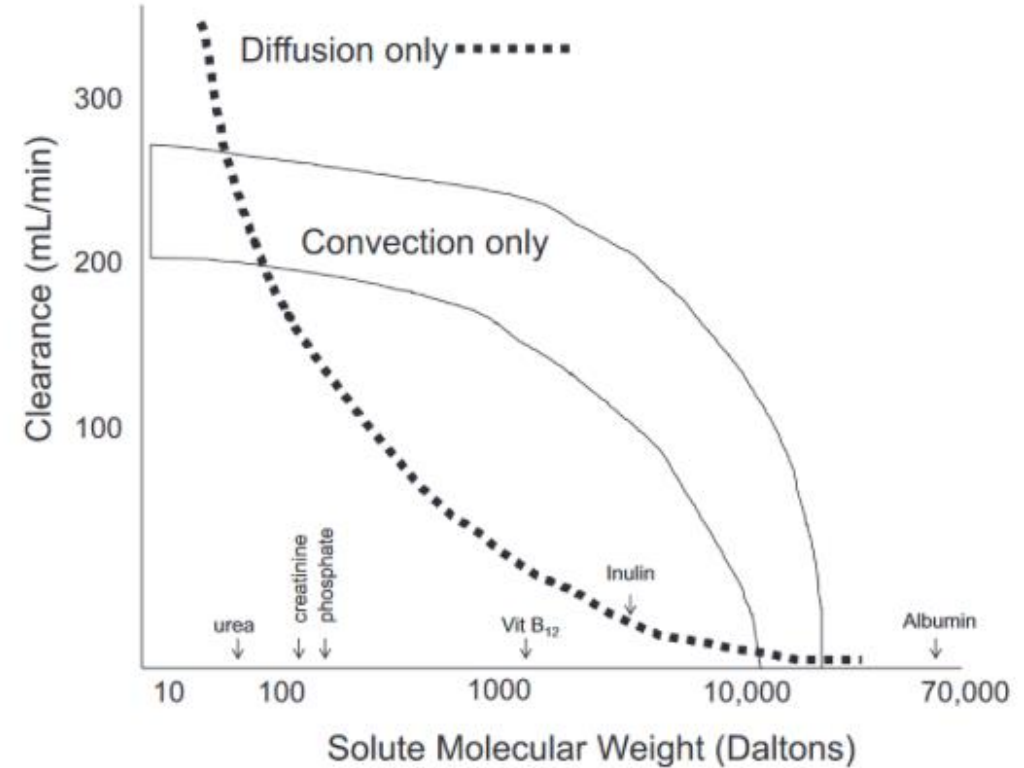
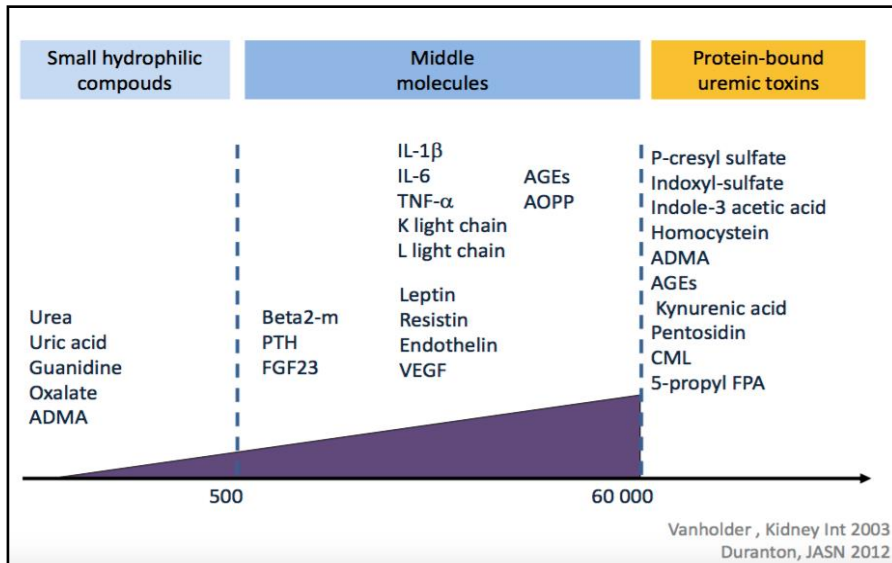
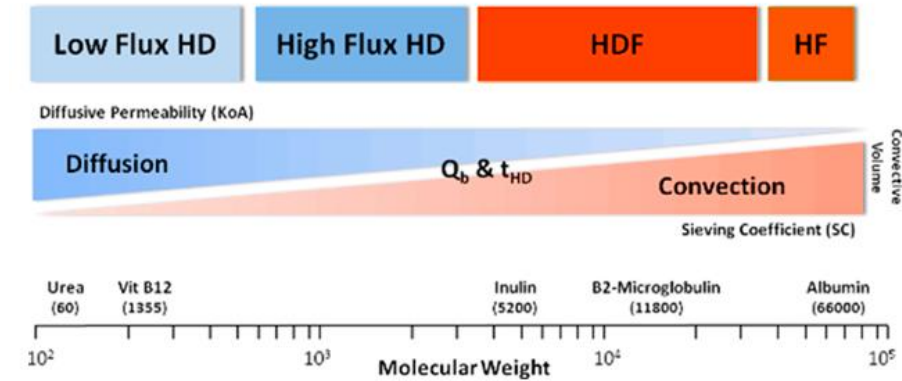


Figure 1: Schematic description of the online HDF system (postdilution), highlighting the fluid balancing system (Q_D inlet/outlet), which is ensured by the ultrafiltration control on the HD monitor. As not reflected in this cartoon, it must be noted that the substitution and dialysate flow passing through the dialyzer can be managed independently by the HDF monitor, as is the case with FMC machines.

