# Efficacy and safety of finerenone in patients with CKD and T2D across the frailty spectrum: A FIDELITY post hoc analysis

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### **Disclosures**

• **Peter Rossing** reports personal fees from Bayer during the conduct of the study; he has received research support and personal fees from AstraZeneca and Novo Nordisk, and personal fees from Astellas, Boehringer Ingelheim, Eli Lilly, Gilead, Mundipharma, Sanofi and Vifor; all fees are given to Steno Diabetes Center Copenhagen

# Frailty is associated with increased risk of adverse outcomes<sup>1–3</sup>



ronsteroidal MRA, reduced the risk of adverse CV and kidney outcomes vs placebo in FIDELITY, a prespecified pooled analysis of the phase III FIDELIO-DKD and FIGARO-DKD trials<sup>4–6</sup>



**12,990 patients** with CKD and T2D on optimised RAS inhibitor and randomised 1:1 to finerenone or placebo<sup>4–6</sup>



CV composite outcome

Time to first occurrence of:

- CV death
- Non-fatal MI
- Non-fatal stroke
- · Hospitalisation for HF



Kidney composite outcome



Other outcomes

Time to first occurrence of:

- Kidney failure
- Sustained ≥57% decrease in eGFR from baseline\*
- · Kidney-related death

Safety outcomes assessed treatmentemergent AEs



Objective: This FIDELITY post hoc analysis explored the efficacy and safety of finerenone in patients with CKD and T2D according to baseline frailty index

- 1. Hannan M, et al. Am J Kidney Dis 2023;83:208–215; 2. Mansur HN, et al. Health Qual Life Outcomes 2014;12:27; 3. Roshanravan B, et al. Am J Kidney Dis 2012;60:912–921;
- 4. Bakris GL, et al. N Engl J Med 2020;383:2219-2229; 5. Pitt B, et al. N Engl J Med 2021;385:2252-2263; 6. Agarwal R, et al. Eur Heart J 2022;43:474-484

<sup>\*</sup>Events based on a sustained decrease in eGFR are considered from randomisation up until 5 months after the last eGFR is recorded at a clinic visit

AE, adverse event; CKD, chronic kidney disease; CV, cardiovascular; eGFR, estimated glomerular filtration rate; HF, heart failure; MI, myocardial infarction; MRA, mineralocorticoid receptor antagonist;

RAS, renin-angiotensin system; T2D, type 2 diabetes

# Frailty was defined using the Rockwood cumulative deficit approach

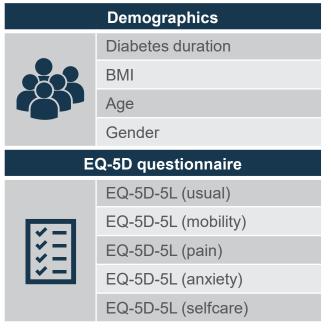
## 30 characteristics

were used to construct the frailty index and assign a normalised frailty index score to each patient\*





Laboratory parameters					
	UACR				
613	eGFR				
	[K] <sup>+</sup>				
<b>A</b>	Systolic blood pressure				
	Diastolic blood pressure				
	Pulse pressure				
	HbA1c				
	Haemoglobin				
	C-reactive protein				



	Medical history
	HF
	MI
	Stroke
	CAD
	Atrial fibrillation/flutter
	Peripheral arterial occlusive disease
	PCI or CABG
	Hypertension
	Hyperlipidaemia
	Diabetic neuropathy
	COPD
	Retinopathy

<sup>\*</sup>For each characteristic, patients were assigned a score between 0 and 1. The frailty index score was normalised by dividing the total score by the number of non-missing characteristics. Patients were categorised by frailty index quartiles ( $\leq$ Q1 [least frail],  $\geq$ Q1 to  $\leq$ Q2,  $\geq$ Q2 to  $\leq$ Q3,  $\geq$ Q3 [most frail])

BMI, body mass index; CABG, coronary artery bypass graft; CAD, coronary artery disease; COPD, chronic obstructive pulmonary disease; eGFR, estimated glomerular filtration rate; EQ-5D, EuroQol-5 Dimension; HbA1c, glycated haemoglobin; HF, heart failure; [K]<sup>+</sup>, serum potassium concentration; MI, myocardial infarction; PCI, percutaneous coronary intervention; UACR, urine albumin-to-creatinine ratio

