Supplementary Online Content

Cogswell ME, Loria CM, Terry AL, et al. Estimated 24-hour urinary sodium and potassium excretion in US adults. *JAMA*. doi:10.1001/jama.2018.1156

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This supplementary material has been provided by the authors to give readers additional information about their work.

eMethods.

24-Hour Urine Collection Methods

The protocol for 24-hour urine collection is available elsewhere.[1] Briefly, during the examination in the Mobile Exam Center (MEC), randomly selected National Health and Nutrition Examination Survey (NHANES) participants were asked to participate in a 24-hour urine collection, post examination.[1] Those who agreed were scheduled for two visits to the Urine MEC (UMEC). During the first visit, they started their urine collection. During the second visit, they returned their kits and finished their collection. Participants were randomly assigned to start collection on a weekend or weekday, but if unable to comply, were allowed to schedule urine collection at their convenience.

At the first appointment in the UMEC, study staff gave a 24-hour urine collection kit to the participant. The kit contained urine collection equipment and written instructions on how to collect and return the 24-hour urine specimen. Study staff opened the kit, explained the contents, provided oral instructions to the participant and gave them the written instructions.[1]

To start collection, study staff asked the participant to empty their bladder in the bathroom in the UMEC. Drinking water was provided if needed, to help individuals void. The time of the void was recorded and checked by UMEC staff. This initial void was discarded and the participant asked to collect all urine from that moment for a period of 24-hours ending with the last specimen collection in the UMEC the next day with the time again checked by UMEC staff. If a participant could not come back the next day (~24-hours after the start time), they were required to schedule a time within 48 hours of the start to return their urine specimen to the UMEC. For participants who could not start or stop 24-hour urine collection in the UMEC, instructions were provided for starting and stopping collection at home.[1]

A questionnaire about the urine collection was administered upon return to UMEC (after stopping collection).[1] A remuneration of $100 was given to the participant at the end of the questionnaire along with a transportation allowance.[1]

Upon completion of the initial 24-hour urine collection, selected participants were eligible for a second collection scheduled 3-10 days after the initial urine collection following the same procedures as the initial collection.[1,2] For the first half of 2014, a random one-half of eligible participants was selected. Due to logistical constraints with scheduling, for the second half of 2014, all eligible participants were selected to achieve a half sample of those with an initial collection.[2]

Cardiovascular Disease (CVD) Risk Subgroup Definitions

Obesity was defined as a body mass index (BMI) of 30 or greater and overweight as a BMI of 25 to less than 30. Body mass index (BMI) was assessed through weight in kilograms divided by height in meters-squared. Height and weight were measured during the examination by trained personnel using standard equipment and quality control procedures.[3] A few (n=12) participants had a BMI of less than 18.5. Results for participants with BMI less than 25 did not change with or without participants with a BMI less than 18.5, so the two groups were combined.

Physical activity was based on responses to a questionnaires about work, transportation, and leisure time physical activity based on the Global Physical Activity Questionnaire.[4] Definitions for physical activity were based on a previous publication.[5] Recommended physical activity was defined as 75 minutes per week or more at vigorous intensity or 150 minutes per week or more at moderate intensity or the equivalent combination of moderate plus vigorous intensity, with 1 minute of vigorous intensity activity equivalent to 2 minutes of moderate intensity activity. Intermediate was defined as 5 to 74 minutes per week at vigorous intensity activity or 10 to 149 minutes per week at moderate intensity or the equivalent combination of moderate plus vigorous intensity activity. Low physical activity included participants who did not engage in recommended or intermediate physical activity.

Hypertension was defined using the 2017 Hypertension Guidelines[6] and using previous national surveillance criteria.[7] The 2017 Hypertension Guidelines define hypertension as mean systolic blood pressure (SBP) ≥130 mm Hg, mean diastolic blood pressure (DBP) ≥80 mm Hg, or self-reported use of antihypertensive medication. For the purpose of this analysis, we defined participants who did not meet the 2017 Hypertension Guidelines definition for hypertension as not hypertensive. The previous national surveillance criteria, defined hypertension as mean SBP ≥140 mm Hg, mean DBP ≥90 mm Hg, or self-reported use of antihypertensive medication. Pre-hypertension was defined as a mean SBP of 120–139 mm Hg or a mean DBP of 80–89 mm Hg

eMethods. *(continued)*

among those without hypertension. Normotension was defined as mean SBP <120 mm Hg and mean DBP <80 mm Hg in the absence of antihypertensive medication.

Statistical Methods

- *Sensitivity Analyses*

Urinary sodium excretion may be underestimated if urine collection is incomplete. Although there is no one recommended method to assess whether collection is complete, para-aminobenzoic acid (PABA), which requires participants to consume PABA supplements, has been recommended by some and has been used.[8,9] Other methods, including urine volume, self-report of missing urine, and the ratio of measured- to expected-24-hour urinary creatinine excretion also have been used.[8,9] In NHANES 2014, completion of 24-hour urine collection was based on adequate duration, no missing urine based on self-report, and adequate urine volume (see Methods). Twenty-four hour urinary creatinine excretion also was measured to further assess the impact of potential incomplete collection, based on the assumption that compared with sodium, urinary creatinine is less variable from day-to-day, and that estimated 24-hour urinary creatinine approximates measured 24-h urinary creatinine. Expected 24-hour urinary creatinine excretion is based on prediction equations. We used two different equations to estimate expected 24-hour urinary creatinine excretion.[10,11] Joossens and Geboers's equation included the participant's sex and weight.[10] Mage's equation included sex, weight, height, age and race (black vs. non-black).[11] We evaluated 1) the proportion of participants who excreted 70% or more of expected creatinine excretion, i.e., presumably complete collection; and 2) mean urinary electrolyte excretion for participants with presumably complete 24 hour urine.

To impute values for missing covariates for exploratory analyses among population subgroups, the Fully Conditional Specification method was used with 5 imputed datasets under the assumption that missing values were missing at random and using all covariates (with missing and non-missing values) in the models (SAS, version 9.3, Cary NC).[12] Mean and 95% confidence intervals for initial 24-hour urinary sodium and potassium excretion by family income and chronic kidney disease subgroups were estimated with imputed data accounting for the complex survey design.

eTable 1. Participation Status and 24-Hour Urine Values by Specimen, NHANES 2014

	24-Hour Urine Specimen	
Participation status	**First**	**Second**
Asked to participate, No.[a]	1103	585
Agreed to participate, No. (%)	1014 (92)	481 (82)
Finished 24-hour urine collection, No. (%)	894 (81)	455 (78)
Complete 24-hour urine specimen, No. (%)[b]	827 (75)	436 (75)
24-hour urine values, complete specimens[b]		
Volume, unweighted mean (SD), ml	1868 (1026)	1838 (1037)
Volume, weighted mean (95% CI), ml[c]	1924 (1793-2054)	1905 (1709-2101)
Creatinine, unweighted mean (SD), mg	1555 (571)	1544 (572)
Creatinine, weighted mean (95% CI), mg[c]	1558 (1488-1628)	1562 (1517-1607)
Sodium, unweighted mean (SD), mg	3617 (1776)	3731 (1794)
Sodium, weighted mean (95% CI), mg[c]	3608 (3414-3803)	3758 (3608-3908)
Potassium, unweighted mean (SD), mg	2066 (930)	2125 (951)
Potassium, weighted mean (95% CI), mg[c]	2155 (2030-2279)	2243 (2015-2471)
Chloride, unweighted mean (SD), mg	5012 (2601)	5224 (2607)
Chloride, weighted mean (95% CI), mg[c]	5026 (4736-5317)	5224 (5021-5428)
Creatinine, unweighted 50th (25th-75th) percentiles, mg	1452 (1113-1908)	1479 (1119-1875)
Creatinine, weighted 50th (25th-75th) percentiles, mg[c]	1469 (1110-1936)	1503 (1134-1927)

Abbreviations: CI, confidence interval; NHANES, National Health and Nutrition Examination Survey; SD, standard deviation
SI conversion factors: To convert urine values to mmol, divide creatinine value by 113, sodium value by 23, potassium value by 39 and chloride value by 35.5.

[a] For the first 24-hour urine collection, half of the participants aged 20-69 years in NHANES 2014 were randomly selected. Of these, participants in the examination component who were non-pregnant were eligible and asked to participate. For the second 24-hour urine collection, participants who completed an initial 24-hour urine collection were eligible, but selection varied over time because of logistical constraints in meeting the required sample size. For the first six months of 2014, half of the participants who completed an initial 24-h urine collection, were randomly selected, and were asked to participate in a second collection. For the second six months of 2014, all participants with a complete initial 24-hour urine specimen were selected to participate in the second collection.

