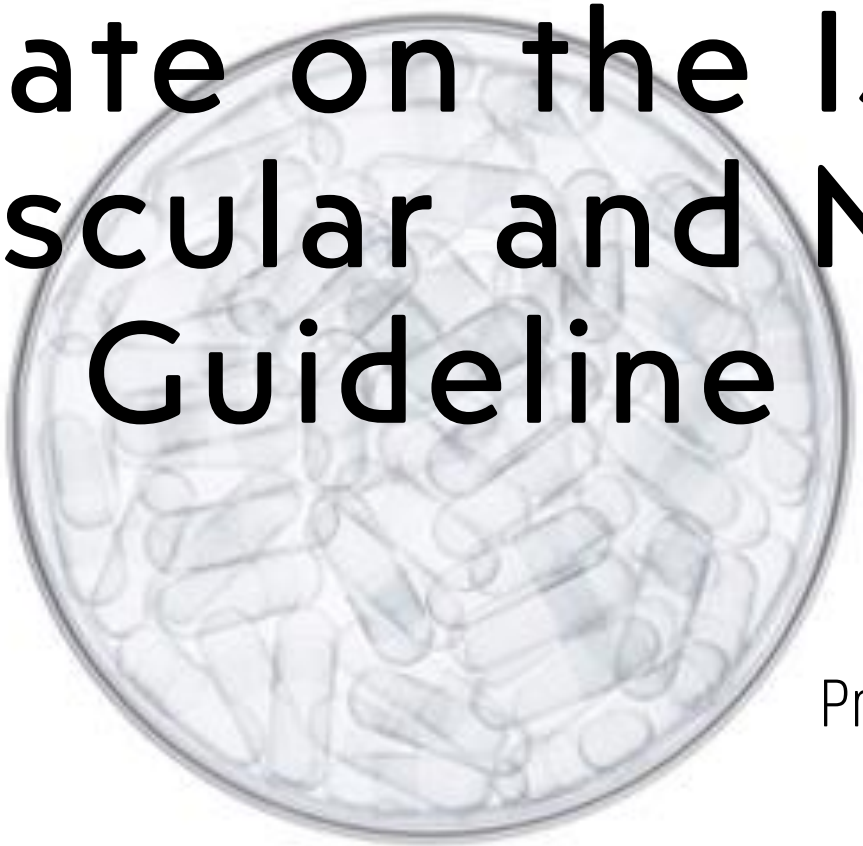
Update on the ISPD Cardiovascular and Metabolic Guideline



Dr. KM Chow

Prince of Wales Hospital, Chinese University of Hong Kong

DECLARATION

- No conflict of interest
- This is Draft of the ISPD Guidelines, not yet published

OUTLINE

- How we prepared ISPD Guidelines
- What's New in ISPD Guidelines

Peritoneal Dialysis International, Vol. 35, pp. 379–387
doi: 10.3747/pdi.2014.00279

0896-8608/15 $3.00 + .00

ISPD GUIDELINES/RECOMMENDATIONS

ISPD CARDIOVASCULAR AND METABOLIC GUIDELINES IN ADULT PERITONEAL DIALYSIS PATIENTS PART I – ASSESSMENT AND MANAGEMENT OF VARIOUS CARDIOVASCULAR RISK FACTORS

Angela Yee Moon Wang,[1] K. Scott Brimble,[2] Gillian Brunier,[3] Stephen G. Holt,[4] Vivekanand Jha,[5] David W. Johnson,[6,7] Shin-Wook Kang,[8] Jeroen P. Kooman,[9] Mark Lambie,[10] Chris McIntyre,[11] Rajnish Mehrotra,[12] and Roberto Pecoits-Filho[13]

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To Be Updated after 10 years

2015

December 2024

January 2025

September 2025

November 2025

EOI: ISPD Standard and Guideline Committee

Selection of writing team

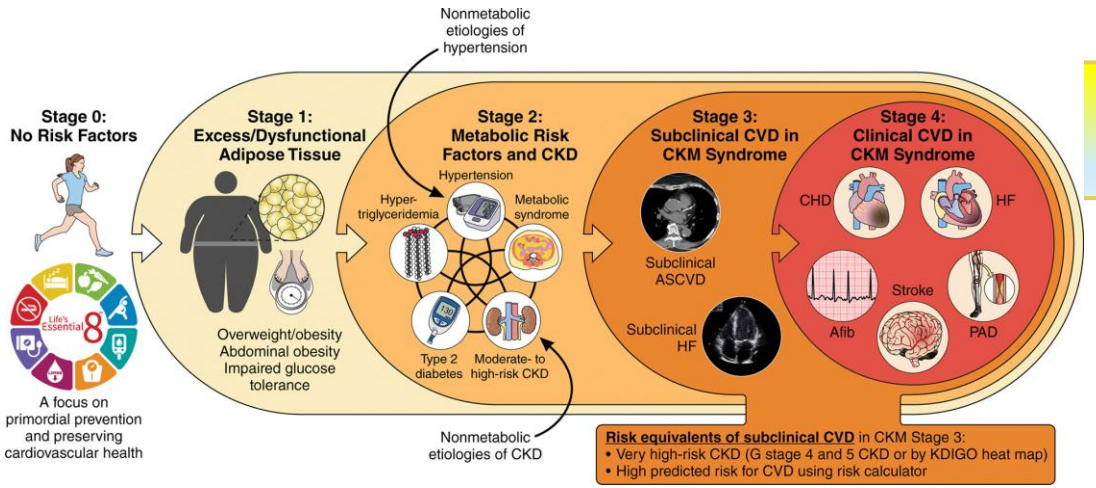
Completion of Guideline Draft (circulation for review)

Journal PDI Submission

2023 Cardiovascular-kidney-metabolic syndrome

ISPD GUIDELINES/RECOMMENDATIONS

ISPD CARDIOVASCULAR AND METABOLIC GUIDELINES IN ADULT PERITONEAL DIALYSIS PATIENTS PART I – ASSESSMENT AND MANAGEMENT OF VARIOUS CARDIOVASCULAR RISK FACTORS



Writing Team

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2. Ms Gillian Brunier (Nurse, Canada) – Co-lead

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13. Dr Wilson Wai Hung Tang (Cardiologist, USA)

Composition and Diversity

- 9 Nephrologists
- 2 Nurses
- 1 Dietitian
- 1 Cardiologist
- Male: female ratio 6:7
- LMIC author 8%

GRADE

Grading of Recommendations Assessment, Development and Evaluation

GRADE

Certainty ratings	General principles of rating
D - Very low	Opinion-based
C - Low	Observational or registry studies Randomized controlled trials with serious flaws
B - Moderate	Moderate-quality randomized controlled trials Moderate-quality non-randomized studies
A - High	High-quality randomized controlled trials

GRADE

Certainty ratings	What it means
D - Very low	The true effect is probably markedly different from the estimated effect
C - Low	The true effect might be markedly different from the estimated effect
B - Moderate	The authors believe that the true effect is probably close to the estimated effect
A - High	The authors have a lot of confidence that the true effect is similar to the estimated effect

Implication of Strong and Weak Recommendations

	Strong (Level 1 = We Recommend)	Weak (Level 2 = We Suggest)
For patients	Many individuals would want course of action	Majority would want, but many would not
For clinicians	Many individuals should receive	Different choices appropriate for different patients Decision aids may be useful Shared decision consistent with values and preferences
For policy makers	Can be adapted as policy in most situations (or performance indicator)	Substantial debates Vary between regions

Recommendation and Suggestion

Blue colour: New item compared to 2015

Red colour: New grading compared to 2015

Main Topics to Cover

1. Sodium and fluid Restriction
2. Diuretics
3. Diabetes Management
4. Lipid Management
5. Heart failure Management
6. AF Management

Sodium and Fluid Restriction

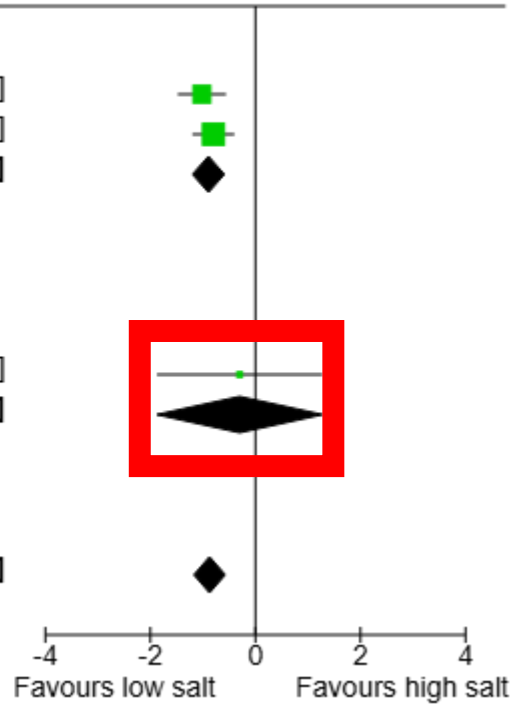
Cochrane Review

Evidence for sodium restriction to reduce extracellular fluid volume or edema is mostly available in the earlier stages of CKD (-0.87 L, 95% CI -1.17 to -0.58; 3 studies; 187 participants; low certainty evidence)

McMahon EJ, Campbell KL, Bauer JD, Mudge DW, Kelly JT. Altered dietary salt intake for people with chronic kidney disease. Cochrane Database Syst Rev 2021;6:CD010070

Extracellular Volume

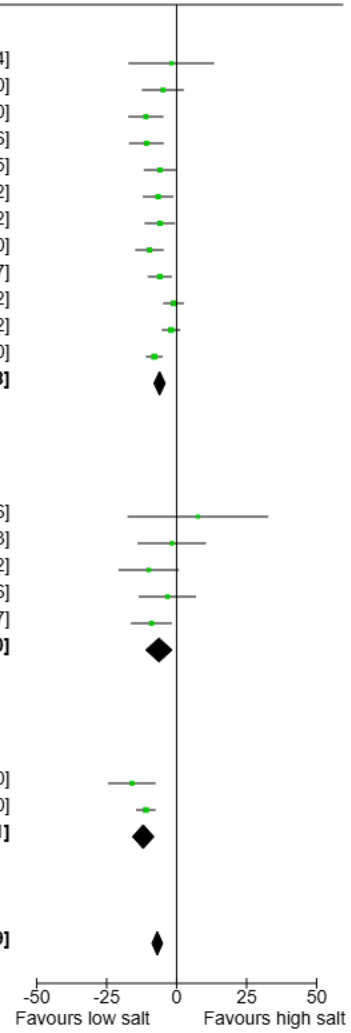
Study or Subgroup	Low salt Mean [L]	Low salt SD [L]	Low salt Total	High salt Mean [L]	High salt SD [L]	High salt Total	Weight	Mean Difference IV, Random, 95% CI [L]
1.12.1 CKD								
Saran 2017	19.18	1.2419	56	20.2	1.2419	56	41.5%	-1.02 [-1.48 , -0.56]
LowSALT CKD 2012	19.2	0.6123	18	20	0.6123	18	54.9%	-0.80 [-1.20 , -0.40]
Subtotal (95% CI)			**74**			**74**	**96.5%**	**-0.89 [-1.20 , -0.59]**
Heterogeneity: Tau² = 0.00; Chi² = 0.50, df = 1 (P = 0.48); I² = 0%								
Test for overall effect: Z = 5.81 (P < 0.00001)								
1.12.2 Dialysis								
Rodrigues Telini 2014	15.3	2.9	21	15.6	2.1	18	3.5%	-0.30 [-1.87 , 1.27]
Subtotal (95% CI)			**21**			**18**	**3.5%**	**-0.30 [-1.87 , 1.27]**
Heterogeneity: Not applicable								
Test for overall effect: Z = 0.37 (P = 0.71)								
Total (95% CI)			**95**			**92**	**100.0%**	**-0.87 [-1.17 , -0.58]**
Heterogeneity: Tau² = 0.00; Chi² = 1.03, df = 2 (P = 0.60); I² = 0%								
Test for overall effect: Z = 5.78 (P < 0.00001)								
Test for subgroup differences: Chi² = 0.53, df = 1 (P = 0.47), I² = 0%								



McMahon EJ, Campbell KL, Bauer JD, Mudge DW, Kelly JT. Altered dietary salt intake for people with chronic kidney disease. Cochrane Database Syst Rev 2021;6:CD010070

Most Evidence on Systolic BP Only

Study or Subgroup	Low salt Mean [mm Hg]	Low salt SD [mm Hg]	Low salt Total	High salt Mean [mm Hg]	High salt SD [mm Hg]	High salt Total	Weight	Mean Difference IV, Random, 95% CI [mm Hg]
1.2.1 CKD								
Ruilope 1992a	146.1	20.2	14	148	21.2	14	1.4%	-1.90 [-17.24 , 13.44]
Mulhauser 1996	-1.7	8.3132	8	3.2	6.9376	8	4.3%	-4.90 [-12.40 , 2.60]
DUAAAL 2011	123	16.3975	52	134	16.3975	52	5.3%	-11.00 [-17.30 , -4.70]
Saran 2017	137	15.7468	49	147.8	15.7468	49	5.3%	-10.80 [-17.04 , -4.56]
Vogt 2008	137	11.9197	33	143	11.9197	33	5.8%	-6.00 [-11.75 , -0.25]
Konishi 2001	115	11.2	38	121.6	13.1	38	6.1%	-6.60 [-12.08 , -1.12]
ViRTUE-CKD 2016	123	12	43	129	14	44	6.1%	-6.00 [-11.48 , -0.52]
LowSALT CKD 2012	144.9	8.2285	20	154.6	8.2285	20	6.6%	-9.70 [-14.80 , -4.60]
Kwakernaak 2014	141	10.4869	45	147	10.4869	45	7.6%	-6.00 [-10.33 , -1.67]
ESPECIAL 2014	-1.7	14.6	119	-0.6	15.1	126	8.4%	-1.10 [-4.82 , 2.62]
ESMO 2017	125	9.8	67	127	10.1	71	9.0%	-2.00 [-5.32 , 1.32]
de Brito-Ashurst 2013	-8.6	5.2977	25	-0.6	5.2977	23	9.5%	-8.00 [-11.00 , -5.00]
Subtotal (95% CI)			**513**			**523**	**75.5%**	**-6.10 [-8.11 , -4.08]**
Heterogeneity: Tau² = 5.51; Chi² = 20.96, df = 11 (P = 0.03); I² = 48%								
Test for overall effect: Z = 5.93 (P < 0.00001)								
1.2.2 Dialysis								
BalanceWise-PD 2011	2.7	27.8	7	-4.9	19.5	7	0.6%	7.60 [-17.56 , 32.76]
Rodrigues Telini 2014	147.5	18.25	21	149.22	20.44	18	2.0%	-1.72 [-13.97 , 10.53]
Doulton 2007	119	12.9412	11	129	12.9412	11	2.5%	-10.00 [-20.82 , 0.82]
Catto 1973	136.9	14.8432	17	140.2	15.6678	17	2.7%	-3.30 [-13.56 , 6.96]
Fine 1997	135	11.8191	20	144	11.8191	20	4.4%	-9.00 [-16.33 , -1.67]
Subtotal (95% CI)			**76**			**73**	**12.2%**	**-6.32 [-11.04 , -1.60]**
Heterogeneity: Tau² = 0.00; Chi² = 3.01, df = 4 (P = 0.56); I² = 0%								
Test for overall effect: Z = 2.63 (P = 0.009)								
1.2.3 Post-transplant								
Keven 2006	116	11	18	132	13	14	3.6%	-16.00 [-24.50 , -7.50]
de Vries 2016	129	5.9227	22	140	5.9227	22	8.7%	-11.00 [-14.50 , -7.50]
Subtotal (95% CI)			**40**			**36**	**12.3%**	**-11.94 [-15.77 , -8.11]**
Heterogeneity: Tau² = 1.51; Chi² = 1.14, df = 1 (P = 0.29); I² = 12%								
Test for overall effect: Z = 6.11 (P < 0.00001)								
Total (95% CI)			**629**			**632**	**100.0%**	**-6.91 [-8.82 , -4.99]**
Heterogeneity: Tau² = 7.70; Chi² = 36.15, df = 18 (P = 0.007); I² = 50%								
Test for overall effect: Z = 7.08 (P < 0.00001)								
Test for subgroup differences: Chi² = 7.17, df = 2 (P = 0.03), I² = 72.1%								



ESC Consensus Statement

ESC European Society of Cardiology

European Journal of Heart Failure (2024) 26, 730–741
doi:10.1002/ejhf.3244

POSITION PAPER

Dietary sodium and fluid intake in heart failure. A clinical consensus statement of the Heart Failure Association of the ESC

Wilfried Mullens[1,2]*, Kevin Damman[3], Sebastiaan Dhont[1,2], Debasish Banerjee[4], Antoni Bayes-Genis[5], Antonio Cannata[6], Ovidiu Chioncel[7], Maja Cikes[8], Justin Ezekowitz[9], Andreas J. Flammer[10], Pieter Martens[11,1], Alexandre Mebazaa[12], Robert J. Mentz[13], Òscar Miró[14], Brenda Moura[15], Julio Nunez[16], Jozine M. Ter Maaten[3], Jeffrey Testani[17], Roland van Kimmenade[18], Frederik H. Verbrugge[19,20], Marco Metra[21], Giuseppe M.C. Rosano[22,23], and Gerasimos Filippatos[24]*

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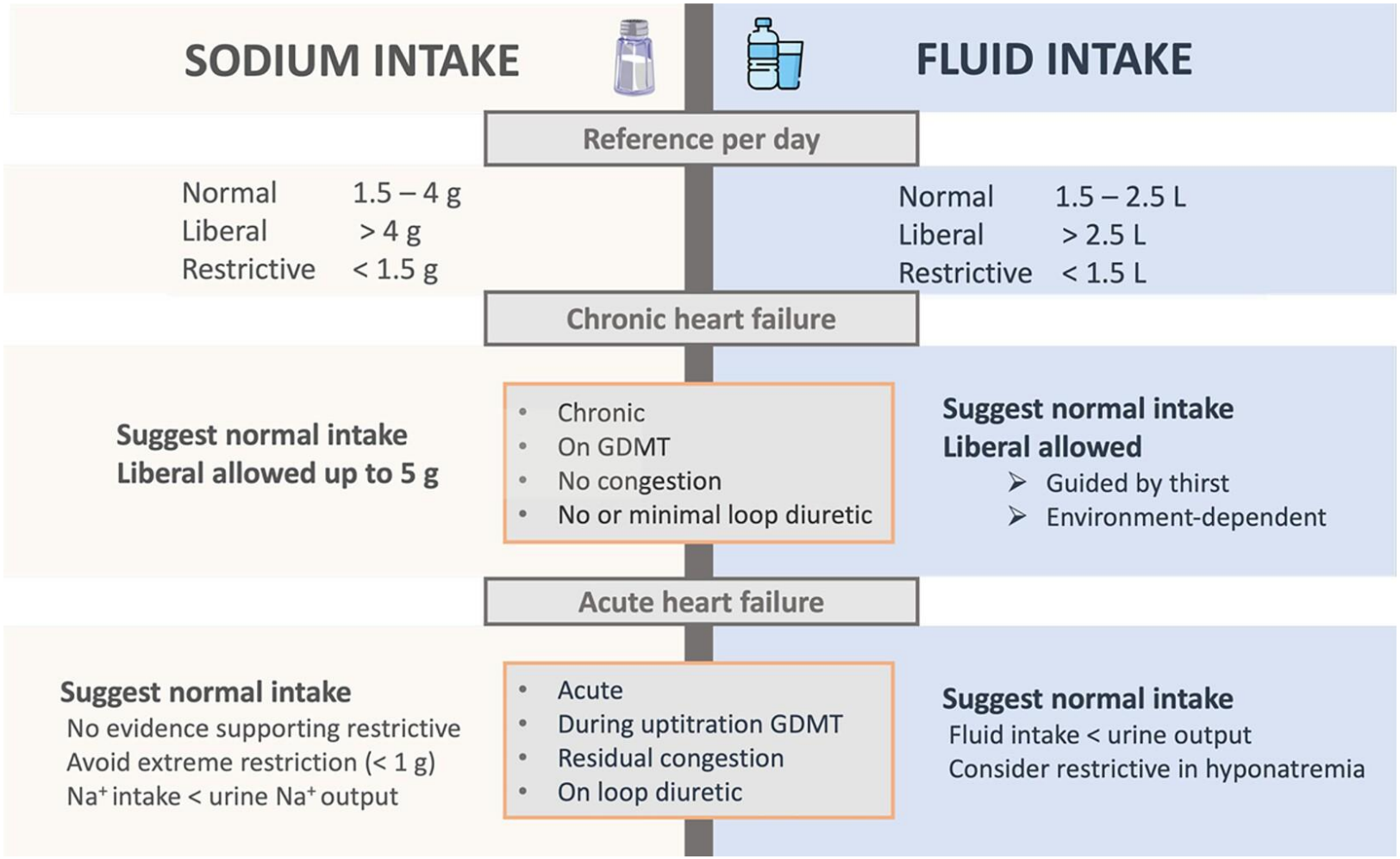
Mullens W, Damman K, Dhont S, Banerjee D, Bayes-Genis A, Cannata A, Chioncel O, Cikes M, Ezekowitz J, Flammer AJ, Martens P, Mebazaa A, Mentz RJ, Miró Ò, Moura B, Nunez J, Ter Maaten JM, Testani J, van Kimmenade R, Verbrugge FH, Metra M, Rosano GMC, Filippatos G. Dietary sodium and fluid intake in heart failure. A clinical consensus statement of the Heart Failure Association of the ESC. Eur J Heart Fail 2024;26:730-741

Study	Design	Patient population	Sample size	Intervention	Comparator	MACE
Fluid intake						
Holst *et al.*	Cross-over	HFrEF without clinical signs of congestion	74	Maximum fluid intake of 1.5 L/day	Fluid intake based on 30 ml/kg body weight/day	Readmission rate: NS
Albert *et al.*	Parallel-group, single-blind	ADHF, serum sodium ≤137 mg/dl	52	Maximum fluid intake of 1 L/day	Usual care discharge instructions and education	60-day mortality or readmission rate: NS
Sodium and fluid intake						
Aliti *et al.*	Parallel-group with blinded outcome assessments	Inpatients with ADHF, HFrEF	75	Sodium to 800 mg/day and fluid to 0.8 L/day during hospital stay	Unrestricted sodium and fluid intake	30-day readmission rate: NS
Machado d'Almeida *et al.*	Parallel-group with blinded outcome assessors	Inpatients with ADHF, HFpEF	53	Sodium to 800 mg/day and fluid to 0.8 L/day during hospital stay	Unrestricted sodium and fluid intake	30-day mortality or readmission rate: NS
Fabricio *et al.*	Single-blind	Patients hospitalized with ADHF	44	Low-sodium diet (3 g/day dietary salt) and fluid to 1 L/day	Normal-sodium diet (7 g/day salt) and fluid to 1 L/day	30-day readmission rate: NS
Sodium intake						
Hummel *et al.*	Single-blind, multicentre	Discharged from hospital with ADHF	66	Home-delivered sodium-restricted food (1500 mg/day sodium)	Usual care discharge instructions and education	30-day mortality or readmission rate: NS
Kalogeropoulos *et al.*	Double-blind	HFrEF with recent hospitalization on optimal GRMT	27	Sodium-restricted diet (1.5 g/day sodium)	Sodium-restricted diet (3 g/day sodium)	30-day readmission rate: NS
Ivey-Miranda *et al.*	Double-blind	HFrEF on optimal GRMT	70	Sodium-restricted diet (2 g/day sodium)	Sodium-restricted diet (3 g/day sodium)	30-day mortality or readmission rate: NS
Ezekowitz *et al.*	Multicentre open-label with blinded outcome assessments	Adult patients with chronic HF (NYHA class II–III) on optimal GRMT	806	Sodium-restricted diet (1.5 g/day sodium)	Usual care according to local guidelines	30-day mortality or readmission rate: NS



