Table S1. Characteristics of 12,860 participants of NHANES 1999 – 2018 by number of metabolic syndrome features

Table S2. Associations of metabolic variables with traditional and corrected anion gap

Table S3. Associations of metabolic variables with elevated anion gap

Table S4. Associations of body mass index with outcomes after adjustment for metabolic variables

Table S5. Associations of waist circumference with outcomes after adjustment for insulin resistance

Table S6. Associations of metabolic variables with outcomes, excluding participants with insulin resistance (HOMA-IR)

Table S7. Associations of metabolic variables with outcomes, excluding participants with diabetes and hypertension

Table S8. Associations of metabolic syndrome features with outcomes, excluding participants with obesity

Table S9. Associations of waist circumference with non-anion gap metabolic acidosis and anion gap metabolic acidosis after excluding CKD

Table S1. Characteristics of 12,860 participants
of NHANES 1999 – 2018 by number of metabolic syndrome features

Characteristic	Metabolic syndrome features					
	0	1	2	3	4	5
Number	3,506	4,474	2,927	1,654	562	54
Age (years)	38.4 (0.4)	44.5 (0.4)	46.8 (0.4)	48.0 (0.5)	51.6 (0.8)	48.6 (1.8)
Women (%)	44.7 (0.9)	53.4 (1.0)	49.7 (1.0)	47.0 (1.8)	48.2 (2.7)	33.3 (0.9)
Race/ethnicity (%)						
Mexican American	8.1 (0.6)	8.9 (0.7)	10.0 (0.9)	10.8 (1.1)	11.7 (1.4)	13.7 (4.9)
Other Hispanic	4.8 (0.6)	5.4 (0.6)	5.8 (0.7)	5.9 (0.9)	4.9 (1.0)	17.1 (7.5)
Non-Hispanic white	70.0 (1.3)	67.3 (1.4)	67.9 (1.7)	70.8 (1.6)	69.8 (2.6)	50.5 (10.0)
Non-Hispanic black	11.4 (0.8)	12.3 (0.8)	10.7 (0.9)	8.2 (0.7)	7.9 (1.3)	11.1 (4.5)
Other Race / Multi-racial	7.7 (0.6)	6.1 (0.5)	5.5 (0.6)	4.4 (0.7)	5.7 (1.3)	7.6 (4.4)
Insurance (%)						
Private	59.9 (1.4)	57.1 (1.2)	51.3 (1.3)	54.2 (1.6)	53.8 (2.7)	66.1 (8.0)
Medicare	5.5 (0.5)	9.3 (0.5)	12.3 (0.7)	11.9 (0.8)	13.3 (1.9)	8.0 (4.1)
Medicaid	3.0 (0.3)	4.3 (0.4)	4.9 (0.5)	4.8 (0.6)	6.1 (1.4)	6.9 (4.3)
Other government insurance	10.0 (0.8)	10.5 (0.7)	12.6 (1.2)	11.5 (1.1)	7.6 (1.8)	2.9 (2.1)
No insurance or missing	21.7 (1.0)	18.8 (0.9)	19.0 (1.0)	17.7 (1.1)	19.1 (2.1)	16.1 (5.3)
Household income						
< $25,000	18.1 (1.1)	18.9 (0.9)	20.5 (1.0)	22.7 (1.3)	23.4 (2.1)	28.3 (8.5)
$25,000 - < 45,000	19.9 (0.9)	22.6 (0.9)	25.0 (1.2)	23.2 (1.5)	28.2 (2.6)	23.3 (7.0)
$45,000 - < $75,000	21.5 (1.0)	25.0 (1.1)	24.3 (1.3)	25.3 (1.6)	25.2 (2.9)	30.1 (9.2)
≥ $75,000	40.4 (1.6)	33.5 (1.4)	30.1 (1.5)	28.8 (1.5)	23.1 (2.5)	18.3 (8.9)
NEAP (mEq/d)	59.6 (0.8)	59.9 (0.9)	57.9 (0.7)	59.7 (0.6)	60.5 (0.7)	63.1 (0.8)
eGFR (ml/min per 1.73 m^2) (%)						
≥ 120	18.7 (0.8)	12.9 (0.7)	12.7 (0.8)	9.8 (0.8)	6.8 (1.2)	8.8 (3.9)
90 - 119	55.2 (1.1)	52.2 (1.1)	50.1 (1.2)	51.3 (1.7)	48.2 (3.1)	55.0 (9.3)