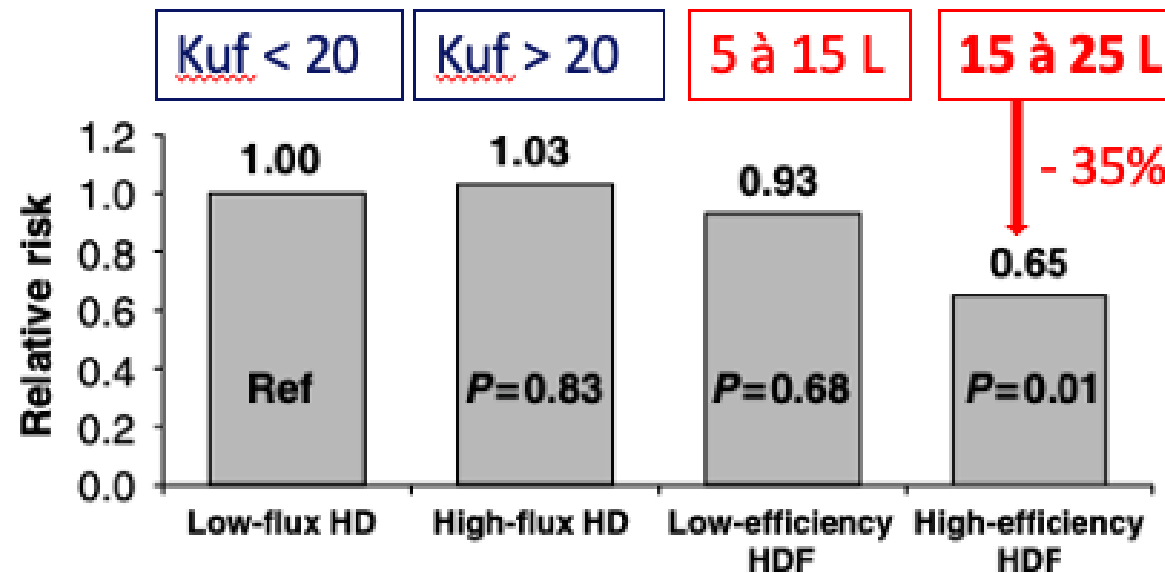
Canaud, CJK 2024

Techniques d'hémodialyse





Etude DOPPS 2006
2165 patients, 3 ans, 5 pays européens



**Diminution de la mortalité
brute de 35%
chez les patients
avec la plus forte dose
convective :
HDF > 15 L**

Figure 1 | Relative risk of mortality by dialysis type. (Adjusted for age, sex, time on dialysis, 14 summary comorbid conditions, weight, catheter use, hemoglobin, albumin, normalized protein catabolic rate, cholesterol, triglycerides, Kt/V, erythropoietin, MCS, and PCS.)

Canaud, Kidney Int 2006

Table 1. Comparison of the different HDF randomized control studies.

	Italian Trial [23]	French Trial [22]	Contrast Study [37]	Turkish Study [38]	ESHOL [39]	Convince [40]
Country	Italian	French	Dutch	Turkish	Spain	Dutch
Included patients	146	420	714	782	906	1360
Year started	2004	2005	2004	2007	2007	2019
Year of publication	2008	2010	2010	2010	2011	2023
Compared groups	Pre-OL-HDF HF LF-HD 1:1:2	Post-OL-HDF HF-HD 1:1	Post-OL-HDF LF-HD 1:1	Post-OL-HDF HF-HD 1:1	Post-OL-HDF HF-HD 1:1	Post-OL-HDF HF-HD 1:1
Follow-up	2 years	2 years	3 years	2 years	3 years	2.5 years
Primary endpoints	Cardiovascular stability and BP control	Intradialytic tolerance	Mortality	Mortality and cardiovascular events	Mortality	Mortality
Results	No difference between groups	No difference between groups	HR 0.95 (0.83–1.39)	HR 0.82 (0.59–1.16)	HR 0.70 (0.53–0.92)	HR 0.77 (0.65–0.93)