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Main Messages from ESC

- Limitation of salt intake to no more than 5 g/day in patients with heart failure
- Contemplating fluid restriction of 1.5–2 L/day only in selected patients

Mullens W, Damman K, Dhont S, Banerjee D, Bayes-Genis A, Cannata A, Chioncel O, Cikes M, Ezekowitz J, Flammer AJ, Martens P, Mebazaa A, Mentz RJ, Miró Ò, Moura B, Nunez J, Ter Maaten JM, Testani J, van Kimmenade R, Verbrugge FH, Metra M, Rosano GMC, Filippatos G. Dietary sodium and fluid intake in heart failure. A clinical consensus statement of the Heart Failure Association of the ESC. Eur J Heart Fail 2024;26:730-741

More Recent RCT in Ambulatory Heart Failure

504 patients with chronic HF for at least 6 months

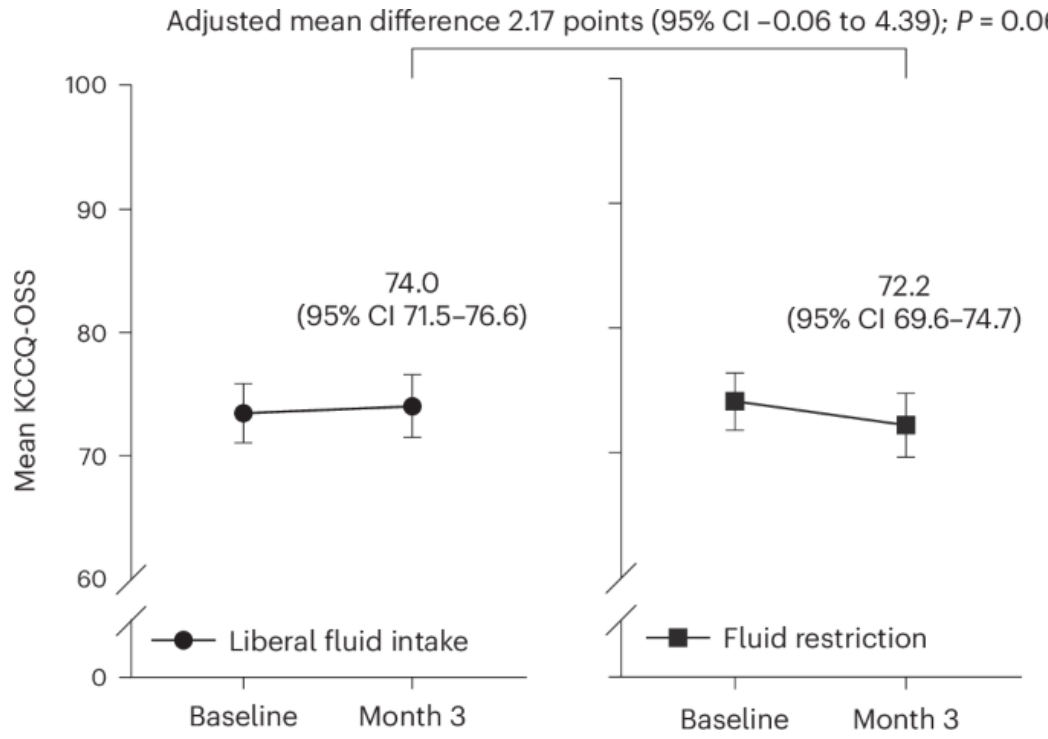
Randomized to receive lifestyle advice recommending either

- fluid restriction (<1.5 L/day), or
- liberal fluid intake (no maximum)

Herrmann JJ, Brunner-La Rocca HP, Baltussen LEHJM, Beckers-Wesche F, Bekkers SCAM, Bellersen L, van Eck JWM, Hassing HC, Jaarsma T, Linssen GCM, Pisters R, Sanders-van Wijk S, Verdijk MHI, Handoko ML, van der Meer P, Verbrugge FH, Januzzi JL Jr, Bayés-Genís A, Nieuwlaat R, Rodwell L, Gommans DHF, van Kimmenade RRJ. Liberal fluid intake versus fluid restriction in chronic heart failure: a randomized clinical trial. Nat Med 2025;31:2062-2068

Primary Outcome

Kansas City Cardiomyopathy Questionnaire summary score, 72.2 vs. 74.0 points (no difference)



Fluid Restriction in Heart Failure

ACC/AHA guideline recommendation

- Consider fluid restriction only for those with advanced heart failure and hyponatremia (Grade 2B)

SALT, FLUID MONITORING AND MANAGEMENT

- We suggest restricting dietary salt < 5 g/day (sodium < 2 g/day) and fluid intake to manage volume overload in PD patients (2C; downgraded from 1C).

Diuretics

Landmark Study: frusemide in patients on PD

61 patients newly started on **CAPD**

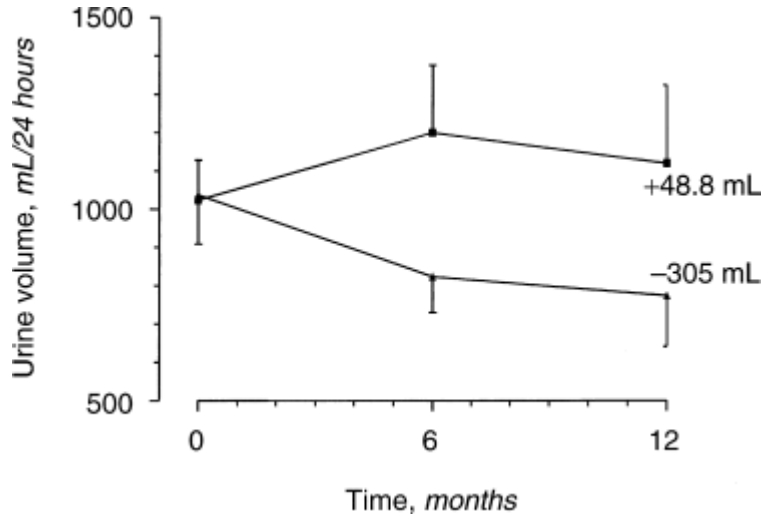
Eligibility: older than 16, and 10 days after CAPD training

Exclusion: had received more than two weeks of hemodialysis and those with a failing kidney transplant

Randomized in a 1:1 ratio to open-label frusemide 250 mg daily or no diuretics

Medcalf JF, Harris KP, Walls J. Role of diuretics in the preservation of residual renal function in patients on continuous ambulatory peritoneal dialysis. Kidney Int 2001;59:1128-33

Frusemide and CAPD: 12 months follow up



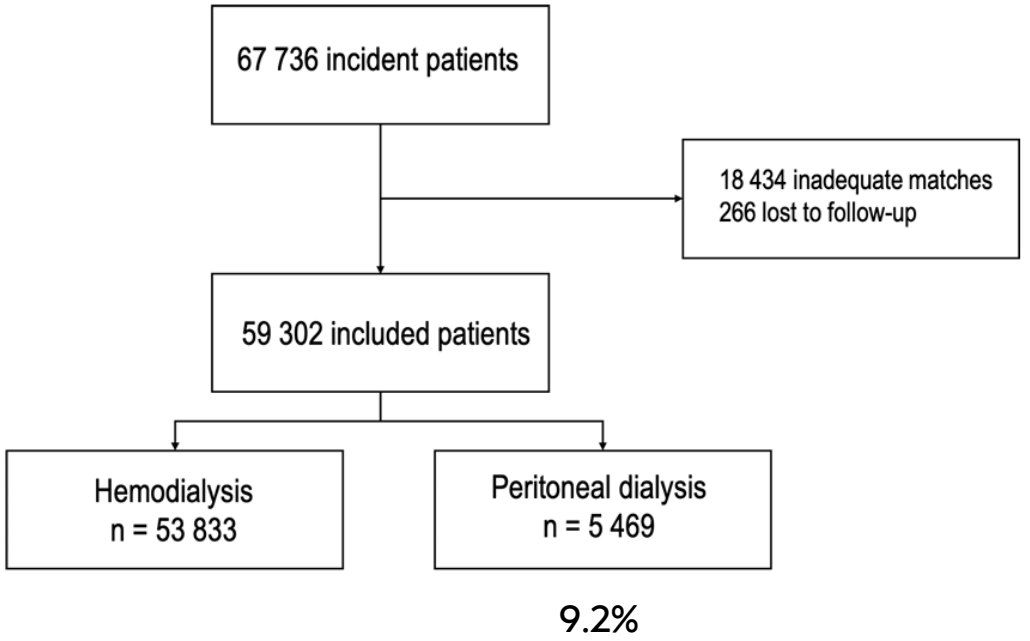
- Increase in urine volume
- Increase in urinary sodium excretion
- Less increase in total body weight
- No effect on residual kidney function

Medcalf JF, Harris KP, Walls J. Role of diuretics in the preservation of residual renal function in patients on continuous ambulatory peritoneal dialysis. Kidney Int 2001;59:1128-33

REIN registry Study: diuretics in patients on PD

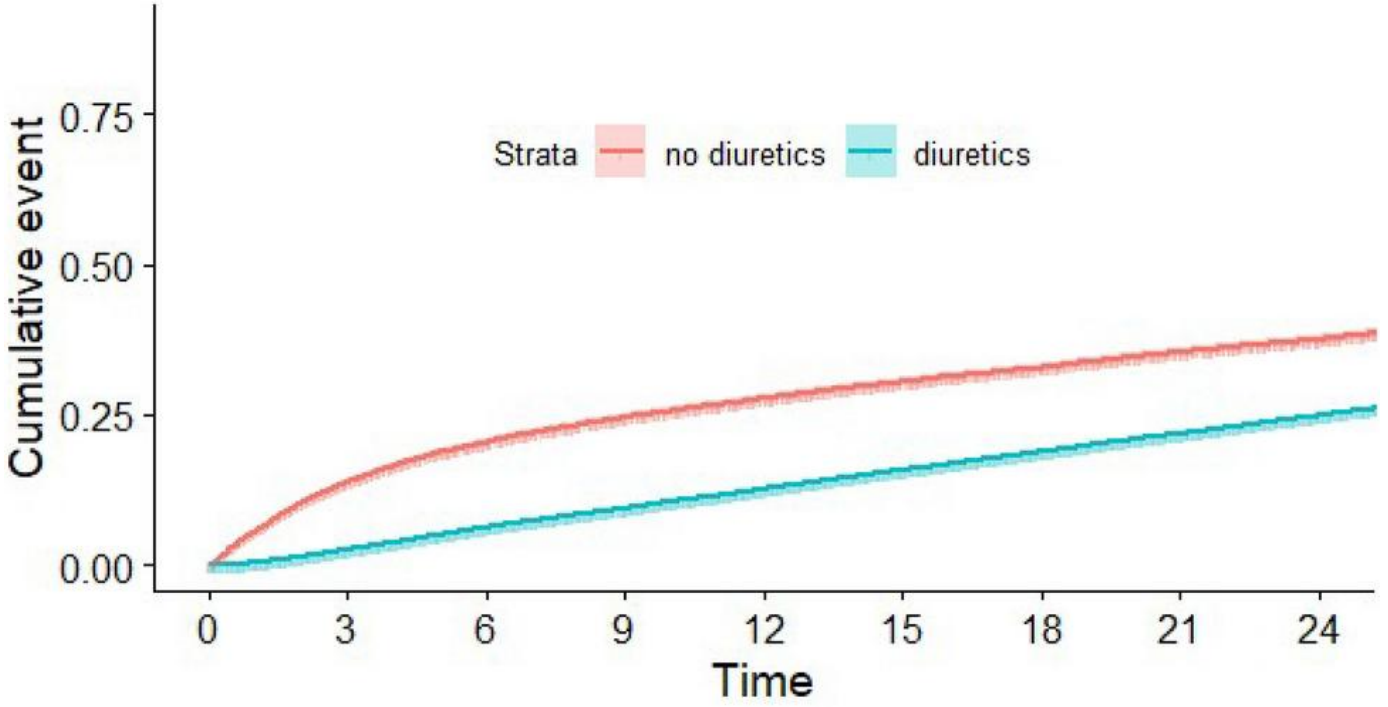
Observational study of adult patients (> 18 years) who started dialysis between 2009 and 2015

Classified by loop diuretics exposure: < 5%, 5–50%, 50–80% or > 80% over the observation period



Ingwiller M, Bozman DF, Florens N, Cerasuolo D, Vigneau C, Couchoud C, Hannedouche T. Diuretics and mortality reduction in incident dialysis patients: a two-year observational study. Sci Rep 2024;14:27447

Significantly lower 2-year mortality (propensity score matching)



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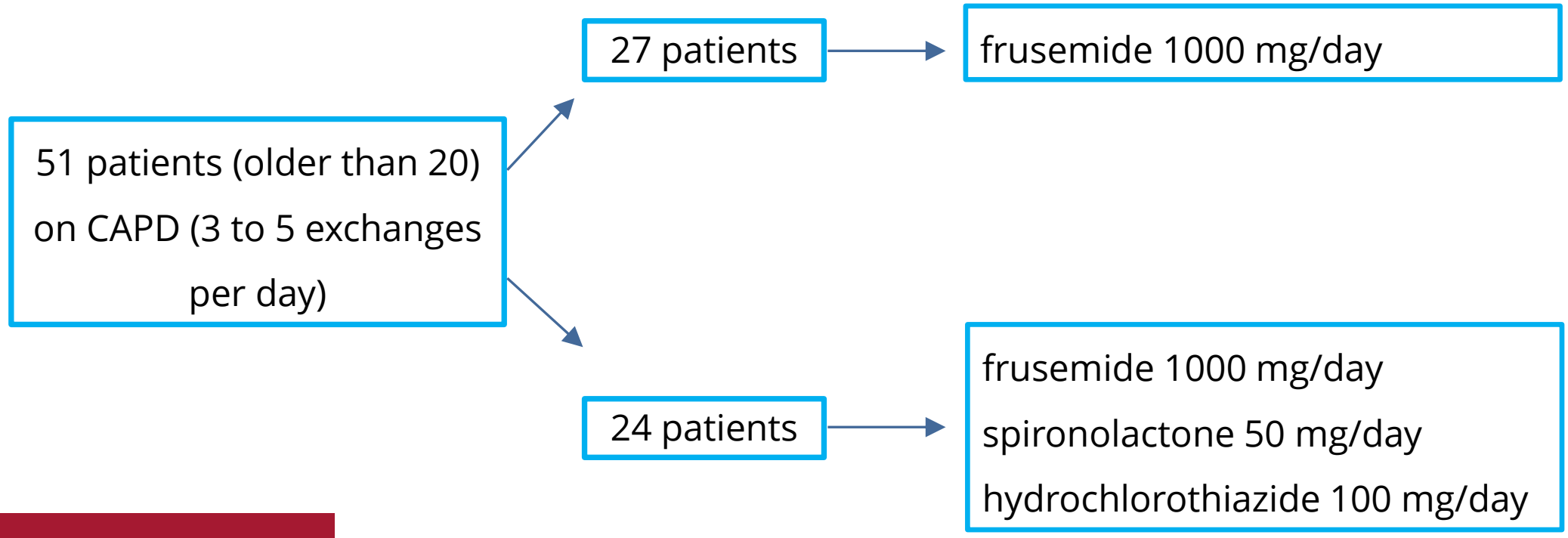
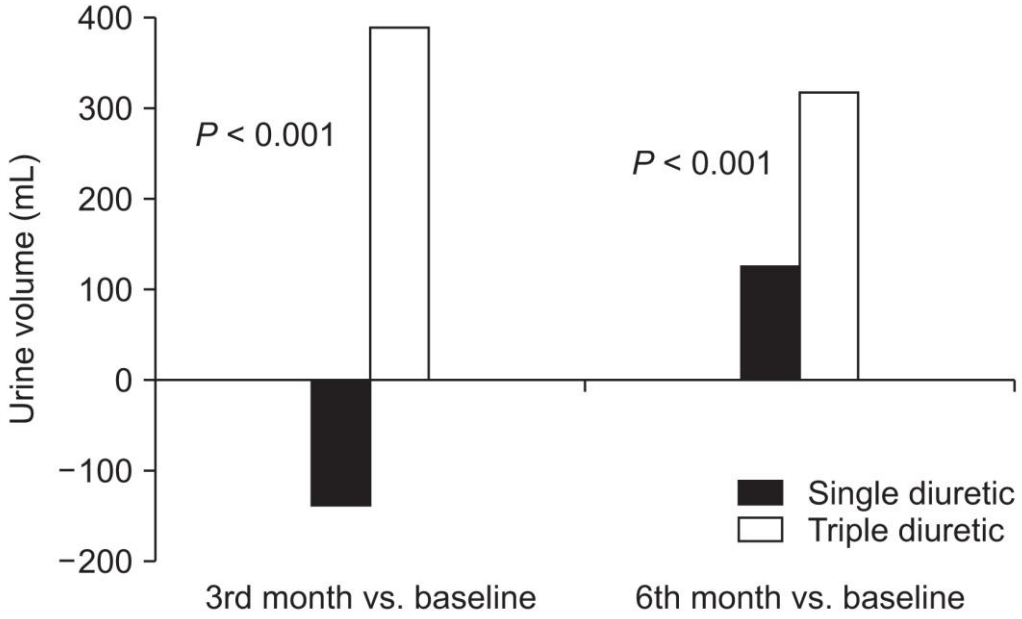
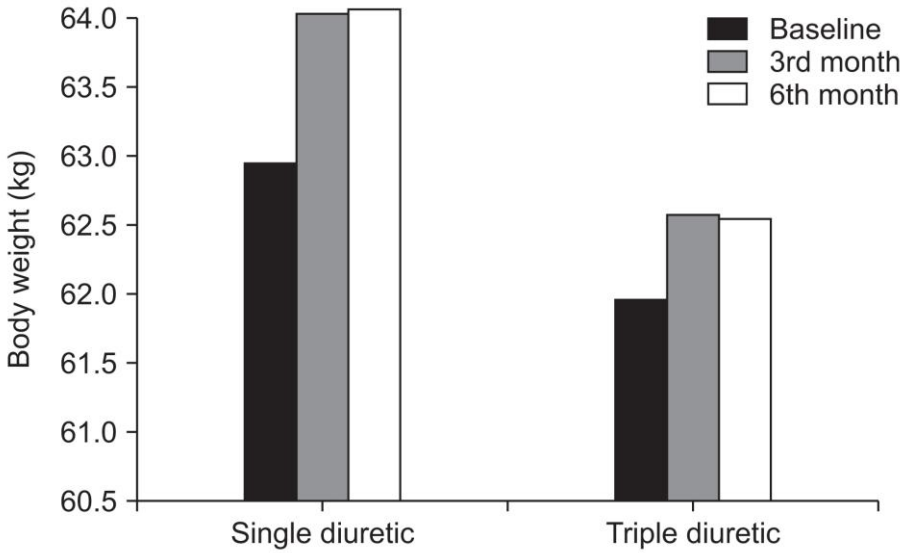
RCT: triple diuretics in patients on PD



Witoon R, Yongsiri S, Buranaburidej P, Nanna P. Efficacy of triple diuretic treatment in continuous ambulatory peritoneal dialysis patients: a randomized controlled trial. Kidney Res Clin Pract 2019;38:108-115

Better urine output and volume control

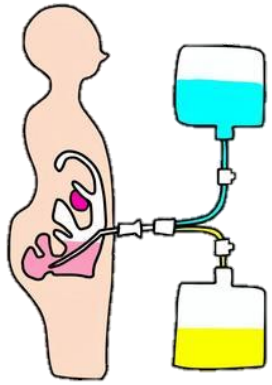




Witoon R, Yongsiri S, Buranaburidej P, Nanna P. Efficacy of triple diuretic treatment in continuous ambulatory peritoneal dialysis patients: a randomized controlled trial. Kidney Res Clin Pract 2019;38:108-115

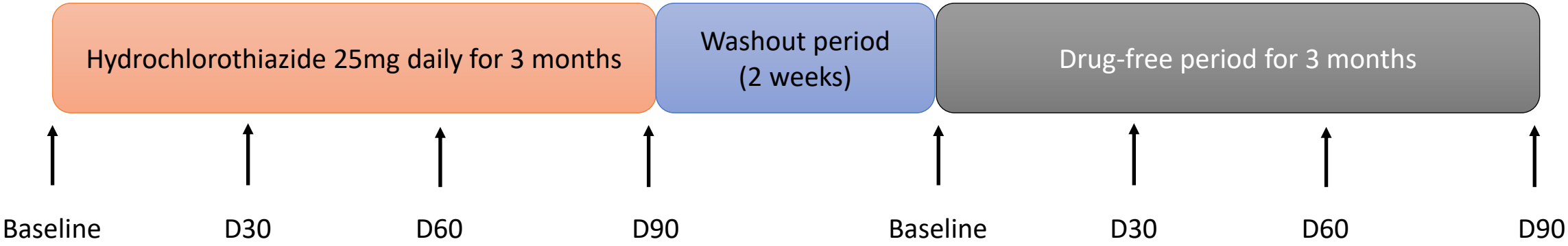
Single Centre Study for Thiazide

62nd ERA CONGRESS
VIENNA & VIRTUAL
JUNE 4-7, 2025
Beyond Nephrology
in collaboration with
ÖGN Österreichische Gesellschaft für Nephrologie



Cross-over study

- 10 adult prevalent patients on PD with uncontrolled hypertension (SBP 140 or DBP >90) with residual kidney function (> 500ml/day)



Assessments: BP, BW, BH, BCM (by bioimpedance spectroscopy), electrolytes, 24-hour urine volume, CrCl, Na