60 - 89	24.4 (1.1)	31.5 (1.1)	33.5 (1.1)	32.9 (1.5)	36.7 (3.1)	27.0 (7.4)
15 - 59	1.7 (0.2)	3.5 (0.3)	3.7 (0.4)	6.0 (0.7)	8.4 (1.3)	9.1 (5.0)
Hypertension (%)	0.0 (0.0)	31.4 (0.9)	33.7 (1.2)	40.8 (1.8)	56.3 (2.8)	71.5 (8.1)
Diabetes mellitus (%)	0.0 (0.0)	3.1 (0.1)	10.7 (0.8)	15.5 (1.3)	30.8 (2.7)	47.4 (9.9)
Coronary artery disease (%)	1.1 (0.2)	3.1 (0.3)	4.4 (0.5)	5.6 (0.7)	6.1 (1.2)	2.3 (2.0)
Serum bicarbonate (mEq/L)	25.0 (0.1)	24.8 (0.1)	24.5 (0.1)	24.4 (0.1)	24.1 (0.1)	23.9 (0.4)
Traditional anion gap (mEq/L)	10.4 (0.1)	10.6 (0.1)	10.8 (0.1)	10.9 (0.1)	11.4 (0.1)	11.5 (0.4)
Corrected anion gap (mEq/L)	9.4 (0.1)	9.8 (0.1)	10.1 (0.1)	10.3 (0.1)	10.8 (0.1)	11.1 (0.4)
Full anion gap (mEq/L)	13.5 (0.1)	14.0 (0.1)	14.4 (0.1)	14.6 (0.1)	15.1 (0.1)	15.4 (0.4)
Elevated traditional anion gap (%)	2.8 (0.6)	2.1 (0.4)	3.1 (0.4)	3.2 (0.6)	3.8 (1.1)	0.0 (0.0)
Elevated corrected anion gap (%)	1.7 (0.4)	2.1 (0.3)	3.3 (0.5)	4.5 (0.7)	5.0 (1.3)	0.0 (0.0)
Elevated full anion gap (%)	2.0 (0.4)	2.2 (0.4)	3.5 (0.6)	4.7 (0.8)	6.1 (1.4)	0.5 (0.4)
Metabolic acidosis ($\leq$ 23 mEq/L) (%)	22.0 (1.4)	27.2 (1.2)	31.9 (1.4)	35.3 (1.9)	38.1 (2.9)	30.2 (8.4)
Metabolic acidosis (< 22 mEq/L) (%)	4.3 (0.6)	6.3 (0.6)	9.4 (1.0)	10.6 (1.3)	13.8 (1.8)	11.5 (6.9)
Corrected anion gap metabolic acidosis (%)	1.4 (0.4)	1.6 (0.3)	2.4 (0.5)	3.3 (0.6)	3.5 (0.9)	0.0 (0.0)
Full anion gap metabolic acidosis (%)	1.5 (0.4)	1.8 (0.3)	2.7 (0.5)	3.4 (0.8)	4.5 (1.2)	0.0 (0.0)

Continuous variables reported as mean (standard error) and categorical variables as percent (standard error).

Abbreviations: eGFR, estimated glomerular filtration rate; mEq, milliequivalent; NEAP, net endogenous acid production; NHANES, national health and nutrition examination survey

Table S2. Associations* of metabolic variables with traditional and corrected anion gap

