National Health and Nutrition Examination Survey

Pilot study to assess the feasibility of collecting 24-hour urine

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National Conference on Health Statistics 2015

NHANES Overview

Household interview

Mobile examination center (MEC)

Post-examination components

- Physical activity monitor
- Dietary recall – phone
- 24-hour urine collection feasibility study

Objective:

To assess the feasibility of collecting 24-hour urines as part of NHANES, by evaluating:

- procedures
- completion rates
- effect on other post-exam components
- two protocols - start/end collection at study location vs. at home

24-hour urine collection pilot study

Location

- Three locations of the 2013 NHANES
- Urban, suburban, rural

Sample

- Half sample of non-pregnant adults 20-69 years, examined in the MEC
- Among those with a complete specimen, a half sample collected a second 24-hour urine

Remuneration

- $100 for each 24-h urine

Laboratory analytes

- Sodium, potassium, chloride, creatinine

24-h urine collection

Recruitment

- during MEC exam
- half start collection on weekdays

Visit 1 - UMEC

- received instructions
- emptied bladder to begin urine collection

Visit 2 - UMEC

- returned urine sample
- voided to end collection
- completion questionnaire

Second urine collection

- 3-10 days after 1st collection
- test two protocols: start/end at UMEC or start/end at home

Urine Study MEC (UMEC)

Urine Collection Kit

Urine processing

- Total urine volume - weighed individual containers
- Aliquot from combined, mixed specimen
- Stored at -30˚C, shipped frozen to laboratories

Evaluation criteria

- ≥70% of participants collect a complete initial urine
- ≥70% of participants collect a complete second collection
- Physical activity monitor and dietary recall completion rates do not decrease by more than 10 percentage points

A urine specimen was "complete" if:

- the collection start and end times were recorded
- the duration of the collection was ≥22 hours
- the total urine volume was ≥ 500 mL
- no more than "a few drops" of urine were missing
- not menstruating during urine collection

Results

Participation status	First 24-h urine		Second 24-h urine	
	No.	%	No.	%
Total sampled	282		108	
Agreed to participate	258	91%	102	94%
Returned urine specimen	237	84%	100	93%
Complete urine specimen	212	75%	92	85%

MEC response rate: 71%
Final 24-hour urine response rate: 53%

Source: CDC, NCHS, NHANES 24-Hour Urine Pilot Study

Reasons for incomplete specimens

Reasons for incomplete specimen	1st urine collection (n=26)	2nd urine collection (n=8)
Missed more than a few drops of urine	18	5
Returned less than 500 ml of urine	4	
Female menstruating during collection	3	1
Collection time was less than 22 hours	1	
Unknown collection start or end time		2
No time, end of study location		3