Unpublished Results

62nd ERA CONGRESS
VIENNA & VIRTUAL
JUNE 4-7, 2025
Beyond Nephrology
in collaboration with
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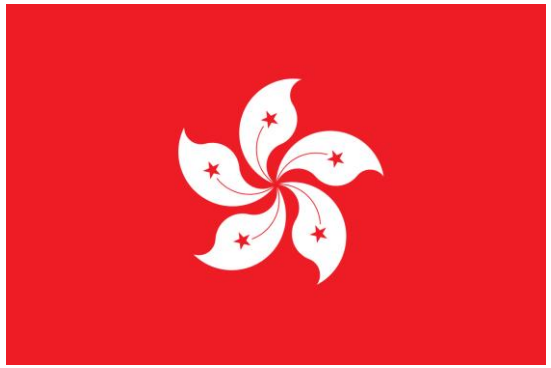
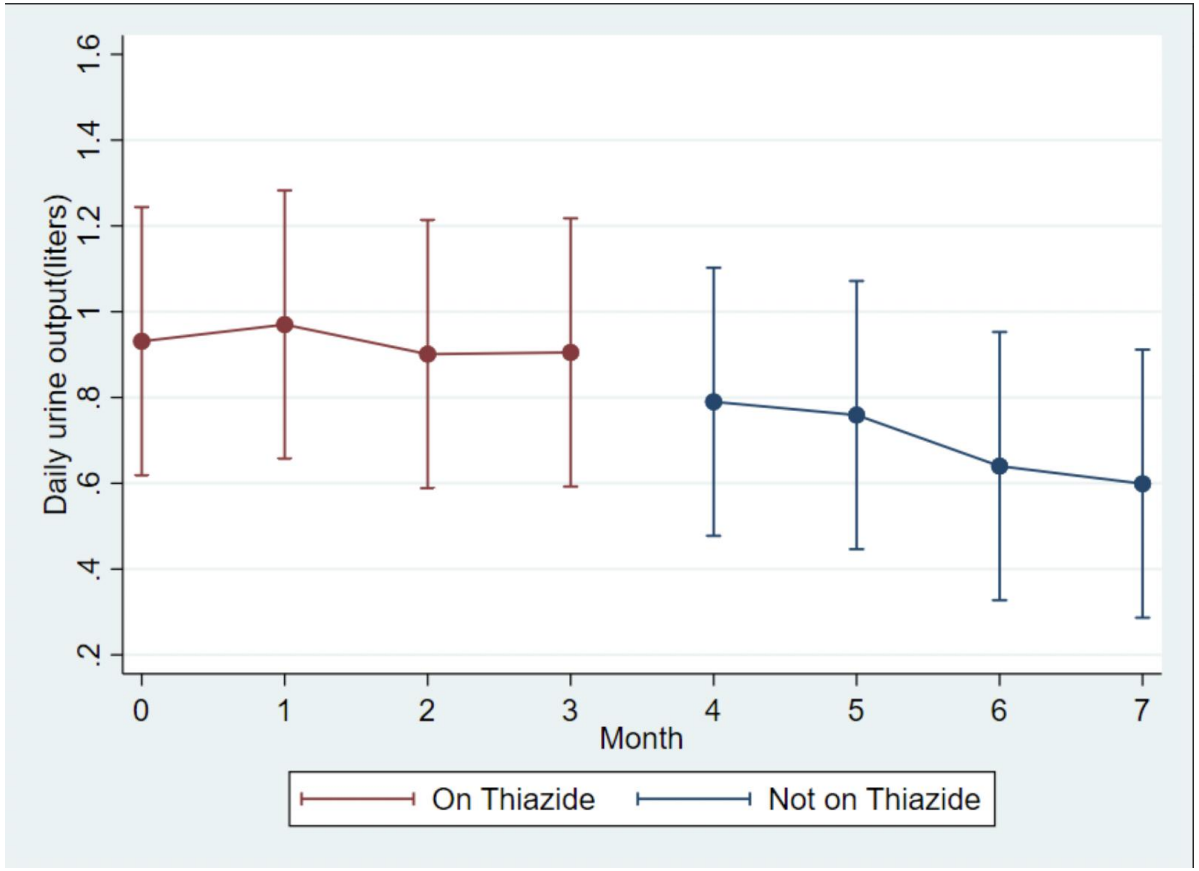
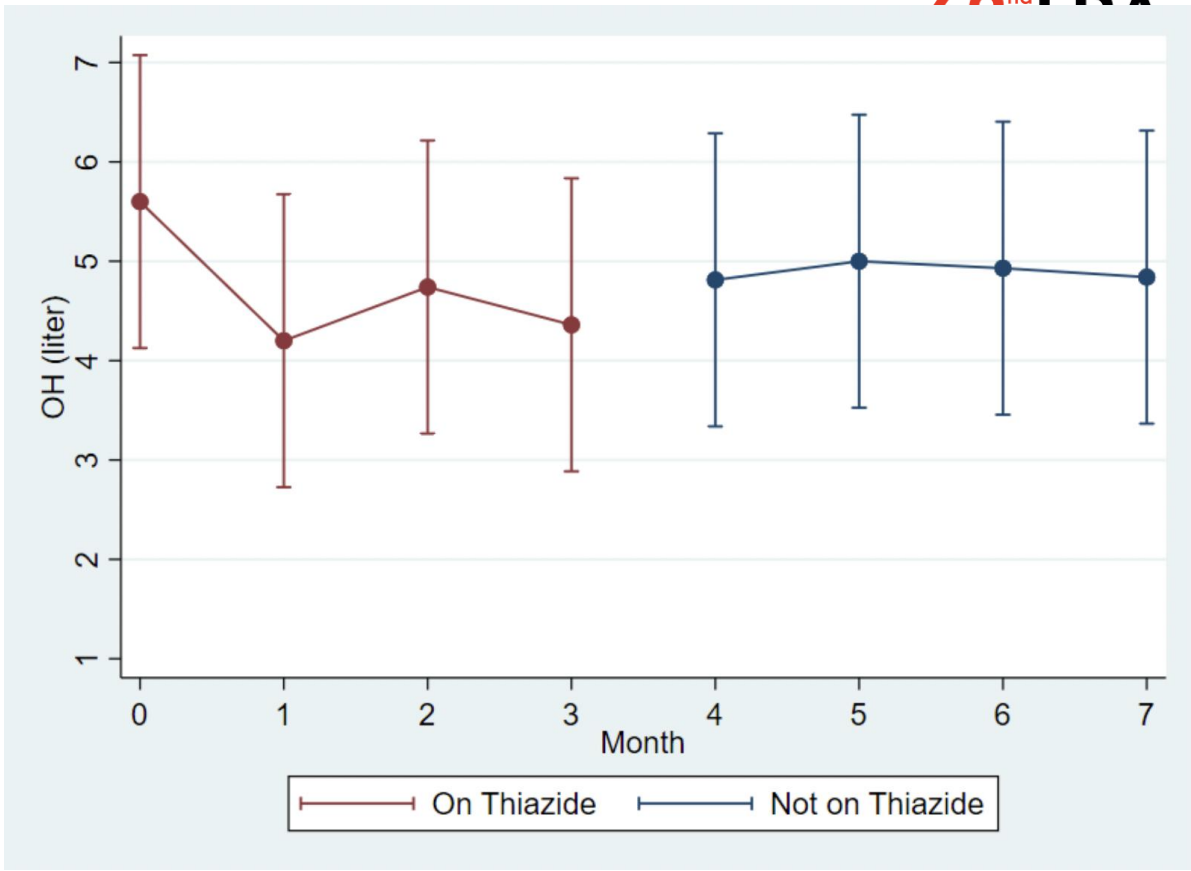
	n = 10
Age	64.4 ± 11.41
Male gender	7 (70%)
Primary diagnosis - Diabetes mellitus - Hypertension - Glomerulonephritis - Unknown	 3 (30%) 2 (20%) 3 (30%) 2 (20%)
Loop diuretics use	10 (100%)
Systolic blood pressure (mmHg)	164 ± 9
Diastolic blood pressure (mmHg)	87 ± 14
Daily urine volume (L)	1.04 ± 0.42







Decline in urine output	
On Thiazide	-0.03 L /3 months (-0.1 L/year)
Not on Thiazide	-0.31 L /3 months (-1.24 L/year)

Overhydration Difference	
On Thiazide	⇩ 1.24L
Not on Thiazide	⇧ 0.48L

Key (Unpublished) Results of Thiazide in patients receiving PD

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	On Thiazide	Not on Thiazide	Difference
Blood pressure	SBP: ⇩ 13.0 ± 10.4	⇧ 10.4 ± 14.0	23.4 mmHg
	DBP: ⇩ 13.0 ± 10.4	⇧ 2.3 ± 13.1	15.2 mmHg
Decline in urine output	-0.03 L /3 months (-0.10 L /year)	-0.31 L /3 months (-1.24 L /year)	-0.28 L /3 months (-1.14 L /year)
Overhydration	⇩ 1.24L	⇧ 0.48L	1.72L

SALT, FLUID MONITORING AND MANAGEMENT

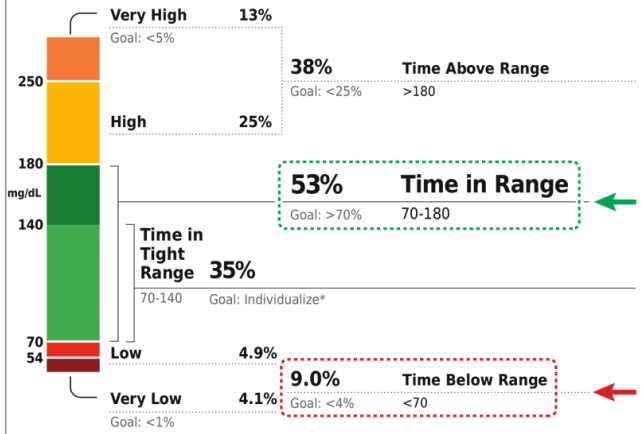
- We recommend maximizing loop diuretics to manage volume overload in patients on PD with RKF or daily urine volume more than 100 mL (1B).
- We suggest adding thiazide or thiazide-like diuretics as an adjunctive therapy to manage fluid overload (2B).

Continuous Glucose Monitoring

Time in Ranges

Each 5% increase in Time in Range (TIR) is clinically beneficial

Each 1% time in range = ~15 minutes



38% Time Above Range
Goal: <25% >180

53% Time in Range
Goal: >70% 70-180

9.0% Time Below Range
Goal: <4% <70

*TITR Goal: 50-90% based on type of diabetes and treatment modality

Multiple daily injection (MDI) therapy

14 Days

Time CGM Active: 96.5%

Glucose Metrics

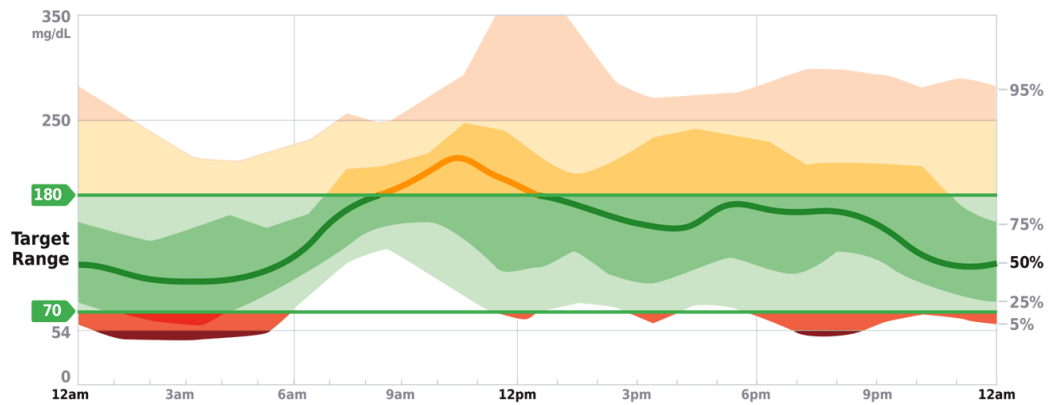
Average Glucose ..... **160 mg/dL**
Goal: <154 mg/dL

Glucose Management Indicator (GMI) **7.1%**
Goal: <7%

Glucose Variability **44.6%**
Defined as percent coefficient of variation
Goal: ≤36%

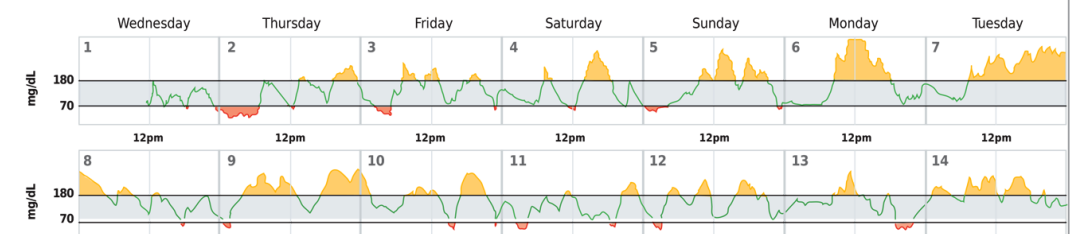
Ambulatory Glucose Profile (AGP)

AGP is a summary of glucose values from the report period, with median (50%) and other percentiles shown as if they occurred in a single day.

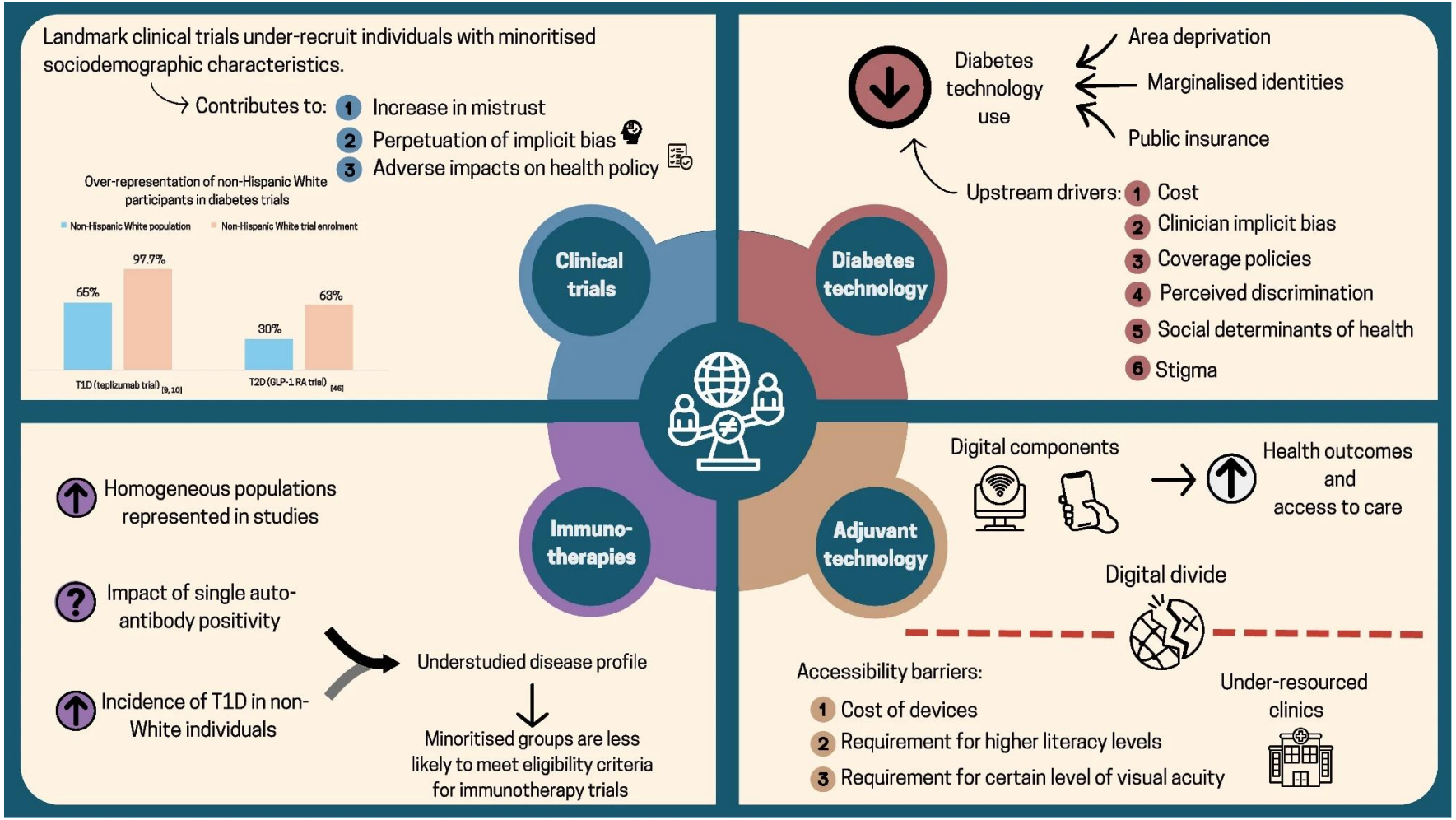


Daily Glucose Profiles

Each daily profile represents a midnight-to-midnight period.



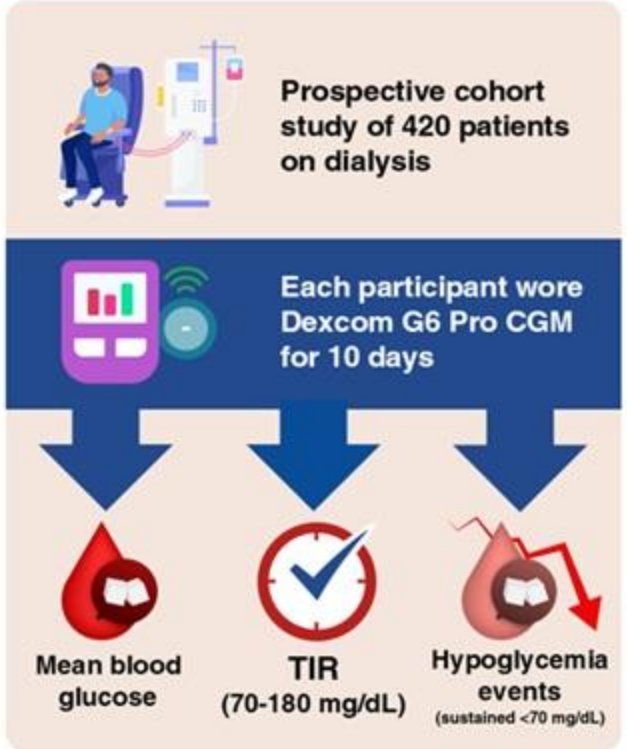
Bergenstal RM, Martens TW, Beck RW. Continuous glucose monitoring. JAMA 2025 Epub ahead of print

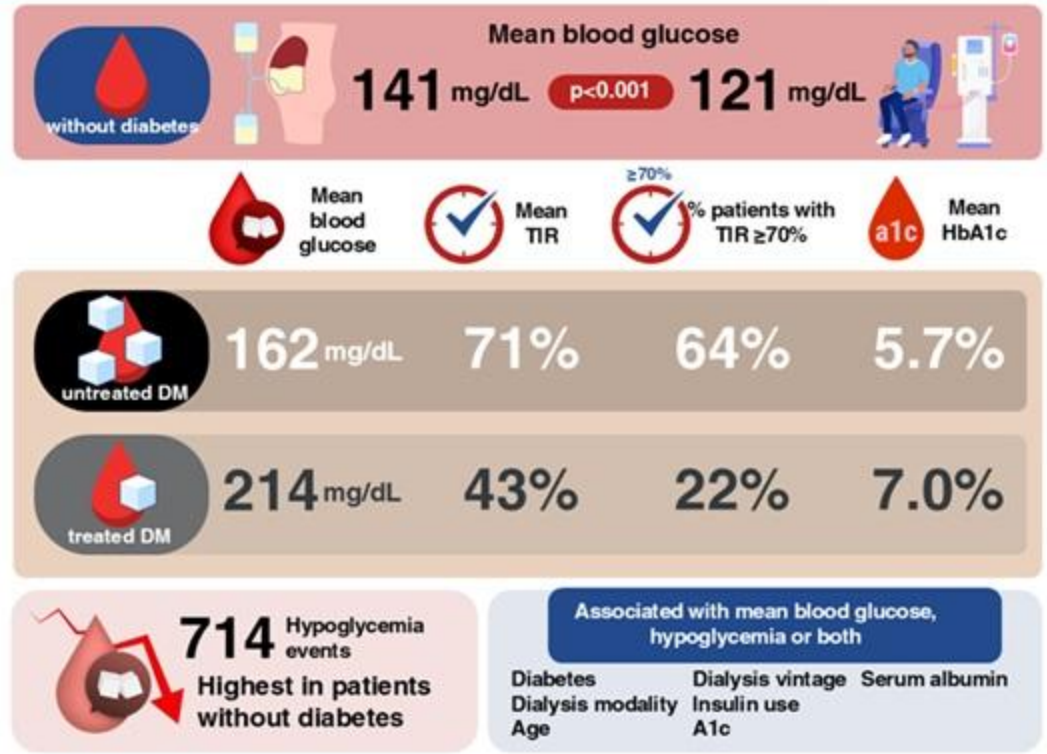


Addala A, Amedari MI, Figg LE, Ebekozien O. Disparities in access to and use of diabetes technologies and therapeutics: a narrative review. Diabetologia 2025;68:2430-2448

Glycemia Assessed by Continuous Glucose Monitoring among People Treated with Maintenance Dialysis

JASN
Journal of the American Society of Nephrology
Clinical Research





TIR - time in range CGM - continuous glucose monitor DM - diabetes mellitus HbA1c - hemoglobin A1c

Conclusions: In maintenance dialysis, CGM frequently identified both hyperglycemia and hypoglycemia that may not be clinically evident. In particular, hyperglycemia was common with peritoneal dialysis, patients with untreated diabetes maintain a diabetic glycemic profile, and patients with treated diabetes rarely meet contemporary CGM-based treatment targets.

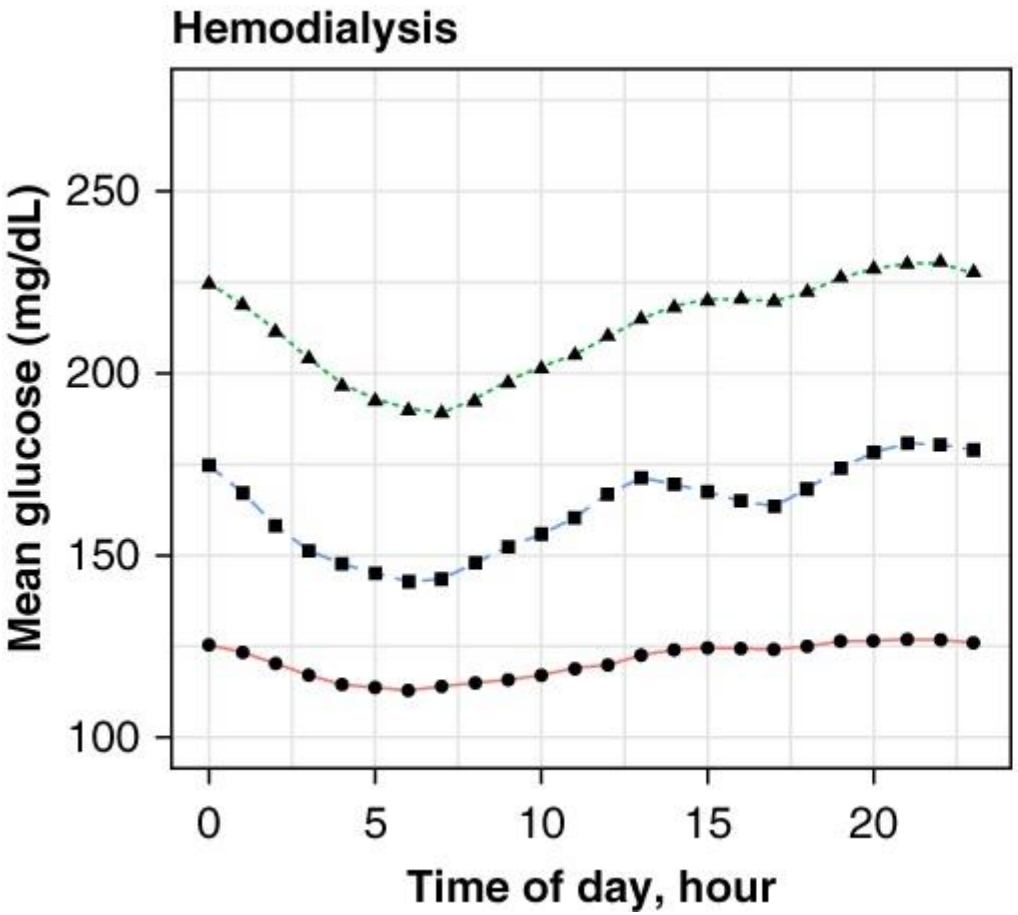
Ian H. de Boer, Lisa D. Anderson, Nathaniel K. Ashford, et al. ***Glycemia Assessed by Continuous Glucose Monitoring among People Treated with Maintenance Dialysis***. JASN doi: 10.1681/ASN.0000000693. **Visual Abstract by Carlo Nemesio B. Trinidad, MD**