	Traditional anion gap (mEq/L)			Corrected anion gap		
	Delta	95% CI	*p*-value	Delta	95% CI	*p*-value
WC (cm)						
< 81.2	Ref.	–	–	Ref.	–	–
81.2 – 89	0	-0.16 – 0.10	0.64	0.07	-0.05 – 0.19	0.26
89.1 – 95.6	-0.04	-0.18 – 0.10	0.60	0.14	0.00 – 0.28	0.05
95.7 – 102.5	0.02	-0.13 – 0.17	0.77	0.30	0.15 – 0.45	<0.001
102.6 – 111.5	0.12	-0.04 – 0.29	0.13	0.48	0.33 – 0.64	<0.001
>111.5	0.20	0.02 – 0.39	0.03	0.81	0.64 – 0.99	<0.001
MetS features						
0	Ref.	–	–	Ref.	–	–
1	0.10	-0.02 – 0.23	0.12	0.29	0.17 – 0.41	<0.001
2	0.26	0.12 – 0.40	<0.001	0.55	0.41 – 0.69	<0.001
3	0.39	0.19 – 0.59	<0.001	0.72	0.51 – 0.92	<0.001
4	0.80	0.54 – 1.05	<0.001	1.06	0.83 – 1.29	<0.001
5	0.68	-0.15 – 1.50	0.11	1.22	0.43 – 2.01	<0.01
Body mass index (kg/m^2)						
< 18.5	0.43	0.17 - 0.69	<0.01	0.26	-0.01 - 0.53	0.06
18.5 – < 25	Ref.	–	–	Ref.	–	–
25 – < 30	0.06	-0.04 - 0.16	0.21	0.21	0.11 - 0.30	<0.001
30 – < 35	0.18	0.04 - 0.31	0.01	0.48	0.35 - 0.62	<0.001
35 – < 40	0.20	0.01 - 0.40	0.04	0.69	0.50 - 0.89	<0.001
> 40	0.20	-0.03 - 0.43	0.09	1.02	0.79 - 1.24	<0.001

Abbreviations: CI, confidence interval; mEq, millequivent; MetS, metabolic syndrome; Ref, reference; WC, waist circumference
*Multivariable model adjusted for age, sex, race/ethnicity, estimated glomerular filtration rate, estimated net endogenous acid production, baseline income, insurance status, hypertension, diabetes, and coronary artery disease

Table S3. Associations* of metabolic variables with elevated anion gap

	Elevated traditional AG			Elevated corrected AG			Elevated full AG		
	OR	95% CI	p-value	OR	95% CI	p-value	OR	95% CI	p-value
WC (cm)									
< 81.2	Ref.	–	–	Ref.	–	–	Ref.	–	–
81.2 – 89	1.05	0.77 – 1.43	0.75	1.18	0.90 – 1.54	0.23	1.31	0.99 – 1.74	0.06
89.1 – 95.6	1.21	0.88 – 1.67	0.25	1.30	0.96 – 1.77	0.09	1.37	1.02 – 1.83	0.04
95.7 – 102.5	1.28	0.98 – 1.68	0.07	1.39	1.06 – 1.83	0.02	1.60	1.21 – 2.12	<0.01
102.6 – 111.5	1.31	0.94 – 1.83	0.12	1.62	1.19 – 2.20	<0.01	1.73	1.29 – 2.32	<0.001
>111.5	1.50	1.11 – 2.01	<0.01	2.29	1.68 – 3.13	<0.001	2.45	1.81 – 3.31	<0.001
MetS features									
0	Ref.	–	–	Ref.	–	–	Ref.	–	–
1	0.83	0.50 – 1.38	0.47	1.09	0.67 – 1.78	0.71	1.03	0.64 – 1.67	0.89
2	1.27	0.80 – 2.02	0.30	1.70	1.00 – 2.89	0.05	1.62	1.01 – 2.60	0.04
3	1.26	0.74 – 2.14	0.39	2.27	1.40 – 3.69	<0.01	2.15	1.26 – 3.67	<0.01
4	1.48	0.83 – 2.66	0.18	2.32	1.27 – 4.26	<0.01	2.59	1.50 – 4.46	<0.01
5	‡	–	–	‡	–	–	0.17	0.04 – 0.83	0.02
BMI (kg/m²)									
< 18.5	1.10	0.68 – 1.79	0.68	0.99	0.51 – 1.92	0.983	1.01	0.52 – 1.97	0.98
18.5 – < 25	Ref.	–	–	Ref.	–	–	Ref.	–	–
25 – < 30	1.14	0.95 – 1.36	0.17	1.21	1.02 – 1.44	0.03	1.27	1.07 – 1.51	<0.01
30 – < 35	1.30	0.99 – 1.69	0.05	1.54	1.21 – 1.94	<0.001	1.63	1.30 – 2.04	<0.001
35 – < 40	1.53	1.15 – 2.04	<0.01	2.15	1.61 – 2.86	<0.001	2.14	1.61 – 2.85	<0.001
> 40	1.10	0.73 – 1.64	0.65	2.11	1.46 – 3.04	<0.001	2.01	1.38 – 2.93	<0.001