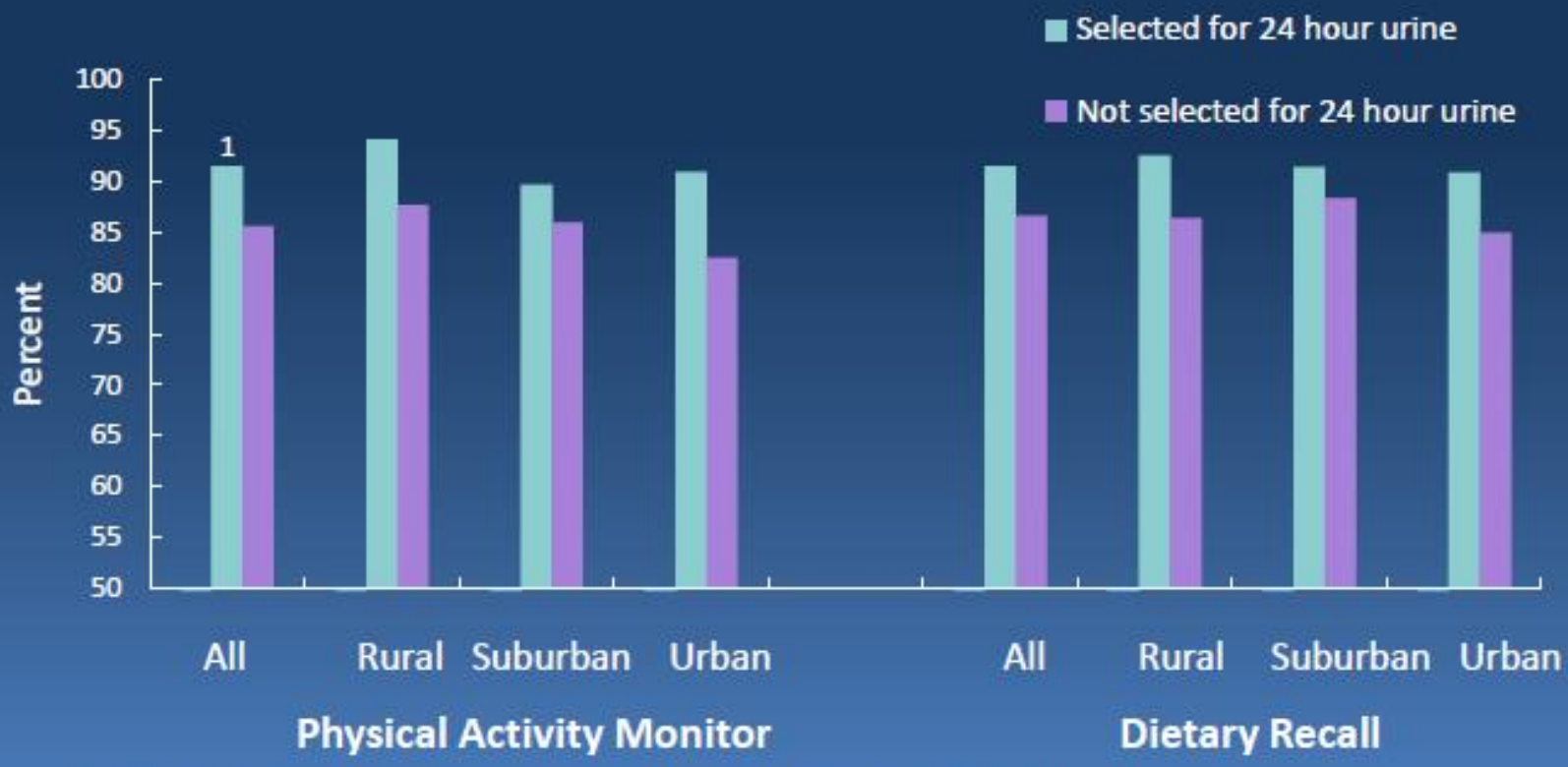
Source: CDC, NCHS, NHANES 24-Hour Urine Pilot Study

Non-response

	First 24-hour urine			Second 24-hour urine		
	Sampled	Complete		Sampled	Complete	
	No.	No.	%	No.	No.	%
All	282	212	75%	108	92	85%
Age						
20-29	43	34	79%	15	13	87%
30-39	60	44	73%	16	15	94%
40-49	73	53	73%	31	26	84%
50-59	60	48	80%	30	24	80%
60-69	46	33	72%	16	14	88%
Sex						
Men	139	112	81%*	54	47	87%
Women	143	100	70%	54	45	83%
Race and ethnicity						
Non-Hispanic white	178	131	74%	65	55	85%
Non-Hispanic black	83	64	77%	33	28	85%
Education						
Less than high school	42	34	81%	15	14	93%
High school graduate	82	60	73%	27	21	78%
Some college	86	65	76%	37	32	87%
College graduate	72	53	74%	29	25	86%