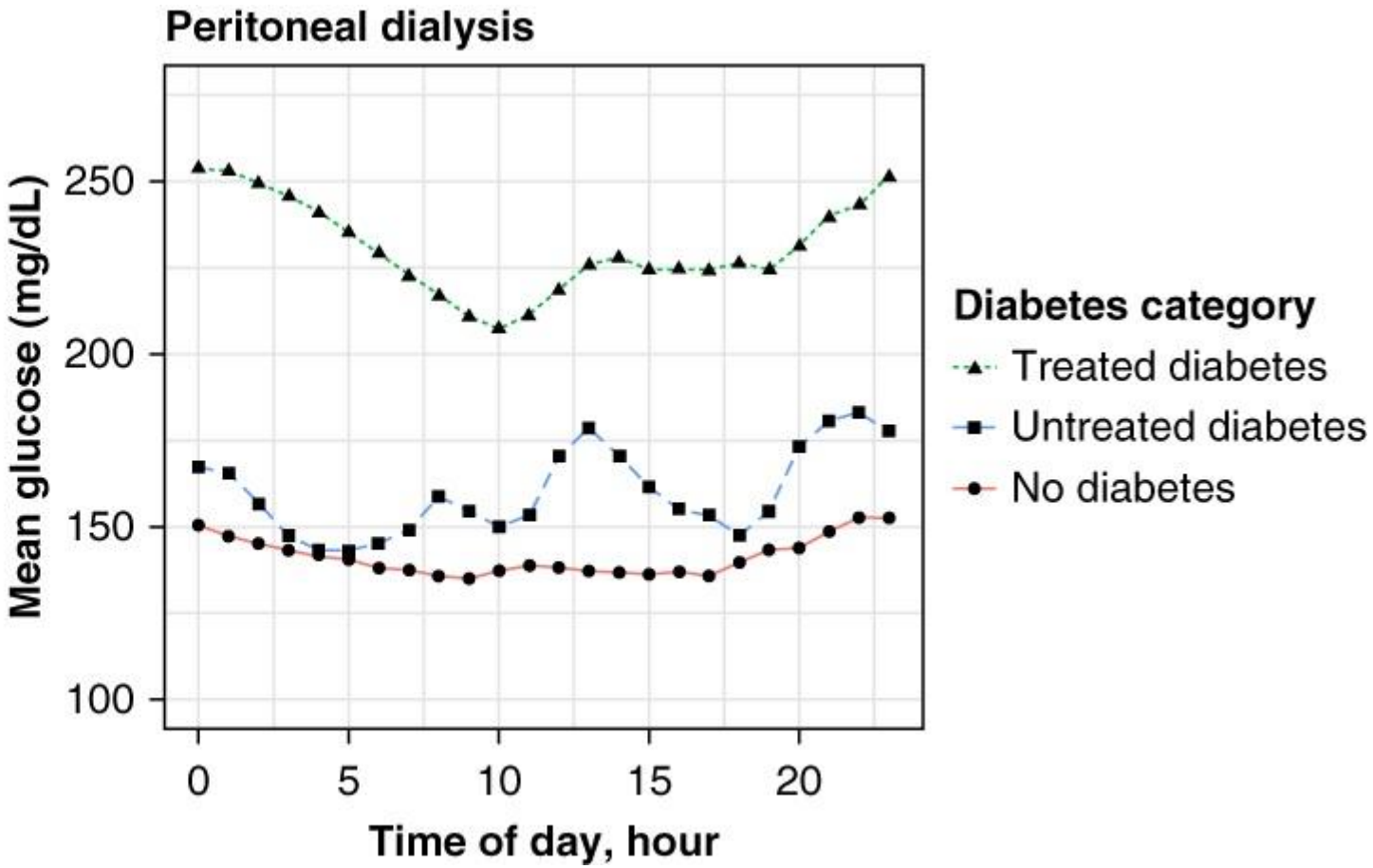
BLOSSOM Study

- 420 individuals (263 with diabetes and 157 without diabetes) treated with dialysis (hemodialysis, *n* = 365; peritoneal dialysis, *n* = 55)
- CGM identified episodes of hyperglycemia and hypoglycemia that were not otherwise clinically evident, even when HbA1c < 7% (53 mmol/mol)

de Boer IH, Anderson LD, Ashford NK, Ayers E, Bansal N, Hall YN, Hirsch IB, Hoofnagle AN, Hsu S, Jones E, Lidgard B, Limonte CP, Linke LJ, Marnell CC, Mayeda L, McNamara E, Mehrotra R, Pesenson A, Porter JM, Rivara MB, Roberts GV, Shanaman B, Trikudanathan S, Watnick S, Wilkens KG, Zelnick LR. Glycemia assessed by continuous glucose monitoring among people treated with maintenance dialysis. J Am Soc Nephrol 2025;36:1798-1810

Diurnal Pattern





GLUCOSE MANAGEMENT

- We suggest using continuous glucose monitoring (CGM) as an adjunct to HbA1c in patients on PD with diabetes to achieve individualized glycemic goal (2C).
- For PD patients who use CGM for glucose monitoring, we consider an individualized target of time in range (3.9–10 mmol/L) (70–180 mg/dL) over 50% appropriate (Not Graded).

Lipid

LIPID MANAGEMENT – SECONDARY PREVENTION

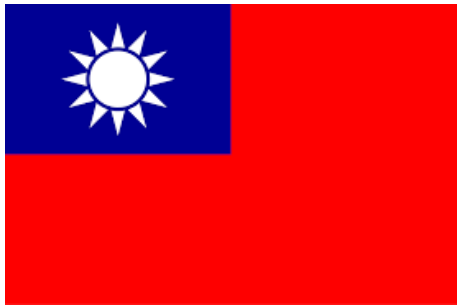
Secondary prevention of ASCVD

- Supported statin use in observational studies
- Most retrospective studies are propensity-matched
- Meta-analysis published in 2023

Statin after PCI for acute myocardial infarction

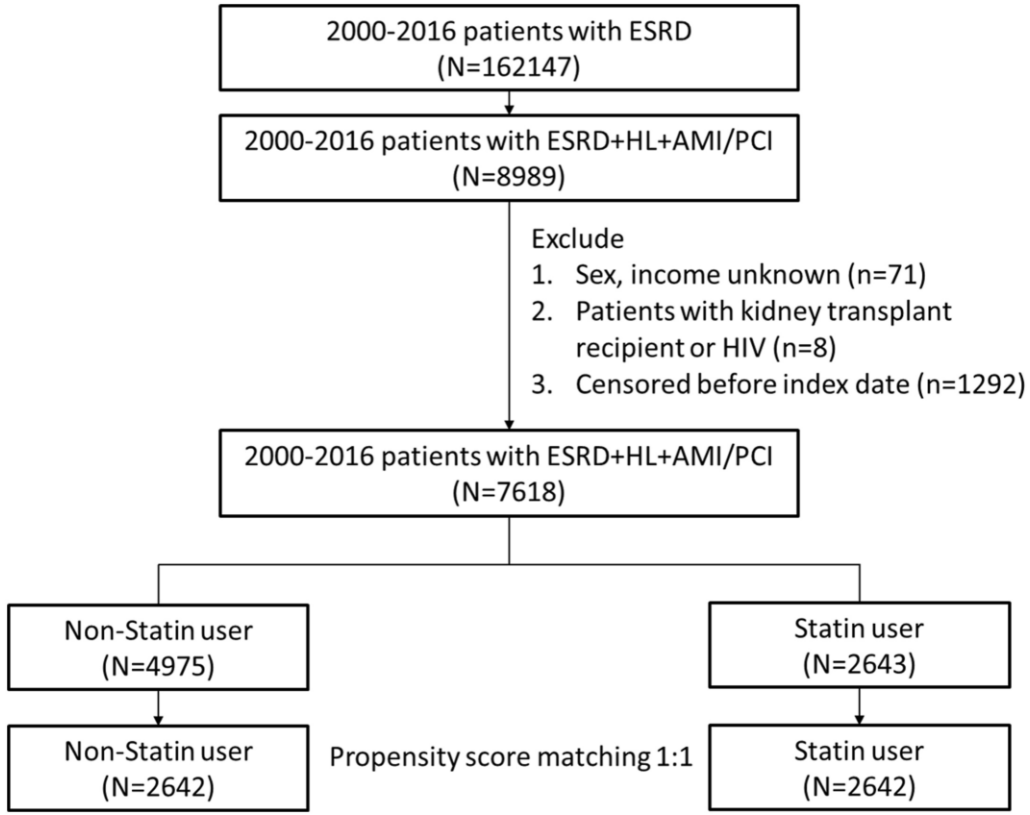
National Health Insurance of Taiwan in 2000–2016

- Patients on dialysis and with hyperlipidemia, with AMI and receiving PCI
- Propensity score matching



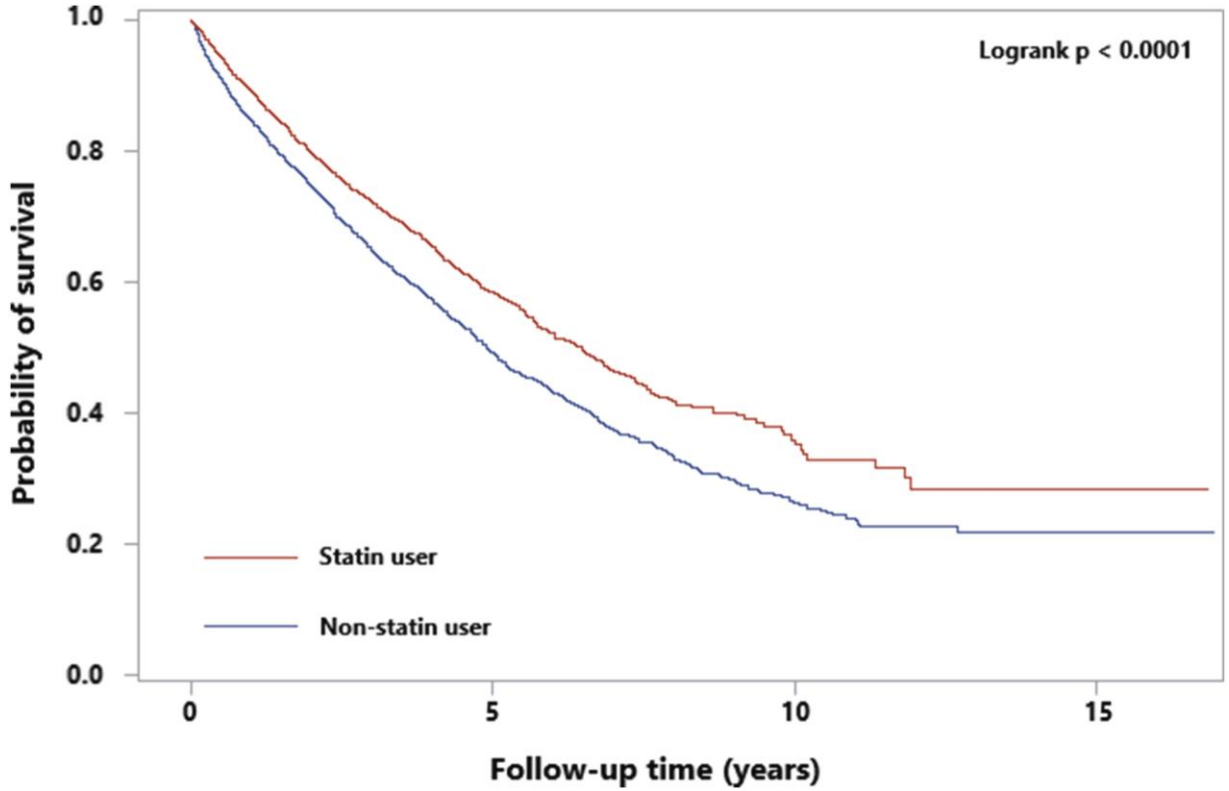
Yeh YT, Sung FC, Tsai CF, Hsu CC, Tsai WC, Hsu YH. Statin therapy associated mortality in hyperlipidemic dialysis patients with percutaneous coronary intervention for acute myocardial infarction, a retrospective cohort study. Heliyon 2024;10:e39906

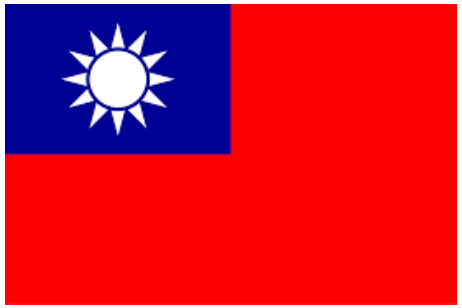
Statin after PCI for acute myocardial infarction



Yeh YT, Sung FC, Tsai CF, Hsu CC, Tsai WC, Hsu YH. Statin therapy associated mortality in hyperlipidemic dialysis patients with percutaneous coronary intervention for acute myocardial infarction, a retrospective cohort study. Heliyon 2024;10:e39906

Statin: All-cause mortality reduced by 23%





Yeh YT, Sung FC, Tsai CF, Hsu CC, Tsai WC, Hsu YH. Statin therapy associated mortality in hyperlipidemic dialysis patients with percutaneous coronary intervention for acute myocardial infarction, a retrospective cohort study. Heliyon 2024;10:e39906

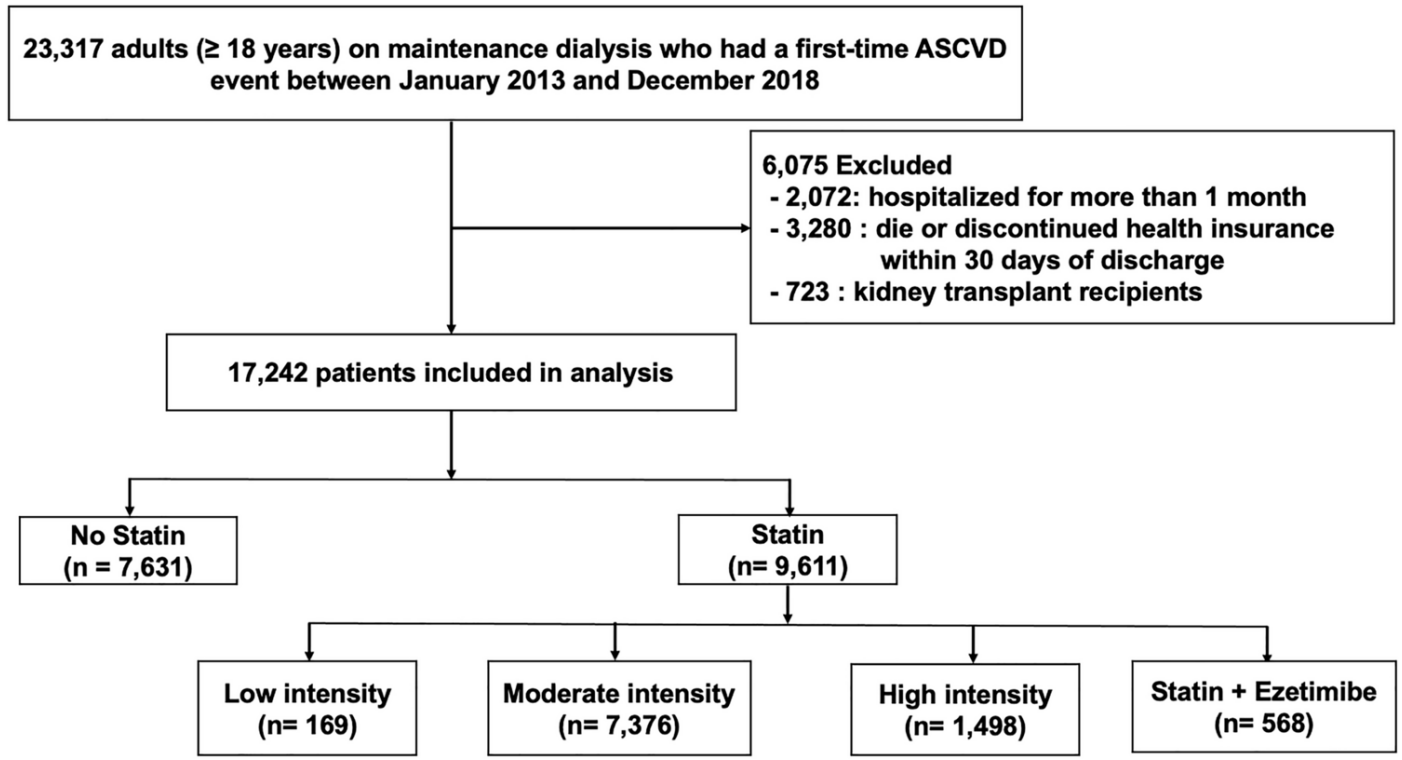
Statin after atherosclerotic cardiovascular disease

Korean NHIS (Nationwide Health Insurance Service) database

- 17,242 patients on dialysis who experienced a first-time ASCVD event
- 9611 patients (55.7%) received statin

Lee M, Choi WJ, Lee Y, Lee K, Park MW, Myong JP, Kim DW. Association between statin therapy and mortality in patients on dialysis after atherosclerotic cardiovascular diseases. Sci Rep 2023;13:10940

Statin after atherosclerotic cardiovascular disease



Lee M, Choi WJ, Lee Y, Lee K, Park MW, Myong JP, Kim DW. Association between statin therapy and mortality in patients on dialysis after atherosclerotic cardiovascular diseases. Sci Rep 2023;13:10940

Statin reduced all-cause mortality

	Unadjusted		Adjusted for age and sex		Fully adjusted	
	HR (95% CI)	p value	HR (95% CI)	p value	HR (95% CI)	p value
All-cause mortality						
No statin	1 (Reference)		1 (Reference)		1 (Reference)	
Statin						
Overall	0.98 (0.94–1.03)	0.454	0.96 (0.92–1.01)	0.086	0.92 (0.88–0.97)	0.0009
CHD	1.07 (1.01–1.14)	0.035	1.01 (0.95–1.08)	0.683	0.97 (0.92–1.04)	0.411
CVA	0.87 (0.78–0.96)	0.006	0.89 (0.81–0.99)	0.034	0.88 (0.80–0.98)	0.021
PAD	1.09 (0.98–1.22)	0.107	1.10 (0.98–1.22)	0.099	1.03 (0.92–1.15)	0.598

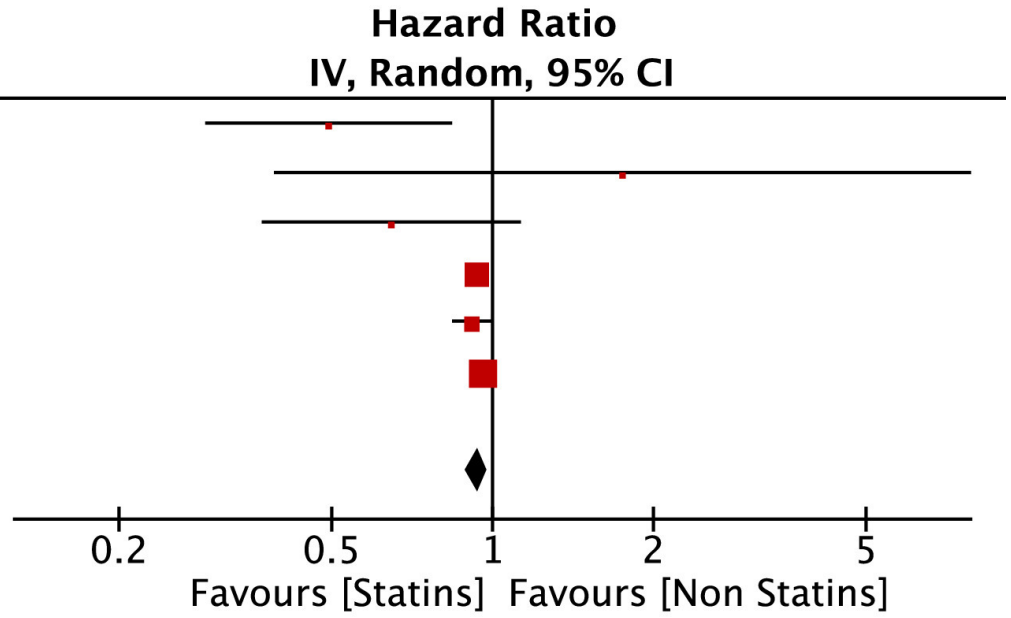
Lee M, Choi WJ, Lee Y, Lee K, Park MW, Myong JP, Kim DW. Association between statin therapy and mortality in patients on dialysis after atherosclerotic cardiovascular diseases. Sci Rep 2023;13:10940

Systematic Review and Meta-analysis: PD and Statin: All-Cause Mortality

Study or Subgroup	log[Hazard Ratio]	SE	Weight	Hazard Ratio IV, Random, 95% CI
Funamizu 2022	-0.7061	0.2713	0.7%	0.49 [0.29, 0.84]
Kagawa 2014	0.5601	0.7662	0.1%	1.75 [0.39, 7.86]
Kim 2018	-0.436	0.2848	0.7%	0.65 [0.37, 1.13]
Lee 2023	-0.0679	0.0191	36.5%	0.93 [0.90, 0.97]
Lo 2022	-0.0892	0.0435	18.1%	0.91 [0.84, 1.00]
Shavadia 2021	-0.041	0.0106	43.9%	0.96 [0.94, 0.98]
Total (95% CI)			**100.0%**	**0.94 [0.89, 0.98]**

Heterogeneity: $Tau^2 = 0.00$; $Chi^2 = 10.73$, df = 5 (P = 0.06); $I^2 = 53\%$

Test for overall effect: Z = 2.84 (P = 0.004)



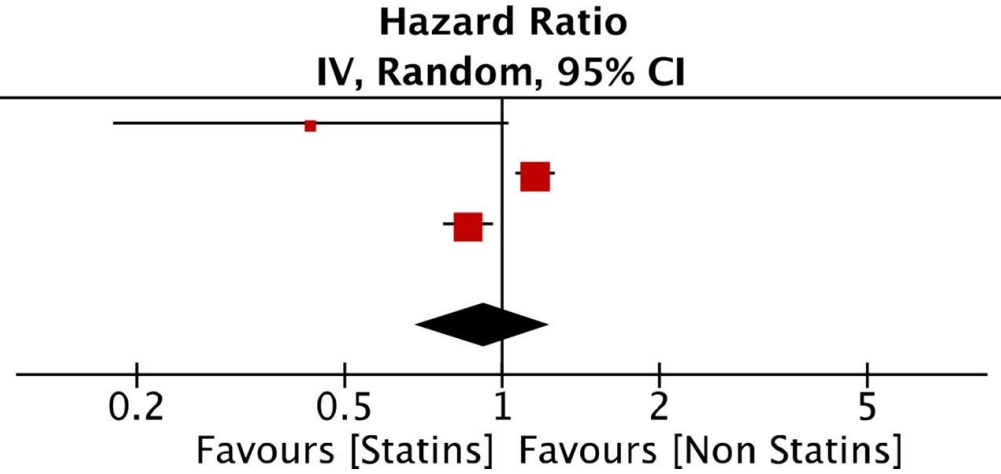
Elkoumi O, Elkoumi A, Elbairy MK, Irfan H, Hageen AW, Beddor A, Khalid N, Mahmoud MAT, Emara A, Alkhazaleh U, Mohamed R, Mohamed A, Elnegiry AK, Nashwan AJ. Impact of statins on mortality and cardiovascular outcomes in dialysis patients with atherosclerotic cardiovascular disease: a systematic review and meta-analysis. Am J Cardiol 2025;256:49-59

Systematic Review and Meta-analysis: PD and Statin: Cardiovascular Mortality

Study or Subgroup	log[Hazard Ratio]	SE	Weight	Hazard Ratio IV, Random, 95% CI
Funamizu 2022	-0.844	0.4443	9.3%	0.43 [0.18, 1.03]
Lee 2023	0.1447	0.0441	45.9%	1.16 [1.06, 1.26]
Lo 2022	-0.1511	0.0563	44.8%	0.86 [0.77, 0.96]
Total (95% CI)			**100.0%**	**0.92 [0.69, 1.24]**

Heterogeneity: $Tau^2 = 0.05$; $Chi^2 = 20.97$, df = 2 ($P < 0.0001$); $I^2 = 90\%$

Test for overall effect: Z = 0.53 (P = 0.60)