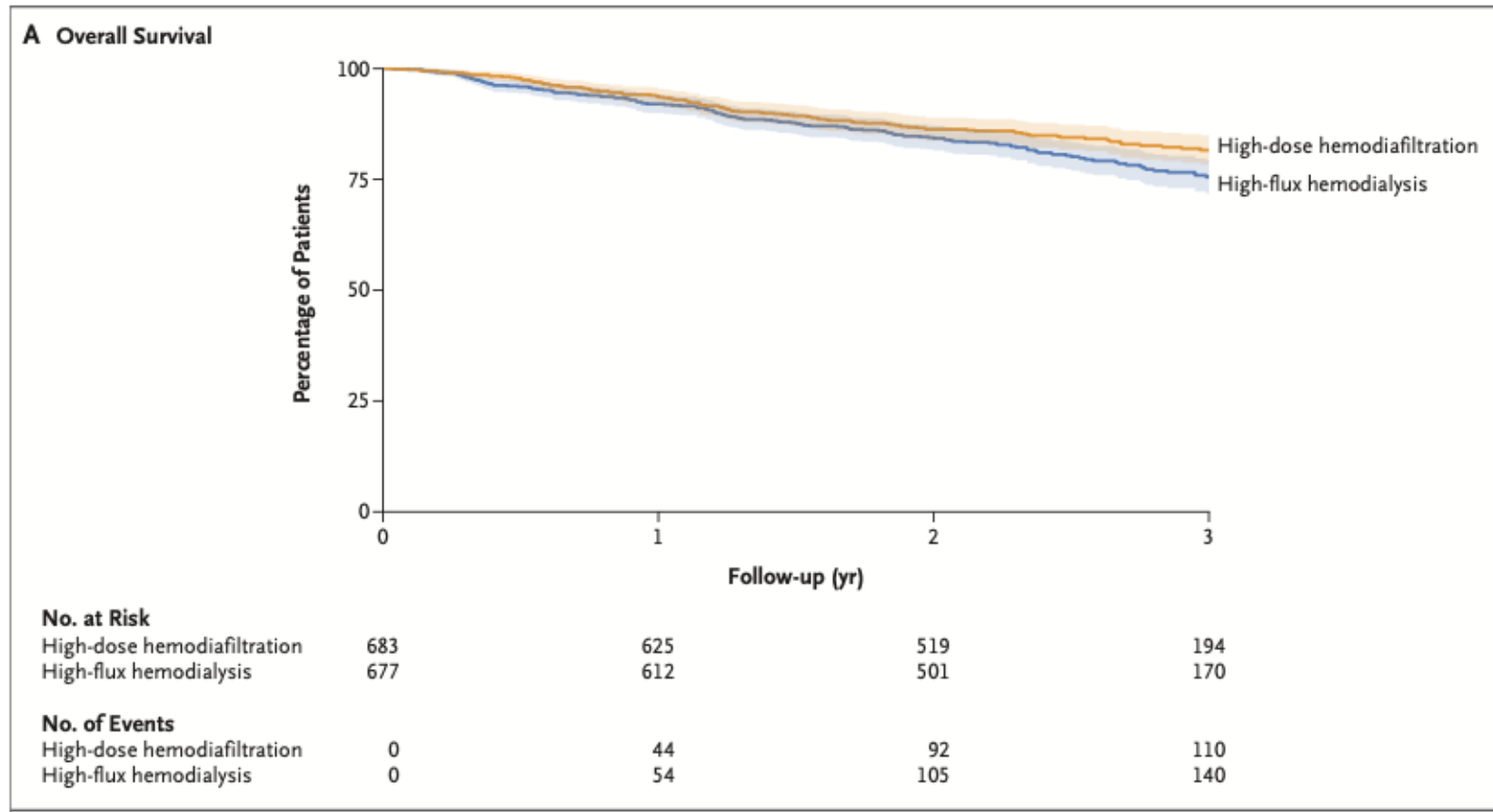
BP: blood pressure; HF: hemofiltration; HF-HD: high-flux hemodialysis; HR: hazard ratio; LF-HD: low-flux hemodialysis; Post-OL-HDF: online postdilution hemodiafiltration; Pre-OL-HDF: online predilution hemodiafiltration.

Maduell, J Clin Med 2024

HDF

Etude CONVINCe

RCT multicentrique, 1360 patients, suivi 3 ans
Patients prévalents en HD



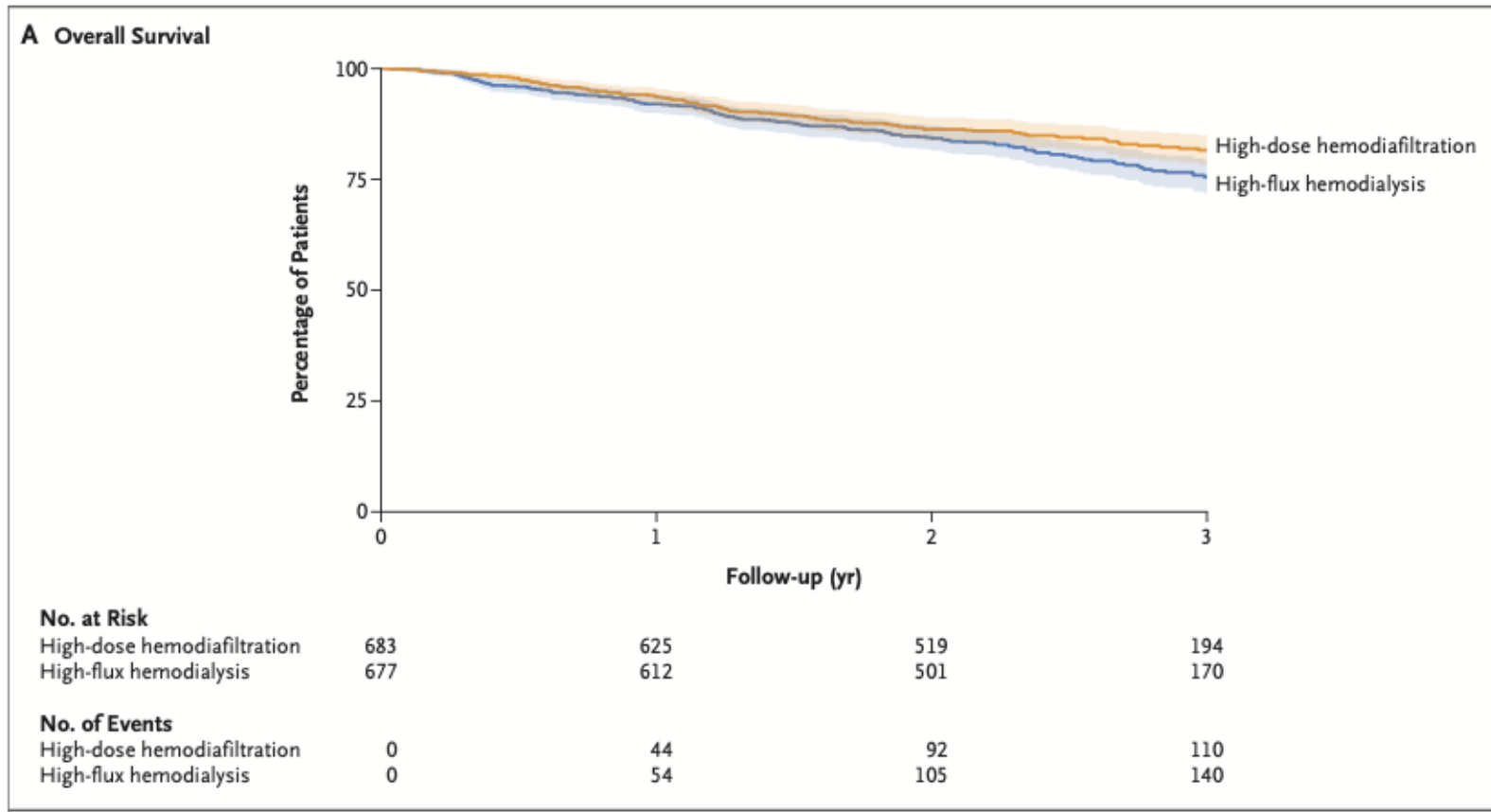
Décès toute cause
HD-HDF 118 (17.3%) vs
HF-HD 148 (21.9%)
HR 0.77 (0.65-0.93)