[b] Complete specimens met the following criteria: start and end time reported; length of collection >22 hours, total urine volume ≥400 ml, participant reported missing no more than a few drops of urine during collection, and if the participant was a women, she reported she did not menstruate during collection.

[c] Weighted estimates and 95% CI. Note: The second urine specimen estimates use the same sample weights as the first.

eTable 2. 24-Hour Urine Collection Completion Rates by Participant Characteristics, NHANES 2014

Participant characteristic[a]	Asked to Participate (n=1103), No.[b]	Completed (n=827), No. (%)[b]	*P* Value[c]
Sex			
Male	542	421 (77.7)	0.04
Female	561	406 (72.4)	
Age range, years			
20-44	584	432 (74.0)	0.41
45-69	519	395(76.1)	
Race and Hispanic origin			
Non-Hispanic white	448	339 (75.7)	
Non-Hispanic black	281	225 (80.1)	0.001
Non-Hispanic Asian	160	100 (62.5)	
Hispanic	178	137 (77.0)	
Family income, % federal poverty guidelines			
≤130%	358	282 (78.8)	0.11
>130%	666	495 (74.3)	
Education, years			
≤12 or GED	476	372 (78.2)	0.03
>12	627	455 (72.6)	
Body mass index, kg/m^2			
<25.0	346	238 (68.8)	
25.0-29.9	316	245 (77.5)	0.002
≥30.0	427	339 (79.4)	
Physical activity			
Recommended	695	509 (73.2)	
Intermediate	163	120 (73.6)	0.06
Low	245	198 (80.8)	
Reported reducing sodium or salt intake			
Yes	530	400 (75.5)	0.73
No	573	427 (74.5)	
Hypertension			
Yes	468	372 (79.5)	0.02
No	600	439 (73.2)	
Diabetes diagnosis			
Yes	114	90 (78.9)	0.30
No	988	736 (74.5)	
Chronic kidney disease			
Yes	131	103 (78.6)	0.60
No	908	695 (76.5)	
History of cardiovascular disease			
Yes	63	50 (79.4)	0.40
No	1036	773 (74.6)	

Abbreviations: GED, participant passed the General Educational Development tests certifying they have American high school-level academic skills; NHANES, National Health and Nutrition Examination Survey.
[a] See "Methods" for descriptions of participant characteristics
[b] Unweighted No.(%). Sample size in participant subgroups may not add to the totals due to missing information.
[c] Chi-square test.

eTable 3. Weighted Characteristics and Urine Values by Number of Completed 24-Hour Urine Specimens

Characteristic [b]	No. of completed 24-Hour urines [a]		P Value [d]
	Two (n=436[c])	One (n=391[c])	
Sex			
Men, unweighted No.	225	196	0.93
Men, weighted % (95% CI)[e]	48.7 (43.6-53.8)	49.0 (43.0-54.9)	
Women, unweighted No.	211	195	
Women, weighted % (95% CI)[e]	51.3 (46.2-56.4)	51.0 (45.1-57.0)	
Race and Hispanic origin			
Non-Hispanic white, unweighted No.	183	156	0.99
Non-Hispanic white, weighted % (95% CI)[e]	64.0 (50.6-77.4)	63.3 (50.2-76.3)	
Non-Hispanic black, unweighted No.	116	109	
Non-Hispanic black, weighted % (95% CI)[e]	11.8 (5.3-18.3)	12.0 (2,7-21.3)	
Non-Hispanic Asian, unweighted No.	50	50	
Non-Hispanic Asian, weighted % (95% CI)[e]	5.6 (1.7-9.5)	5.6 (2.4-8.9)	
Hispanic, unweighted No.	69	68	
Hispanic, weighted % (95% CI)[e]	15.5 (8.8-22.2)	16.1 (8.6-23.6)	
Hypertension, unweighted No.	200	172	
Hypertension, weighted % (95% CI)[e]	43.1 (38.5-47.7)	44.0 (34.2-53.8)	0.83
Age, unweighted mean (SD), years	44.7 (14.2)	43.3 (14.1)	
Age, weighted mean (95% CI), years[e]	43.4 (41.5-45.2)	43.2 (40.4-46.1)	0.92
BMI, unweighted mean (SD), kg/m^2	29.5 (8.2)	30.1 (7.8)	
BMI, weighted mean (95% CI), kg/m^{2,e}	29.7 (28.6-30.8)	29.9 (28.5-31.4)	0.80
Initial 24-hour urine specimen value			
Volume, unweighted mean (SD), ml	1884 (967)	1850 (1088)	
Volume, weighted mean (95% CI), ml[e]	1919 (1776-2061)	1929 (1739-2119)	0.91
Creatinine, unweighted mean (SD), mg	1543(571)	1568 (572)	
Creatinine, weighted mean (95% CI), mg[e]	1568 (1513-1623)	1547 (1419-1675)	0.74
Sodium, unweighted mean (SD), mg	3684 (1773)	3544 (1778)	
Sodium, weighted mean (95% CI), mg[e]	3627 (3308-3946)	3588 (3223-3952)	0.88
Potassium, unweighted mean (SD), mg	2085 (940)	2045 (920)	
Potassium, weighted mean (95% CI), mg[e]	2178 (1982-2373)	2129 (2008-2250)	0.64
Chloride, unweighted mean (SD), mg	5127 (2610)	4884 (2588)	
Chloride, weighted mean (95% CI), mg[e]	5064 (4626-5502)	4984 (4443-5524)	0.83

Abbreviations: BMI, body mass index; CI, confidence interval, SD, standard deviation
[a] Non-pregnant participants aged 20-69 years in NHANES 2014 who completed at least one 24-hour urine collection.
[b] See "Methods" for descriptions of participant characteristics
[c] Unweighted sample size
[d] Chi-square test for proportions; two-tailed, t-test for means.
[e] Weighted estimates and 95% CI.

eTable 4. Within- to Between-Individual Variance in 24-Hour Urinary Electrolyte or Creatinine Excretion[a]

	Ratio[b] of Within- to Between-Individual Variance		
	Both Sexes n=436[c]	**Male n=255[c]**	**Female n=211[c]**
Sodium	1.08	0.76	1.99
Potassium	0.60	0.66	0.50
Chloride	1.13	0.88	1.67
Creatinine	0.38	0.37	0.40

[a] Non-pregnant adults aged 20-69 years in NHANES 2014 who completed two 24-hour urine collections 3-10 days apart.

[b] Unweighted ratio calculated based on two 24-hour urine collections per person using methods described previously.[13] Total (both sexes together) adjusted for sex.

[c] Unweighted sample size.

eTable 5. Within-Individual Difference in 24-Hour Urinary Sodium Excretion[a]

	Mean (SD), mg	Median (25th to 75th percentile), mg
Both sexes, n=436[b]	-47 (1739)	-51 (-1020 to 950)
Male, n=255[b]	33 (1734)	24 (-1086 to 1196)
Female, n=211[b]	-132 (1745)	-72 (-970 to 821)

Abbreviation: SD, standard deviation

SI conversion factor: To convert sodium value to mmol, divide by 23.

[a] Unweighted estimates of within-individual differences in 24-hour urinary sodium excretion for non-pregnant participants aged 20-69 years with two complete 24-hour urine specimens collected 3-10 days apart in NHANES 2014.

[b] Unweighted sample size.

eTable 6. *P* Value Comparing Weighted Mean 24-Hour Urinary Sodium Excretion by Group[a]

Characteristic, Comparison Groups[b]	Both Sexes	Men	Women
Sex, men vs. women	<.001	NA	NA
Age, 20-44 vs. 45-69 years	0.20	0.31	0.36
Race and Hispanic origin, Non-Hispanic white vs. non-Hispanic black	0.99	0.25	0.17
Race and Hispanic origin, Non-Hispanic white vs. non-Hispanic Asian	0.88	0.84	0.16
Race and Hispanic origin, Non-Hispanic white vs. Hispanic	0.82	0.90	0.52
Race and Hispanic origin, Non-Hispanic black vs. non-Hispanic Asian	0.87	0.71	0.83
Race and Hispanic origin, Non-Hispanic black vs. Hispanic	0.80	0.46	0.37
Race and Hispanic origin, Non-Hispanic Asian vs. Hispanic	0.997	0.91	0.48
Family income, ≤130% vs. >130% of the federal poverty index	0.24	0.47	0.77
Education, ≤12 years or GED vs. > 12 years	0.36	0.67	0.70
Body mass index, <25.0 vs. 25.0-29.9 kg/m^2	0.001	<.001	0.18
Body mass index, <25.0 vs. ≥30 kg/m^2	<.001	<.001	0.003
Body mass index, 25.0-29.9 vs. ≥30 kg/m^2	0.11	0.005	0.07
Physical activity, recommended vs. intermediate	0.19	0.94	0.37
Physical activity, recommended vs. low	0.99	0.91	0.46
Physical activity, intermediate vs. low	0.20	0.90	0.28
Reported reducing sodium or salt intake, yes vs. no	0.75	0.96	0.11
Hypertension, yes vs. no	0.04	0.03	0.48
Diabetes diagnosis, yes vs. no	<.001	0.01	0.08
Chronic kidney disease, yes vs. no	0.44	0.48	0.91
History of cardiovascular disease, yes vs. no	0.49	0.20	0.82