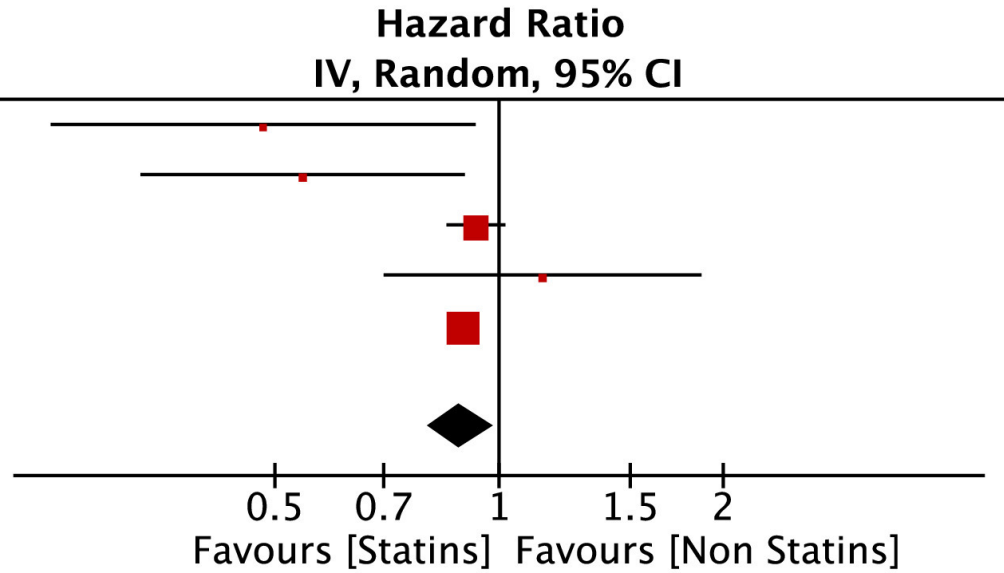
Elkoumi O, Elkoumi A, Elbairy MK, Irfan H, Hageen AW, Beddor A, Khalid N, Mahmoud MAT, Emara A, Alkhazaleh U, Mohamed R, Mohamed A, Elnegiry AK, Nashwan AJ. Impact of statins on mortality and cardiovascular outcomes in dialysis patients with atherosclerotic cardiovascular disease: a systematic review and meta-analysis. Am J Cardiol 2025;256:49-59

Systematic Review and Meta-analysis: PD and Statin: MACE

Study or Subgroup	log[Hazard Ratio]	SE	Weight	Hazard Ratio IV, Random, 95% CI
Funamizu 2022	-0.7294	0.3351	2.3%	0.48 [0.25, 0.93]
Kim 2018	-0.607	0.2559	3.8%	0.54 [0.33, 0.90]
Lo 2022	-0.0714	0.0465	37.3%	0.93 [0.85, 1.02]
Natsuaki 2012	0.1346	0.2507	3.9%	1.14 [0.70, 1.87]
Shavadia 2021	-0.1111	0.0086	52.7%	0.89 [0.88, 0.91]
Total (95% CI)			**100.0%**	**0.89 [0.80, 0.98]**

Heterogeneity: $Tau^2 = 0.00$; $Chi^2 = 8.84$, df = 4 (P = 0.07); $I^2 = 55\%$

Test for overall effect: Z = 2.31 (P = 0.02)



Elkoumi O, Elkoumi A, Elbairy MK, Irfan H, Hageen AW, Beddor A, Khalid N, Mahmoud MAT, Emara A, Alkhazaleh U, Mohamed R, Mohamed A, Elnegiry AK, Nashwan AJ. Impact of statins on mortality and cardiovascular outcomes in dialysis patients with atherosclerotic cardiovascular disease: a systematic review and meta-analysis. Am J Cardiol 2025;256:49-59

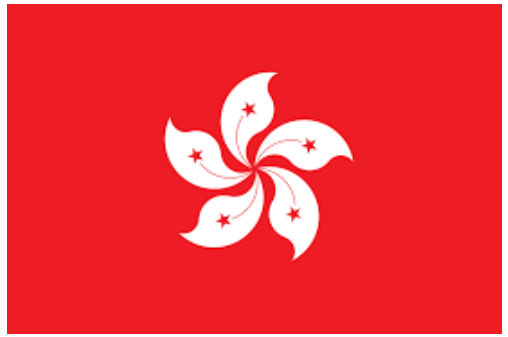
LIPID MANAGEMENT – PRIMARY PREVENTION

Primary prevention of ASCVD

- Supported statin use in observational studies
- Most retrospective studies are propensity-matched

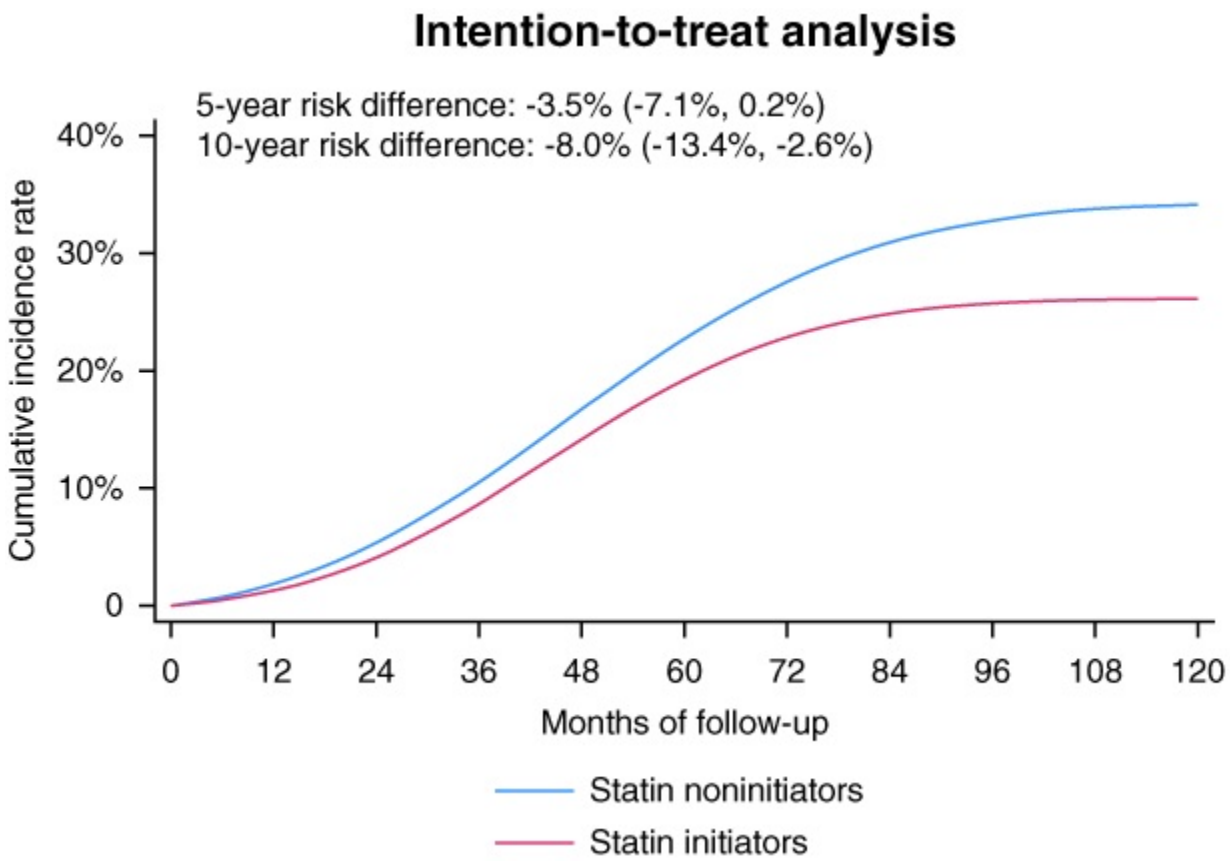
Emulation Target Study of Statin in stage 5 CKD

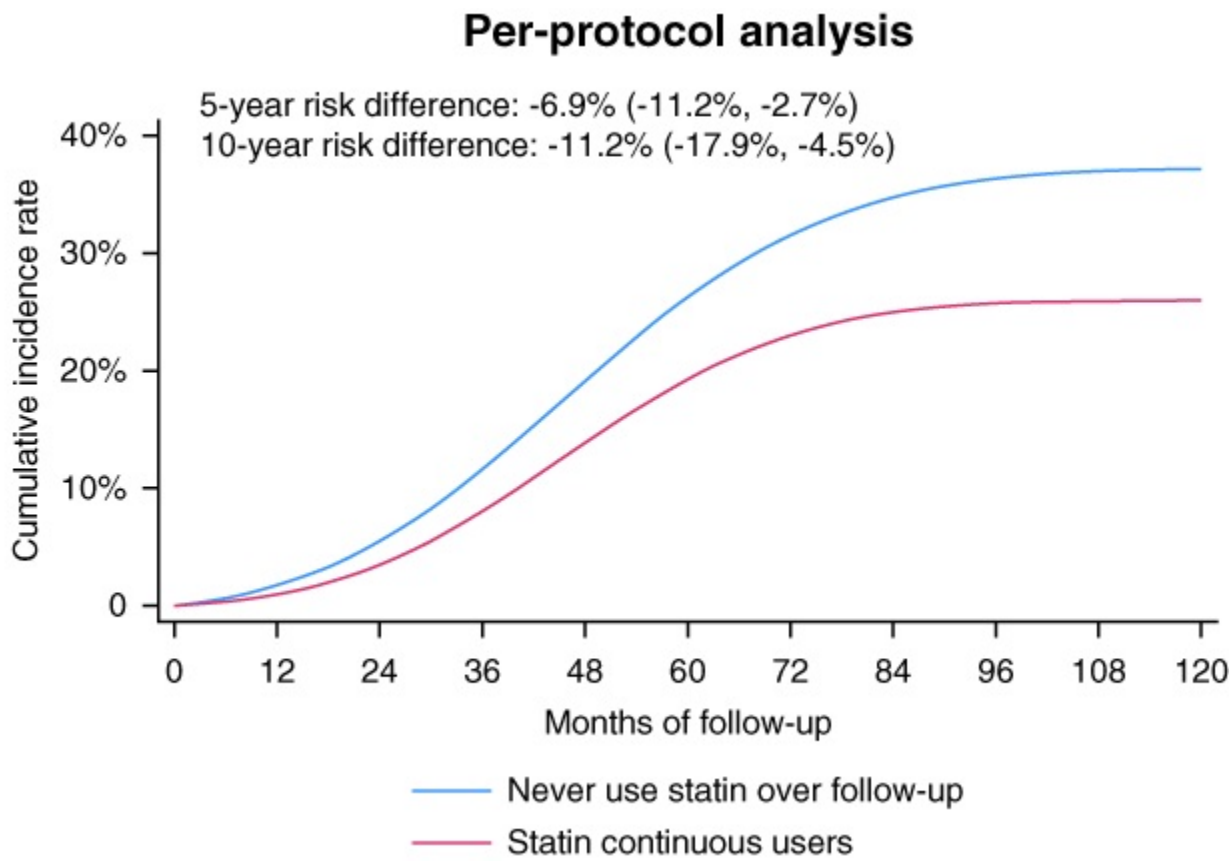
- Electronic health record
- 3019 statin-eligible individuals with kidney failure (eGFR < 15 ml/min/1.73 m^2) and elevated LDL cholesterol ≥100 mg/dl (≥ 2.5 mmol/L)



Cheng FW, Xu W, Tang SCW, Wan EYF. Long-term benefits and safety of statins in patients with kidney failure: a target trial emulation study. J Am Soc Nephrol 2025;36:882-889

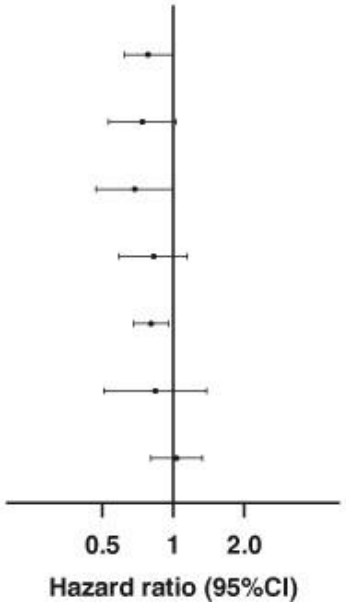
Lower risks of cardiovascular diseases





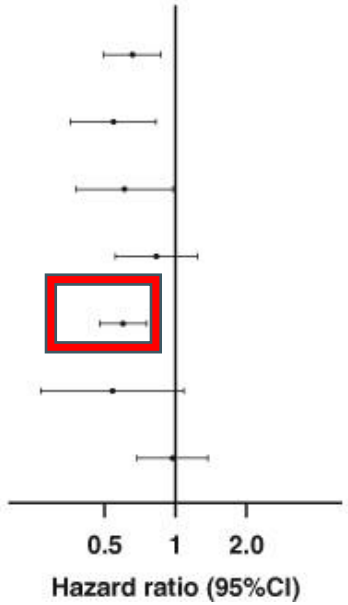
Intention-to-treat analysis

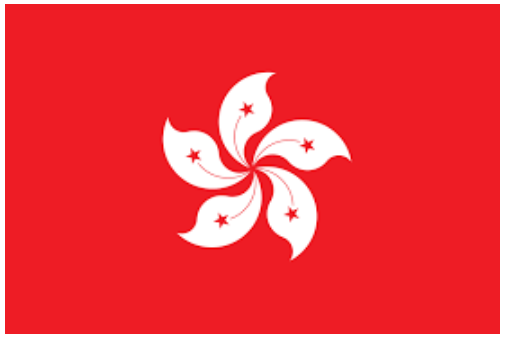
	Hazard ratio (95%CI)	5-year risk difference (%)	10-year risk difference (%)
Overall CVD	0.78 (0.62, 0.98)	-3.5 (-7.1, 0.2)	-8.0 (-13.4, -2.6)
Myocardial infarction	0.74 (0.53, 1.03)	-2.3 (-4.6, -0.1)	-4.5 (-8.9, -0.2)
Heart failure	0.69 (0.47, 1.00)	-2.5 (-5.2, 0.3)	-4.7 (-9.0, -0 5)
Stroke	0.82 (0.59, 1.15)	-1.1 (-4.0, 1.9)	-6.0 (-10.9, -1.2)
All-cause mortality	0.80 (0.68, 0.95)	-5.7 (-9.8, -1.6)	-1.5 (-8.3, 5.3)
Myopathies	0.84 (0.51, 1.38)	-0.6 (-3.0, 1.9)	-2.6 (-5.4, 0.2)
Liver dysfunction	1.03 (0.80, 1.32)	0.1 (-3.3, 3.4)	1.6 (-7.6, 10.9)



Per-protocol analysis

	Hazard ratio (95%CI)	5-year risk difference (%)	10-year risk difference (%)
	0.66 (0.50, 0.87)	-6.9 (-11.2, -2.7)	-11.2 (-17.9, -4.5)
	0.55 (0.36, 0.83)	-5.3 (-7.9, -2.7)	-5.8 (-12.7, 1.1)
	0.61 (0.38, 0.98)	-3.2 (-7.6, 1.2)	-6.4 (-12.0, -0.8)
	0.83 (0.56, 1.24)	-1.7 (-5.0, 1.6)	-6.1 (-12.6, 0.4)
	0.60 (0.48, 0.76)	-11.5 (-15.5, -7.6)	-9.9 (-19.8, -0.1)
	0.55 (0.27, 1.08)	-3.1 (-5.7, -0.6)	-6.0 (-8.8, -3.2)
	0.98 (0.69, 1.38)	0.0 (-4.9, 4.9)	0.1 (-10.0, 10.2)



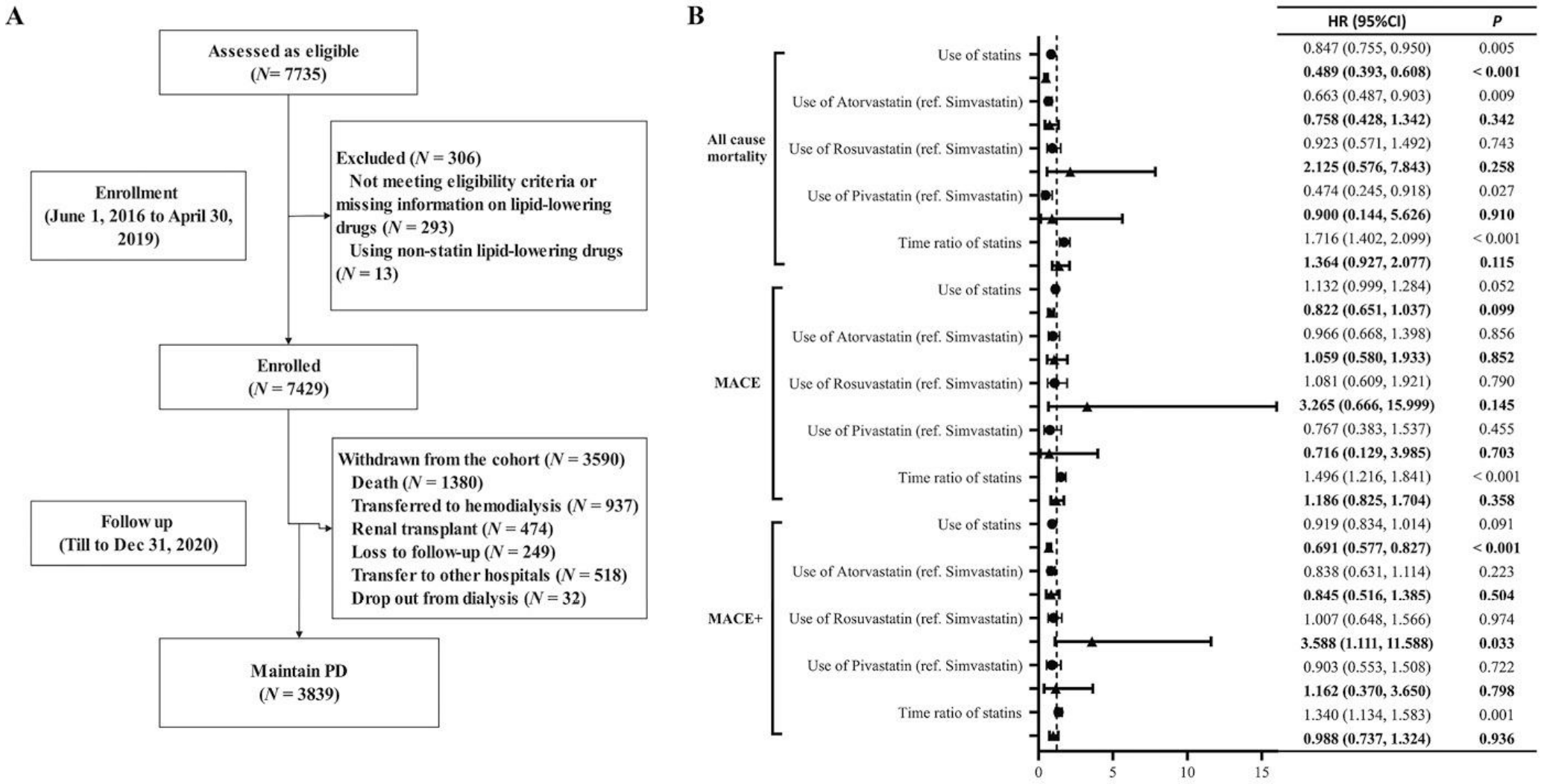


Cheng FW, Xu W, Tang SCW, Wan EYF. Long-term benefits and safety of statins in patients with kidney failure: a target trial emulation study. J Am Soc Nephrol 2025;36:882-889

Propensity-matched Cohort in PD

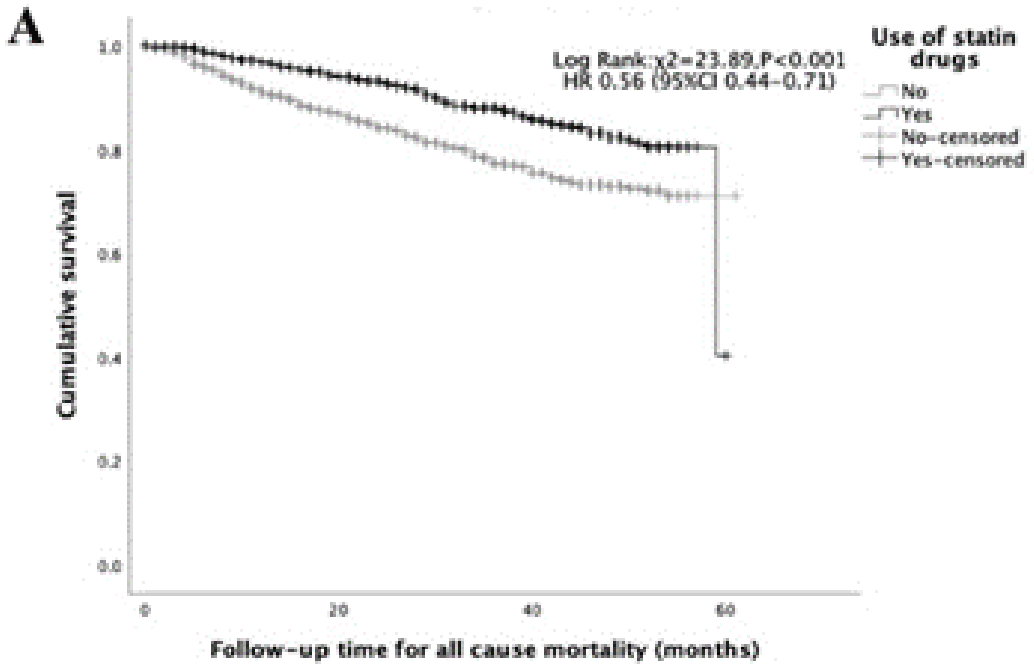
- PD Telemedicine-assisted Platform (PDTAP) Cohort Study, a nationwide large-scale PD cohort study in China
- 7429 patients on PD, from 27 hospitals, followed up for 29.0 months
- 2211 (29.8%) had used statins, median time of medication use 16.7 months

Gao S, Nan L, Li X, et al; PDTAP working group. Associations between statins and all-cause mortality and cardiovascular events among peritoneal dialysis patients: a multi-center large-scale cohort study. Chin Med J (Engl) 2025;138:2856-2858



Gao S, Nan L, Li X, et al; PDTAP working group. Associations between statins and all-cause mortality and cardiovascular events among peritoneal dialysis patients: a multi-center large-scale cohort study. Chin Med J (Engl) 2025;138:2856-2858

Lower All-Cause Mortality with Statin



Gao S, Nan L, Li X, et al; PDTAP working group. Associations between statins and all-cause mortality and cardiovascular events among peritoneal dialysis patients: a multi-center large-scale cohort study. Chin Med J (Engl) 2025;138:2856-2858

LIPID MANAGEMENT

- We suggest considering statin or statin/ezetimibe therapy for PD patients with established atherosclerotic cardiovascular disease (ASCVD) or very high cardiovascular risk (diabetes with hypertension, or low-density lipoprotein cholesterol LDL-C ≥190 mg/dL or 4.9 mmol/L), accounting for life expectancy on dialysis and comorbid disease (2B).
- We suggest against routine initiation of statin therapy in patients undergoing PD without ASCVD (2A).

Angiotensin receptor–neprilysin ARN inhibitor

HEART FAILURE MANAGEMENT

- We suggest that pharmacological treatment with heart failure indication under guideline-directed medical therapy (GDMT) be optimized in patients receiving PD (Not Graded).