Blankestijn, NEJM 2022

HDF

Etude CONVINCe

RCT multicentrique, 1360 patients, suivi 3 ans
Patients prévalents en HD



Patients sélectionnés

Age moyen 62,5 ans

Diabète 35%

FAV > 80 %

**Diurèse résiduelle
significative**

Blankestijn, NEJM 2022

Recommandations pour l'hémodialyse

JOURNAL ARTICLE

EBPG guideline on dialysis strategies

[Get access >](#)

James Tattersall, Alejandro Martin-Malo, Luciano Pedrini, Ali Basci, Bernard Canaud, Denis Fouque, Patrick Haage, Klaus Konner, Jeroen Kooman, Francesco Pizzarelli ... [Show more](#)

Nephrology Dialysis Transplantation, Volume 22, Issue suppl_2, May 2007, Pages ii5–ii21,

<https://doi.org/10.1093/ndt/gfm022>

Published: 01 May 2007

La dialyse doit être réalisée au moins 3 fois par semaine, au moins 12 heures par semaine sauf si fonction rénale résiduelle

Augmenter le temps et/ou la fréquence chez

- les patients avec instabilité hémodynamique
- les patients qui restent hypertendus malgré une élimination liquidienne maximale
- les patients avec une anomalie du contrôle du phosphore
- les patients dénutris

Recommandations pour l'hémodialyse



KDOQI Clinical Practice Guideline Hemodialysis Update

Update of the KDOQI™ Clinical Practice Guideline for Hemodialysis Adequacy

Running head: Hemodialysis Guideline Update

www.kidney-international.org

KDIGO executive conclusions

Dialysis initiation, modality choice, access, and prescription: conclusions from a Kidney Disease: Improving Global Outcomes (KDIGO) Controversies Conference



OPEN

Christopher T. Chan¹, Peter J. Blankestijn², Laura M. Dember³, Maurizio Gallieni⁴, David C.H. Harris⁵, Charmaine E. Lok¹, Rajnish Mehrotra⁶, Paul E. Stevens⁷, Angela Yee-Moon Wang⁸, Michael Cheung⁹, David C. Wheeler¹⁰, Wolfgang C. Winkelmayer¹¹ and Carol A. Pollock⁵; for Conference Participants¹²

Chapter 2:

Frequent and Long Duration Hemodialysis

In-center Frequent HD

- 2.1 We suggest that patients with end-stage kidney disease be offered in-center short frequent hemodialysis as an alternative to conventional in-center thrice weekly hemodialysis after considering individual patient preferences, the potential quality of life and physiological benefits, and the risks of these therapies. (2C)
- 2.2 We recommend that patients considering in-center short frequent hemodialysis be informed about the risks of this therapy, including a possible increase in vascular access procedures (1B) and the potential for hypotension during dialysis. (1C)

Home Long HD

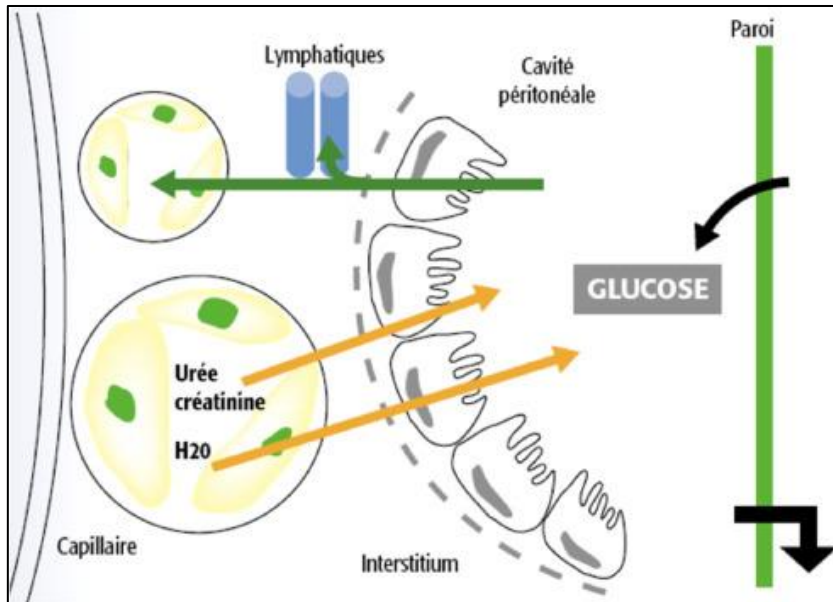
- 2.3 Consider home long hemodialysis (6-8 hours, 3 to 6 nights per week) for patients with end-stage kidney disease who prefer this therapy for lifestyle considerations. (ungraded)
- 2.4 We recommend that patients considering frequently administered home long hemodialysis be informed about the risks of this therapy, including possible increase in vascular access complications, potential for increased caregiver burden, and possible accelerated decline in residual kidney function. (1C)

Chapter 5:

New Hemodialysis Membranes

- 5.1 We recommend the use of biocompatible high flux hemodialysis membranes for intermittent hemodialysis. (1B)