Abbreviations: NA, not applicable, vs., versus.
[a] Two-tailed t-test. See Table 3 for weighted mean 24-hour urinary sodium excretion.
[b] See "Methods" for definitions of participant characteristics and groups.

eTable 7. Unweighted Mean and Percentiles of 24-Hour Urinary Sodium Excretion, NHANES 2014[a]

Group[b]	Both Sexes		Men		Women	
	Mean (SD), mg	50th (25th-75th) percentiles, mg	Mean (SD), mg	50th (25th-75th) percentiles, mg	Mean (SD), mg	50th (25th-75th) percentiles, mg
All participants	3617 (1776)	3332 (2334-4517)	4135 (1944)	3923 (2736-5129)	3080 (1394)	2896 (2166-3779)
Age, years						
20-44	3730 (1813)	3423 (2452-4659)	4300 (2037)	4019 (2754-5532)	3156 (1332)	2989 (2229-3939)
45-69	3494 (1727)	3275 (2254-4383)	3961 (1828)	3788 (2676-4837)	2995 (1460)	2770 (2044-3644)
Race and Hispanic origin						
Non-Hispanic white	3669 (1826)	3397 (2290-4584)	4242 (1978)	3985 (3047-5243)	3029 (1388)	2676 (2008-3802)
Non-Hispanic black	3627 (1919)	3159 (2357-4464)	4023 (2078)	3612 (2640-4914)	3221 (1654)	2950 (2216-3956)
Non-Hispanic Asian	3532 (1623)	3498 (2292-4413)	4001 (1911)	3889 (2307-4927)	3081 (1135)	3003 (2276-3939)
Hispanic	3555 (1488)	3393 (2488-4470)	4086 (1589)	4082 (2952-5162)	3061 (1201)	3052 (2258-3771)
Family income, % federal poverty index						
≤130%	3526 (1881)	3117 (2238-4459)	4086 (2079)	3698 (2550-5262)	3074 (1570)	2741 (2086-3760)
>130%	3697 (1746)	3451 (2475-4580)	4211 (1903)	4015 (2881-5030)	3080 (1295)	2935 (2211-3793)
Education, years						
≤12 or GED	3687 (1700)	3400 (2449-4721)	4133 (1757)	4031 (2836-5283)	3133 (1453)	2907 (2196-3779)
>12	3561 (1835)	3312 (2307-4418)	4138 (2112)	3850 (2712-4941)	3044 (1354)	2870 (2107-3783)
Body mass index, kg/m^2						
<25.0	2939 (1291)	2676 (2027-3725)	3192 (1419)	2816 (2193-4011)	2672 (1084)	2572 (1887-3556)
25.0-29.9	3656 (1581)	3474 (2384-4533)	4157 (1629)	4156 (3001-5129)	2943 (1197)	2636 (2114-3510)
≥30.0	4050 (2036)	3741 (2765-4977)	4843 (2250)	4572 (3424-5886)	3397 (1571)	3109 (2364-4178)
Physical activity						
Recommended	3617 (1676)	3365 (2366-4514)	4061 (1793)	3803 (2727-5034)	3029 (1295)	2936 (2129-3811)
Intermediate	3462 (1894)	3147 (2287-4145)	4159 (2478)	3913 (2522-4986)	3044 (1283)	2915 (2211-3779)
Low	3713 (1946)	3346 (2297-4641)	4373 (2120)	4374 (2998-5243)	3205 (1636)	2814 (2169-3832)
Reported reducing sodium or salt intake						
Yes	3591 (1816)	3305 (2302-4463)	4187 (2077)	3959 (2678-4941)	3025 (1297)	2853 (2155-3822)
No	3642 (1739)	3379 (2364-4582)	4091 (1825)	3871 (2754-5262)	3137 (1488)	2940 (2169-3734)
Hypertension						
Yes	3733 (2038)	3343 (2321-4573)	4297 (2219)	3889 (2945-5123)	3056 (1551)	2894 (2015-3771)
No	3485 (1498)	3274 (2312-4393)	3923 (1600)	3978 (2617-5009)	3090 (1279)	2871 (2226-3811)

eTable 7. Unweighted Mean and Percentiles of 24-Hour Urinary Sodium Excretion, NHANES 2014[a] (continued)

Group[b]	Overall		Men		Women	
	Mean (SD), mg	50th (25th-75th) percentiles, mg	Mean (SD), mg	50th (25th-75th) percentiles, mg	Mean (SD), mg	50th (25th-75th) percentiles, mg
Diabetes diagnosis						
Yes	4379 (2404)	3952 (2915-5129)	5300 (2518)	4725 (3790-6581)	3459 (1900)	3024 (2348-4054)
No	3525 (1663)	3275 (2293-4413)	3996 (1818)	3809 (2667-4988)	3033 (1315)	2841 (2140-3771)
Chronic kidney disease						
Yes	3411 (2005)	3003 (2014-4331)	4261 (2614)	3725 (2550-5126)	2849 (1198)	2900 (1939-3474)
No	3660 (1753)	3398 (2366-4567)	4151 (1868)	3985 (2736-5136)	3122 (1439)	2896 (2188-3816)
History of CVD						
Yes	3694 (2634)	3002 (2155-4208)	4141 (2781)	3714 (2258-4784)	3125 (2375)	2586 (1797-4054)
No	3622 (1706)	3348 (2366-4527)	4150 (1872)	3966 (2802-5162)	3084 (1318)	2935 (2196-3779)

Abbreviations: CVD, cardiovascular disease; GED, participant passed the General Educational Development tests certifying they have American high school-level academic skills; SD, standard deviation.

SI conversion factor: To convert sodium value to mmol, divide by 23.

[a] Unweighted estimates based on the first 24-hour urine specimen. Non-pregnant participants aged 20-69 years in the 2014 National Health and Nutrition Examination Survey who completed an initial 24-hour urine collection. See Table 2 for sample sizes and Table 3 weighted estimates.

[b] See "Methods" for definitions of participant characteristics and groups.

eTable 8. Weighted Proportion of Adults with 24-Hour Urinary Sodium Excretion ≥2300 mg, NHANES 2014[a]

Group[b]	Both Sexes, % (95% CI)	Men, % (95% CI)	Women, % (95% CI)
All participants	75.1 (72.0, 78.2)	83.5 (79.9, 87.0)	67.1 (62.1, 72.0)
Age, years			
20-44	77.1 (74.1, 80.1)	84.3 (77.6, 91.0)	69.8 (64.1, 75,6)
45-69	72.8 (67.5, 78.1)	82.5 (75.1, 89.9)	64.1 (55.5, 72.7)
Race and Hispanic origin			
Non-Hispanic white	73.3 (70.1, 76.5)	83.6 (78.9, 88.3)	63.2 (57.5, 68.9)
Non-Hispanic black	76.0 (69.1, 82.8)	82.7 (75.3, 90.2)	70.3 (62.6, 78.1)
Non-Hispanic Asian	77.5 (66.2, 88.7)	73.4 (59.0, 87.7)	---[c]
Hispanic	79.4 (71.2, 87.6)	---[c]	72.2 (61.4, 82.9)
Family income, % federal poverty index			
≤130%	70.4 (64.9, 75.9)	79.8 (69.8, 89.7)	63.2 (57.7, 68.8)
>130%	77.2 (73.2, 81.1)	85.3 (80.8, 89.7)	68.8 (61.8, 75.9)
Education, years			
≤12 or GED	75.5 (72.0, 78.9)	83.3 (78.8, 87.9)	66.1 (57.9, 74.3)
>12	74.8 (68.8, 80.8)	83.6 (77.7, 89.6)	67.6 (58.9, 76.3)
Body mass index, kg/m^2			
<25.0	63.3 (54.6, 71.9)	67.5 (55.8, 79.3)	59.8 (50.9, 68.7)
25.0-29.9	76.9 (68.3, 85.4)	85.5 (77.6, 93.4)	65.3 (50.8, 79.9)
≥30.0	81.7 (77.6, 85.8)	---[c]	73.2 (66.9, 79.5)
Physical activity			
Recommended	77.4 (73.3, 81.6)	85.6 (82.2, 88.9)	68.3 (61.8, 74.8)
Intermediate	70.1 (61.7, 78.5)	80.0 (67.3, 92.5)	63.4 (51.6, 75.2)
Low	72.1 (65.9, 78.3)	78.9 (67.8, 90.1)	66.8 (54.2, 79.5)
Reported reducing sodium or salt intake			
Yes	75.0 (70.3, 79.6)	84.3 (78.8, 89.9)	66.9 (59.7, 74.1)
No	75.2 (71.1, 79.3)	82.9 (79.0, 86.7)	67.2 (60.7, 73.7)
Hypertension			
Yes	72.7 (69.1, 76.3)	84.5 (79.7, 89.3)	59.4 (51.0, 67.9)
No	76.2 (71.9, 80.5)	82.1 (76.7, 87.5)	71.4 (66.0, 76.9)
Diabetes diagnosis			
Yes	85.5 (77.8, 91.2)	---[c]	76.4 (61.4, 91.4)
No	74.0 (70.8, 77.3)	82.4 (78.5, 86.3)	65.9 (60.5, 71.4)
Chronic kidney disease			
Yes	71.2 (62.0, 80.3)	---[c]	64.4 (47.9, 79.0)
No	75.5 (71.7, 79.2)	83.0 (78.8, 87.2)	67.8 (61.3, 74.4)
History of CVD			
Yes	66.6 (47.6, 85.5)	---[c]	---[c]
No	75.6 (72.3, 78.9)	84.3 (80.8, 87.9)	67.3 (62.0, 72.7)