HEART FAILURE MANAGEMENT – RENALISM

Most landmark RCT for heart failure excluded patients with eGFR < 20

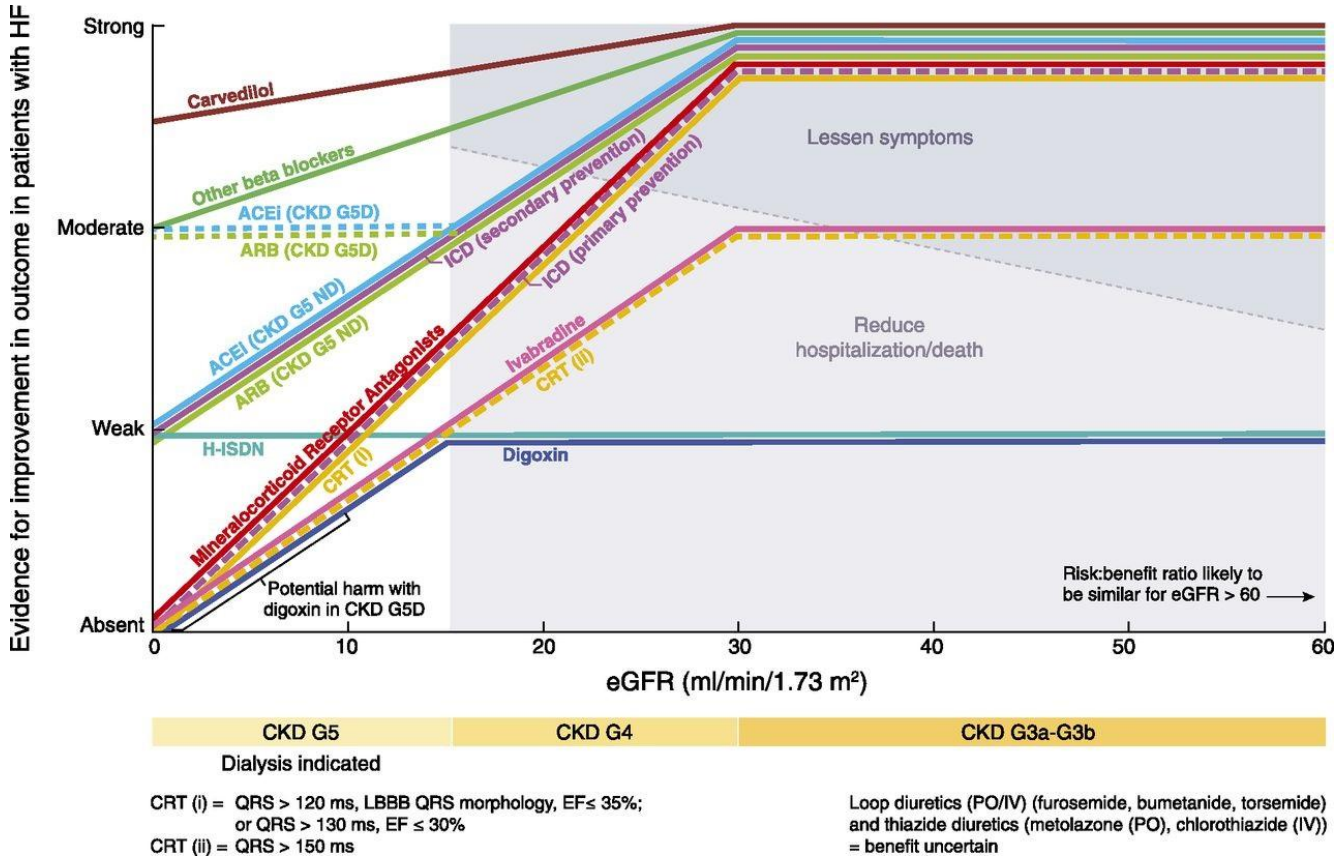
- FINEARTS-HF
- EMPEROR-Reduced
- DAPA-HF
- PARADIGM-HF

Evidence of HFrEF Rx - *AJKD* Core Curriculum

HFrEF therapies	CKD 1 and 2	CKD 3	CKD 4	CKD 5
Beta Blocker	Strong	Strong	Limited	Absent
MRA	Strong	Strong	Limited	Absent
Non-steroidal MRA	Strong	Strong	Strong (up to eGFR> 25 cc/min)	Absent
ARNi	Strong	Strong	Limited	Absent
ACEi/ARB	Strong	Strong	Limited	Absent
Diuretics	Absent	Absent	Absent	Absent
SGLT2i	Strong	Strong	Strong (eGFR> 20 cc/min)	Limited

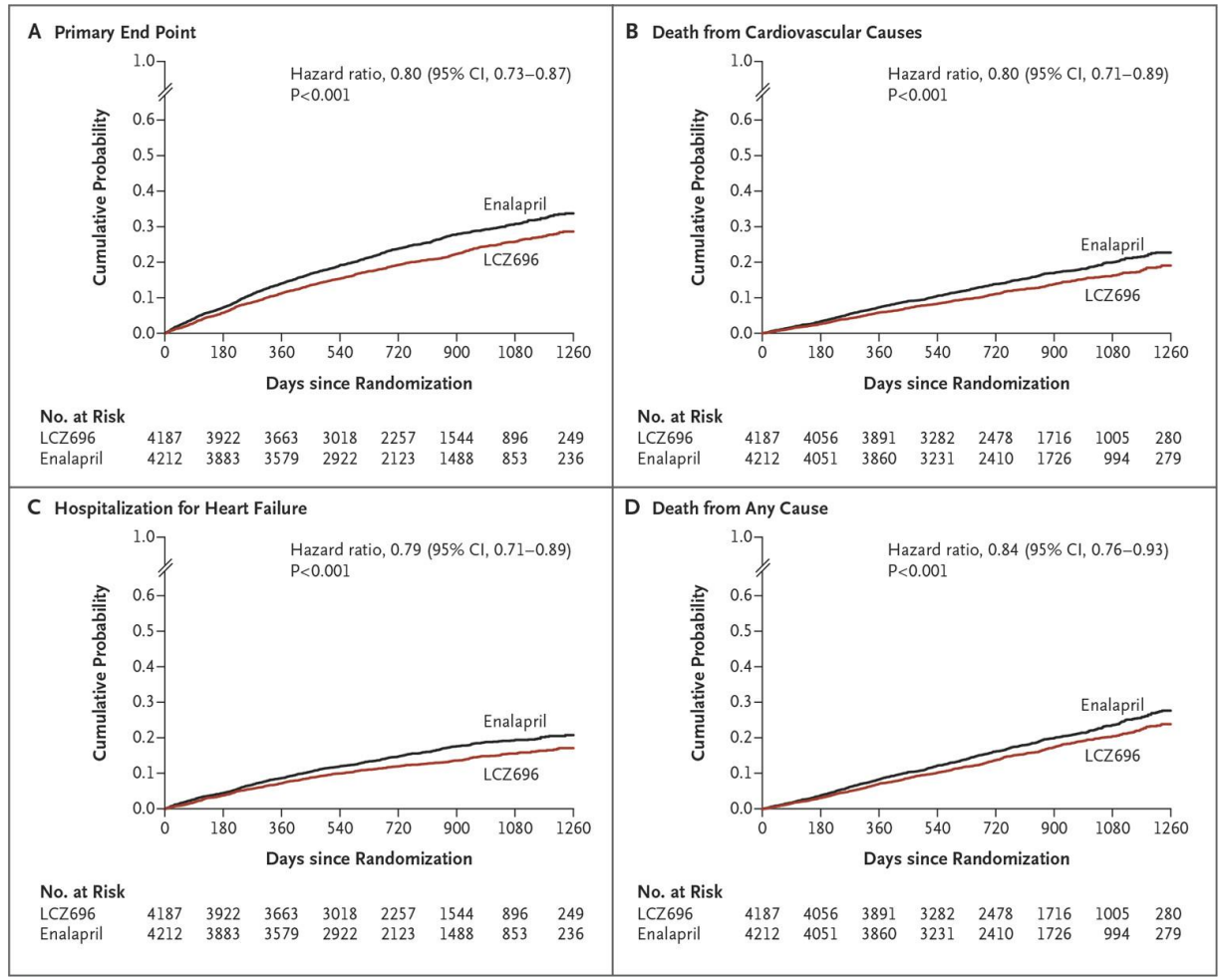
Lo KB, Janakiraman A, Rangaswami J. Kidney dysfunction in heart failure: Core Curriculum 2025. Am J Kidney Dis 2025;86:109-124

KDIGO Consensus Conference Report



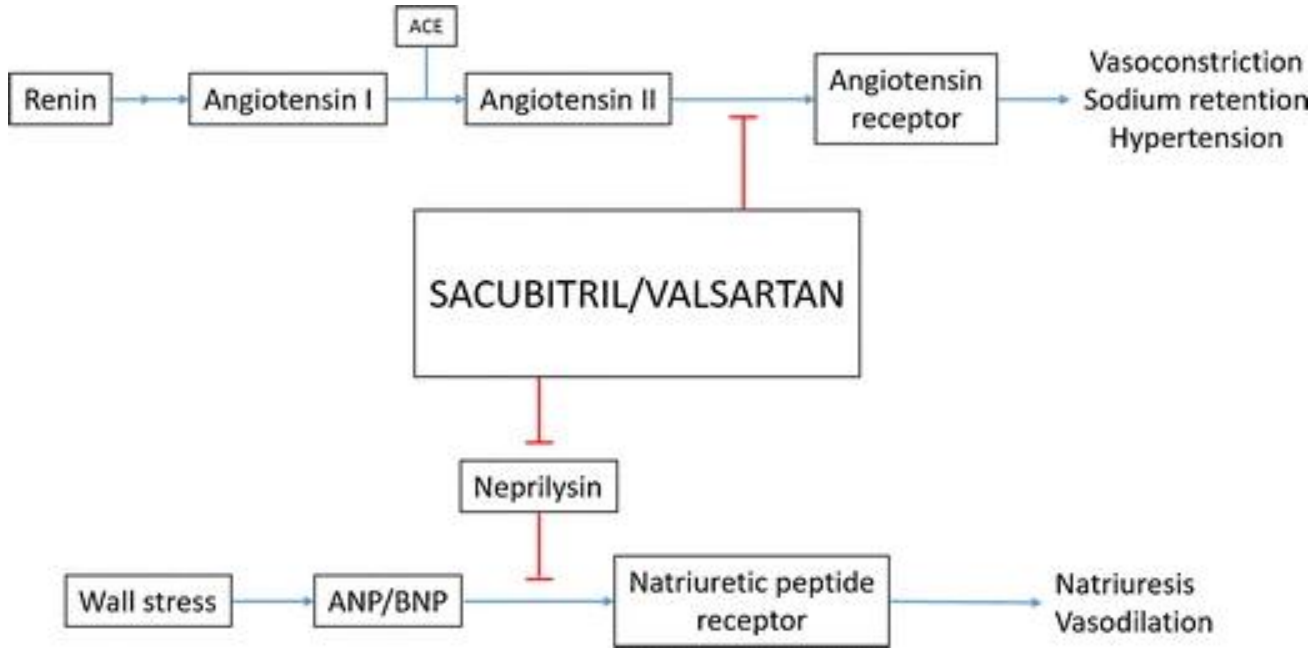
Banerjee D, Rosano G, Herzog CA. Management of heart failure patient with CKD. Clin J Am Soc Nephrol 2021;16:1131-1139

PARADIGM-HF – ARNI



McMurray JJ, Packer M, Desai AS, Gong J, Lefkowitz MP, Rizkala AR, Rouleau JL, Shi VC, Solomon SD, Swedberg K, Zile MR; PARADIGM-HF Investigators and Committees. Angiotensin-neprilysin inhibition versus enalapril in heart failure. N Engl J Med 2014;371:993-1004

SACUBITRIL/VALSARTAN



Kang G, Banerjee D. Neprilysin inhibitors in cardiovascular disease. Curr Cardiol Rep 2017;19:16

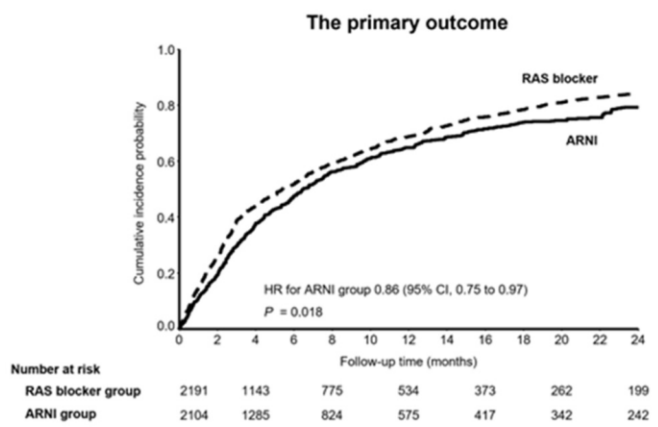
Observational Data

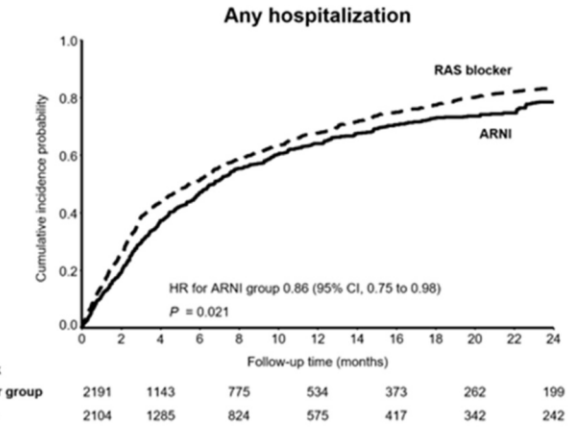
National Health Insurance Service database

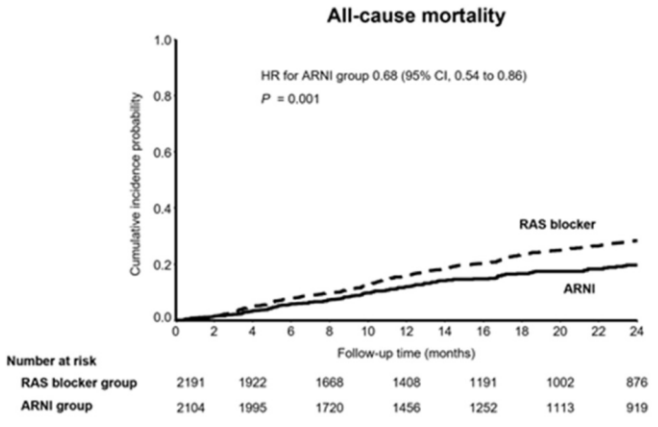
- Patients with HFrEF and kidney failure receiving dialysis who were prescribed either ARNI or renin-angiotensin system (RAASi)
- Inverse probability of treatment weighting: 2104 patients on ARNI and 2191 on RAASi

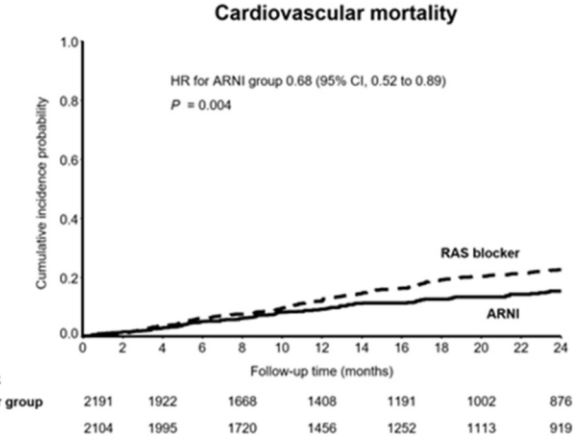
Jung MH, Cho DH, Choi J, Kim MN, Lee CJ, Son JW, Kim Y, Youn JC, Yoo BS. Angiotensin receptor-neprilysin inhibitors in concurrent heart failure with reduced ejection fraction and kidney failure. ESC Heart Fail 2025;12:3405-3415

Lower all-cause mortality, any hospitalization and cardiovascular mortality with ARNI



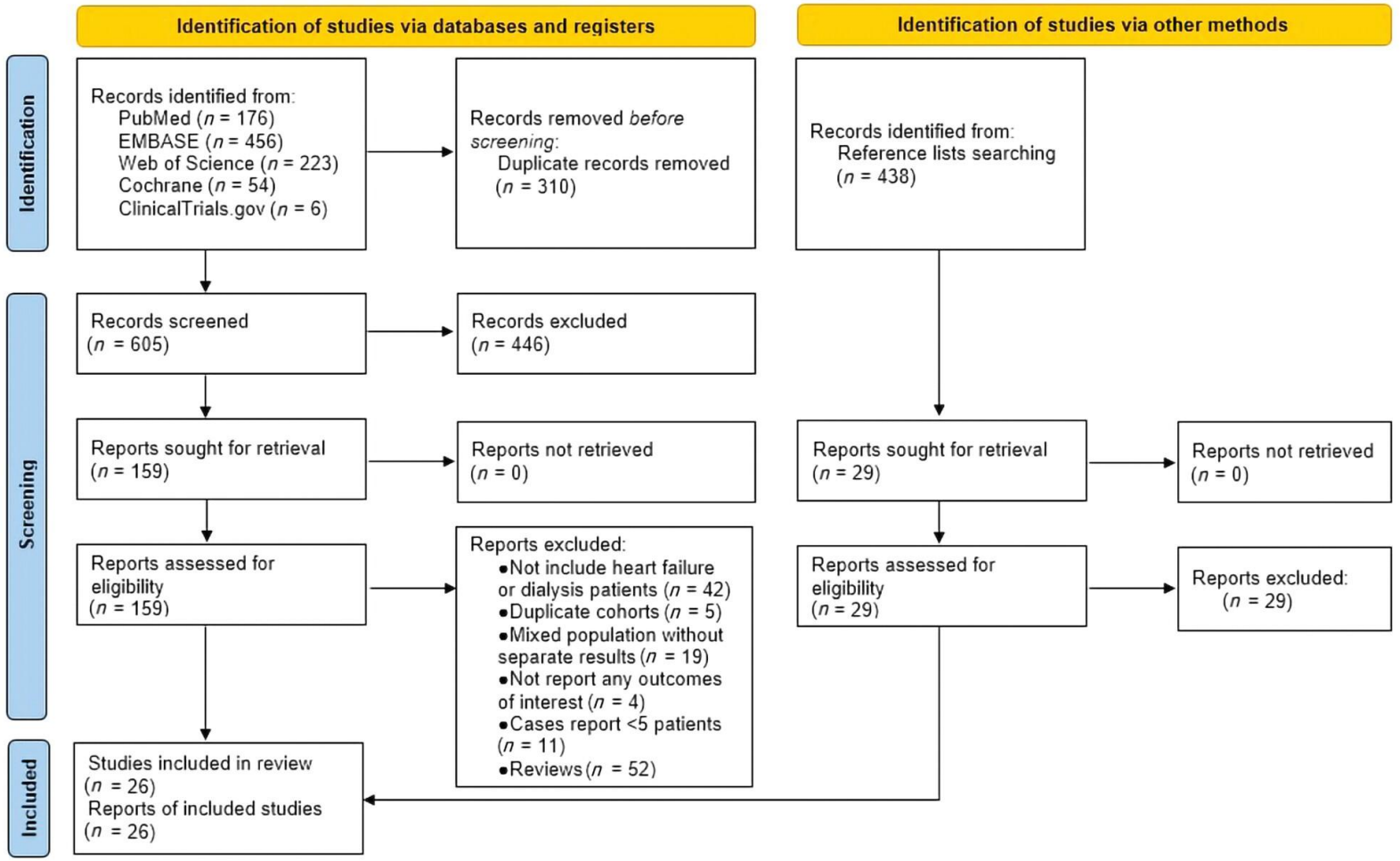




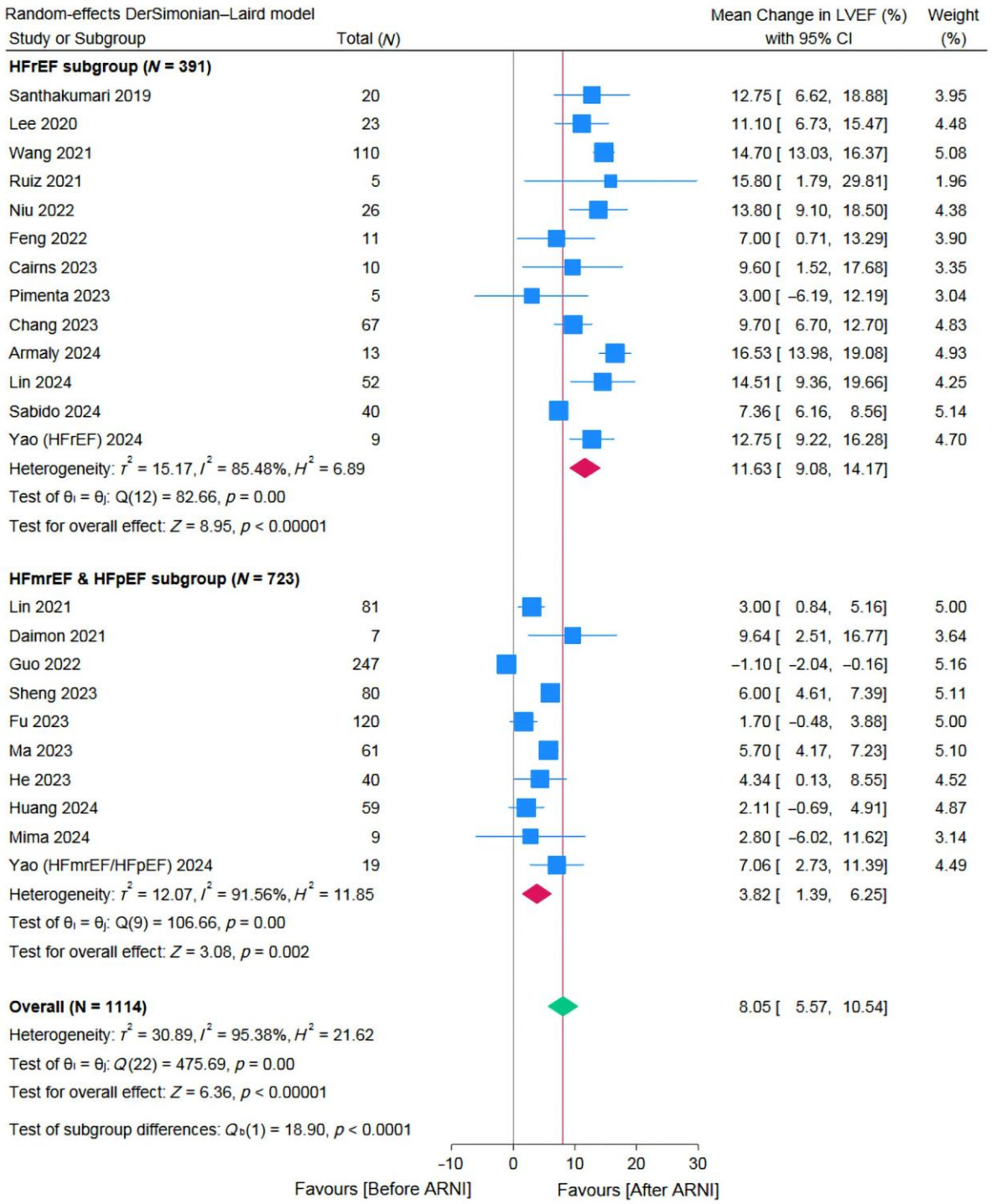


Jung MH, Cho DH, Choi J, Kim MN, Lee CJ, Son JW, Kim Y, Youn JC, Yoo BS. Angiotensin receptor-neprilysin inhibitors in concurrent heart failure with reduced ejection fraction and kidney failure. ESC Heart Fail 2025;12:3405-3415

ARNI



Nguyen DV, Le TN, Truong BQ, Nguyen HTT. Efficacy and safety of angiotensin receptor-neprilysin inhibition in heart failure patients with end-stage kidney disease on maintenance dialysis: a systematic review and meta-analysis. Eur J Heart Fail 2025;27:72-84



