Item S1. Sensitivity Analyses

Table *a*. Sensitivity Analysis After Adjusting for Loop Diuretic Use

Association of Serum Bicarbonate with Lumbar and Total Bone Mineral Density			
	Coefficient (95% CI)		
	Total Population	Men	Women
Lumbar BMD (g/cm^2)			
Continuous*	**0.006 (0.001,0.010)**	**0.008 (0.002,0.015)**	**0.008 (0.001,0.014)**
< 24 mEq/L	[Ref]	[Ref]	[Ref]
24 – 25 mEq/L	0.004 (-0.006,0.014)	-0.005 (-0.024,0.013)	**0.016 (0.003,0.028)**
25.1 – 26.9 mEq/L	0.010 (-0.001,0.020)	0.010 (-0.006,0.026)	**0.018 (0.004,0.031)**
≥ 27 mEq/L	**0.016 (0.004,0.028)**	**0.020 (0.002,0.038)**	**0.022 (0.005,0.039)**
P for trend	0.007	0.01	0.008
Total BMD (g/cm^2)			
Continuous*	0.003 (-0.0001, 0.007)	0.004 (-0.0004,0.009)	**0.006 (0.001,0.010)**
< 24 mEq/L	[Ref]	[Ref]	[Ref]
24 – 25 mEq/L	0.006 (-0.003,0.016)	0.005 (-0.010,0.020)	0.009 (-0.0003,0.019)
25.1 – 26.9 mEq/L	0.003 (-0.006,0.012)	0.005 (-0.008,0.018)	0.006 (-0.002,0.014)
≥ 27 mEq/L	0.011 (-0.001,0.023)	0.012 (-0.002,0.027)	**0.019 (0.005,0.033)**
P for trend	0.1	0.1	0.01

Abbreviations: eGFR, estimate glomerular filtration rate; BMD, bone mineral density; CI, confidence interval. **Bold** values indicate $p<0.05$.

Models adjusted for age, sex, race/ethnicity, body mass index, poverty, education, activity level, smoking status, fasting length, loop diuretic and calcium carbonate use, diagnosis of diabetes mellitus, hypertension and cardiovascular disease, eGFR, albuminuria, serum albumin, calcium, phosphate and C-reactive protein.

* Per standard deviation higher serum bicarbonate (SD = 2.2 mEq/L).

Table *b*. Sensitivity Analysis After Adjusting for Thiazide Diuretic Use

Association of Serum Bicarbonate with Lumbar and Total Bone Mineral Density			
	Coefficient (95% CI)		
	Total Population	Men	Women
Lumbar BMD (g/cm^2)			
Continuous*	**0.005 (0.001,0.010)**	**0.009 (0.002,0.015)**	**0.007 (0.001,0.014)**
< 24 mEq/L	[Ref]	[Ref]	[Ref]
24 – 25 mEq/L	0.004 (-0.006,0.014)	-0.006 (-0.024,0.013)	**0.016 (0.003,0.028)**
25.1 – 26.9 mEq/L	0.009 (-0.001,0.020)	0.010 (-0.006,0.026)	**0.017 (0.004,0.031)**
≥ 27 mEq/L	**0.015 (0.003,0.028)**	**0.020 (0.002,0.038)**	**0.021 (0.005,0.038)**
P for trend	0.01	0.01	0.01
Total BMD (g/cm^2)			
Continuous*	0.003 (-0.001,0.007)	0.004 (-0.001,0.009)	**0.005 (0.001,0.010)**
< 24 mEq/L	[Ref]	[Ref]	[Ref]
24 – 25 mEq/L	0.006 (-0.003,0.016)	0.005 (-0.010,0.020)	0.009 (-0.0003,0.019)
25.1 – 26.9 mEq/L	0.003 (-0.006,0.012)	0.005 (-0.008,0.018)	0.006 (-0.002,0.014)
≥ 27 mEq/L	0.011 (-0.001,0.023)	0.012 (-0.003,0.027)	**0.019 (0.004,0.033)**
P for trend	0.1	0.1	0.02

Abbreviations: eGFR, estimate glomerular filtration rate; BMD, bone mineral density; CI, confidence interval. **Bold** values indicate p<0.05.

Models adjusted for age, sex, race/ethnicity, body mass index, poverty, education, activity level, smoking status, fasting length, thiazide diuretic and calcium carbonate use, diagnosis of diabetes mellitus, hypertension and cardiovascular disease, eGFR, albuminuria, serum albumin, calcium, phosphate and C-reactive protein.

* Per standard deviation higher serum bicarbonate (SD = 2.2 mEq/L).