Abbreviations: AG, anion gap; BMI, body mass index; CI, confidence interval; mEq, milliequivalent; MetS, metabolic syndrome; OR, odds ratio; Ref, reference; WC, waist circumference
*Multivariable model adjusted for age, sex, race/ethnicity, estimated glomerular filtration rate, estimated net endogenous acid production, baseline income, insurance status, hypertension, diabetes, and coronary artery disease
‡Not calculable due to small sample

Table S4. Associations* of body mass index with outcomes after adjustment for metabolic variables

	Serum bicarbonate (mEq/L)			Full AG (mEq/L)			Metabolic acidosis			AGMA		
	Delta	95% CI	p-value	Delta	95% CI	p-value	OR	95% CI	p-value	OR	95% CI	p-value
BMI (kg/m^2) Unadjusted												
< 18.5	0.21	-0.15 – 0.56	0.25	0.26	-0.01 – 0.53	0.06	1.01	0.52 – 1.97	0.98	0.99	0.51 – 1.92	0.98
18.5 – < 25	Ref.	–	–	Ref.	–	–	Ref.	–	–	Ref.	–	–
25 – < 30	-0.41	-0.51 – -0.31	<0.001	0.21	0.11 – 0.30	<0.001	1.27	1.07 – 1.51	<0.01	1.21	1.02 – 1.44	0.03
30 – < 35	-0.72	-0.84 – -0.59	<0.001	0.48	0.35 – 0.62	<0.001	1.63	1.30 – 2.04	<0.001	1.54	1.21 – 1.94	<0.001
35 – < 40	-0.82	-0.96 – -0.67	<0.001	0.69	0.50 – 0.89	<0.001	2.14	1.61 – 2.85	<0.001	2.15	1.61 – 2.86	<0.001
> 40	-0.88	-1.08 – -0.67	<0.001	1.02	0.79 – 1.24	<0.001	2.01	1.38 – 2.93	<0.001	2.11	1.46 – 3.04	<0.001
BMI (kg/m^2) adjusted for WC												
< 18.5	0.16	-0.19 – 0.52	0.36	0.28	0.00 – 0.56	0.05	1.02	0.79 – 1.33	0.86	1.22	0.57 – 2.63	0.61
18.5 – < 25	Ref.	–	–	Ref.	–	–	Ref.	–	–	Ref.	–	–
25 – < 30	-0.20	-0.32 – -0.08	<0.01	0.13	-0.01 – 0.27	0.07	1.27	1.11 – 1.47	<0.01	1.21	0.81 – 1.80	0.35
30 – < 35	-0.21	-0.40 – -0.03	0.03	0.26	0.06 – 0.46	0.01	1.30	1.06 – 1.61	0.01	1.29	0.78 – 2.15	0.32
35 – < 40	-0.08	-0.32 – 0.16	0.50	0.36	0.13 – 0.60	<0.01	1.19	0.93 – 1.52	0.17	1.41	0.72 – 2.76	0.31
> 40	-0.04	-0.34 – 0.25	0.77	0.64	0.31 – 0.97	<0.001	1.15	0.85 – 1.55	0.37	1.29	0.52 – 3.18	0.58
BMI (kg/m^2) adjusted for MetS features												
< 18.5	0.28	-0.12 – 0.69	0.17	0.08	-0.34 – 0.49	0.72	0.79	0.49 – 1.26	0.32	1.17	0.37 – 3.67	0.79
18.5 – < 25	Ref.	–	–	Ref.	–	–	Ref.	–	–	Ref.	–	–
25 – < 30	-0.17	-0.32 – -0.03	0.02	-0.13	-0.25 – -0.01	0.04	1.12	0.94 – 1.34	0.19	0.96	0.52 – 1.80	0.91
30 – < 35	-0.37	-0.32 – -0.04	<0.001	-0.16	-0.31 – -0.00	0.04	1.36	1.11 – 1.66	<0.01	0.87	0.38 – 1.99	0.75
35 – < 40	-0.62	-0.32 – -0.05	<0.001	0.08	-0.13 – 0.29	0.46	1.68	1.33 – 2.13	<0.001	1.08	0.46 – 2.57	0.85
> 40	-0.45	-0.32 – -0.06	<0.01	0.42	0.18 – 0.66	<0.01	1.58	1.20 – 2.09	<0.01	0.91	0.38 – 2.17	0.84