Source: CDC, NCHS, NHANES 24-Hour Urine Pilot Study

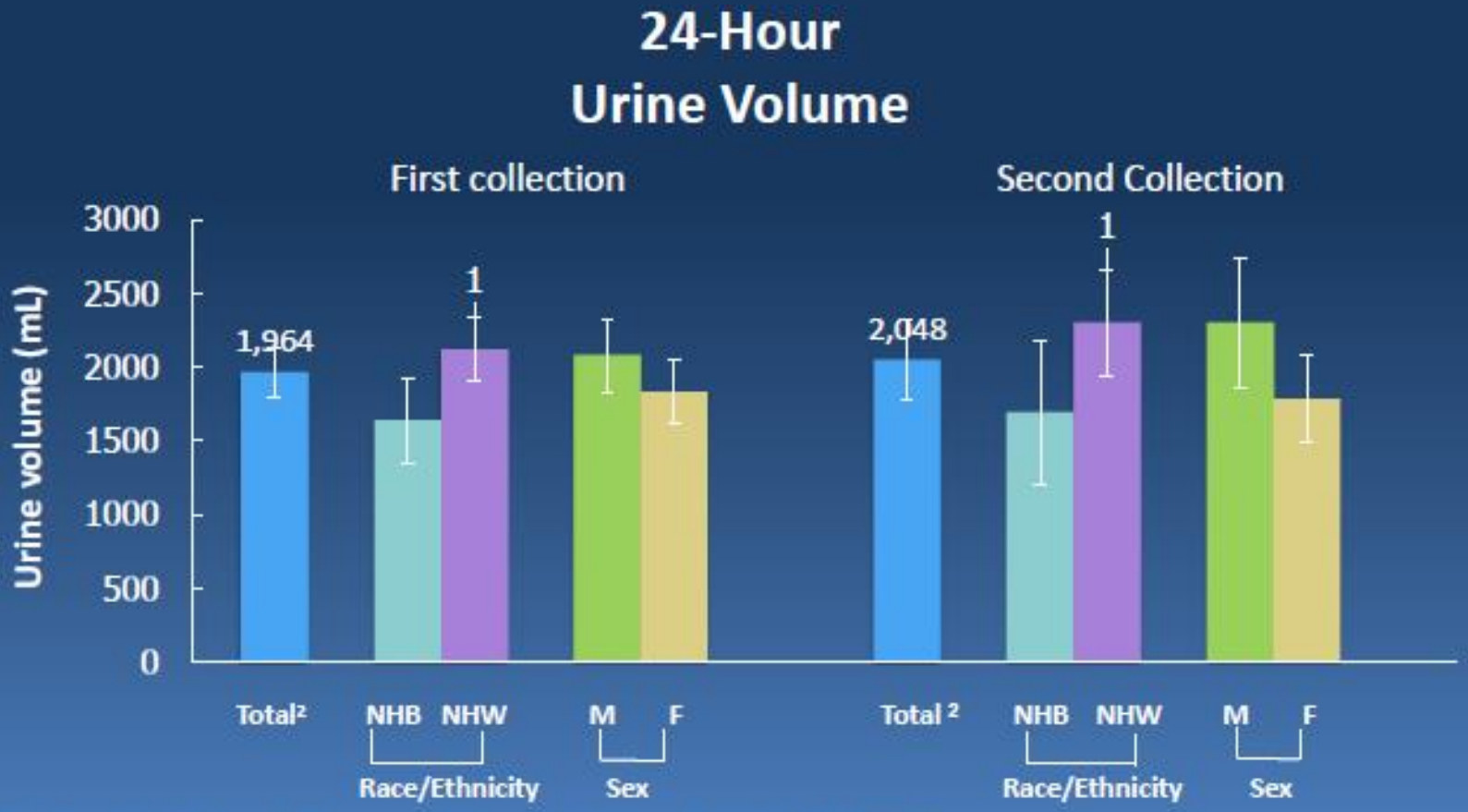
Physical activity monitor and dietary recall completion rates were not affected by the 24-h urine collection



[1]Significantly different from those not selected for the 24-hour urine feasibility study