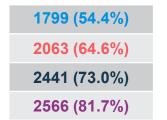
# As severity of frailty increased, patients had older age, higher UACR and longer duration of diabetes, and lower eGFR at baseline

Frailty subgroup: ≤Q1 >Q1 to ≤Q2 >Q2 to ≤Q3 >Q3 N=3310 N=3192 N=3346 N=3142



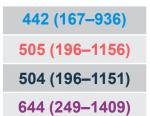




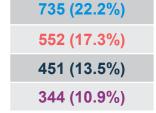












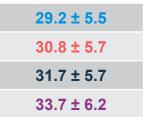




61.2 ± 9.7
64.4 ± 9.5
66.1 ± 9.1
67.5 ± 8.6

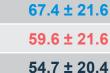


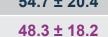
BMI, kg/m<sup>2</sup>





eGFR, ml/min/1.73 m<sup>2</sup>







Systolic blood pressure, mmHq

131.7 ± 12.8
135.4 ± 13.5
138.1 ± 14.2
142.1 ± 14.2

#### **Medical History**



Duration of diabetes, years

12.8 ± 7.8 14.7 ± 8.3 16.4 ± 9.0

17.8 ± 8.8



History of CV disease

687 (20.8%)

1241 (38.9%)

1846 (55.2%) 2154 (68.6%)

History of MI

184 (5.6%)

409 (12.8%) 615 (18.4%)

812 (25.8%)

History of hypertension

3080 (93.1%)

3098 (97.1%)

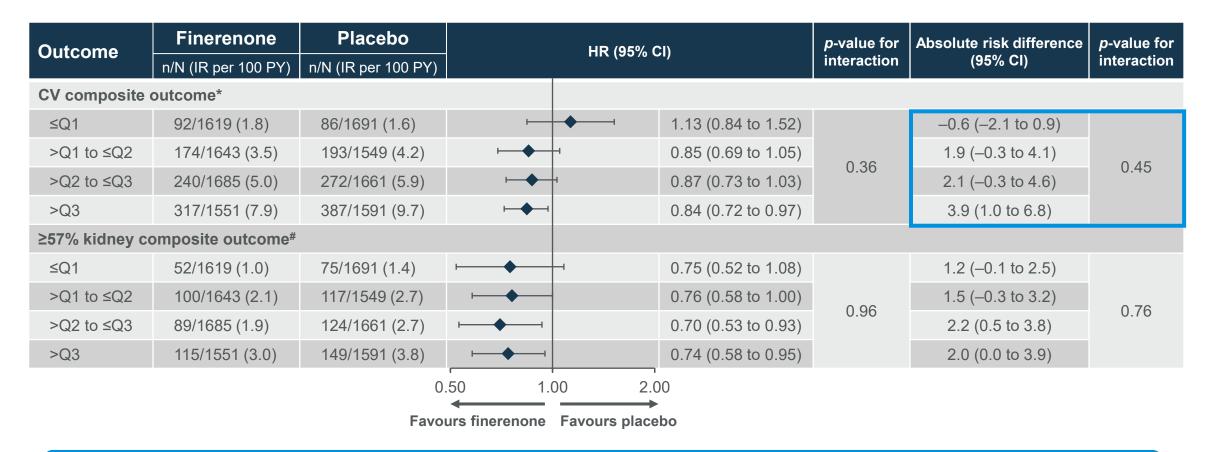
3269 (97.7%)

3084 (98.2%)

Values are n (%), mean  $\pm$  SD or median (IQR).

BMI, body mass index; CV, cardiovascular; eGFR, estimated glomerular filtration rate; IQR, interquartile range, MI, myocardial infarction; Q, quartile; SD, standard deviation; UACR, urine albumin-to-creatinine ratio