Dialyse péritonéale



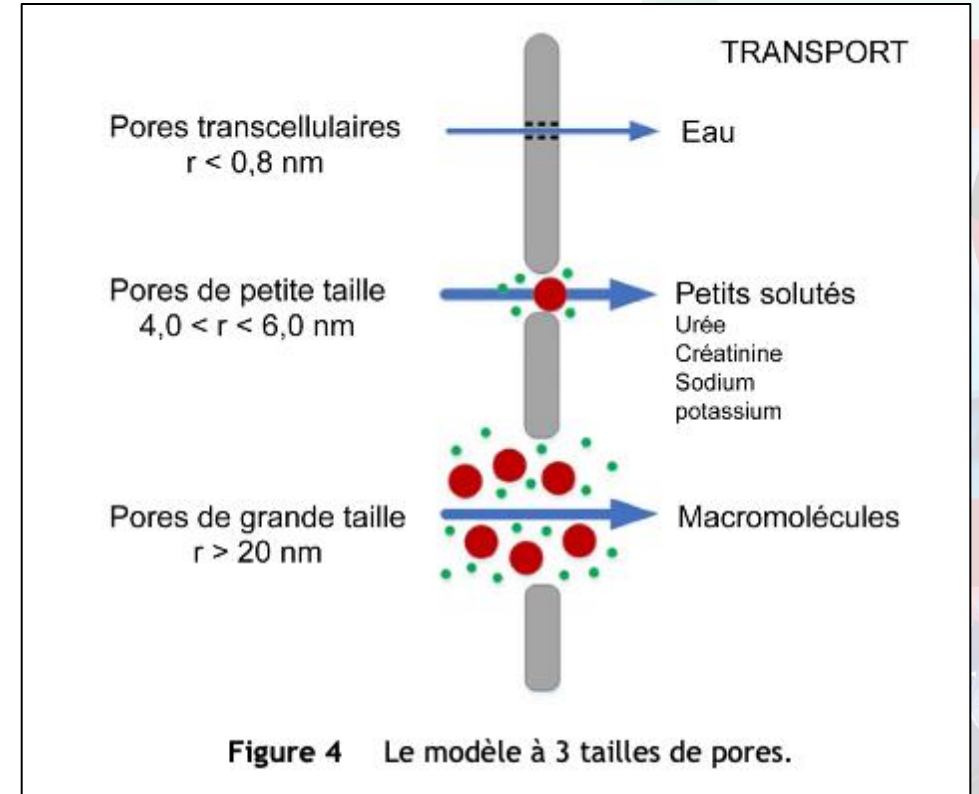
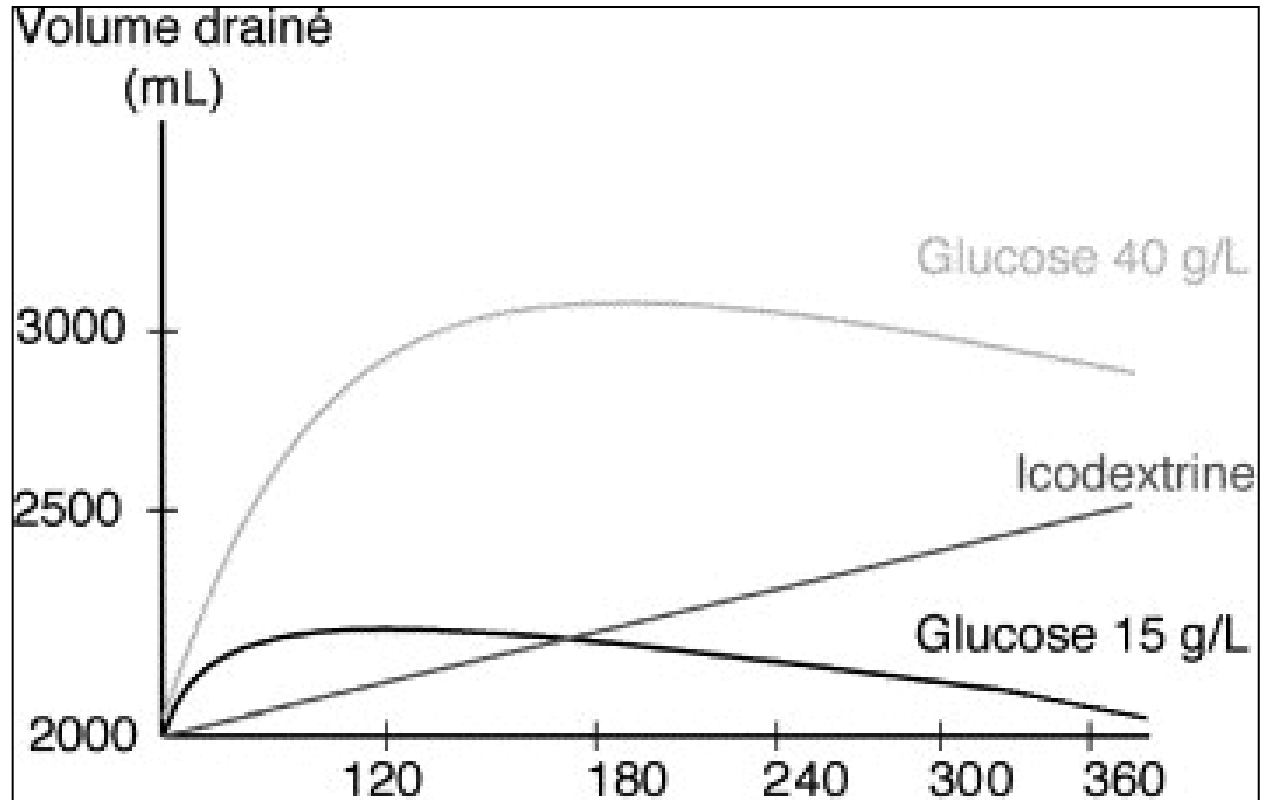
**Transport par diffusion
et par convection selon gradient osmotique**

Tableau 1 Composition des solutions de dialyse péritonéale.