Abbreviations: AG, anion gap; AGMA, anion gap metabolic acidosis; BMI, body mass index; CI, confidence interval; mEq, milliequivalent; MetS, metabolic syndrome; OR, odds ratio; Ref, reference

*Multivariable model adjusted for age, sex, race/ethnicity, estimated glomerular filtration rate, estimated net endogenous acid production, baseline income, insurance status, hypertension, diabetes, and coronary artery disease

Table S5. Associations* of waist circumference with outcomes after adjustment for insulin resistance

	Serum bicarbonate			Full AG			Metabolic acidosis			Full AGMA		
	Delta	95% CI	p-value	Delta	95% CI	p-value	OR	95% CI	p-value	OR	95% CI	p-value
WC (cm)												
< 81.2	Ref.	–	–	Ref.	–	–	Ref.	–	–	Ref.	–	–
81.2 – 89	-0.05	-0.22 – 0.11	0.52	0.08	-0.12 – 0.27	0.45	1.03	0.85 – 1.25	0.74	1.54	0.73 – 3.26	0.26
89.1 – 95.6	-0.23	-0.42 – -0.04	0.02	0.11	-0.06 – 0.29	0.20	1.11	0.91 – 1.37	0.31	1.70	0.82 – 3.50	0.15
95.7 – 102.5	-0.48	-0.67 – -0.30	<0.001	0.15	-0.05 – 0.34	0.14	1.57	1.28 – 1.91	<0.001	1.60	0.59 – 4.35	0.36
102.6 – 111.5	-0.45	-0.66 – -0.25	<0.001	0.11	-0.10 – 0.32	0.29	1.34	1.08 – 1.65	<0.01	1.21	0.49 – 2.97	0.68
>111.5	-0.80	-1.03 – -0.57	<0.001	0.50	0.26 – 0.73	<0.001	1.89	1.50 – 2.40	<0.001	1.54	0.55 – 4.35	0.41
HOMA-IR												
< 1.26	Ref.	–	–	Ref.	–	–	Ref.	–	–	Ref.	–	–
1.26 – 2.08	-0.03	-0.18 – 0.13	0.72	0.07	-0.08 – 0.22	0.38	1.01	0.85 – 1.21	0.89	0.83	0.50 – 1.37	0.46
2.09 – 3.57	-0.26	-0.47 – -0.06	0.01	0.22	0.00 – 0.44	0.05	1.25	1.01 – 1.53	0.04	1.03	0.47 – 2.25	0.95
>3.57	-0.50	-0.69 – -0.31	<0.001	0.46	0.29 – 0.64	<0.001	1.54	1.25 – 1.90	<0.001	1.33	0.75 – 2.36	0.32

Abbreviations: AG, anion gap; AGMA, anion gap metabolic acidosis; BMI, body mass index; CI, confidence interval; mEq, milliequivalent; MetS, metabolic syndrome; OR, odds ratio; Ref, reference

*Multivariable model adjusted for age, sex, race/ethnicity, estimated glomerular filtration rate, estimated net endogenous acid production, baseline income, insurance status, insulin sensitivity, hypertension, diabetes, and coronary artery disease

Table S6. Associations* of metabolic variables with outcomes, excluding participants with insulin resistance (n = 8,988)

