

Supplementary Tables

Supplementary Table 1: Participants by Baseline KDIGO stage

		Baseline Albuminuria Category		
		A1	A2	A3
Baseline GFR Category	G1 or G2	480	31	6
	G3a	626	108	15
	G3b	258	85	21
	G4	19	13	2

Supplementary Table 2 : Baseline characteristics by baseline vitamin D

Variable	Vitamin D (nmol/l)			
	<25	25-50	51-75	>75
Number	104	648	553	359
eGFR (ml/min/1.73m ²)	50.3 ± 11.5	53.3 ± 11.9	54.8 ± 11.9	53.5 ± 11.8
Age (years)	74.2 ± 9.6	73.6 ± 9.0	72.5 ± 8.8	72.2 ± 8.8
Female Gender	72 (69.2)	408 (63)	331 (59.9)	199 (55.4)
Caucasian	90 (86.5)	633 (97.7)	544 (98.4)	356 (99.2)
Ethnicity				
Haemoglobin (g/dl)	12.9 ± 1.3	13.1 ± 1.5	13.3 ± 1.3	13.4 ± 1.4
Bicarbonate (mmol/l)	25.1 ± 3.3	25.5 ± 2.6	25.5 ± 2.6	25.7 ± 2.6
Calcium (mmol/l)	2.3 ± 0.1	2.4 ± 0.1	2.4 ± 0.1	2.4 ± 0.1
Phosphate (mmol/l)	1.1 ± 0.2	1.1 ± 0.2	1.1 ± 0.2	1.1 ± 0.2
Albumin (g/dl)	39.5 ± 4.1	40.4 ± 3.3	41.0 ± 3.0	41.0 ± 2.9
uACR (mg/mmol)	0.6 (0.1 – 1.3)	0.5 (0.0 – 1.7)	0.3 (0.0 – 1.3)	0.2 (0.0 – 1.4)
SBP (mmHg)	132.7 ± 21.8	135.3 ± 18.8	133.0 ± 17.4	134.0 ± 17.9
DBP (mmHg)	70.0 ± 10.5	72.6 ± 11.2	72.6 ± 11.1	74.3 ± 10.8
PTH	73.5 (44.3 – 101.8)	54 (40 – 74)	43 (32 – 58)	38 (29 – 51)
FGF23	42.0 (33.0 – 56.3)	42 (34 – 53)	42 (32 – 52)	42 (34 – 56)

Data are number (%), mean ± sd or median (IQR)

Supplementary Table 3 : Baseline characteristics and year 5 outcomes by baseline PTH

Variable	PTH (pg/ml)			
	<35	35-65	66-95	>95
Number	436	806	286	136
eGFR (ml/min/1.73m ²)	57.3 ± 11.8	54.4 ± 11.1	49.8 ± 10.7	45.4 ± 10.7
Age (years)	70.1 ± 9.0	73.2 ± 8.5	75.2 ± 9.1	75.4 ± 8.5
Female Gender	260 (59.6)	498 (61.8)	181 (63.3)	71 (52.2)
Caucasian	429 (98.4)	788 (97.8)	278 (97.2)	128 (94.1)
Ethnicity				
Haemoglobin (g/dl)	13.5 ± 1.4	13.2 ± 1.4	13.0 ± 1.3	12.8 ± 1.4
Bicarbonate (mmol/l)	25.5 ± 2.6	25.5 ± 2.6	25.5 ± 2.7	25.9 ± 3.2
Calcium (mmol/l)	2.40 ± 0.09	2.37 ± 0.09	2.35 ± 0.10	2.35 ± 0.14
Phosphate (mmol/l)	1.11 ± 0.19	1.12 ± 0.17	1.11 ± 0.17	1.07 ± 0.18
Albumin (g/l)	41.0 ± 3.1	40.7 ± 3.2	40.4 ± 3.1	39.9 ± 3.2
uACR (mg/mmol)	0.2 (0.0 – 1.0)	0.3 (0.0 – 1.3)	0.5 (0.0 – 1.9)	1.0 (0.2 – 3.7)
SBP (mmHg)	132.2 ± 17.7	134.1 ± 18.0	137.2 ± 19.6	133.5 ± 19.6
DBP (mmHg)	73.3 ± 10.8	72.7 ± 11.1	72.8 ± 11.3	71.7 ± 11.4
Vit D (nmol/l)	64 (48 – 82)	54 (40 – 72)	42 (31 – 57)	34.5 (26.0 – 52.0)
FGF23 (pg/ml)	37 (30.0 – 48.0)	42 (33.8 – 52.0)	47 (36.0 – 58.0)	51.5 (42.0 – 68.0)