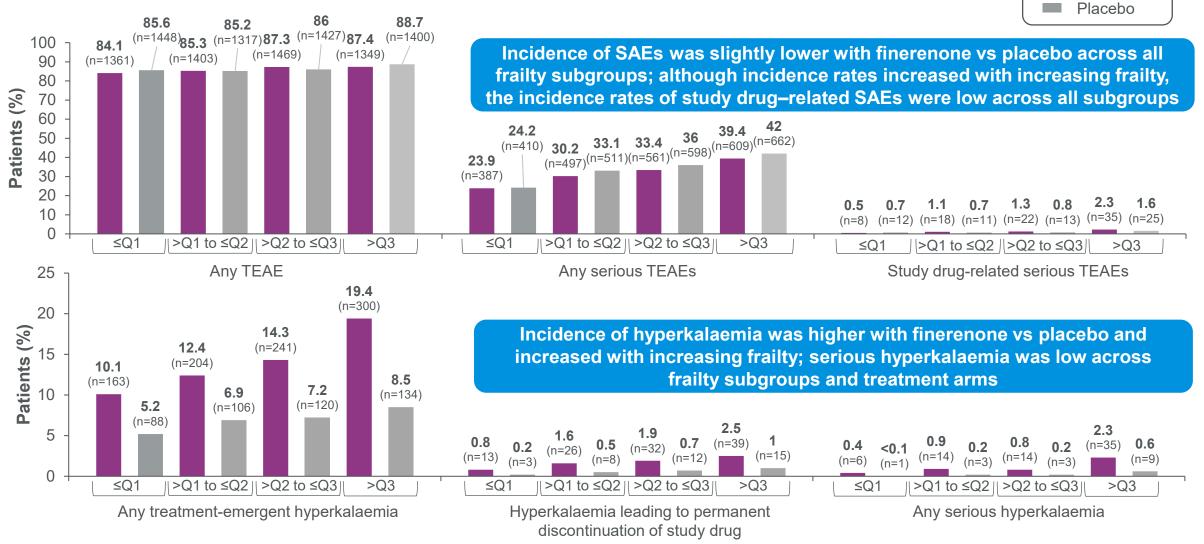
# Finerenone lowered the risk of CV and kidney outcomes irrespective of frailty status



Absolute risk reduction of CV composite outcome with finerenone vs placebo was nominally higher in severely frail patients (*p*-value for interaction = 0.45)

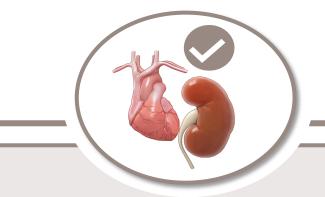
<sup>\*</sup>Defined as a composite of CV death, non-fatal myocardial infarction, non-fatal stroke, or HHF; #defined as kidney failure, sustained ≥57% eGFR decline, or kidney-related death CI, confidence interval; CV, cardiovascular; eGFR, estimated glomerular filtration rate; HHF, hospitalisation for heart failure; HR, hazard ratio; IR, incidence rate; PY, person-years; Q, quartile

# The safety profile of finerenone relative to placebo was not modified by frailty status



AE, adverse event; Q, quartile; SAE, serious adverse event; TEAE, treatment-emergent adverse event

## **Summary**



Finerenone lowered the risk of CV and kidney outcomes in patients with CKD and T2D regardless of frailty status



Incidence rates of SAEs and hyperkalaemia increased with frailty index score



These data suggest finerenone is an effective and well-tolerated treatment option for people with CKD and T2D across the spectrum of frailty

CKD, chronic kidney disease; CV, cardiovascular; SAE, serious adverse event; T2D, type 2 diabetes

## Thank you

#### **Executive committee**

George L. Bakris\* (co-chair); Gerasimos Filippatos (co-chair); Rajiv Agarwal; Stefan D. Anker; Bertram Pitt; Luis M. Ruilope

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\*Our esteemed steering committee member, George Bakris, passed away in June 2024 and will be remembered for his passion for science and patient care.



The FIDELIO-DKD and FIGARO-DKD teams would also like to thank all participating investigators, the centres, and the participants and their families

# Efficacy and safety of finerenone in patients with CKD and T2D across the frailty spectrum: A FIDELITY post hoc analysis

>O3 (most frail)

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#### Introduction

- Frailty is often defined as a state of increased vulnerability associated with a decline in physiological system function and is associated with increased risk of adverse outcomes.<sup>14</sup>
- Given the accumulation of risk factors and comorbidities in people with more severe frailty, inappropriate prescribing is prevalent in older people with frailty<sup>5</sup>
- An estimated 7–20% of adults with chronic kidney disease (CKD) are considered to have frailty, and this has been associated with a
  lower quality of life, an increased rate of disease progression, and an increased risk of death<sup>64</sup>
- Finerenone, a selective nonsteroidal mineralocorticoid receptor antagonist, reduced the risk of adverse cardiovascular (CV) and kidney outcomes vs placebo in FIDELITY, a prespecified pooled analysis of the phase III FIDELIO-DKD and FIGARO-DKD trials<sup>8-11</sup>