Abbreviations: CI, confidence interval; CVD, cardiovascular disease, GED, participant passed the General Educational Development tests certifying they have American high school-level academic skills.NHANES, National Health and Nutrition Examination Survey;
[a] Weighted proportion (95% CI) of non-pregnant adults, aged 20-69 years, with initial 24-hour urinary sodium excretion ≥2300 mg. Sample size (n) are available in Table 2 (in the main paper). Values account for oversampling, non-coverage, and non-response.
[b] See "Methods" for definitions of participant characteristics and groups.
[c] Estimate not shown, statistically unreliable based on relative standard error > 30%.

eTable 9. *P* Value Comparing Weighted Mean 24-Hour Urinary Potassium Excretion by Group[a]

Characteristic, Comparison Groups[b]	Both Sexes	Men	Women
Sex, men vs. women	<.001	NA	NA
Age, 20-44 vs. 45-69 years	0.002	0.001	0.03
Race and Hispanic origin, Non-Hispanic white vs. non-Hispanic black	<.001	<.001	0.01
Race and Hispanic origin, Non-Hispanic white vs. non-Hispanic Asian	0.16	0.76	0.02
Race and Hispanic origin, Non-Hispanic white vs. Hispanic	0.04	0.17	0.04
Race and Hispanic origin, Non-Hispanic black vs. non-Hispanic Asian	0.02	0.01	0.45
Race and Hispanic origin, Non-Hispanic black vs. Hispanic	0.04	0.01	0.68
Race and Hispanic origin, Non-Hispanic Asian vs. Hispanic	0.65	0.33	0.90
Family income, $\leq$130% vs. >130% of the federal poverty index	<.001	<.001	0.003
Education $\leq$12 years or GED vs. > 12 years	0.01	0.02	0.002
Body mass index, <25.0 vs. 25.0-29.9 kg/m^2	0.99	0.30	0.24
Body mass index, <25.0 vs. $\geq$30 kg/m^2	0.05	0.001	0.92
Body mass index, 25.0-29.9 vs. $\geq$30 kg/m^2	0.14	0.03	0.21
Physical activity, recommended vs. intermediate	0.68	0.87	0.32
Physical activity, recommended vs. low	0.23	0.79	0.39
Physical activity, intermediate vs. low	0.17	0.69	0.18
Reported reducing sodium or salt intake, yes vs. no	0.30	0.50	0.71
Hypertension, yes vs. no	0.86	0.79	0.67
Diabetes diagnosis, yes vs. no	0.38	0.59	0.32
Chronic kidney disease, yes vs. no	0.82	0.06	0.21
History of cardiovascular disease, yes vs. no	0.45	0.94	0.37

Abbreviations: NA, not applicable

[a] Two-tailed t-test. See Table 4 for weighted mean 24-hour urinary potassium excretion.

[b] See "Methods" for definitions of participant characteristics and groups.

eTable 10. Unweighted Mean and Percentiles of 24-Hour Urinary Potassium Excretion, NHANES 2014[a]

Group[b]	Both Sexes		Men		Women	
	Mean (SD), mg	50th (25th-75th) percentiles, mg	Mean (SD), mg	50th (25th-75th) percentiles, mg	Mean (SD), mg	50th (25th-75th) percentiles, mg
All Participants	2066 (930)	1940 (1358-2546)	2291 (957)	2237 (1633-2911)	1832 (842)	1709 (1245-2191)
Age, years						
20-44	1948 (855)	1838 (1294-2420)	2164 (909)	2167 (1529-2760)	1730 (737)	1638 (1199-2092)
45-69	2194 (991)	2053 (1488-2752)	2425 (990)	2286 (1719-3067)	1948 (934)	1791 (1283-2315)
Race and Hispanic origin						
Non-Hispanic white	2225 (996)	2097 (1529-2934)	2436 (950)	2347 (1736-3136)	1989 (996)	1754 (1269-2394)
Non-Hispanic black	1813 (891)	1690 (1223-2252)	1922 (977)	1762 (1316-2268)	1702 (783)	1559 (1118-2231)
Non-Hispanic Asian	2197 (810)	2101 (1627-2566)	2559 (822)	2519 (2118-2985)	1850 (632)	1775 (1428-2157)
Hispanic	2045 (802)	1999 (1474-2463)	2367 (814)	2382 (1824-2840)	1746 (668)	1735 (1282-2092)
Family income, % federal poverty index						
≤130%	1800 (791)	1678 (1187-2279)	1979 (833)	2019 (1350-2519)	1655 (727)	1490 (1119-2062)
>130%	2236 (976)	2104 (1566-2808)	2451 (972)	2383 (1739-3115)	1978 (918)	1834 (1328-2337)
Education, years						
≤12 or GED	1926 (828)	1868 (1303-2386)	2136 (868)	2132 (1545-2587)	1667 (694)	1543 (1165-2027)
>12	2180 (993)	2034 (1474-2748)	2439 (1015)	2384 (1694-3130)	1947 (914)	1762 (1308-2370)
Body mass index (BMI) kg/m^2						
<25.0	1939 (908)	1788 (1223-2407)	2073 (929)	2045 (1342-2606)	1797 (867)	1644 (1176-2092)
25.0-29.9	2026 (838)	1943 (1363-2514)	2237 (873)	2199 (1637-2800)	1724 (682)	1600 (1306-2146)
≥30.0	2182 (999)	2032 (1502-2760)	2521 (1013)	2382 (1917-3101)	1902 (898)	1761 (1265-2295)
Physical activity						
Recommended	2083 (903)	1961 (1391-2587)	2267 (938)	2191 (1563-2912)	1839 (793)	1723 (1273-2172)
Intermediate	2070 (897)	1961 (1512-2532)	2304 (928)	2237 (1659-2973)	1930 (854)	1806 (1242-2258)
Low	2019 (1017)	1911 (1306-2451)	2363 (1038)	2300 (1823-2865)	1754 (922)	1611 (1148-2157)
Reported reducing sodium or salt intake						
Yes	2039 (929)	1896 (1333-2579)	2310 (993)	2212 (1644-2934)	1780 (783)	1645 (1240-2181)
No	2091 (932)	1979 (1423-2529)	2274 (926)	2256 (1598-2851)	1886 (897)	1775 (1258-2231)

eTable 10. Unweighted Mean and Percentiles of 24-Hour Urinary Potassium, NHANES 2014[a] (continued)

Group[b]	Both Sexes		Men		Women	
	Mean (SD), mg	50th (25th-75th) percentiles, mg	Mean (SD), mg	50th (25th-75th) percentiles, mg	Mean (SD), mg	50th (25th-75th) percentiles, mg
Hypertension						
Yes	2098 (967)	1948 (1418-2607)	2315 (997)	2212 (1633-2934)	1837 (862)	1708 (1273-2231)
No	2034 (902)	1921 (1339-2520)	2259 (931)	2236 (1590-2911)	1832 (825)	1709 (1240-2181)
Diabetes diagnosis						
Yes	2363 (1200)	2132 (1537-2973)	2670 (1218)	2547 (1895-3183)	2056 (1113)	1754 (1378-2295)
No	2030 (886)	1924 (1342-2509)	2245 (912)	2211 (1605-2838)	1806 (800)	1702 (1220-2157)
Chronic kidney disease						
Yes	2054 (1197)	1754 (1322-2459)	2301 (1286)	1943 (1529-2934)	1891 (1114)	1684 (1255-2366)
No	2081 (884)	1976 (1394-2586)	2306 (909)	2265 (1659-2911)	1836 (788)	1713 (1258-2192)
History of CVD disease						
Yes	2235 (1341)	2012 (1221-2846)	2524 (1530)	2309 (1505-3055)	1867 (967)	1562 (1147-2279)
No	2055 (896)	1940 (1363-2532)	2279 (901)	2233 (1636-2911)	1826 (832)	1711 (1255-2181)

Abbreviations: CVD, cardiovascular disease; GED, participant passed the General Educational Development tests certifying they have American high school-level academic skills; SD, standard deviation.

