National Health and Nutrition Examination Survey 2003-2004

Documentation, Codebook, and Frequencies

Laboratory Component:
Urinary Iodine

Survey Years:
2003 to 2004

SAS Export File:
L06UIO_C.XPT

First Published: December 2007
Last Revised:N/A

NHANES 2003–2004 Data Documentation

Laboratory Assessment: Lab 6 – Urinary Iodine (l06uio_c)

First Published: December 2007 **Last Revised:** N/A

Component Description

Iodine, an essential element for thyroid function, is necessary for normal growth, development, and functioning of the brain and body. Iodine-deficiency disorder (IDD) is a well documented global health problem, affecting more than a billion people worldwide. Consequences of IDD include goiter, cretinism, intellectual impairment, brain damage, mental retardation, stillbirth, spontaneous abortions, miscarriages, congenital deformities, and increased perinatal mortality. Progress toward eliminating IDDs has been substantial; an estimated 70% of the world's edible salt currently is iodized. Most excess iodine is excreted, and most people can tolerate fairly large amounts without experiencing problems. People with a tendency toward autoimmune thyroid disease are less tolerant of excess iodine. If a person has previously been iodine-deficient, that person may be at risk for iodine-induced hyperthyroidism. Excessive iodine intake by a mother can pose a reproductive risk. Since urinary iodine values directly reflect dietary iodine intake, urinary iodine analysis is the recommended and most common method for biochemically assessing the iodine status of a population. This method achieves rapid and accurate quantification of iodine content in urine.

Eligible Sample

Participants aged 6 years and older on a 1/3 sample were tested.

Description of Laboratory Methodology

Inductively coupled plasma-mass spectrometry (ICP-MS) is a multi-element analytical technique (2). Liquid samples are introduced into the ICP through a nebulizer and spray chamber carried by a flowing argon stream. By coupling radio-frequency power with flowing argon, plasma is created in which the predominant species are positive argon ions and electrons. The sample passes through a region of the plasma that has a temperature of 6000–8000 K. The thermal energy atomizes the sample and then ionizes the atoms. The ions and the argon enter the mass spectrometer through the interface that separates the ICP, which operates at atmospheric pressure, from the mass spectrometer, which operates at a pressure of 10^{-6} torr. The mass spectrometer permits rapid-sequence ion detection at each mass, which allows determination of individual isotopes of an element. Electrical signals from the ion detection are processed into digital information that is used to first

indicate the intensity of the ions and then the concentration of the element. Urine samples are diluted 1+9 with 1% (v/v) tetramethylammonium hydroxide (TMAH) containing tellurium for internal standardization.

There were no changes to the equipment, methods, or lab site from the previous 2 years.

Laboratory Quality Control and Monitoring

Specimens were processed, stored and shipped to Division of Laboratory Sciences, National Center for Environmental Health.

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

There was no top coding or fill values added to this file.

Data Processing and Editing

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.

The NHANES QA/QC protocols meet the 1988 Clinical Laboratory Improvement Act mandates. Detailed QA/QC instructions are discussed in the NHANES LPM.

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.

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 iodine 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

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 iodine measures were above the limit of detection (1.0 µg/L) for all samples. The detection limit divided by the square root of 2 is the value that is provided for results that are below the limit of detection.

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

References

None

Locator Fields

Title: Urinary Iodine

Contact Number: 1-866-441-NCHS

Years of Content: 2003–2004

First Published: December 2007

Revised: N/A

Access Constraints: None

Use Constraints: None

Geographic Coverage: National

Subject: Urinary Iodine

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 Iodine (L06UIO_C)
Person Level Data

First Published: December 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:	

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

Code or Value	Description	Count	Cumulative	Skip to Item
6 to 49930.1	Range of Values	2526	2526	
.	Missing	86	2612	

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
7 to 648	Range of Values	2530	2530	
.	Missing	82	2612	

WTSC2YR	Target
	B(6 Yrs. to 150 Yrs.)
Hard Edits	**SAS Label**
	Two-year MEC weights of subsample C
English Text: Two-year MEC weights of subsample C	
English Instructions:	

Code or Value	Description	Count	Cumulative	Skip to Item
0 to 456851.11941	Range of Values	2612	2612	
.	Missing	0	2612	