#### Aim

 This FIDELITY post hoc analysis explored the efficacy and safety of finerenone in patients with CKD and type 2 diabetes (T2D) according to baseline frailty index score

#### Methods

- Full eligibility criteria are outlined in the FIDELIO-DKD and FIGARO-DKD primary analyses 10,11, and included those who:
- Were aged ≥18 years with CKD and T2D
- Had a serum potassium level ≤4.8 mmol/l at screening
- Had either a urine albumin-to-creatinine ratio (UACR) ≥30 to <300 mg/g and an estimated glomerular filtration rate (eGFR) ≥25 to ≤90 ml/min/1.73 m², or UACR ≥300 to ≤5000 mg/g and eGFR ≥25 ml/min/1.73 m²
- Were treated with standard-of-care therapy, including a maximum tolerated labelled dose of a renin-angiotensin system inhibitor
- Patients were randomly assigned to receive finerenone at titrated doses of 10 or 20 mg once daily as oral treatment or matching placebo (1:1)
- Frailty was defined using the Rockwood cumulative deficit approach
- 30 baseline clinical characteristics, including laboratory measures, quality of life measures and medical history, were used to construct the frailty index and assign a normalised frailty index score between 0 (no frailty) and 1 (maximal frailty) to each patient
- All enrolled participants were categorised into subgroups based on frailty index quartiles (≤Q1, >Q1 to ≤Q2, >Q2 to ≤Q3, and >Q3)
- Efficacy outcomes included a CV composite outcome (CV death, nonfatal myocardial infarction, nonfatal stroke, or hospitalisation for heart failure) and a kidney composite outcome (kidney failure, sustained ≥57% eGFR decline from baseline, or kidney-related death)
- Changes in eGFR compared with baseline values were measured at multiple visits across the study period

#### Results

A total of 12,990 people were included in this analysis; the mean frailty index was 0.463 (standard deviation 0.105) and participants in both
treatment arms were equally distributed across the frailty spectrum (Table 1)

>01 to <02

Table 1. Baseline characteristics of enrolled participants stratified by baseline frailty index

<O1 (least frail)