Source: CDC, NCHS, NHANES 24-Hour Urine Pilot Study

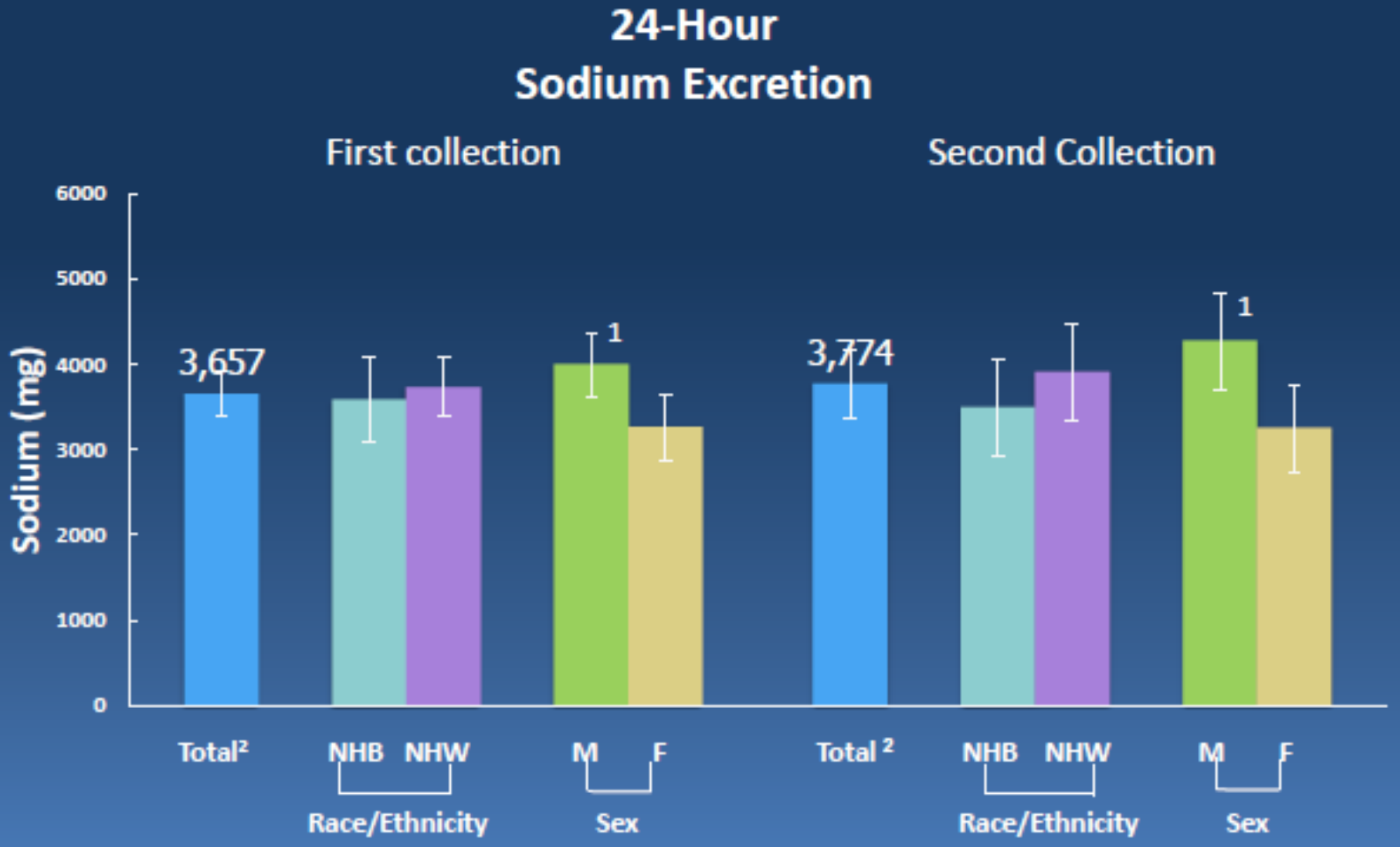
Adjusted mean total 24-h urine volume was significantly higher among NHW compared with NHB participants, for both collections



[1]Significantly different from non-Hispanic black individuals, $P < 0.05$
[2]Total includes other race and ethnicity groups.

Source: CDC, NCHS, NHANES 24-Hour Urine Pilot Study

Mean total 24-h sodium excretion was significantly higher among men than women, for both collections



[1]Significantly different from female participants, $P < 0.05$

[2]Total includes other race and ethnicity groups.

Source: CDC, NCHS, NHANES 24-Hour Urine Pilot Study

UMEC vs. Home

	UMEC		Home	
Participation status				
Total number sampled	57		51	
Returned urine specimen	50	88%	50	98%[1]
Complete urine specimen	47	82%	45	88%
Total urine volume, mL	1,875		2,250	

[1]Significantly different from those who started and ended the collection at the UMEC

Source: CDC, NCHS, NHANES 24-Hour Urine Pilot Study

Reactions by participants

"I will do it on a day I plan to be at home"

"I don't want to carry all these things around"

"Don't want to take it to work"

"It was easy"

Source: CDC, NCHS, NHANES 24-Hour Urine Pilot Study

Challenges and limitations

- Cost
- Logistics
- Time
- Limited
  - sample size
  - to three study locations
  - study population almost entirely non-Hispanic white and non-Hispanic black

Conclusion

- 24-hour urine collection was feasible
  - 75% collected a complete initial specimen
  - 85% collected a complete second specimen
  - PAM and dietary recall completion rates did not drop
- A collection cup and funnel were not needed
- A 24-hour urine collection was implemented in 2014 NHANES

2014 NHANES

24-Hour Urine Collection

data coming soon…

- to provide a baseline of sodium intake by US adults
- to assess national effort to reduce sodium in the food supply

Thank you