Improvement in left ventricular ejection fraction (LVEF)

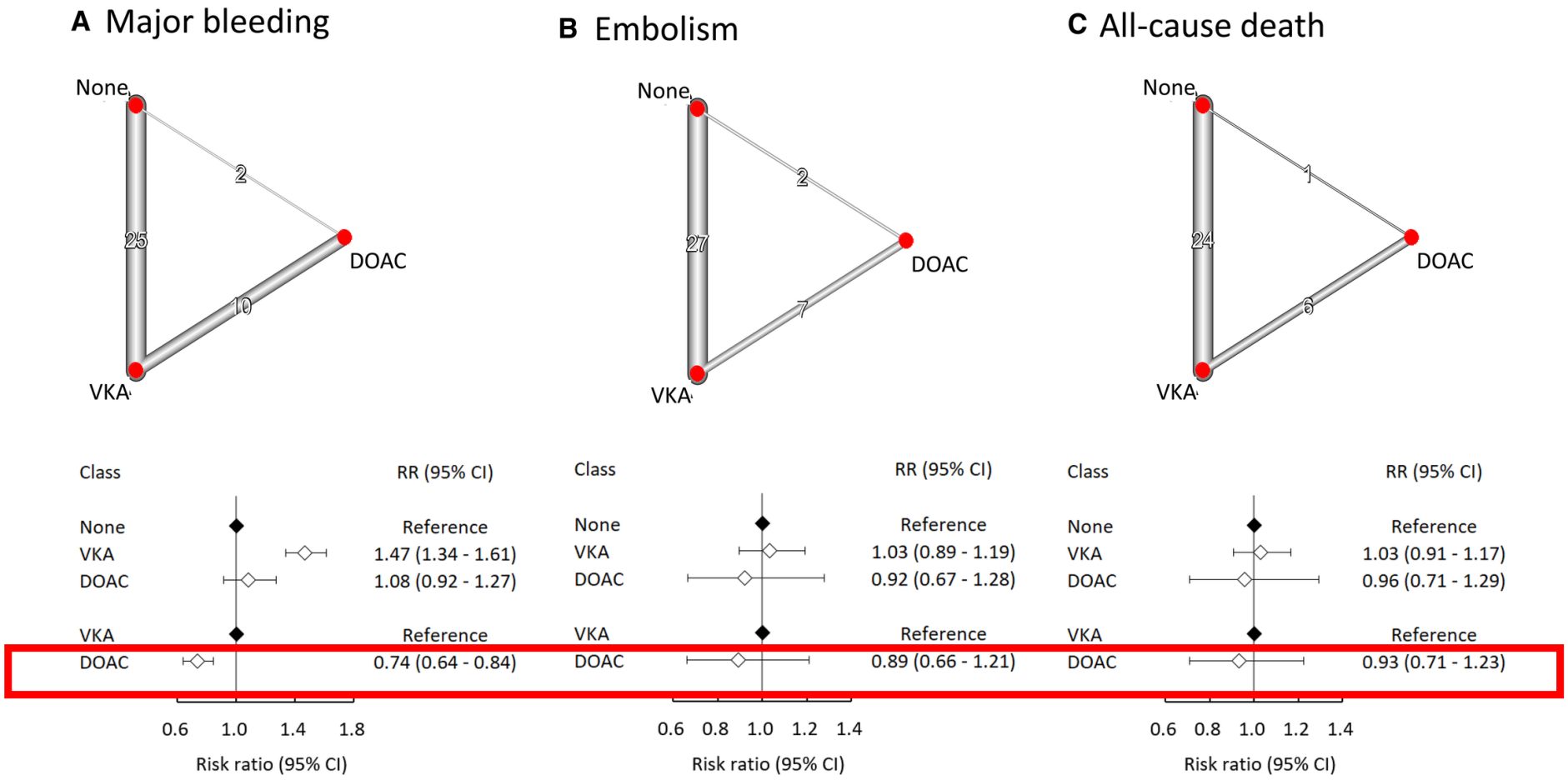
Nguyen DV, Le TN, Truong BQ, Nguyen HTT. Efficacy and safety of angiotensin receptor-neprilysin inhibition in heart failure patients with end-stage kidney disease on maintenance dialysis: a systematic review and meta-analysis. Eur J Heart Fail 2025;27:72-84

HEART FAILURE MANAGEMENT

- We recommend sacubitril-valsartan use in patients on PD with heart failure with a reduced ejection fraction (HFrEF) and a history of New York Heart Association (NYHA) class II to III symptoms; ACEi and ARB should be considered in patients with contraindications, intolerance, or inaccessibility to ARNI (1C).

ANTICOAGULATION

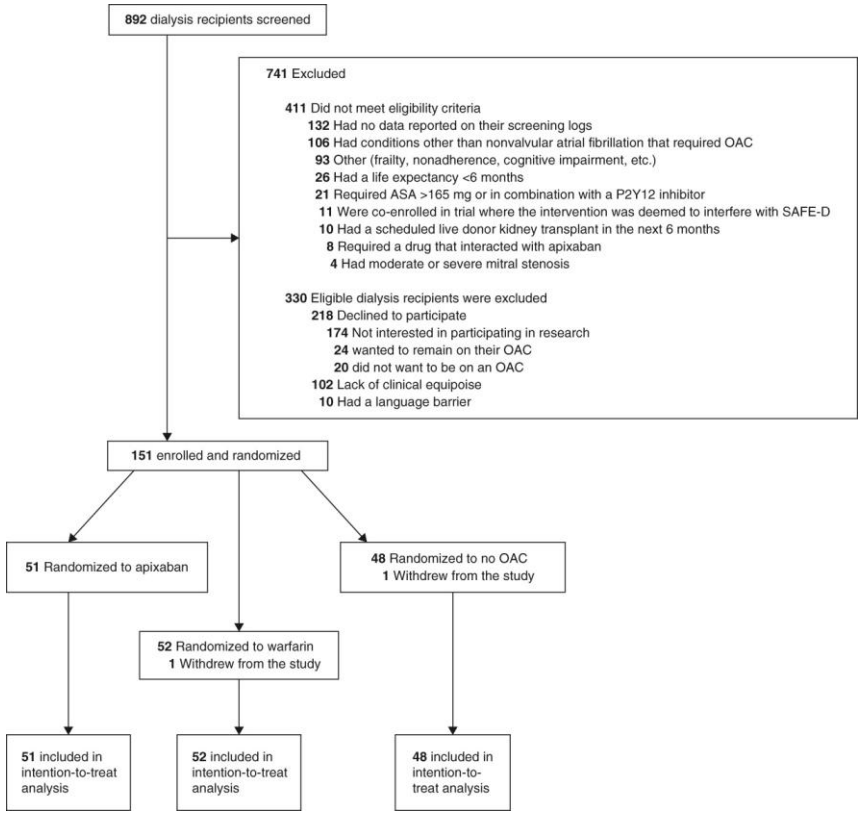
Systematic Review and Meta-analysis

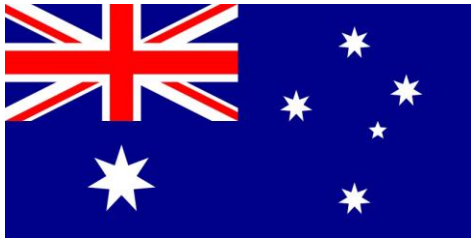


Kao TW, Chen ZW, Lin YH. Anticoagulation for patients with concomitant atrial fibrillation and end-stage renal disease: a systematic review and network meta-analysis. J Am Heart Assoc 2024;13:e034176

RCT: SAFE-D

Strategies for the Management of Atrial Fibrillation in Patients Receiving Dialysis (SAFE-D)

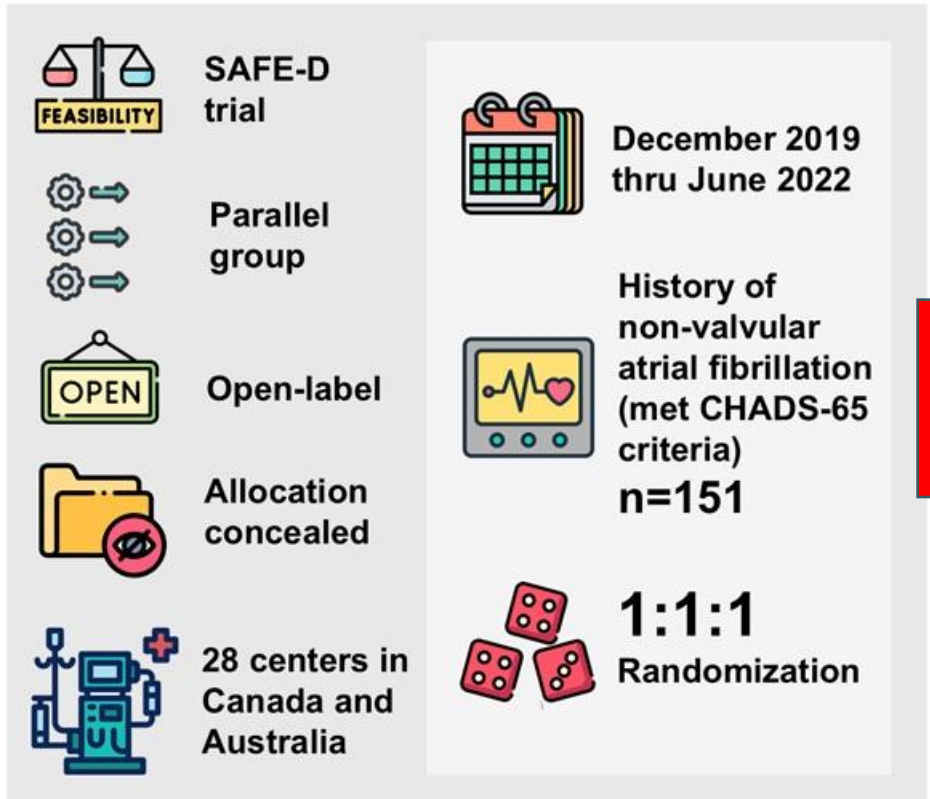


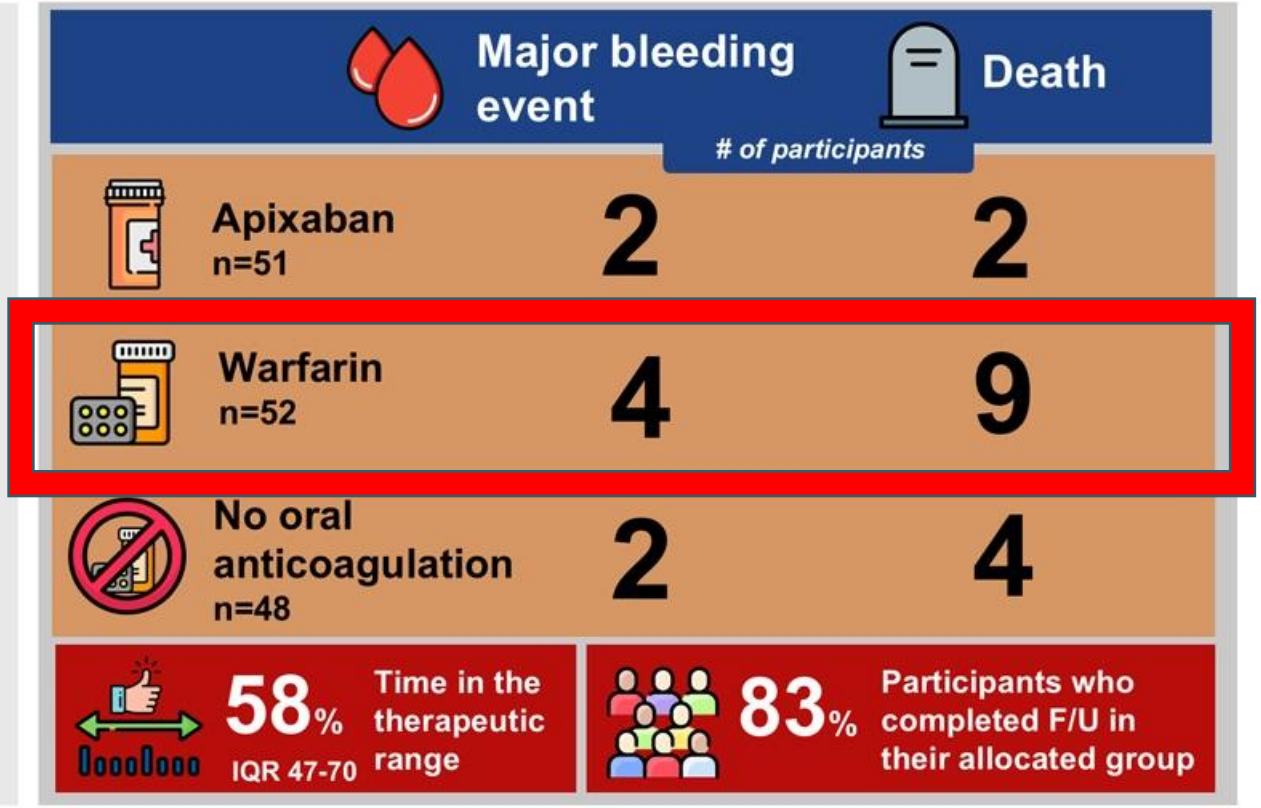


Harel Z, Smyth B, Badve SV, Blum D, Beaubien-Souligny W, Silver SA, Clark E, Suri R, Mavrakanas TA, Sasal J, Prasad B, Eikelboom J, Tennankore K, Rigatto C, Prce I, Madore F, Mac-Way F, Steele A, Zeng Y, Sholzberg M, Dorian P, Yan AT, Sood MM, Gladstone DJ, Tseng E, Kitchlu A, Walsh M, Sapir D, Oliver MJ, Krishnan M, Kiaii M, Wong N, Kotwal S, Battistella M, Acedillo R, Lok C, Weir M, Wald R. Anticoagulation for patients with atrial fibrillation receiving dialysis: a pilot randomized controlled trial. J Am Soc Nephrol 2025;36:901-910

Strategies for the Management of Atrial Fibrillation in patiEnts Receiving Dialysis (SAFE-D)

JASN
Journal of the American Society of Nephrology
Clinical Research





Conclusions: This study demonstrated the feasibility of recruitment and adherence in a trial that compared different anticoagulation strategies in patients with atrial fibrillation receiving dialysis.

Ziv Harel, Brendan Smyth, Sunil V. Badve, et al. ***Anticoagulation for Patients with Atrial Fibrillation Receiving Dialysis: A Pilot Randomized Controlled Trial***. JASN doi: 10.1681/ASN.0000000000000495.
Visual Abstract by Edgar Lerma, MD, FASN

Systematic Review and Meta-analysis: RCT

Studies	Study type	Trial acronyms	Location	Comparison	Dialysis characteristics	Sample size	Age (years)	Female (%)	DOAC type and dosage	TTR for VKA group	Follow-up
Reinecke et al. (2023)	PROBE RCT	AXADIA-AFNET 8 trial; NCT02933697	Germany; 2017–2022	Apixaban versus Phenprocoumon	Hemodialysis: 93.8%; Peritoneal: 6.2%	*n* = 97 API (48) and phenprocoumon (49)	74.7	30%	API; 2.5 mg BID	50.7%	API: 429 days VKA: 506 days
Pokorney et al. (2022)	Multicenter RCT; PROBE	RENAL-AF trial; NCT02942407	42 U.S. clinical sites; 2017–2019	API versus Warfarin	Hemodialysis	*n* = 154 API (82) and warfarin (72)	68.0	56%	API; 5 mg BID (2.5 mg BID for patients ≥80 years, weight ≤60 kg)	44%	API: 330 days VKA: 340 days
De Vriese et al. (2021)	Multicenter RCT	Valkyrie trial; NCT03799822	3 sites in Belgium; 2015–2019	RIV versus VKA versus RIV + Vitamin K2	Hemodialysis	*n* = 132 Rivaroxaban (88) and VKA (44)	RIV: 79.9 and VKA: 80.3	33%	RIV; 10 mg QD	48%	1.88 years
Harel et al. (2024)	Pilot RCT	SAFE-D trial; NCT03987711	28 centers in Canada and Australia; 2019–2022	API versus Warfarin versus No OAC	Hemodialysis: 93%; Peritoneal: 7%	*n* = 103 API (51) and warfarin (52)	API: 72 and VKA: 71	22.3%	API; 5 mg BID (2.5 mg BID for patients ≥80 years, weight ≤60 kg)	58%	26 weeks

Kaisaier W, Chen Y, Lip GYH, Liu C, Zhu W. Safety and efficacy of factor Xa inhibitors in atrial fibrillation patients on dialysis: evidence from four randomized controlled trials. Thromb Haemost 2025 Epub ahead of print

Systematic Review and Meta-analysis: RCT

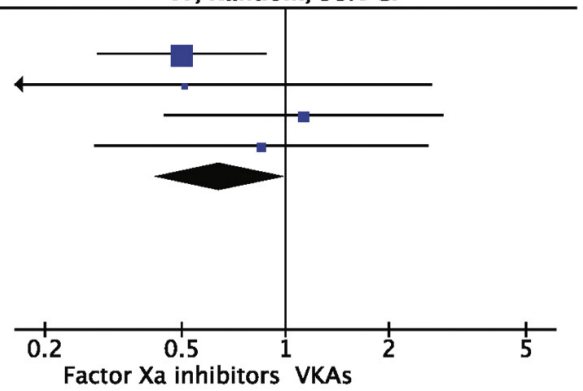
Primary safety

A

Study or Subgroup	Factor Xa inhibitors Events	Total	VKAs Events	Total	Weight	Risk Ratio IV, Random, 95% CI
1.1.1 Major bleeding						
De Vriese et al. 2021	17	88	17	44	57.4%	0.50 [0.28, 0.88]
Harel et al. 2024	2	51	4	52	6.7%	0.51 [0.10, 2.66]
Pokorney et al. 2022	9	82	7	72	21.1%	1.13 [0.44, 2.88]
Reinecke et al. 2023	5	48	6	49	14.7%	0.85 [0.28, 2.60]
Subtotal (95% CI)		**269**		**217**	**100.0%**	**0.64 [0.42, 0.99]**
Total events	33		34			

Heterogeneity: $Tau^2 = 0.00$; $Chi^2 = 2.46$, df = 3 ($p = 0.48$); $I^2 = 0\%$

Test for overall effect: Z = 2.02 ($p = 0.04$)



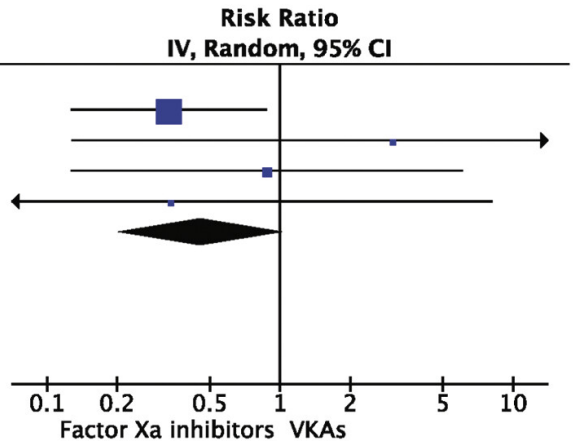
Primary efficacy

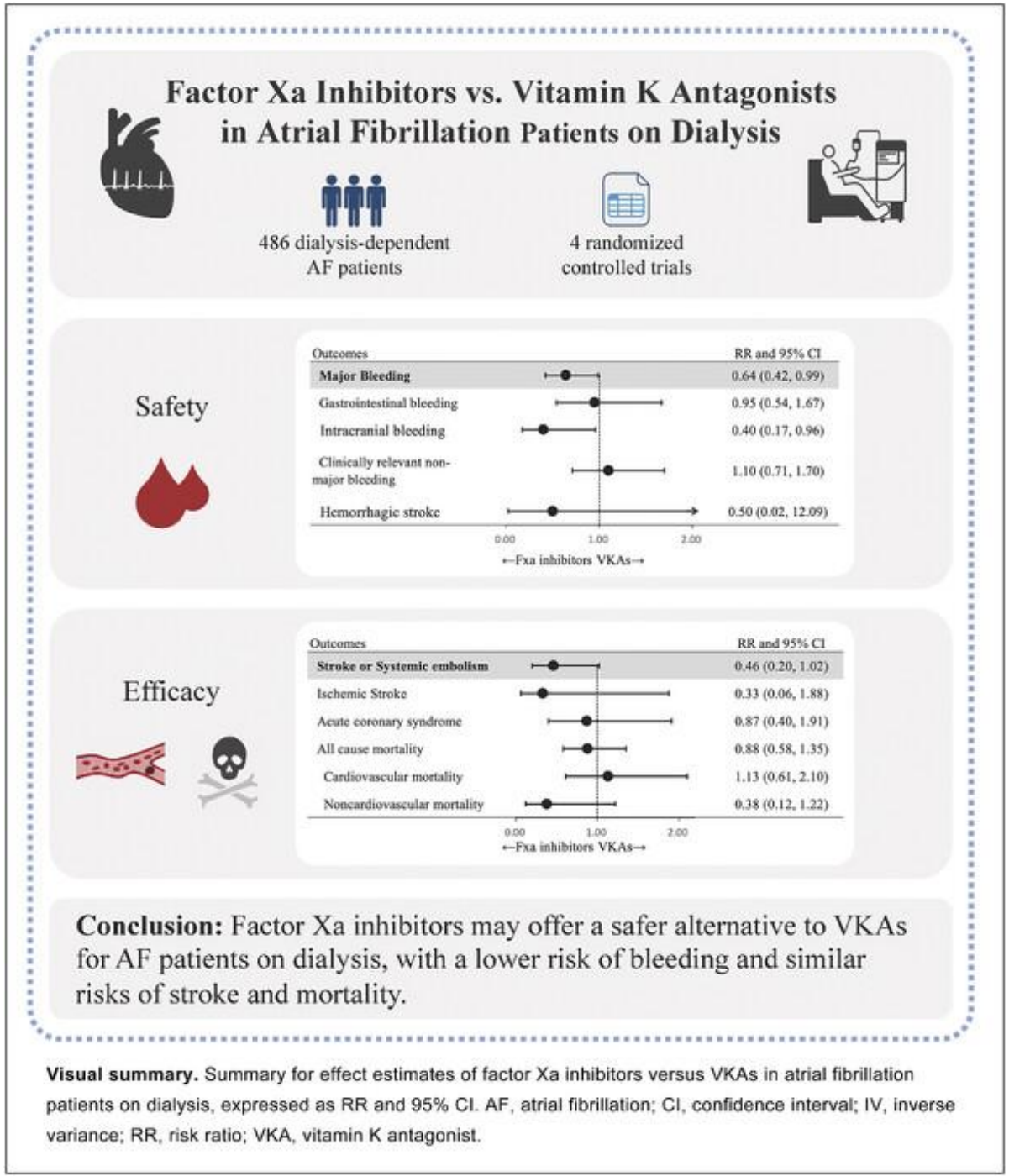
B

Study or Subgroup	Factor Xa inhibitors Events	Total	VKAs Events	Total	Weight	Risk Ratio IV, Random, 95% CI
2.1.1 Stroke or systemic embolism						
De Vriese et al. 2021	6	88	9	44	69.7%	0.33 [0.13, 0.88]
Harel et al. 2024	1	51	0	52	6.5%	3.06 [0.13, 73.36]
Pokorney et al. 2022	2	82	2	72	17.4%	0.88 [0.13, 6.07]
Reinecke et al. 2023	0	48	1	49	6.5%	0.34 [0.01, 8.15]
Subtotal (95% CI)		**269**		**217**	**100.0%**	**0.46 [0.20, 1.02]**
Total events	9		12			

Heterogeneity: $Tau^2 = 0.00$; $Chi^2 = 2.25$, df = 3 ($p = 0.52$); $I^2 = 0\%$

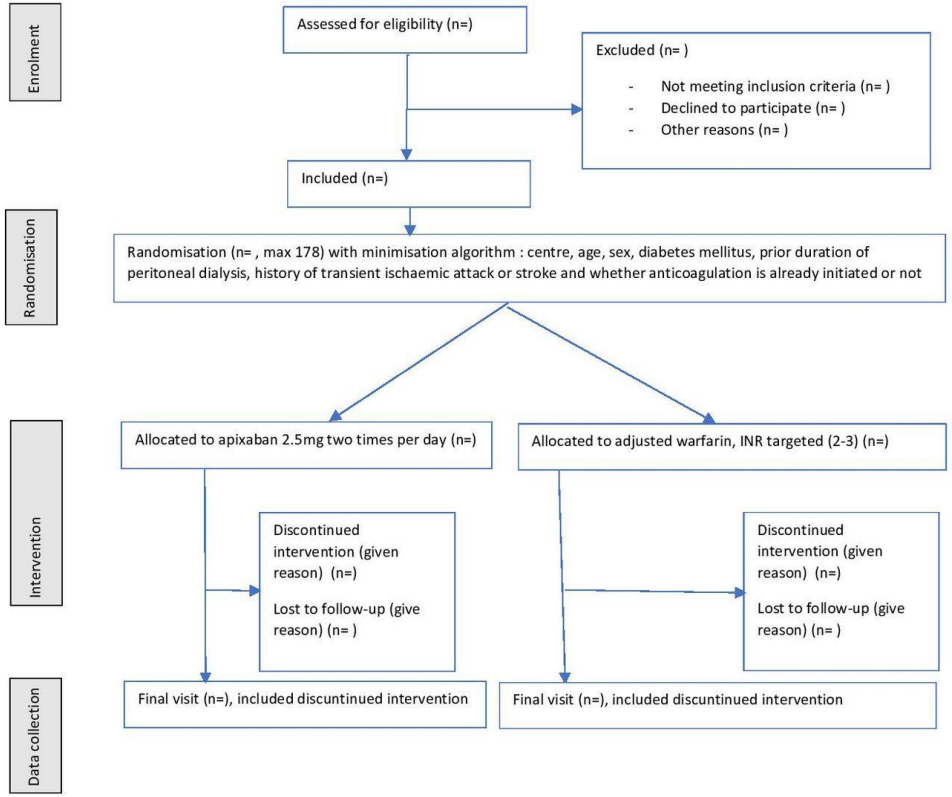
Test for overall effect: Z = 1.91 ($p = 0.06$)





Visual summary. Summary for effect estimates of factor Xa inhibitors versus VKAs in atrial fibrillation patients on dialysis, expressed as RR and 95% CI. AF, atrial fibrillation; CI, confidence interval; IV, inverse variance; RR, risk ratio; VKA, vitamin K antagonist.