	≤Q1 (least frail)		>Q1 to ≤Q2		>Q2 to ≤Q3		>Q3 (most frail)	
Baseline	Finerenone	Placebo	Finerenone	Placebo	Finerenone	Placebo	Finerenone	Placebo
characteristic	(n = 1619)	(n = 1691)	(n = 1643)	(n = 1549)	(n = 1685)	(n = 1661)	(n = 1551)	(n = 1591)
Sex, n (%)								
Female	467	413	480	422	523	504	565	558
	(28.8)	(24.4)	(29.2)	(27.2)	(31.0)	(30.3)	(36.4)	(35.1)
Male	1152	1278	1163	1127	1162	1157	986	1033
	(71.2)	(75.6)	(70.8)	(72.8)	(69.0)	(69.7)	(63.6)	(64.9)
Age, years, mean (SD)	61.0	61.4	64.5	64.3	66.2	66.1	67.3	67.7
	(9.4)	(10.1)	(9.3)	(9.6)	(9.0)	(9.2)	(8.5)	(8.6)
Race, n (%)								
Asian	591	627	424	396	286	287	112	137
	(36.5)	(37.1)	(25.8)	(25.6)	(17.0)	(17.3)	(7.2)	(8.6)
Black or African American	42	46	55	47	72	81	82	95
	(2.6)	(2.7)	(3.3)	(3.0)	(4.3)	(4.9)	(5.3)	(6.0)
White	880	919	1063	1000	1229	1212	1277	1289
	(54.4)	(54.3)	(64.7)	(64.6)	(72.9)	(73.0)	(82.3)	(81.0)
BMI, kg/m², mean (SD)	29.2	29.2	30.8	30.8	31.6	31.7	33.8	33.5
	(5.5)	(5.5)	(5.8)	(5.6)	(5.8)	(5.7)	(6.2)	(6.2)
Current smoker, n (%)	370	365	284	268	235	216	170	174
	(22.9)	(21.6)	(17.3)	(17.3)	(13.9)	(13.0)	(11.0)	(10.9)
UACR, mg/g, median (IQR)	450	431	497	512	490	517	642	647
	(178–943)	(161–926)	(185–1168)	(208–1147)	(194–1099)	(196–1223)	(247–1380)	(254–1426
eGFR, ml/min/1.73 m²,	67.5	67.4	58.9	60.3	55.2	54.1	48.1	48.4
mean (SD)	(21.4)	(21.8)	(21.4)	(21.8)	(20.5)	(20.4)	(18.4)	(18.1)
Serum potassium, mmol/l,	4.28	4.28	4.33	4.32	4.35	4.37	4.43	4.43
mean (SD)	(0.39)	(0.38)	(0.42)	(0.43)	(0.45)	(0.45)	(0.49)	(0.49)
Systolic blood pressure,	131.8	131.5	134.9	136.0	138.2	138.0	142.4	141.7
mmHg, mean (SD)	(12.7)	(13.0)	(13.4)	(13.6)	(14.2)	(14.3)	(14.2)	(14.2)
HbA1c, %, mean (SD)	7.22	7.21	7.60	7.53	7.83	7.85	8.20	8.17
	(1.22)	(1.24)	(1.38)	(1.34)	(1.35)	(1.34)	(1.31)	(1.31)
Duration of diabetes, years, mean (SD)	12.6	12.9	15.0	14.4	16.4	16.4	17.8	17.9
	(7.6)	(8.0)	(8.5)	(8.1)	(8.9)	(9.1)	(9.1)	(8.6)
History of CV disease, n (%)	361	326	648	593	935	911	1029	1125
	(22.3)	(19.3)	(39.4)	(38.3)	(55.5)	(54.8)	(66.3)	(70.7)
History of hypertension,	1506	1574	1587	1511	1648	1621	1519	1565
n (%)	(93.0)	(93.1)	(96.6)	(97.5)	(97.8)	(97.6)	(97.9)	(98.4)
History of MI, n (%)	96	88	217	192	299	316	404	408
	(5.9)	(5.2)	(13.2)	(12.4)	(17.7)	(19.0)	(26.0)	(25.6)
History of atrial fibrillation and atrial flutter, n (%)	48	48	121	103	179	168	218	219
	(3.0)	(2.8)	(7.4)	(6.6)	(10.6)	(10.1)	(14.1)	(13.8)
Baseline medications, n (%)								
Beta blocker	538	547	769	735	920	935	1005	1050
	(33.2)	(32.3)	(46.8)	(47.4)	(54.6)	(56.3)	(64.8)	(66.0)
GLP-1RA	111	99	137	113	132	115	117	119
	(6.9)	(5.9)	(8.3)	(7.3)	(7.8)	(6.9)	(7.5)	(7.5)
SGLT-2i	137	136	117	116	110	111	72	74
	(8.5)	(8.0)	(7.1)	(7.5)	(6.5)	(6.7)	(4.6)	(4.7)

- . Overall, incidence of CV and kidney events increased with increasing frailty in both treatment arms (Figure 1)
- Finerenone lowered the risk of CV and kidney outcomes irrespective of frailty status (Figure 1)
- Absolute risk reduction of CV composite outcome with finerenone vs placebo was nominally higher in severely frail patients (p-value for interaction = 0.45)

Figure 1. Efficacy outcomes for finerenone and placebo across the frailty subgroup

