National Health and Nutrition Examination Survey 2003-2004

Documentation, Codebook, and Frequencies

Laboratory Component:
Urinary Mercury

Survey Years:
2003 to 2004

SAS Export File:
L06UHG_C.XPT

First Release: July 2007
Last Revised: N/A

NHANES 2003–2004 Data Documentation

Laboratory Assessment: Lab 06 – Urinary Mercury

Years of Coverage: 2003–2004 **First Published:** July 2007 **Last Revised:** N/A

Component Description

Mercury is widespread in the environment and originates from natural and anthropogenic sources. The general population may be exposed to three forms of mercury: elemental, inorganic, or organic (primarily methylmercury). The concentration of total mercury in urine is a biomeasure of exposure primarily to elemental and inorganic mercury. Elemental and inorganic mercury exposure can result from mercury spills, dental amalgams, and occupational exposures. Both elemental and inorganic mercury are nephrotoxic and neurotoxic. Health effects related to low exposure in the general population are not well defined. In the 1999-2002 NHANES, urine mercury levels were measured in all women aged 16-49 years. In 2003-2004, urine mercury levels are measured in a one-third subsample of participants aged 6 years and older.

Eligible Sample

Participants aged 6 years and older on an one-third sample.

Description of Laboratory Methodology

Mercury in urine is measured by flow injection cold vapor atomic absorption analysis, which is based on the method that Guo and Bassner (1993) developed. Because mercury in urine is found almost entirely in the inorganic form, Guo and Bassner's method does not use microwave digestion, and decomposition of mercury compounds is achieved by manually adding mixed bromate-bromide reagent and concentrated hydrochloric acid (HCl). Further decomposition of mercury compounds is achieved by adding potassium permanganate online. The mercury vapor (reduced from inorganic mercury compounds by sodium tetrahydroborate) is measured by the spectrophotometer at 253.7 nm.

Laboratory Quality Control and Monitoring

Specimens were processed, stored and shipped to Division of Laboratory Sciences, National Center for Environmental Health, National Centers for Disease Control and Prevention, Atlanta, Georgia.

The NHANES quality control and quality assurance protocols (QA/QC)

meet the 1988 Clinical Laboratory Improvement Act mandates. Detailed quality control and quality assurance instructions are discussed in the NHANES Laboratory/Medical Technologists Procedures Manual (LPM). Read the LABDOC file for detailed QA/QC protocols.

Mobile Examination Centers (MECs)

Laboratory team performance is monitored using several techniques. NCHS and contract consultants use a structured quality assurance evaluation during unscheduled visits to evaluate both the quality of the laboratory work and the quality-control procedures. Each laboratory staff person is observed for equipment operation, specimen collection and preparation; testing procedures and constructive feedback are given to each staff. Formal retraining sessions are conducted annually to ensure that required skill levels were maintained.

Analytical Laboratories

NHANES uses several methods to monitor the quality of the analyses performed by the contract laboratories. In the MEC, these methods include performing blind split samples collected on “dry run” sessions. In addition, contract laboratories randomly perform repeat testing on 2.0% of all specimens.

NCHS developed and distributed a quality control protocol for all the contract laboratories which outlined the Westgard rules used when running NHANES specimens. Progress reports containing any problems encountered during shipping or receipt of specimens, summary statistics for each control pool, QC graphs, instrument calibration, reagents, and any special considerations are submitted to NCHS and Westat quarterly. The reports are reviewed for trends or shifts in the data. The laboratories are required to explain any identified areas of concern.

There were no changes to the method, site or laboratory from the previous two year cycle.

All QC procedures recommended by the manufacturers were followed. Reported results for all assays meet the Division of Laboratory Science’s quality control and quality assurance performance criteria for accuracy and precision (similar to specifications outlined by Westgard, 1981).