Table *c*. Sensitivity Analysis After Adjusting for Loop and Thiazide Diuretic Use

Association of Serum Bicarbonate with Lumbar and Total Bone Mineral Density			
	Coefficient (95% CI)		
	Total Population	Men	Women
Lumbar BMD (g/cm^2)			
Continuous*	**0.005 (0.001,0.010)**	**0.008 (0.002,0.015)**	**0.007 (0.001,0.014)**
< 24 mEq/L	[Ref]	[Ref]	[Ref]
24 – 25 mEq/L	0.004 (-0.007,0.014)	-0.005 (-0.024,0.013)	**0.016 (0.003,0.028)**
25.1 – 26.9 mEq/L	0.009 (-0.001,0.020)	0.010 (-0.005,0.026)	**0.017 (0.004,0.031)**
≥ 27 mEq/L	**0.015 (0.003,0.028)**	**0.019 (0.001,0.037)**	**0.021 (0.004,0.038)**
P for trend	0.01	0.01	0.01
Total BMD (g/cm^2)			
Continuous*	0.003 (-0.001,0.007)	0.004 (-0.0005,0.009)	**0.005 (0.001,0.010)**
< 24 mEq/L	[Ref]	[Ref]	[Ref]
24 – 25 mEq/L	0.006 (-0.003,0.016)	0.005 (-0.010,0.020)	0.009 (-0.0003,0.019)
25.1 – 26.9 mEq/L	0.003 (-0.006,0.012)	0.005 (-0.008,0.018)	0.006 (-0.002,0.014)
≥ 27 mEq/L	0.011 (-0.001,0.024)	0.013 (-0.002,0.027)	**0.019 (0.005,0.033)**
P for trend	0.1	0.09	0.01

Abbreviations: eGFR, estimate glomerular filtration rate; BMD, bone mineral density; CI, confidence interval. **Bold** values indicate p<0.05.

Models adjusted for age, sex, race/ethnicity, body mass index, poverty, education, activity level, smoking status, fasting length, loop and thiazide diuretic and calcium carbonate use, diagnosis of diabetes mellitus, hypertension and cardiovascular disease, eGFR, albuminuria, serum albumin, calcium, phosphate and C-reactive protein.

* Per standard deviation higher serum bicarbonate (SD = 2.2 mEq/L).

Table *d*. Sensitivity Analysis After Adjustment for 25-Hydroxy Vitamin D Level (n=6,963)

Association of Serum Bicarbonate with Lumbar and Total Bone Mineral Density			
	Coefficient (95% CI)		
	Total Population	Men	Women
Lumbar BMD (g/cm^2)			
Continuous*	0.005 (-0.0003,0.010)	0.006 (-0.001,0.014)	0.007 (-0.0003,0.015)
< 24 mEq/L	[Ref]	[Ref]	[Ref]
24 – 25 mEq/L	0.002 (-0.010,0.014)	-0.012 (-0.033,0.009)	**0.018 (0.004,0.031)**
25.1 – 26.9 mEq/L	0.007 (-0.005,0.019)	0.002 (-0.019,0.022)	**0.018 (0.003,0.033)**
≥ 27 mEq/L	0.013 (-0.0006,0.026)	0.012 (-0.009,0.034)	**0.021 (0.001,0.041)**
P for trend	0.06	0.1	0.03
Total BMD (g/cm^2)			
Continuous*	**0.005 (0.0001,0.009)**	0.005 (-0.001,0.010)	**0.008 (0.002,0.013)**
< 24 mEq/L	[Ref]	[Ref]	[Ref]
24 – 25 mEq/L	0.003 (-0.009,0.015)	-0.003 (-0.021,0.016)	0.010 (-0.002,0.023)
25.1 – 26.9 mEq/L	0.004 (-0.007,0.015)	0.001 (-0.016,0.017)	**0.012 (0.004,0.021)**
≥ 27 mEq/L	**0.014 (0.001,0.028)**	0.011 (-0.006,0.028)	**0.025 (0.010,0.041)**
P for trend	0.05	0.2	0.001

Abbreviations: BMD, bone mineral density; CI, confidence interval. **Bold** values indicate $p<0.05$.

Models adjusted for age, sex, race/ethnicity, body mass index, poverty, education, activity level, smoking status, fasting length, diuretic and calcium carbonate use, diagnosis of diabetes mellitus, hypertension and cardiovascular disease, eGFR, albuminuria, serum albumin, calcium, phosphate, serum 25-hydroxy vitamin D level (2001-2004), C-reactive protein.

* Per standard deviation higher serum bicarbonate (SD = 2.2 mEq/L).

Table *e*. Sensitivity Analysis After Adjustment for Vitamin D Supplementation (n=7,002)

Association of Serum Bicarbonate with Lumbar and Total Bone Mineral Density			
	Coefficient (95% CI)		
	Total Population	Men	Women
Lumbar BMD (g/cm^2)			
Continuous*	0.005 (-0.0001,0.010)	0.006 (-0.001,0.014)	**0.008 (0.0001,0.016)**
< 24 mEq/L	[Ref]	[Ref]	[Ref]
24 – 25 mEq/L	0.003 (-0.009,0.015)	-0.011 (-0.032,0.010)	**0.018 (0.005,0.032)**
25.1 – 26.9 mEq/L	0.007 (-0.006,0.019)	0.002 (-0.019,0.023)	**0.018 (0.003,0.034)**
≥ 27 mEq/L	**0.013 (0.0001,0.027)**	0.012 (-0.009,0.034)	**0.023 (0.002,0.043)**
P for trend	0.05	0.1	0.02
Total BMD (g/cm^2)			
Continuous*	**0.005 (0.0002,0.010)**	0.005 (-0.0005,0.010)	**0.008 (0.002,0.013)**
< 24 mEq/L	[Ref]	[Ref]	[Ref]
24 – 25 mEq/L	0.004 (-0.008,0.016)	-0.001 (-0.020,0.017)	0.010 (-0.001,0.022)
25.1 – 26.9 mEq/L	0.004 (-0.007,0.016)	0.001 (-0.016,0.018)	**0.012 (0.003,0.021)**
≥ 27 mEq/L	**0.015 (0.001,0.029)**	0.012 (-0.006,0.029)	**0.026 (0.011,0.042)**
P for trend	0.05	0.2	0.001