SI conversion factor: To convert potassium value to mmol, divide by 39.

[a] Unweighted estimates based on the first 24-hour urine specimen. Non-pregnant participants aged 20-69 years in the 2014 National Health and Nutrition Examination Survey who completed an initial 24-hour urine collection. See Table 2 for sample sizes and Table 4 weighted estimates.

[b] See "Methods" for definitions of participant characteristics and groups.

eTable 11. Weighted Mean and Percentiles, Ratio of 24-Hour Urinary Sodium-to-Potassium Excretion, US Adults, 2014[a]

Group[b]	Both Sexes		Men		Women	
	Mean (95% CI), mg[c]	50th (25th-75th) Percentiles, mg[c]	Mean (95% CI), mg[c]	50th (25th-75th) Percentiles, mg[c]	Mean (95% CI), mg[c]	50th (25th-75th) Percentiles, mg[c]
All participants	3.17 (2.91-3.43)	2.87 (2.05-3.93)	3.32(2.96-3.67)	3.01 (2.15-3.97)	3.03 (2.76-3.29)	2.79 (1.91-3.83)
Age, years						
20-44	3.50 (3.22-3.78)	3.20 (2.34-4.32)	3.69 (3.29-4.09)	3.35 (2.62-4.37)	3.31 (3.05-3.57)	2.99 (2.19-4.22)
45-69	2.80 (2.53-3.06)	2.56 (1.88-3.55)	2.88 (2.47-3.28)	2.57 (1.97-3.48)	2.73 (2.47-2.98)	2.52 (1.69-3.64)
Race and Hispanic origin						
Non-Hispanic white	2.98 (2.69-3.27)	2.69 (1.90-3.71)	3.15 (2.71-3.60)	2.80 (2.09-3.88)	2.80 (2.55-3.06)	2.53 (1.79-3.65)
Non-Hispanic black	3.75 (3.53-3.98)	3.59 (2.64-4.49)	3.99 (3.62-4.36)	3.71 (2.76-4.51)	3.56 (3.28-3.83)	3.43 (2.51-4.46)
Non-Hispanic Asian	3.15 (2.73-3.57)	3.01 (2.27-3.91)	2.93 (2.60-3.26)	2.91 (2.02-3.51)	3.33 (2.72-3.94)	2.98 (2.28-4.31)
Hispanic	3.42 (2.89-3.95)	3.01 (2.27-3.91)	3.58 (2.64-4.52)	2.99 (2.29-3.85)	3.25 (2.86-3.63)	2.90 (2.28-4.08)
Family income, % federal poverty index						
≤130	3.53 (3.20-3.87)	3.23 (2.34-4.32)	3.91 (3.36-4.45)	3.55 (2.56-4.66)	3.25 (2.92-3.58)	3.00 (2.17-4.07)
>130	3.04 (2.71-3.37)	2.78 (1.85-3.65)	3.16 (2.71-3.60)	2.89 (2.14-3.71)	2.92 (2.60-3.23)	2.64 (1.85-3.67)
Education, years						
≤12 or GED	3.51 (3.30-3.73)	3.12 (2.45-4.28)	3.59 (3.24-3.95)	3.32 (2.63-4.20)	3.42 (3.12-3.72)	2.96 (2.19-4.30)
>12	2.93 (2.55-3.31)	2.65 (1.85-3.65)	3.08 (2.55-3.62)	2.67 (1.95-3.71)	2.80 (2.48-3.13)	2.62 (1.70-3.65)
Body mass index, kg/m^2						
<25.0	2.75 (2.46-3.04)	2.37 (1.63-3.54)	2.84 (2.45-3.24)	2.40 (1.85-3.44)	2.67 (2.26-3.09)	2.22 (1.57-3.61)
25.0-29.9	3.41 (2.90-3.92)	3.01 (2.34-3.84)	3.53 (2.88-4.18)	3.03 (2.49-3.85)	3.25 (2.82-3.67)	2.85 (2.20-3.82)
≥30.0	3.25 (2.96-3.54)	3.00 (2.27-3.96)	3.27 (2.88-3.67)	3.02 (2.24-4.12)	3.15 (2.83-3.46)	2.98 (1.92-3.96)
Physical activity						
Recommended	3.15 (2.88-3.43)	2.87 (2.01-3.89)	3.33 (2.94-3.71)	2.95 (2.18-3.97)	2.96 (2.68-3.23)	2.80 (1.84-3.81)
Intermediate	2.86 (2.41-3.30)	2.54 (1.90-3.64)	3.32 (2.51-4.14)	2.97 (2.12-4.33)	2.54 (2.07-3.02)	2.20 (1.86-3.25)
Low	3.41 (3.08-3.74)	3.08 (2.27-4.21)	3.27 (2.88-3.67)	3.05 (2.20-4.04)	3.52 (3.07-3.98)	3.14 (2.32-4.50)
Reported reducing sodium or salt intake						
Yes	3.19 (2.83-3.49)	2.85 (2.00-3.84)	3.39 (2.96-3.81)	2.80 (2.13-3.92)	3.02 (2.59-3.44)	2.87 (1.97-3.83)
No	3.15 (2.82-3.47)	2.91 (2.07-3.96)	3.26 (2.89-3.64)	3.05 (2.20-4.04)	3.03 (2.74-3.32)	2.73 (1.88-3.86)
Hypertension						
Yes	3.16 (2.83-3.49)	2.74 (2.07-3.81)	3.48 (3.07-3.90)	3.02 (2.26-4.18)	2.79 (2.38-3.20)	2.58 (1.89-3.60)
No	3.15 (2.82-3.47)	2.95 (2.00-3.96)	3.14 (2.70-3.59)	2.96 (2.09-3.84)	3.15 (2.84-3.46)	2.89 (1.89-3.92)

eTable 11. Weighted Mean and Percentiles, Ratio of 24-Hour Urinary Sodium-to-Potassium Excretion, US Adults, 2014[a]

Group[b]	Both Sexes		Men		Women	
	Mean (95% CI), mg[c]	50th (25th-75th) Percentiles, mg[c]	Mean (95% CI), mg[c]	50th (25th-75th) Percentiles, mg[c]	Mean (95% CI), mg[c]	50th (25th-75th) Percentiles, mg[c]
Diabetes diagnosis						
Yes	3.38 (2.89-3.86)	3.12 (2.15-3.95)	3.84 (3.04-4.64)	3.56 (2.40-5.54)	2.96 (2.68-3.24)	2.87 (1.96-3.63)
No	3.14 (2.87-3.42)	2.85 (2.04-3.92)	3.26 (2.90-3.62)	2.96 (2.15-3.87)	3.03 (2.74-3.33)	2.75 (1.87-3.92)
Chronic kidney disease						
Yes	3.25 (2.95-3.56)	2.74 (1.93-4.18)	4.12 (3.19-5.05)	3.87 (2.60-5.32)	2.80 (2.33-3.28)	2.46 (1.89-3.52)
No	3.15 (2.86-3.43)	2,87 (2.07-3.88)	3.25 (2.89-3.61)	2.99 (2.15-3.92)	3.04 (2.75-3.32)	2.80 (1.88-3.84)
History of CVD						
Yes	2.92 (2.30-3.54)	2.39 (1.68-3.52)	3.14 (2.00-4.29)	2.57 (1.50-3.51)	2.64 (1.98-3.30)	2.30 (1.67-3.12)
No	3.18 (2.90-3.46)	2.89 (2.07-3.95)	3.33 (2.94-3.71)	3.02 (2.19-3.97)	3.05 (2.78-3.31)	2.80 (1.91-3.85)

Abbreviations: CI, confidence interval; CVD, cardiovascular disease; GED, participant passed the General Educational Development tests certifying they have American high school-level academic skills.

[a] Molar ratio of 24-hour urinary sodium-to-potassium excretion based on the first 24-hour urine specimen. Non-pregnant participants aged 20-69 years in the 2014 National Health and Nutrition Examination Survey who completed an initial 24-hour urine collection.

[b] See "Methods" for definitions of participant characteristics and groups.