(mM)	Sol. Bio-compatibles	Sol. classique
Sodium	132	132
Cl	95	95
Lactate/Bicarbonate	10–40/25–39	35–40/-
Ca ⁺⁺	1,25–1,75	
Mg ⁺⁺	0,25	
Glucose	1,36–1,5 % 2,27–2,5 % 3,86–4,5 %	
Icodextrine	7,5 %	—
pH	6,5–7,3	5,0–5,4
Osmolarité (mOsm/L)	344–485	

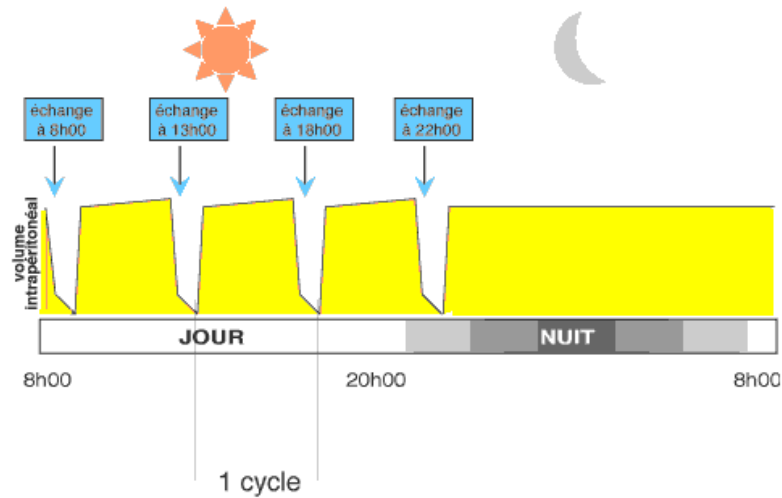
Vrtovnik, 2022

Dialyse péritonéale

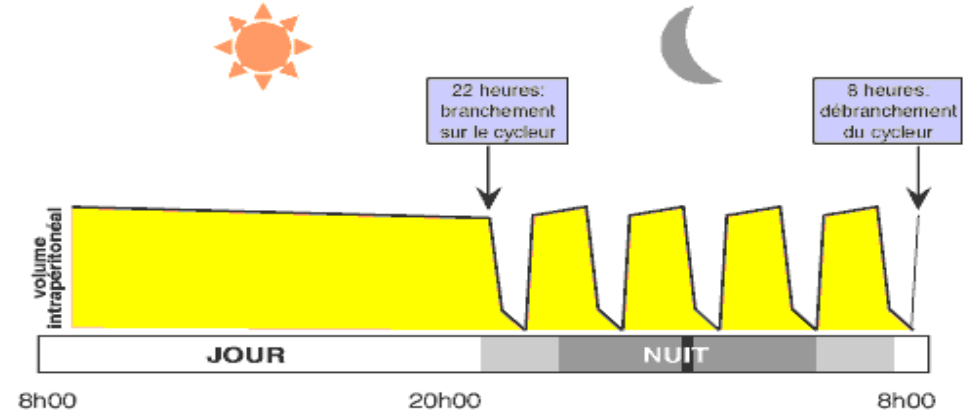
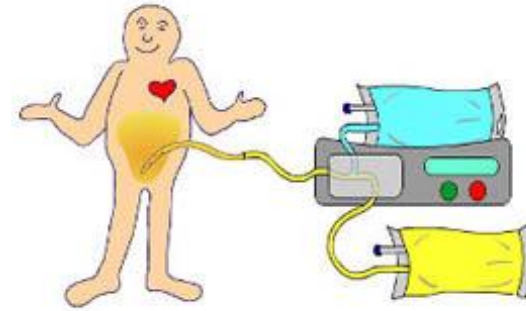


Dialyse péritonéale

Dialyse péritonéale continue ambulatoire (DPCA)



Dialyse péritonéale automatisée (DPA)



Dialyse péritonéale

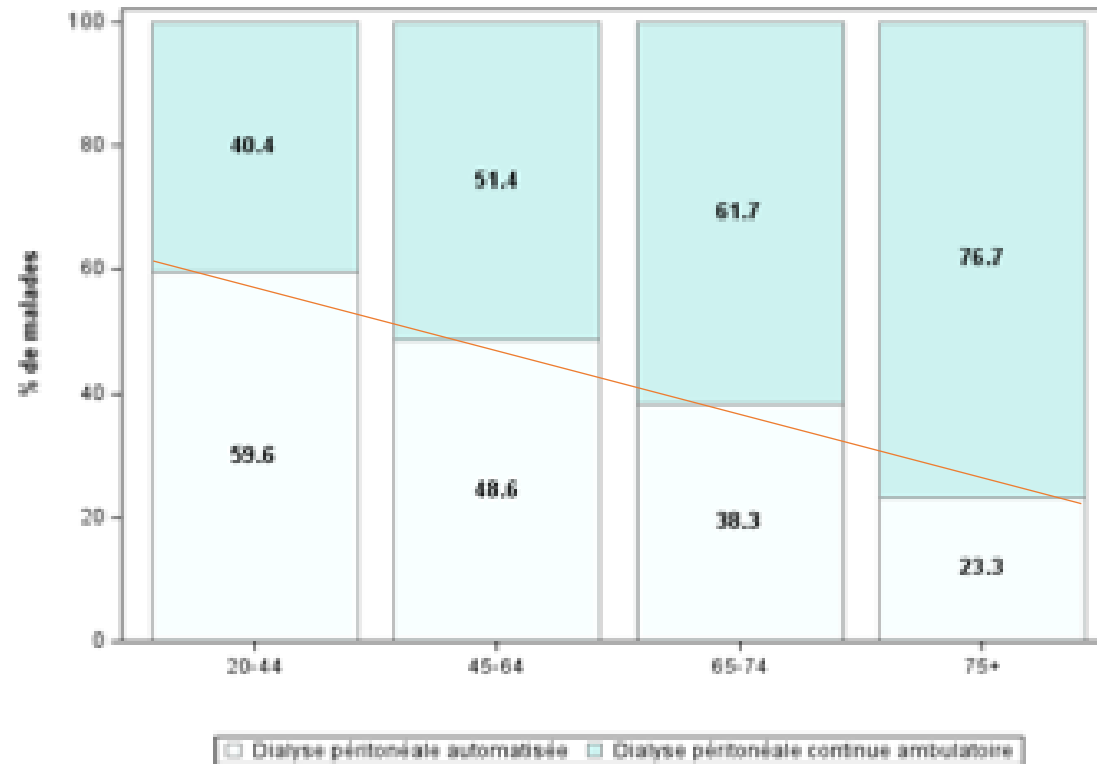


Figure 4-6. Technique de dialyse péritonéale des patients présents au 31/12/2021 selon l'âge
Peritoneal dialysis technique on December 31, 2021, by age