	Serum bicarbonate (mEq/L)			Full AG (mEq/L)			Metabolic acidosis			AGMA		
	Delta	95% CI	p-value	Delta	95% CI	p-value	OR	95% CI	p-value	OR	95% CI	p-value
WC (cm)												
< 81.2	Ref.	–	–	Ref.	–	–	Ref.	–	–	Ref.	–	–
81.2 – 89	-0.13	-0.30 – 0.03	0.12	0.06	-0.13 – 0.26	0.52	1.12	0.91 – 1.36	0.28	1.55	0.74 – 3.26	0.24
89.1 – 95.6	-0.33	-0.52 – -0.14	<0.01	0.11	-0.06 – 0.27	0.22	1.21	0.98 – 1.50	0.07	1.94	0.98 – 3.84	0.06
95.7 – 102.5	-0.59	-0.77 – -0.41	<0.001	0.06	-0.12 – 0.25	0.5	1.71	1.40 – 2.08	<0.001	1.48	0.52 – 4.17	0.46
102.6 – 111.5	-0.64	-0.83 – -0.45	<0.001	0.14	-0.06 – 0.34	0.16	1.59	1.29 – 1.95	<0.001	1.43	0.58 – 3.57	0.44
>111.5	-0.88	-1.12 – -0.64	<0.001	0.29	0.06 – 0.52	0.02	2.16	1.62 – 2.88	<0.001	1.45	0.54 – 3.94	0.45
MetS features												
Elevated blood pressure	-0.44	-0.72 – -0.16	<0.01	0.41	0.13 – 0.70	<0.01	1.61	1.18 – 2.19	<0.01	1.49	0.61 – 3.65	0.37
Low HDL cholesterol	-0.40	-0.54 – -0.26	0.001	0.26	0.07 – 0.45	<0.01	1.48	1.26 – 1.74	<0.001	1.50	0.96 – 2.36	0.08
Elevated triglycerides	-0.23	-0.38 – -0.08	<0.01	0.41	0.22 – 0.60	<0.001	1.16	0.98 – 1.38	0.08	1.45	0.78 – 2.71	0.24
Elevated waist circumference	-0.36	-0.47 – -0.25	<0.001	0.07	-0.04 – 0.18	0.23	1.39	1.20 – 1.60	<0.001	1.01	0.63 – 1.62	0.97

Abbreviations: AG, anion gap; AGMA, anion gap metabolic acidosis; CI, confidence interval; mEq, milliequivalent; MetS, metabolic syndrome; OR, odds ratio; Ref, reference; WC, waist circumference

*Multivariable model adjusted for age, sex, race/ethnicity, estimated glomerular filtration rate, estimated net endogenous acid production, baseline income, insurance status, hypertension, diabetes, and coronary artery disease

Table S7. Associations* of metabolic variables with outcomes, excluding participants with diabetes and hypertension (main cohort n = 20,881; fasting cohort n = 8,581)

	Serum bicarbonate (mEq/L)			Full AG (mEq/L)			Metabolic acidosis			AGMA		
	Delta	95% CI	*p*-value	Delta	95% CI	*p*-value	OR	95% CI	*p*-value	OR	95% CI	*p*-value
WC (cm)												
< 81.2	Ref.	–	–	Ref.	–	–	Ref.	–	–	Ref.	–	–
81.2 - 89	-0.12	-0.29 – 0.06	0.19	0.06	-0.14 – 0.27	0.54	1.12	0.92 – 1.36	0.27	1.96	0.93 – 4.11	0.08
89.1 - 95.6	-0.34	-0.52 – -0.17	<0.001	0.10	-0.07 – 0.27	0.24	1.29	1.06 – 1.57	0.01	2.10	1.01 – 4.36	0.04
95.7 - 102.5	-0.71	-0.90 – -0.52	<0.001	0.15	-0.03 – 0.33	0.94	2.00	1.64 – 2.45	<0.001	1.56	0.56 – 4.37	0.40
102.6 - 111.5	-0.71	-0.91 – -0.52	<0.001	0.14	-0.04 – 0.32	0.12	1.70	1.36 – 2.11	<0.001	1.86	0.87 – 3.95	0.11
>111.5	-1.24	-1.47 – -1.02	<0.001	0.74	0.48 – 1.00	<0.001	2.60	2.00 – 3.36	<0.001	2.02	0.76 – 5.35	0.16
MetS features												
0	Ref.	–	–	Ref.	–	–	Ref.	–	–	Ref.	–	–
1	-0.49	-0.62 – -0.36	<0.001	0.30	0.17 – 0.43	<0.001	1.53	1.28 – 1.82	<0.001	1.29	0.76 – 2.21	0.35
2	-0.80	-0.95 – -0.64	<0.001	0.51	0.35 – 0.66	<0.001	1.97	1.67 – 2.33	<0.001	1.87	1.13 – 3.08	0.02
3	-1.11	-1.34 – -0.87	<0.001	0.73	0.44 – 1.01	<0.001	2.64	2.04 – 3.42	<0.001	1.75	0.72 – 4.25	0.22
4	-1.28	-1.62 – -0.94	<0.001	1.03	0.66 – 1.40	<0.001	2.28	1.57 – 3.33	<0.001	1.85	0.59 – 5.77	0.29
5	-2.17	-3.05 – -1.29	<0.001	0.31	-0.75 – 1.38	0.56	3.39	0.83 – 13.84	0.09	‡	–	–