[c] Weighted estimates and 95% CI. See Table 2 for sample sizes.

eTable 12. *P* Value Comparing Weighted Mean Ratio of 24-Hour Urinary Sodium-to-Potassium Excretion by Group[a]

Characteristic, Comparison Groups[b]	Both Sexes	Men	Women
Sex, men vs. women	0.08	NA	NA
Age, 20-44 vs. 45-69 years	<.001	<.001	<.001
Race and Hispanic origin, Non-Hispanic white vs. non-Hispanic black	<.001	0.001	0.001
Race and Hispanic origin, Non-Hispanic white vs. non-Hispanic Asian	0.42	0.38	0.07
Race and Hispanic origin, Non-Hispanic white vs. Hispanic	0.11	0.40	0.03
Race and Hispanic origin, Non-Hispanic black vs. non-Hispanic Asian	0.01	<.001	0.45
Race and Hispanic origin, Non-Hispanic black vs. Hispanic	0.21	0.35	0.12
Race and Hispanic origin, Non-Hispanic Asian vs. Hispanic	0.23	0.10	0.76
Family income, $\leq$130% vs. >130% of the federal poverty index	0.05	0.06	0.09
Education $\leq$12 years or GED vs. > 12 years	0.01	0.12	0.01
Body mass index, <25.0 vs. 25.0-29.9 kg/m^2	0.02	0.07	0.06
Body mass index, <25.0 vs. $\geq$30 kg/m^2	0.01	0.07	0.02
Body mass index, 25.0-29.9 vs. $\geq$30 kg/m^2	0.52	0.60	0.71
Physical activity, recommended vs. intermediate	0.15	0.99	0.07
Physical activity, recommended vs. low	0.12	0.79	0.02
Physical activity, intermediate vs. low	0.02	0.89	0.01
Reported reducing sodium or salt intake, yes vs. no	0.79	0.47	0.95
Hypertension, yes vs. no	0.94	0.20	0.12
Diabetes diagnosis, yes vs. no	0.36	0.16	0.70
Chronic kidney disease, yes vs. no	0.52	0.09	0.34
History of cardiovascular disease, yes vs. no	0.47	0.76	0.21

Abbreviations: NA, not applicable.
[a] Two-tailed t-test. See eTable 11 for weighted mean molar ratio of 24-hour urinary sodium-to-potassium excretion.
[b] See "Methods" for definitions of participant characteristics and groups.

eTable 13. Weighted Proportion of Adults With >70% of Expected 24-Hour Urinary Creatinine Excretion, NHANES 2014[a]

Characteristic[b]	No. of Total Participants[c]	Joossens and Geboers's Criteria[d]			Mage's Criteria[e]		
		No.[f]	Weighted % of Total Participants[g]	P Value[h]	No.[f]	Weighted % of Total Participants[g]	P Value[h]
All participants	821	607	73.0		757	94.2	
Sex							
Male	419	364	87.7	<.001	397	95.0	0.40
Female	402	243	59.0		376	93.6	
Age, years							
20-44	429	347	80.7	<.001	395	92.5	0.08
45-69	392	260	64.3		378	96.3	
Race and Hispanic origin[g]							
Non-Hispanic white	337	234	71.2		319	95.0	
Non-Hispanic black	222	164	74.1		202	90.3	
Non-Hispanic Asian	100	90	92.1	0.04	100	100.0	---i
Hispanic	136	98	72.2		127	92.1	
Family income, % federal poverty index							
≤130%	280	186	65.4	0.02	257	90.7	0.01
>130%	491	389	76.4		470	95.7	
Education, years							
≤12 or GED	368	251	68.6	0.03	337	91.4	0.02
>12	453	356	75.9		436	96.3	
Body mass index, kg/m^2							
<25.0	238	207	85.3		225	94.6	
25.0-29.9	245	214	87.3	<.001	235	97.2	0.08
≥30.0	338	186	53.3		313	91.8	
Physical activity							
Recommended	507	405	80.0		478	94.5	
Intermediate	119	74	64.7	0.001	113	95.8	0.72
None	195	128	59.1		182	92.7	
Reported reducing sodium or salt intake							
Yes	396	273	67.6	0.09	370	94.0	0.04
No	425	334	77.3		403	94.5	
Hypertension							
Yes	368	238	63.6	<.001	348	96.1	0.16
No	437	354	79.4		403	94.5	

eTable 13. Weighted Proportion of Adults With >70% of Expected 24-Hour Urinary Creatinine Excretion, NHANES 2014[a] (continued)

Characteristic[b]	No. of Total Participants[c]	Joossens and Geboers's Criteria[d]			Mage's Criteria[e]		
		No.[f]	Weighted % of Total Participants[g]	P Value[h]	No.[f]	Weighted % of Total Participants[g]	P Value[h]
Diabetes diagnosis							
Yes	87	42	45.3	0.007	78	92.0	0.48
No	733	564	75.8		694	94.5	
Chronic kidney disease							
Yes	102	59	54.0	0.04	97	96.9	0.31
No	690	529	75.3		652	94.1	
History of CVD							
Yes	49	31	62.6	0.27	47	93.0	0.81
No	768	574	73.5		723	94.4	

Abbreviations: CVD, cardiovascular disease; GED, participant passed the General Educational Development tests certifying they have American high school-level academic skills. NHANES, National Health and Nutrition Examination Survey.

[a] Non-pregnant participants aged 20-69 years in NHANES 2014 who completed an initial 24-h urine collection whose ratio of observed-to-expected 24-hour urinary creatinine excretion was 0.7 or more. Expected 24-hour urinary creation excretion based on two different criteria.

[b] See "Methods" for definitions of participant characteristics and groups.

[c] Unweighted number. Excludes 6 participants with missing data on weight, height, or for whom expected urinary creatinine excretion could not be computed. No. in subgroups may not add to totals due to missing values.

[d] Joossens and Geboers's criteria[10] for estimated (expected) 24-hour urinary creatinine excretion: Expected 24-hour creatinine excretion (mg/day) = G × body weight (kg), G = 21 for females and 24 for males.

[e] Mage's criteria[11] for estimated (expected) 24-hour urinary creatinine excretion: For males: Expected 24-hour creatinine (mg/day) = $0.00179 * [140 - Age\ (years)] * [Weight\ (kg)^{1.5} * Height\ (cm)^{0.5}] * [1 + 0.18 * (Black=1, non\text{-}Black=0)] * [1.366 - 0.0159\ BMI\ (kg/m^2)]$. For females: Expected 24-hour creatinine (mg/day) = $0.00163 * [140 - Age\ (years)] * [Weight\ (kg)^{1.5} * Height\ (cm)^{0.5}] * [1 + 0.18 * (Black=1, non\text{-}Black=0)] * [1.429 - 0.0198\ BMI\ (kg/m^2)]$.

[f] Unweighted number of participants with >70% of expected 24-hour urinary creatinine excretion.

[g] Weighted percent of total participants with >70% of expected 24-hour urinary creatinine excretion.

[h] P value for Rao-Scott F-adjusted chi-square test.

[i] P value could not be computed as one cell included 100% of total participants.

eTable 14. Weighted Mean Urinary Electrolyte Excretion, Adults With >70% of Expected Creatinine Excretion[a]

Participant subgroup[b]	Joossens and Geboers's criteria[c]		Mage's criteria[d]	
	Mean 24-h urinary sodium excretion (95% CI), mg	Mean 24-h urinary potassium excretion (95% CI), mg	Mean 24-h urinary sodium excretion (95% CI), mg	Mean 24-h urinary potassium excretion (95% CI), mg
Total	3879 (3637-4121)	2305 (2162-2448)	3688 (3461-3915)	2229 (2099-2359)
Sex				
Male	4406 (4063-4749)	2510 (2324-2696)	4334 (4012-4655)	2504 (2352-2656)
Female	3126 (2952-3301)	2013 (1853-2173)	3071 (2865-3276)	1966 (1792-2141)
P Value[e]	<.001	<.001	<.001	<.001
Age, years				
20-44	3891 (3603-4179)	2142 (2035-2249)	3829 (3530-4128)	2070 (1959-2181)
45-69	3862 (3515-4210)	2531 (2326-2735)	3537 (3266-3809)	2399 (2203-2595)
P Value[e]	0.88	0.001	0.10	0.005
Race and Hispanic origin				
Non-Hispanic white	3893 (3574-4212)	2455 (2265-2646)	3669 (3370-3968)	2360 (2218-2501)
Non-Hispanic black	3820 (3565-4075)	1846 (1704-1988)	3714 (3423-4005)	1818 (1669-1968)
Non-Hispanic Asian	3747 (3276-4218)	2097 (1783-2410)	3666 (3210-4122)	2098 (1813-2384)
Hispanic	3915 (3513-4317)	2190 (2023-2357)	3772 (3307-4236)	2113 (1926-2299)
P Value[e]				
Non-Hispanic white vs. non-Hispanic black	0.73	<.001	0.83	<.001
Non-Hispanic white vs. non-Hispanic Asian	0.63	0.02	0.99	0.04
Non-Hispanic white vs. Hispanic	0.92	0.07	0.68	0.04
Non-Hispanic black vs. non-Hispanic Asian	0.75	0.07	0.84	0.03
Non-Hispanic black vs. Hispanic	0.56	0.006	0.77	0.02
Non-Hispanic Asian vs. Hispanic	0.49	0.62	0.67	0.93

Abbreviations: CI, confidence intervals.