Dialyse péritonéale

► Indications de la DP en première intention par rapport à l'HD, en fonction des comorbidités

Il existe un accord (accord fort) pour considérer que la DP est indiquée en première intention en cas :

- de difficultés à créer un abord vasculaire pour hémodialyse ;
- de cirrhose décompensée avec ascite ;
- d'embols de cholestérol.

Il existe un accord (accord fort) pour considérer que la DP n'est pas indiquée en première intention en cas :

- de dénutrition avec hypoalbuminémie sévère ;
- d'insuffisance respiratoire chronique ;
- de stomie digestive ;
- d'antécédent de sigmoïdite diverticulaire ;
- de maladie inflammatoire chronique de l'intestin ;
- de hernie ou d'éventration non opérable ;
- d'antécédent de pancréatectomie ;
- de prothèse aorto-iliaque depuis moins de 3 mois.



Dialyse péritonéale

Cochrane Database of Systematic Reviews | Review - Intervention

Peritoneal dialysis versus haemodialysis for people commencing dialysis

Isabelle Ethier, Ashik Hayat, Juan Pei, Carmel M Hawley, Ross S Francis, Germaine Wong, Jonathan C Craig, Andrea K Viecegli, Htay Htay, Samantha Ng, Saskia Leibowitz, David W Johnson, ✉ Yeoungjee Cho

Authors' declarations of interest

Version published: 20 June 2024 Version history

<https://doi.org/10.1002/14651858.CD013800.pub2>

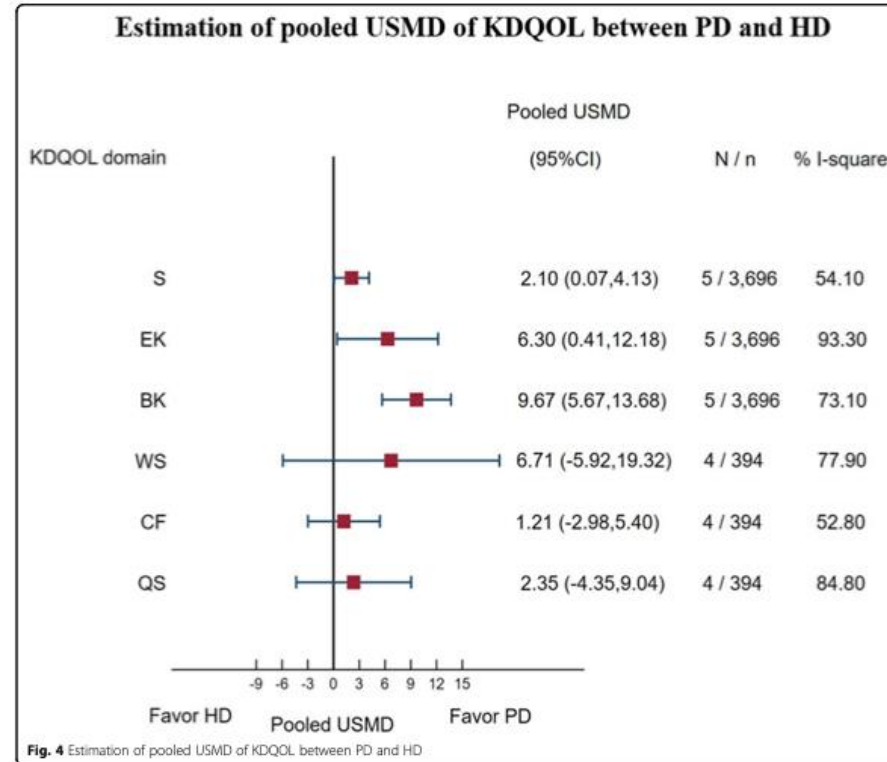
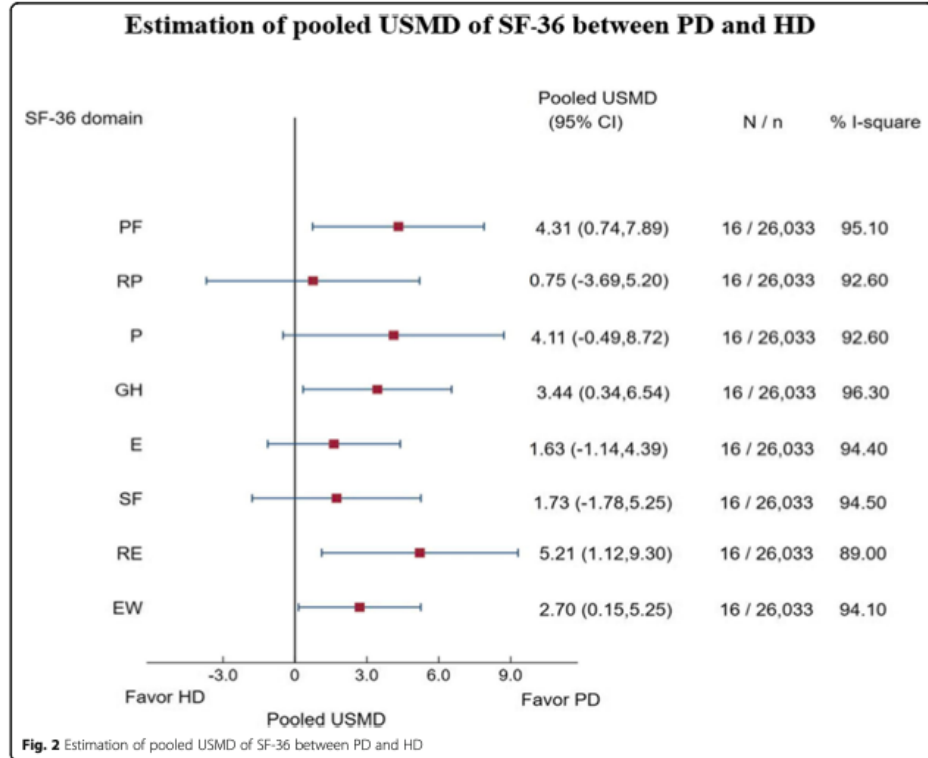
Authors' conclusions