Analytic Notes

Subsample weights

Measures of urinary mercury were measured in a one third subsample of persons 6 years and over. Special sample weights are required to analyze these data properly. Specific sample weights for this subsample are included in this data file and should be used when analyzing these data.

Variance estimation

The analysis of NHANES 2003-2004 laboratory data must be conducted with the key survey design and basic demographic variables. The NHANES 2003-2004 Demographic Data File contains demographic and sample design variables. The recommended procedure for variance estimation requires use of stratum and PSU variables (SDMVSTRA and SDMVPSU, respectively) in the demographic data file.

Links to NHANES Data Files

This laboratory data file can be linked to the other NHANES 2003-2004 data files using the unique survey participant identifier SEQN.

Detection Limits

Urinary mercury has two detection limits in the data set. Two variables are provided for this analyte. The variable named LBDUHGLC indicates whether the result was below the limit of detection. There are two values: “0”, and “1”. “0” means that the result was at or above the limit of detection. “1” indicates that the result was below the limit of detection.

The other variable named LBX___ provides the analytic result for that analyte. In cases, where the result was below the limit of detection, the value for that variable is the detection limit divided by the square root of two. There are two valid fill values of 0.08 and 0.10.

Please refer to the Analytic Guidelines for further details on the use of sample weights and other analytic issues.

References

Guo T, Baasner J. Determination of mercury by flow-injection cold vapor atomic absorption spectrometry. Analytica Chimica Acta. 1993; 278:189–196.

Locator Fields

Title: Urinary Mercury

Contact Number: 1-866-441-NCHS

Years of Content: 2003–2004

First Published: July 2007

Revised: N/A

Access Constraints: None

Use Constraints: None

Geographic Coverage: National

Subject: Urinary Mercury

Record Source: NHANES 2003–2004

Survey Methodology: NHANES 2003–2004 is a stratified multistage probability sample of the civilian non-institutionalized population of the U.S.

Medium: NHANES Web site; SAS transport files

National Health and Nutrition Examination Survey
Codebook for Data Production (2003-2004)

Urinary Mercury (L06UHG_C)
Person Level Data

First Published: July 2007
Last Revised: N/A

SEQN	Target
	B(6 Yrs. to 150 Yrs.)
Hard Edits	**SAS Label**
	Respondent sequence number
English Text: Respondent sequence number.	
English Instructions:	

URXUHG	Target
	B(6 Yrs. to 150 Yrs.)
Hard Edits	**SAS Label**
	Mercury, urine (ng/mL)
English Text: Mercury, urine (ng/mL)	
English Instructions:	

Code or Value	Description	Count	Cumulative	Skip to Item
0.11 to 75.75	Range of Values	2055	2055	
0.10	Fill Value of Limit of Detection	483	2538	
.	Missing	135	2673	

URDUHGLC	Target
	B(6 Yrs. to 150 Yrs.)
Hard Edits	**SAS Label**
	Urinary mercury comment code
English Text: The comment codes associated with the condition of the urinary mercury specimens	
English Instructions:	

Code or Value	Description	Count	Cumulative	Skip to Item
0	At or above the detection limit	2055	2055	
1	Below lower detection limit	483	2538	
.	Missing	135	2673	

URXUCR	Target
	B(6 Yrs. to 150 Yrs.)
Hard Edits	**SAS Label**
	Creatinine, urine (mg/dL)
English Text: Creatinine, urine (mg/dL)	
English Instructions:	

Code or Value	Description	Count	Cumulative	Skip to Item
6 to 768	Range of Values	2586	2586	
.	Missing	87	2673	

WTSA2YR	Target
	B(6 Yrs. to 150 Yrs.)
Hard Edits	**SAS Label**
	Two-year MEC weights of subsample A
English Text: Two-year MEC weights of subsample A	
English Instructions:	

Code or Value	Description	Count	Cumulative	Skip to Item
0 to 455771.88304	Range of Values	2673	2673	
.	Missing	0	2673	