SI conversion factors: To convert electrolyte values to mmol, divide the sodium value by 23 and the potassium value by 39.

[a] Weighted mean,and 95% CI were estimated from the initial 24-hour urine collection. Sample size (n) are available in eTable 13 in this document. The subsamples of participants were identified as having observed 24-h urinary creatinine excretion greater than 70% of that expected based on weight, sex, and other characteristics (see footnote c and d below).

[b] See "Methods" for definitions of participant characteristics and groups.

[c] Joossens and Geboers's criteria[10] for estimated (expected) 24-hour urinary creatinine excretion: Expected 24-hour creatinine excretion (mg/day) = G × body weight (kg), G = 21 for females and 24 for males.

[d] Mage's criteria[11] for estimated (expected) 24-hour urinary creatinine excretion: For males: estimated 24-hour creatinine (mg/day) = 0.00179 * [140 – Age (years)] * [Weight (kg)$^{1.5}$ * Height (cm)$^{0.5}$] * [1 + 0.18 * (Black=1, non-Black=0)] * [1.366 – 0.0159 BMI (kg/m^2)]. For females: estimated 24-hour creatinine (mg/day) = 0.00163 * [140 – Age (years)] * [Weight (kg)$^{1.5}$ * Height (cm)$^{0.5}$] * [1 + 0.18 * (Black=1, non-Black=0)] * [1.429 – 0.0198 BMI (kg/m^2)]

[e] P values, two-tailed t-test, comparing weighted mean 24-hour urinary sodium or potassium excretion between subgroups for the specified participant characteristic. When a participant characteristic included more than two subgroups, the comparison was indicated.

eTable 15. Weighted Mean 24-Hour Urinary Electrolyte Excretion With and Without Multiple Imputation[a]

Group	With multiple imputation[a]			Without multiple imputation[b]		
	Weighted % of participants	24-hour urinary sodium excretion Mean (95% CI), mg[c]	24-hour urinary potassium excretion Mean (95% CI), mg[c]	Weighted % of participants	24-hour urinary sodium excretion, Mean (95% CI), mg[c]	24-hour urinary potassium excretion Mean (95% CI), mg[c]
Family income, % federal poverty index[d]						
<130%	28.0	3471 (3206-3736)	1799 (1678-1921)	27.9	3475 (3207-3742)	1799 (1681-1916)
>130%	72.0	3662 (3405-3919)	2292 (2159-2426)	72.1	3681 (3440-3922)	2301 (2162-2440)
Chronic kidney disease[e]						
Yes	11.3	3506 (3223-3789)	2112 (1750-2475)	11.2	3527 (3250-3804)	2128 (1765-2490)
No	88.7	3622 (3416-3828)	2160 (2028-2292)	88.8	3620 (3417-3820)	2167 (2031-2302)

Abbreviations: CI, confidence interval.

SI conversion factors: To convert electrolyte values to mmol, divide the sodium value by 23 and the potassium value by 39.

[a] Multiple imputation was used to classify adults with missing information on family income (6.0% missing, n=50) and chronic kidney disease (3.5% missing, n=29).

[b] Adults with missing information on the designated participant characteristic were excluded from analysis.

[c] Weighted means and confidence intervals for 24-hour urinary sodium and potassium excretion were estimated from the initial 24-hour urine collection for non-pregnant adults, aged 20-69 years. Values account for complex survey design, sampling and non-response using sample weights for the 24 h urine collection in the 2014 National Health and Nutrition Examination Survey.

[d] Total family income relative to the Department of Health and Human Services poverty guidelines for 2014.

[e] Chronic kidney disease defined as an estimated glomerular filtration (eGfr) rate <60 mL/min/1.73 m2 or urinary albumin/creatinine ratio > 30 mg/g.

eTable 16. Weighted Mean 24-Hour Urinary Electrolyte Excretion by Hypertension Status, US Adults, 2014[a]

Total sample	No. (% [95% CI])[b]	Sodium, mg	Potassium, mg	Molar ratio, Na:K
Hypertension	258 (29.0 [22.3-35.8])	3845 (3527-4163)	2179 (2029-2329)	3.26 (2.83-3.68)
Prehypertension	193 (23.2 [19.5-26.9])	3606 (3370-3842)	2264 (2069-2458)	3.01 (2.71-3.31)
Normotension	360 (47.8 [41.8-53.7])	3416 (3170-3662)	2084 (1917-2251)	3.15 (2.82-3.49)
P Value[c]				
Hypertension vs. prehypertension	NA	0.17	0.38	0.27
Hypertension vs. normotension	NA	0.054	0.33	0.65
Prehypertension vs. normotension	NA	0.21	0.04	0.40
Men				
Hypertension	130 (29.1 [20.4-37.8])	4707 (4153-5262)	2418 (2178-2658)	3.69 (3.07-4.31)
Prehypertension	124 (29.0 [20.4-37.5])	4092 (3768-4417)	2411 (2175-2646)	3.21 (2.81-3.60)
Normotension	157 (41.9 [34.5-49.4])	3852 (3492-4213)	2369 (2128-2610)	3.11 (2.64-3.57)
P Value[c]				
Hypertension vs. prehypertension	NA	0.07	0.97	0.19
Hypertension vs. normotension	NA	0.03	0.65	0.08
Prehypertension vs. normotension	NA	0.33	0.79	0.71
Women				
Hypertension	128 (28.9 [21.3-36.5])	3026 (2623-3429)	1953 (1714-2192)	2.84 (2.38-3.31)
Prehypertension	69 (17.8 [12.5-23.1])	2859 (2593-3125)	2038 (1664-2413)	2.72 (2.34-3.10)
Normotension	203 (53.3[46.6-59.9])	3093 (2880-3306)	1873 (1669-2076)	3.19 (2.85-3.53)
P Value[c]				
Hypertension vs. prehypertension	NA	0.39	0.64	0.60
Hypertension vs. normotension	NA	0.74	0.57	0.18
Prehypertension vs. normotension	NA	0.18	0.39	0.04

Abbreviations: CI, confidence interval; K, potassium; Na, sodium; NA, not applicable; NHANES, National Health and Nutrition Examination Survey, vs., versus.

SI conversion factors: To convert electrolyte values to mmol, divide the sodium value by 23 and the potassium value by 39.

[a] Weighted means and 95% confidence intervals of 24-hour urinary electrolyte excretions were estimated from the initial 24-hour urine collection for non-pregnant adults aged 20-69 years in NHANES 2014. Hypertension status was defined according to previous national surveillance criteria, as mean SBP ≥140 mm Hg, mean DBP ≥90 mm Hg, or self-reported use of antihypertensive medication. Pre-hypertension was defined as a mean SBP of 120–139 mm Hg or a mean DBP of 80–89 mm Hg among those without hypertension. Normotension was defined as mean SBP <120 mm Hg and mean DBP <80 mm Hg in the absence of antihypertensive medication.

[b] Unweighted sample size, weighted percent.

[c] Two-tailed t-test, comparing mean 24-hour urinary electrolyte excretion between subgroups as specified.

eTable 17. Weighted Mean Dietary Sodium, Energy, and Sodium Density, NHANES 2013-2014[a]

	No.[b]	Sodium, Mean (95% CI), mg/day	Energy, Mean (95% CI), kcal/d	Sodium density, Mean (95% CI), mg sodium/1000 kcal,
Both sexes	4246	3607 (3541-3672)	2189 (2148-2231)	1699 (1670-1729)
Men	2056	4175 (4061-4290)	2533 (2479-2586)	1696 (1668-1723)
Women	2190	3044 (2994-3094)	1849 (1805-1893)	1703 (1653-1754)
P-value, two-tailed t-test, comparing mean intake, men vs. women		<.001	<.001	0.78

Abbreviations: CI, confidence interval; NHANES, National Health and Nutrition Examination Survey.

SI conversion factors: To convert sodium values to mmol, divide the sodium value by 23.

[a] Weighted mean and 95% CI for dietary sodium and energy intake and their ratio (sodium density) were estimated from the initial 24-hour dietary recall in NHANES 2013-2014 for non-pregnant adults aged 20-69 years who participated in the examination component and completed an initial, reliable, 24-hour dietary recall.