The comparative effectiveness of PD and HD on the preservation of RKF, all-cause and cause-specific death risk, the incidence of bacteraemia, other vascular complications (e.g. stroke, cardiovascular events) and patient-reported outcomes (e.g. life participation and fatigue) are uncertain, based on data obtained mostly from NRSIs, as only two RCTs were included.

La très grande majorité des études comparant la survie entre DP et HD sont observationnelles (biais de sélection)

Pas de supériorité d'une technique par rapport à l'autre démontrée à ce jour

Dialyse péritonéale



Méta-analyse évaluation de la qualité de vie
21 études, 29000 patients
SF-36, EQ-5D, KDQOL

Chuasuan, Health and
Quality of Life Outcomes
2020

Conclusion

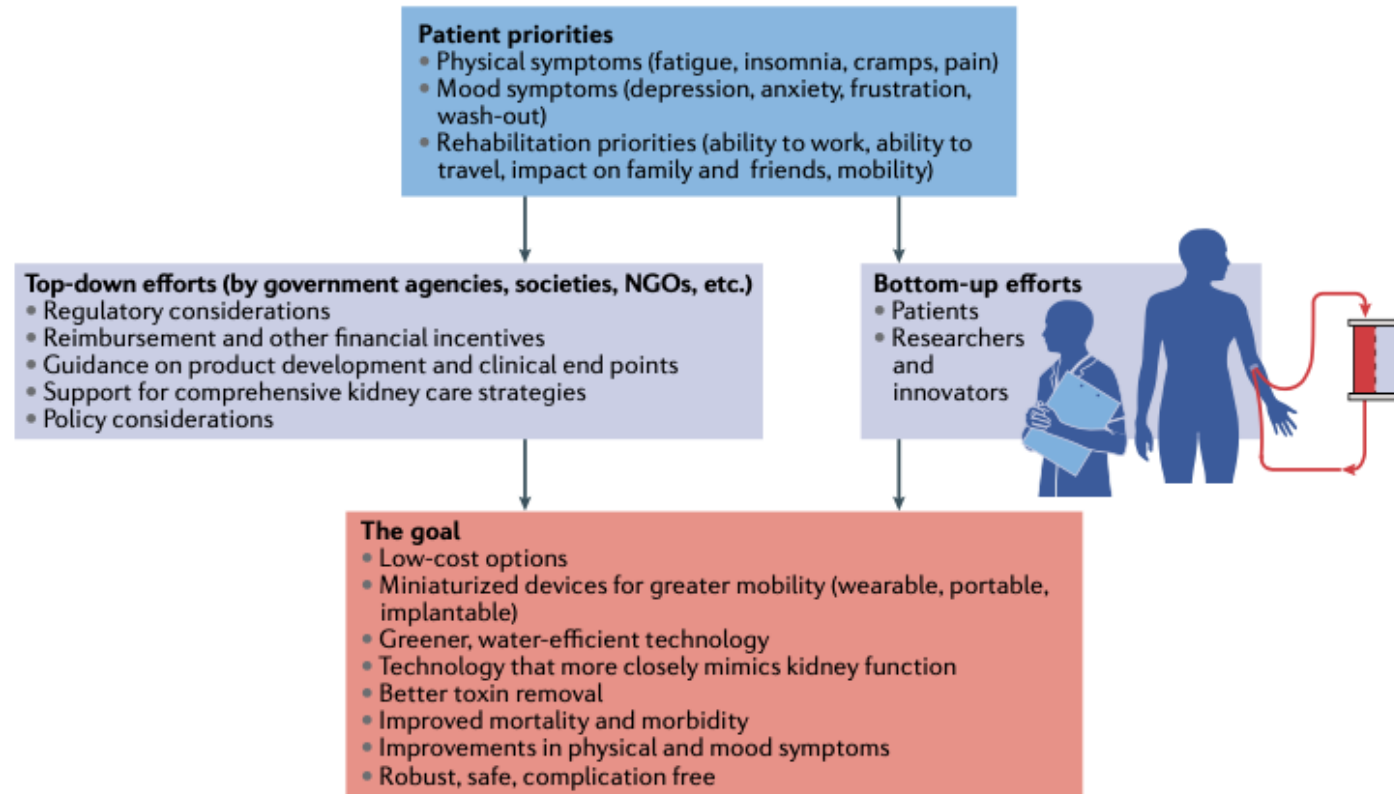


Fig. 2 | **Changing the ecosystem of dialysis care and technology to support transformative outcomes.** Initiatives to transform dialysis outcomes for patients require both top-down efforts (for example, those that involve systems-level changes at the policy, regulatory, macroeconomic and organizational level) and bottom-up efforts (for example, patient-led and patient-centred advocacy efforts and efforts from individual teams of innovators). Both of these efforts need to be guided by priorities identified by patients. Such an approach, focused on patient-centred innovation, has the potential to result in meaningful innovations that support high-quality, high-value care. NGOs, non-governmental organizations.

Himmelfarb,
Nature Reviews 2020