Outcome	Finerenone	Placebo		HR (95% CI)	p-value for	Absolute risk difference (95% CI)	p-value for interaction
Outcome	n/N (IR per 100 PY)	n/N (IR per 100 PY)		HK (85% CI)	interaction		
CV composite outcome							
≤Q1	92/1619 (1.8)	86/1691 (1.6)	-	1.13 (0.	84 to 1.52)	-0.6 (-2.1 to 0.9)	
>Q1 to ≤Q2	174/1643 (3.5)	193/1549 (4.2)		0.85 (0.	69 to 1.05)	1.9 (-0.3 to 4.1)	0.45
>Q2 to ≤Q3	240/1685 (5.0)	272/1661 (5.9)		0.87 (0.	73 to 1.03)	2.1 (-0.3 to 4.6)	
>Q3	317/1551 (7.9)	387/1591 (9.7)		0.84 (0.	72 to 0.97)	3.9 (1.0 to 6.8)	
≥57% kidney composite outco	ome						
≤Q1	52/1619 (1.0)	75/1691 (1.4)	-	0.75 (0.	52 to 1.08)	1.2 (-0.1 to 2.5)	
>Q1 to ≤Q2	100/1643 (2.1)	117/1549 (2.7)	-	0.76 (0.	58 to 1.00)	1.5 (-0.3 to 3.2)	0.76
>Q2 to ≤Q3	89/1685 (1.9)	124/1661 (2.7)	<b>——</b>	0.70 (0.	53 to 0.93)	2.2 (0.5 to 3.8)	
>Q3	115/1551 (3.0)	149/1591 (3.8)	<b></b>	0.74 (0.	58 to 0.95)	2.0 (0.0 to 3.9)	
			0.50 1.0	0 2.00			
			Favours finerenone	Favours placebo			

confidence interval; CV, cardiovascular; HR, hazard ratio; IR, incidence rate; PY, patient-years; Q, quartile.

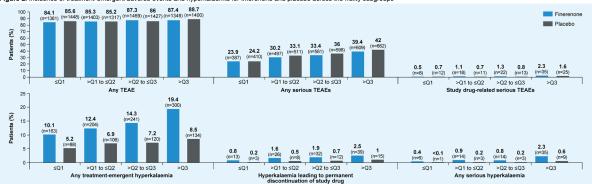
- From baseline to month 48, finerenone was associated with a lower rate of eGFR decline compared with placebo for all frailty subgroups (Table 2)
- The attenuation of total eGFR slope by finerenone compared with placebo was more pronounced with increasing severity of frailty

Table 2. Change in eGFR across the study period for finerenone and placebo according to frailty index score

Table 2. Shange in Corn R across the study period for innerental and placebe according to mainly index score									
	≤Q1 (least frail)		>Q1 to ≤Q2		>Q2 to ≤Q3		>Q3 (most frail)		
ml/min/1.73 m² (95% CI)	Difference of LS-means (finerenone vs placebo)	p-value							
Acute eGFR slope from baseline to month 4	-5.55 (-7.13 to -3.96)	<0.0001	-5.62 (-7.34 to -3.89)	<0.0001	-6.41 (-8.04 to -4.78)	<0.0001	-2.85 (-4.48 to -1.23)	0.0006	
Chronic eGFR slope from month 4 to end of study visit	0.75 (0.46 to 1.05)	<0.0001	1.12 (0.76 to 1.48)	<0.0001	1.23 (0.90 to 1.56)	<0.0001	1.03 (0.67 to 1.39)	<0.0001	
Total slope from baseline to month 48	0.23 (-0.05 to 0.51)	0.1113	0.56 (0.23 to 0.89)	0.0010	0.59 (0.28 to 0.91)	0.0002	0.71 (0.37 to 1.04)	<0.0001	
CI, confidence interval; eGFR, estimated glomerular filtration rate; LS, least-squares; Q, quartile.									

- The safety profile of finerenone relative to placebo was not modified by frailty status (Figure 2)
- Incidence of serious adverse events (SAEs) was slightly lower with finerenone vs placebo across all frailty subgroups; although incidence rates increased with increasing frailty,
- the incidence rates of study drug-related SAEs were low across all subgroups
- Incidence of hyperkalaemia was higher with finerenone vs placebo and increased with increasing frailty; serious hyperkalaemia was low across frailty subgroups and treatment arms

Figure 2. Incidence of treatment-emergent adverse events and hyperkalaemia for finerenone and placebo across the frailty subgroups



Q, quartile; TEAE, treatment-emergent adverse event.

#### Conclusions

- Finerenone lowered the risk of CV and kidney outcomes in patients with CKD and T2D regardless of frailty status
- Incidence rates of SAEs and hyperkalaemia increased with frailty index score; however, the relative risk remained consistent between the treatment arms across the frailty subgroups
- Compared with placebo, finerenone slowed the rate of eGFR decline from baseline to month 48 for all frailty subgroups

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