[b] Unweighted sample size.

eFigure 1. Weighted Mean 24-Hour Urinary Sodium Excretion by Age Group, NHANES 2014
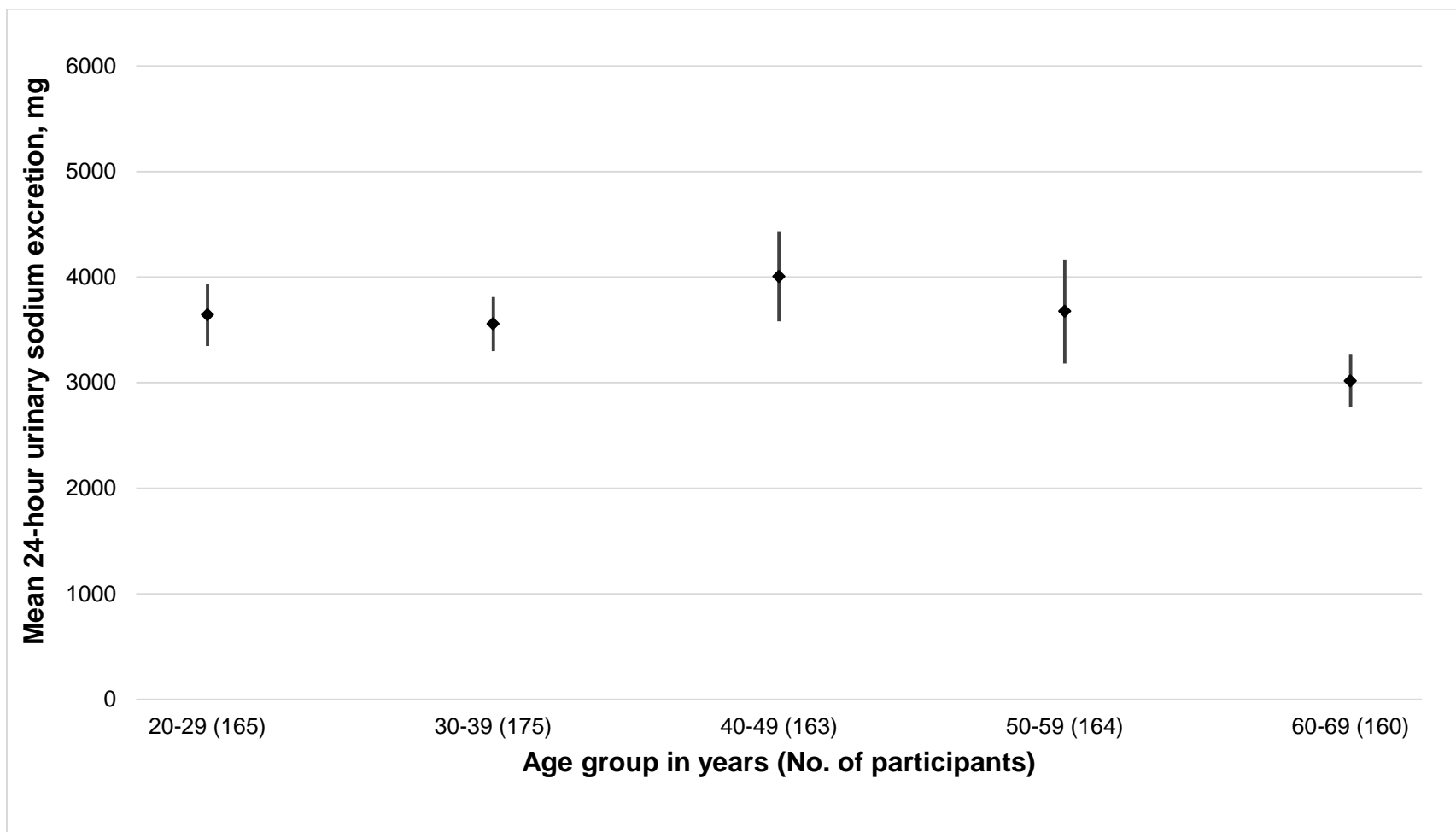
eFigure 2. Weighted Mean 24-Hour Urinary Sodium Excretion by Age Group and Sex, NHANES 2014
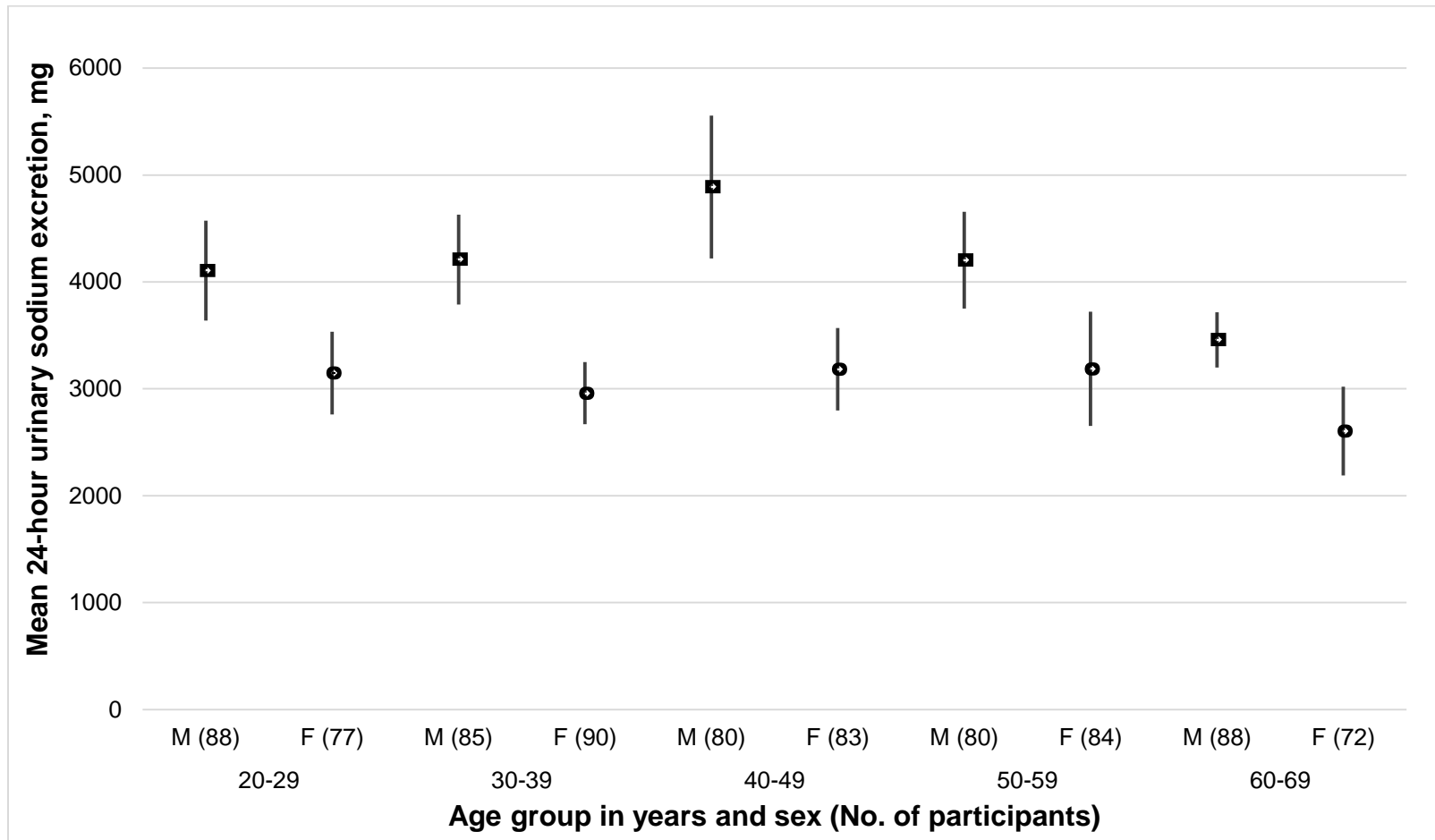
eFigure Legends.

eFigure1. Weighted Mean 24-Hour Urinary Sodium Excretion by 10-Year Age Group, NHANES 2014.

Abbreviations: CI, confidence interval; NHANES, National Health and Nutrition Examination Survey. SI conversion factors: To convert sodium values to mmol, divide 23. The weighted means (diamonds) are shown with the bars representing 95% CI. Unweighted sample size are shown in parentheses for each group.

eFigure2. Weighted Mean 24-Hour Urinary Sodium Excretion by 10-Year Age Group and Sex, NHANES, 2014.

Abbreviations: CI, confidence interval; F,Female; M, Male; NHANES, National Health and Nutrition Examination Survey. SI conversion factors: To convert sodium values to mmol, divide by 23. The weighted means for men (squares) and for women (circles) are shown with the bars representing 95% CI. Unweighted sample size are shown in parentheses for each group.

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