Abbreviations: BMD, bone mineral density; CI, confidence interval. **Bold** values indicate $p<0.05$.

Models adjusted for age, sex, race/ethnicity, body mass index, poverty, education, activity level, smoking status, fasting length, diuretic and calcium carbonate use, diagnosis of diabetes mellitus, hypertension and cardiovascular disease, eGFR, albuminuria, serum albumin, calcium, phosphate, vitamin D supplementation (2001-2004), C-reactive protein.

* Per standard deviation higher serum bicarbonate (SD = 2.2 mEq/L).

Table *f*. Sensitivity Analysis using Serum Bicarbonate without Correction Factor (1999-2002)

Association of Serum Bicarbonate with Lumbar and Total Bone Mineral Density			
	Coefficient (95% CI)		
	Total Population	Men	Women
Lumbar BMD (g/cm^2)			
Continuous*	**0.007 (0.001,0.013)**	0.008 (-0.0004,0.016)	**0.010 (0.003,0.018)**
< 23 mEq/L	[Ref]	[Ref]	[Ref]
23 – 24 mEq/L	0.008 (-0.003,0.018)	0.009 (-0.007,0.026)	0.012 (-0.002,0.026)
25.1 – 25.9 mEq/L	**0.015 (0.002,0.029)**	**0.022 (0.002,0.042)**	0.021 (-0.003,0.045)
≥ 26 mEq/L	**0.019 (0.003,0.035)**	0.022 (-0.003,0.046)	**0.027 (0.007,0.047)**
P for trend	0.02	0.06	0.01
Total BMD (g/cm^2)			
Continuous*	0.004 (-0.001,0.008)	0.004 (-0.002,0.010)	**0.006 (0.001,0.011)**
< 23 mEq/L	[Ref]	[Ref]	[Ref]
23 – 24 mEq/L	0.006 (-0.001,0.014)	**0.013 (0.001,0.025)**	0.003 (-0.006,0.012)
25.1 – 25.9 mEq/L	0.008 (-0.003,0.020)	0.012 (-0.003,0.026)	0.013 (-0.001,0.028)
≥ 26 mEq/L	0.012 (-0.002,0.025)	0.014 (-0.002,0.031)	**0.018 (0.001,0.035)**
P for trend	0.09	0.1	0.02

Abbreviations: BMD, bone mineral density; CI, confidence interval. **Bold** values indicate $p<0.05$.

Models adjusted for age, sex, race/ethnicity, body mass index, poverty, education, activity level, smoking status, fasting length, diuretic and calcium carbonate use, diagnosis of diabetes mellitus, hypertension and cardiovascular disease, eGFR, albuminuria, serum albumin, calcium, phosphate, C-reactive protein.

* Per standard deviation higher serum bicarbonate (SD = 2.2 mEq/L).

Table *g*. Sensitivity Analysis of Logistic Regression for Participants >50 Years Old (n=2,072)

	OR (95% CI)	
	Men	Women
Low Lumbar Bone Mass		
Continuous*	0.90 (0.78,1.04)	0.91 (0.79,1.04)
< 24 mEq/L	[Ref]	[Ref]
24 – 25 mEq/L	1.09 (0.54,2.21)	0.94 (0.66,1.32)
25.1 – 26.9 mEq/L	1.14 (0.67,1.93)	1.01 (0.73,1.41)
≥ 27 mEq/L	0.73 (0.44,1.22)	0.74 (0.52,1.06)
P for trend	0.2	0.2
Low Total Bone Mass		
Continuous*	0.96 (0.83,1.12)	0.90 (0.77,1.05)
< 24 mEq/L	[Ref]	[Ref]
24 – 25 mEq/L	0.71 (0.49,1.04)	0.96 (0.61,1.53)
25.1 – 26.9 mEq/L	0.80 (0.55,1.18)	0.95 (0.57,1.58)
≥ 27 mEq/L	0.82 (0.53,1.25)	**0.65 (0.43,0.99)**
P for trend	0.5	0.08

Abbreviations: OR, odds ratio; CI, confidence interval. **Bold** values indicate p<0.05.

Models adjusted for age, race/ethnicity, body mass index, poverty, education, activity level, smoking status, fasting length, diuretic and calcium carbonate use, diagnosis of diabetes mellitus, hypertension and cardiovascular disease, eGFR, albuminuria, serum albumin, calcium, phosphate and C-reactive protein.

* Per standard deviation higher serum bicarbonate (SD = 2.2 mEq/L).