RCT Study in PD – to be finished 2027



Planned sample size:

178 participants from 20 PD centres

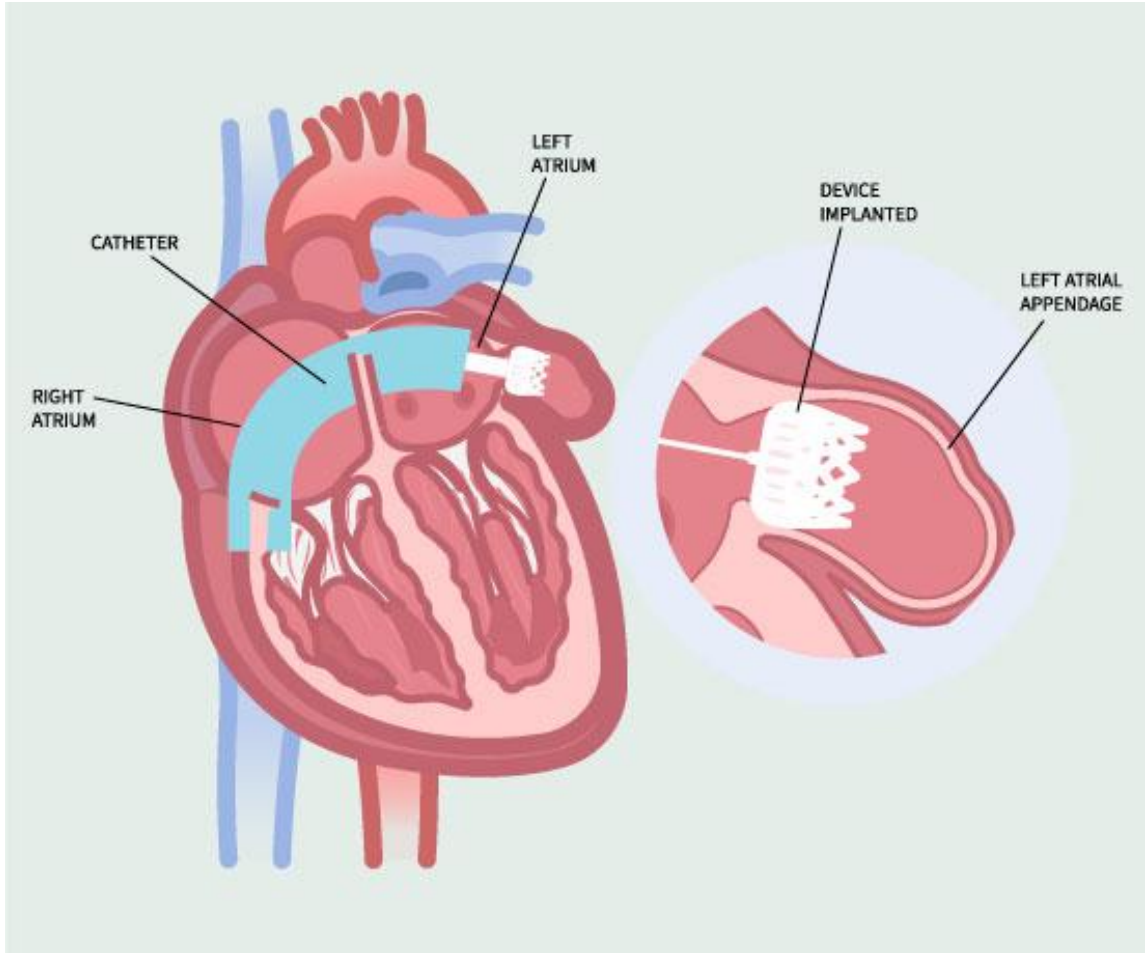
Ficheux M, Peyro-Saint-Paul L, Balayn D, Lecrux B, Brossier M, Morin A, Lanot A, Peron C, Boulanger M, Brionne M, Beygui F, Parienti JJ, Lobbedez T, Béchade C. Safety and efficacy of apixaban versus warfarin in peritoneal dialysis patients with non-valvular atrial fibrillation: protocol for a prospective, randomised, open-label, blinded endpoint trial (APIDP2). BMJ Open 2024;14:e089353

CARDIAC ARRHYTHMIAS MANAGEMENT

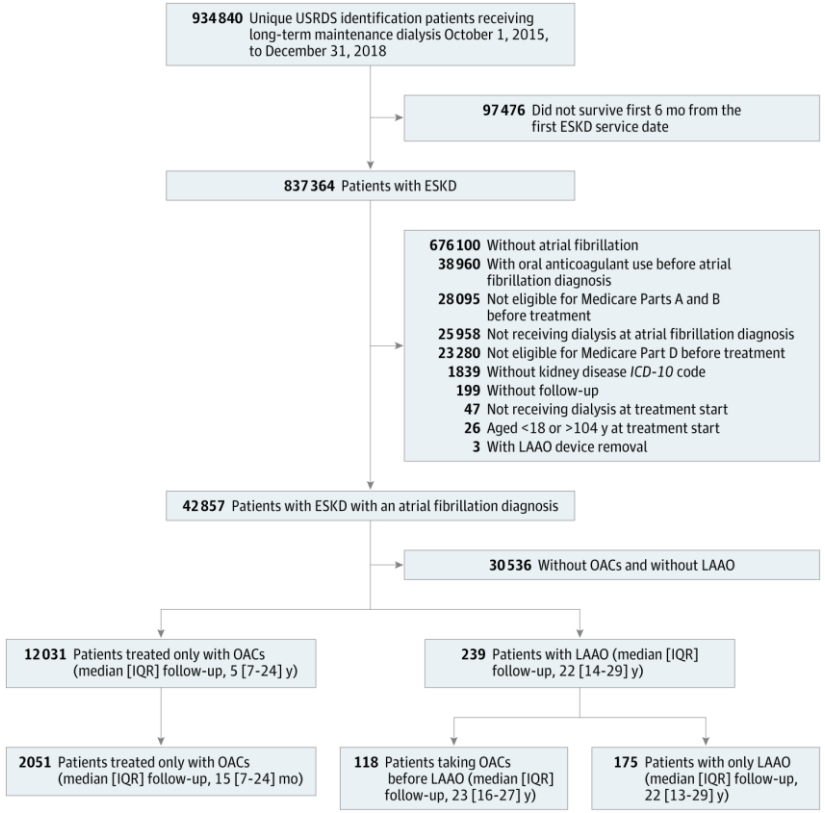
- We suggest shared medical decision-making to consider direct oral anticoagulation (DOAC) in high-risk patients on PD with atrial fibrillation (2C).
- We suggest no anticoagulation instead of a vitamin K antagonist in patients on PD with a low risk of stroke or high bleeding risk (2D).

LAAO

LEFT ATRIAL APPENDAGE OCCLUSION



LAAO – Propensity matching



USRDS data with Medicare claims

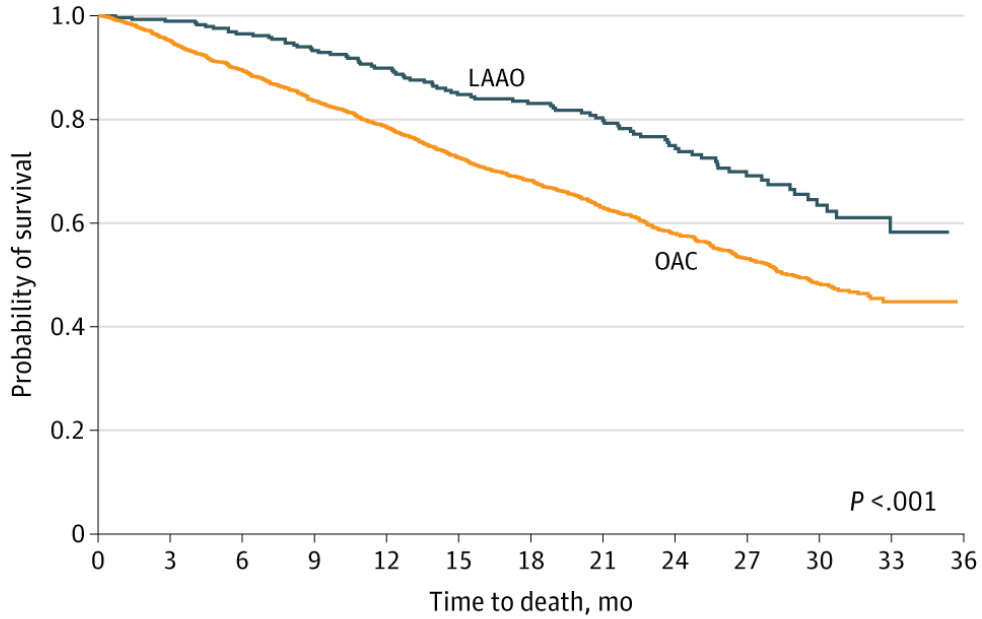
N = 2344 patients on dialysis (150 on PD, 6.4%)

Two groups with propensity score matching

LAAO, oral anticoagulation

Dhar G, Phadnis MA, Hunt SL, Du HE, Ong V, Khandekar N, Shireman TI, Lynch D, Randhawa S, Deshmukh A, Vallurapalli S, Jain N. Left atrial appendage occlusion vs anticoagulants in dialysis with atrial fibrillation. JAMA Netw Open 2025;8:e2530990

LAAO – Lower all-cause mortality

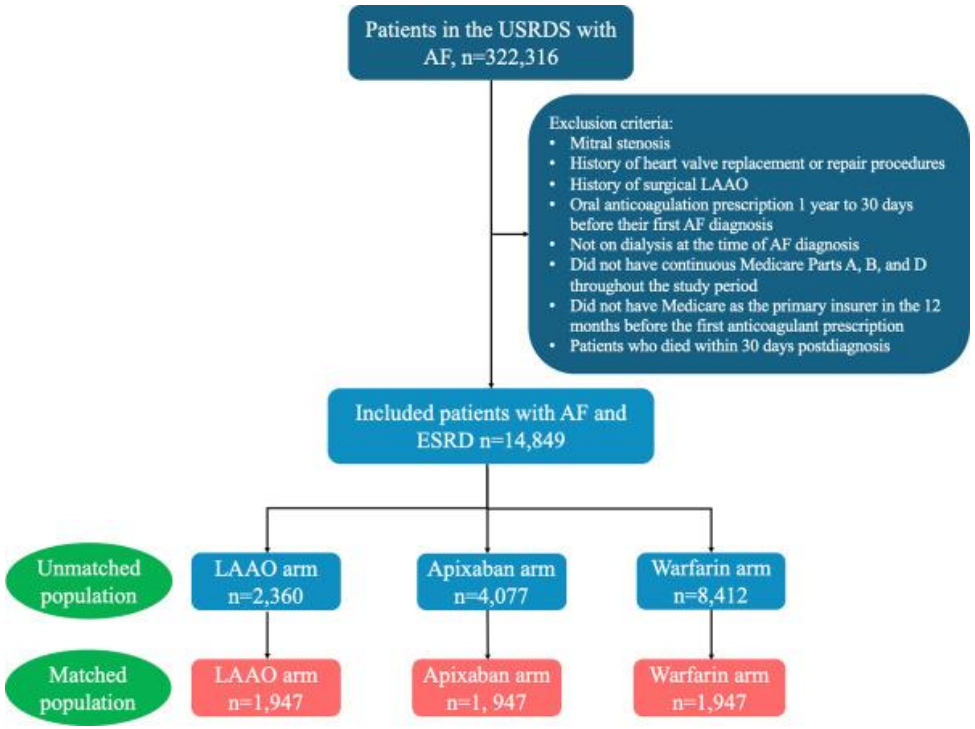


No. at risk

LAAO	293	274	234	187	130	58	0
OAC	2051	1652	1246	874	492	203	0

Dhar G, Phadnis MA, Hunt SL, Du HE, Ong V, Khandekar N, Shireman TI, Lynch D, Randhawa S, Deshmukh A, Vallurapalli S, Jain N. Left atrial appendage occlusion vs anticoagulants in dialysis with atrial fibrillation. JAMA Netw Open 2025;8:e2530990

LAAO – Propensity matching

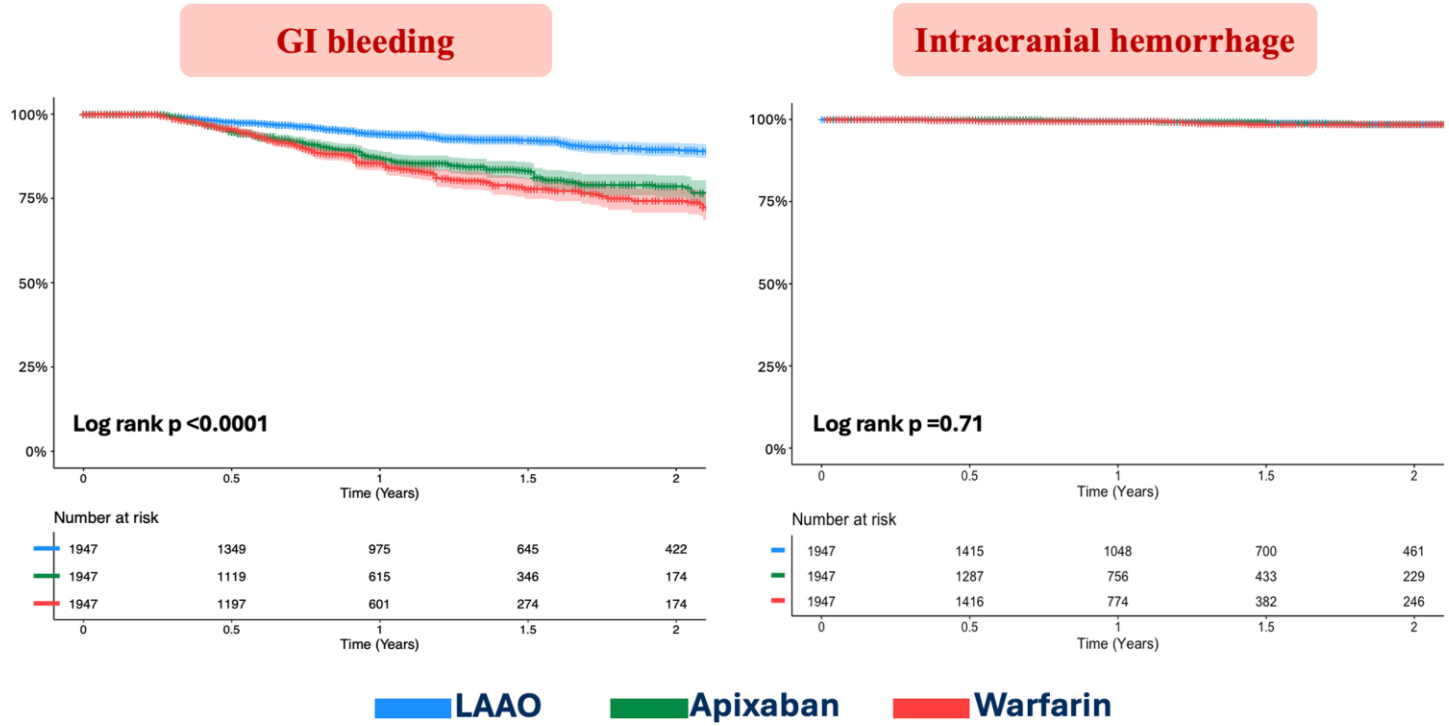


14,849 patients with kidney failure and AF

Three groups with propensity score matching
LAAO, apixaban, warfarin

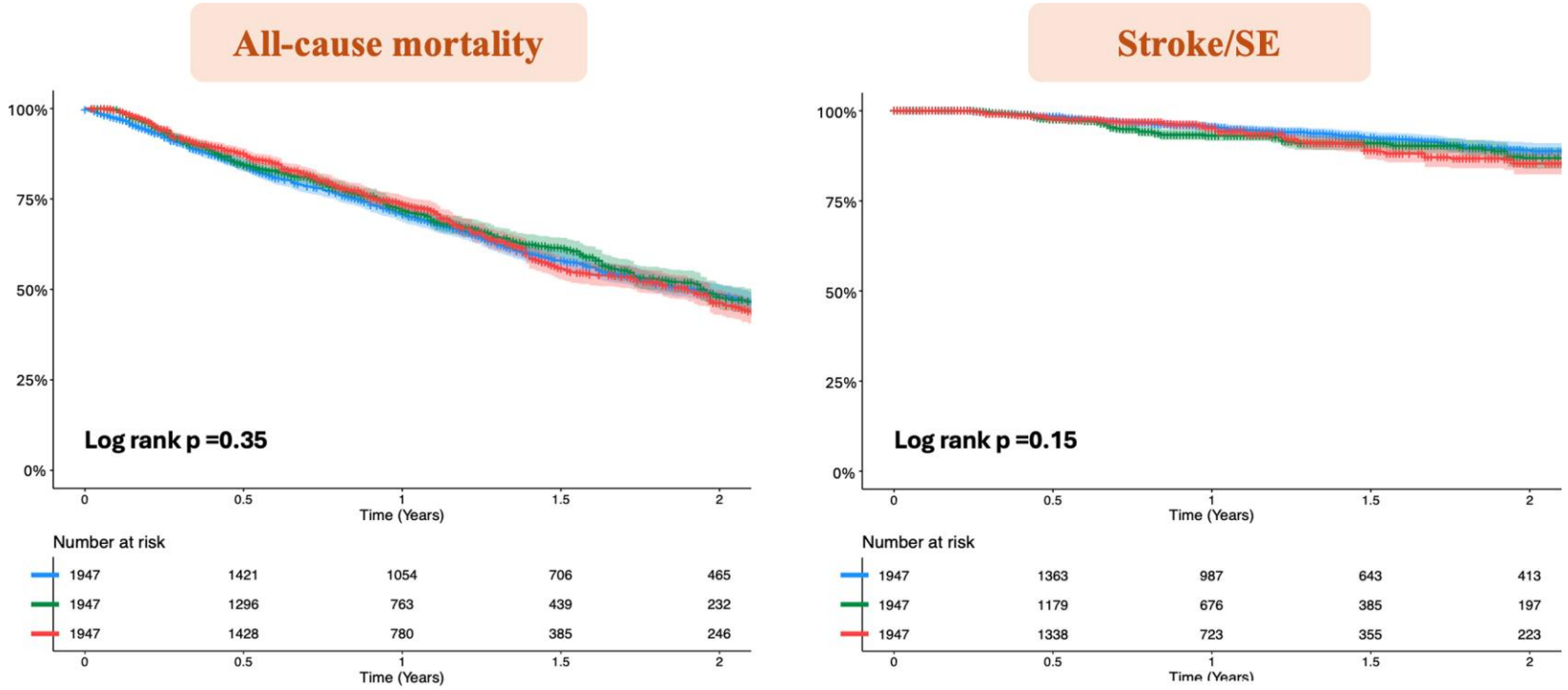
Al-Abcha A, Saleh G, Sledge H, Abbasi M, Ismayl M, Killu AM, Simard T, Liu X, Hibbert B, Friedman PA, Siontis KC, Alkhouli M. Outcomes of stroke prevention strategies in patients with atrial fibrillation and end-stage renal disease. JACC Cardiovasc Interv 2025;18:2614-2624

LAAO: Lowest major and GI bleeding



Al-Abcha A, Saleh G, Sledge H, Abbasi M, Ismayl M, Killu AM, Simard T, Liu X, Hibbert B, Friedman PA, Siontis KC, Alkhouli M. Outcomes of stroke prevention strategies in patients with atrial fibrillation and end-stage renal disease. JACC Cardiovasc Interv 2025;18:2614-2624

LAAO: Lowest primary composite outcome



Primary endpoint composite of ischemic stroke/systemic embolism, major bleeding, or death

Al-Abcha A, Saleh G, Sledge H, Abbasi M, Ismayl M, Killu AM, Simard T, Liu X, Hibbert B, Friedman PA, Siontis KC, Alkhouli M. Outcomes of stroke prevention strategies in patients with atrial fibrillation and end-stage renal disease. JACC Cardiovasc Interv 2025;18:2614-2624

CARDIAC ARRHYTHMIAS MANAGEMENT

- We suggest percutaneous left atrial appendage occlusion be considered in patients on PD with high risk of stroke but contraindications for long-term anticoagulant treatment (2C).

CONCLUSION

- What is new in the 2025 guidelines?

Key Changes

- Recommendation for maximizing loop diuretics with or without thiazide or thiazide-like diuretics to manage fluid overload.
- New recommendation regarding statin or statin/ezetimibe for secondary prevention of atherosclerotic cardiovascular disease.

Key Changes

- Revised, updated pharmacologic recommendations for heart failure management, including mineralocorticoid receptor antagonist and angiotensin receptor-neprilysin inhibitor.
- New recommendations regarding continuous glucose monitoring and glucose management.

Key Changes

- Revised, updated recommendation for direct oral anticoagulation for stroke prevention.
- New recommendations regarding percutaneous left atrial appendage occlusion for stroke prevention.