Data are number (%), mean ± sd or median (IQR)

Supplementary Table 4 : Baseline characteristics by baseline FGF23

Variable	FGF23 (pg/ml)			
	< 25	25 - 51	51- 70	>70
Number	100	1089	319	156
eGFR (ml/min/1.73m ²)	59.3 ± 11.4	55.6 ± 11.1	49.1 ± 11.1	45.4 ± 12.0
Age (years)	70.9 ± 9.9	72.8 ± 8.9	73.8 ± 8.5	73.5 ± 9.6
Female Gender	63 (63.0)	676 (62.1)	185 (58.0)	86 (55.1)
Caucasian	97 (97.0)	1062 (97.5)	311 (97.5)	153 (98.1)
Ethnicity				
Haemoglobin (g/dl)	13.4 ± 1.2	13.3 ± 1.4	13.1 ± 1.5	12.8 ± 1.4
Bicarbonate (mmol/l)	25.4 ± 2.9	25.6 ± 2.6	25.3 ± 2.8	25.3 ± 2.9
Calcium (mmol/l)	2.4 ± 0.1	2.4 ± 0.1	2.4 ± 0.1	2.4 ± 0.1
Phosphate (mmol/l)	1.1 ± 0.2	1.1 ± 0.2	1.1 ± 0.2	1.2 ± 0.2
Albumin (g/l)	40.5 ± 3.1	40.7 ± 3.1	40.5 ± 3.0	40.4 ± 4.1
uACR (mg/mmol)	0.3 (0.0 – 1.2)	0.3 (0.0 – 1.1)	0.5 (0.0 – 2.5)	0.7 (0.1 – 0.7)
SBP (mmHg)	132.9 ± 17.8	134.5 ± 18.1	133.6 ± 19.6	132.7 ± 17.9
DBP (mmHg)	74.7 ± 10.7	73.1 ± 11.0	71.8 ± 10.6	71.2 ± 12.8
PTH (pg/ml)	40 (28 - 51)	45 (33 - 62)	51 (36 - 76)	57 (40.3 – 89.3)
25OHvitD (nmol/l)	53.5 (37 – 69.8)	52 (38 – 70)	53 (38 – 74)	54 (34 – 73)

Data are number (%), mean ± sd or median (IQR)

Supplementary table 5 : Hazard ratios for all-cause mortality treating vitamin D, PTH and FGF23 as continuous variables following logarithmic transformation

Variable	Univariate Hazard Ratio (95% CI)	Adjusted Hazard ratios (95% CI)	
		Model 1	Model 2
logVit D	0.75 (0.67 – 0.84)*	0.81 (0.72 – 0.91)*	0.86 (0.76 – 0.97)*
logPTH	1.49 (1.33 – 1.67)*	1.19 (1.05 – 1.33)*	1.12 (1.00 – 1.27)*
LogFGF23	1.20 (1.08 – 1.34)*	0.97 (0.86 – 1.10)	0.95 (0.85 – 1.08)

*p < 0.005

All Hazard ratios expressed per standard deviation change in the independent variable

Model 1 – Hazard ratios adjusted for baseline age, eGFR,uACR and gender

Model 2 – Hazard ratios adjusted for all variables in model 1 and diabetes, previous cardiovascular disease, albumin, bicarbonate and haemoglobin

Supplementary Table 6 : Sensitivity analysis comparing hazard ratios for all-cause mortality in those with baseline eGFR \geq 45 ml/min/1.73m² and < 45 ml/min/1.73m²