Abbreviations: AG, anion gap; AGMA, anion gap metabolic acidosis; CI, confidence interval; mEq, milliequivalent; MetS, metabolic syndrome; OR, odds ratio; Ref, reference; WC, waist circumference
*Multivariable model adjusted for age, sex, race/ethnicity, estimated glomerular filtration rate, estimated net endogenous acid production, baseline income, insurance status, and coronary artery disease
‡Not calculable due to small sample

Table S8. Associations* of metabolic syndrome features with outcomes, excluding participants with obesity (n = 8,374)

MetS features	Serum bicarbonate (mEq/L)			Full AG (mEq/L)			Metabolic acidosis			AGMA		
	Delta	95% CI	p-value	Delta	95% CI	p-value	OR	95% CI	p-value	OR	95% CI	p-value
0	Ref.	–	–	Ref.	–	–	Ref.	–	–	Ref.	–	–
1	-0.41	-0.54 – 0.29	<0.001	0.27	0.11 – 0.42	0.001	1.49	1.26 – 1.77	<0.001	1.18	0.61 - 2.26	0.62
2	-0.62	-0.78 – -0.46	<0.001	0.53	0.34 – 0.72	<0.001	1.70	1.40 – 2.06	<0.001	2.01	1.11 - 3.66	0.02
3	-1.03	-1.26 – -0.80	<0.001	0.68	0.44 – 0.92	<0.001	2.73	2.10 – 3.55	<0.001	1.86	0.92 - 3.76	0.09
4	-1.50	-1.95 – -1.06	<0.001	1.22	0.84 – 1.61	<0.001	3.69	2.13 – 6.39	<0.001	3.71	1.43 - 9.66	0.008
5	-1.14	-1.80 – -0.49	0.001	0.57	-0.20 – 1.34	0.14	1.90	0.46 – 7.82	0.37	‡	–	–

Abbreviations: AG, anion gap; AGMA, anion gap metabolic acidosis; CI, confidence interval; mEq, milliequivalent MetS, metabolic syndrome; OR, odds ratio; Ref, reference
*Multivariable model adjusted for age, sex, race/ethnicity, estimated glomerular filtration rate, estimated net endogenous acid production, baseline income, insurance status, hypertension, diabetes, and coronary artery disease
‡Not calculable due to small sample

Table S9. Associations* of waist circumference with non-anion gap metabolic acidosis and anion gap metabolic acidosis after excluding CKD (n = 12,804)

WC (cm)	NAGMA (n = 320)			AGMA (n = 236)		
	OR	95% CI	*p*-value	OR	95% CI	*p*-value
< 81.2	Ref.	–	–	Ref.	–	–
81.2 – 89	0.94	0.57 - 1.58	0.83	1.36	0.88 - 2.11	0.17
89.1 – 95.6	1.34	0.75 - 2.41	0.32	1.03	0.51 - 2.10	0.93
95.7 – 102.5	1.28	0.66 - 2.49	0.43	2.11	0.89 - 5.02	0.09
102.6 – 111.5	1.86	1.09 - 3.18	0.02	2.33	1.14 - 4.80	0.02
>111.5	1.08	0.81 - 2.85	0.48	3.49	1.85 - 6.62	<0.001

Abbreviations: AGMA, anion gap metabolic acidosis; CI, confidence interval; CKD, chronic kidney disease; NAGMA, non-anion gap metabolic acidosis; OR, odds ratio; Ref, reference; WC, waist circumference
*Multivariable model adjusted for age, sex, race/ethnicity, estimated net endogenous acid production, baseline income, insurance status, hypertension, diabetes, and coronary artery disease, and excluding eGFR < 90 mL/min/1.73m^2 or albumin to creatinine ratio $\geq$ 30 mg/g.