Variable	Baseline eGFR \geq 45 ml/min/1.73m ²			Baseline eGFR < 45 ml/min/1.73m ²		
	Number (%)	Univariable	Adjusted ^a	Number (%)	Univariable	Adjusted ^a
FGF23 (pg/ml)						
<25	88 (7.0)	1 (ref)	1 (ref)	12 (3.0)	1 (ref)	1 (ref)
25-51	896 (70.8)	1.24 (0.7-2.4)	1.10 (0.58-2.10)	193 (48.5)	1.24 (0.7-2.4)	0.41 (0.16-1.03)
51-70	200 (15.8)	1.06 (0.5-2.2)	0.74 (0.35-1.57)	119 (29.9)	1.06 (0.5-2.2)	0.57 (0.22-1.45)
>70	82 (6.5)	1.47 (0.7-3.4)	0.91 (0.40-2.10)	74 (18.6)	1.47 (0.6-3.3)	0.66 (0.25-1.77)
PTH (pg/ml)						
<35	369 (29.1)	1 (ref)	1 (ref)	67 (16.8)	1 (ref)	1 (ref)
35-65	647 (51.1)	1.12 (0.8-1.6)	0.78 (0.53-1.15)	159 (39.9)	1.22 (0.7-2.3)	1.15 (0.62-2.12)
66-95	185 (14.6)	1.89 (1.2-3.0)*	1.05 (0.66-1.69)	101 (25.4)	2.27 (1.2-4.2)*	2.11 (1.15-3.89)*
>95	65 (5.1)	2.89 (1.6-5.1)*	1.39 (0.78-2.48)	71 (17.8)	2.11 (1.1-4.0)*	2.04 (1.07-3.88)*
25(OH)Vit D (nmol/l)						
<25	69 (5.5)	3.27 (1.8-5.9)*	2.41 (1.34-4.35)*	35 (8.8)	1.75 (0.9-3.4)	1.80 (0.94-3.46)
25-50	481 (38.0)	1.45 (0.9-2.2)	1.26 (0.81-1.96)	167 (42.0)	1.14 (0.7-1.9)	1.06 (0.64-1.73)
51-75	441 (34.8)	1.20 (0.8-1.9)	1.09 (0.69-1.72)	112 (28.1)	1.05 (0.6-1.8)	1.07 (0.62-1.83)
>75	275 (21.7)	1 (ref)	1 (ref)	84 (21.1)	1 (ref)	1 (ref)

^aHazard ratios adjusted for baseline eGFR, age, uACR and gender

Supplementary Table 7 : Hazard ratios for all-cause mortality by the end of year 5 follow-up. A comparison of participants aged over 75 years at baseline with those aged less

Variable	Baseline age < 75 years			Baseline age ≥ 75 years		
	Number (%)	Univariable	Adjusted ^a	Number (%)	Univariable	Adjusted ^a
FGF23 (pg/ml)						
<25	62 (7.1)	1 (ref)	1 (ref)	38 (4.8)	1 (ref)	1 (ref)
25-51	579 (66.3)	1.13 (0.4-3.2)	0.88 (0.32-2.48)	510 (64.5)	0.88 (0.47-1.62)	0.77 (0.41-1.43)
51-70	156 (17.9)	1.95 (0.66-5.76)	0.94 (0.32-2.90)	163 (20.6)	0.96 (0.49-1.85)	0.70 (0.36-1.37)
>70	76 (8.7)	2.73 (0.88-8.57)	1.33 (0.42-4.23)	80 (10.1)	1.26 (0.62-2.53)	0.79 (0.38-1.62)
PTH (pg/ml)						
<35	287 (32.9)	1 (ref)	1 (ref)	149 (18.8)	1 (ref)	1 (ref)
35-65	413 (47.3)	0.93 (0.51-1.69)	0.78 (0.43-1.41)	393 (49.7)	1.0 (0.7-1.5)	0.90 (0.61-1.34)
66-95	121 (13.9)	2.77 (1.48-5.18)*	1.89 (0.99-3.63)	165 (20.9)	1.6 (1.0-2.4)*	1.25 (0.81-1.93)
>96	52 (6.0)	3.56 (1.69-7.49)*	1.66 (0.76-3.61)	84 (10.6)	2.0 (1.2-3.2)*	1.53 (0.95-2.47)
25(OH)Vit D (nmol/l)						
<25	50 (5.7)	7.17 (3.28-15.68)*	5.70 (2.55-12.73)*	54 (6.8)	1.55 (0.90-2.66)	1.41 (0.82-2.44)
25-50	320 (36.7)	1.61 (0.79-3.27)	1.51 (0.74-3.08)	328 (41.5)	1.13 (0.78-1.64)	1.06 (0.73-1.53)
51-75	303 (34.7)	1.4 (0.69-2.92)	1.52 (0.74-3.13)	250 (31.6)	0.97 (0.66-1.44)	0.96 (0.64-1.42)
>75	200 (22.9)	1 (ref)	1 (ref)	159 (20.1)	1 (ref)	1 (ref)

^aHazard ratios adjusted for baseline eGFR, age, uACR and gender