

National Health and Nutrition Examination Survey

2015-2016 Data Documentation, Codebook, and Frequencies

Iodine - Urine (UIO_I)

Data File: UIO_I.xpt

First Published: June 2018

Last Revised: NA

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, 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

All examined participants aged 3 to 5 years were eligible and participants aged 6 years and older from a one-third subsample were eligible.

Description of Laboratory Methodology

This method directly measures the iodine and mercury content of urine specimens using ICP-DRC-MS (Inductively Coupled Plasma Dynamic Reaction Cell Mass Spectroscopy) after a dilution sample preparation step. Liquid samples are introduced into the mass spectrometer through the ICP ionization source, reduced to small droplets in an argon aerosol via a nebulizer, and then the droplets enter the ICP. The ions first pass through a focusing region, then the dynamic reaction cell (DRC), the quadrupole mass filter, and finally are selectively counted in rapid sequence at the detector, allowing individual isotopes of an element to be determined.

Refer to the Laboratory Method Files section for a detailed description of the laboratory methods used.

There were no changes to lab method, lab equipment, or lab site for this component in the NHANES 2015-2016 cycle.

Laboratory Method Files

[Iodine and Mercury, Urine Lab Procedure Manual](#) (June 2018)

Laboratory Quality Assurance and Monitoring

Urine samples are processed, stored, and shipped to the Division of Laboratory Sciences, National Center for Environmental Health, Centers for Disease Control and Prevention, Atlanta, GA for analysis.

Detailed instructions on specimen collection and processing are discussed in the [NHANES Laboratory Procedures Manual \(LPM\)](#). Vials are stored under appropriate frozen (-30°C) conditions until they are shipped to the National Center for Environmental Health for testing.

The NHANES quality assurance and quality control (QA/QC) protocols meet the 1988 Clinical Laboratory Improvement Act mandates. Detailed QA/QC instructions are discussed in the [NHANES LPM](#).

Mobile Examination Centers (MECs)

Laboratory team performance is monitored using several techniques. NCHS and contract consultants use a structured competency assessment evaluation during visits to evaluate both the quality of the laboratory work and the quality-control procedures. Each laboratory staff member is observed for equipment operation, specimen collection and preparation; testing procedures and constructive feedback are given to each staff member. 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% of all specimens.

NCHS developed and distributed a quality control protocol for all CDC and contract laboratories, which outlined the use of Westgard rules (Westgard et al., 1981) 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 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 Sciences' quality control and quality assurance performance criteria for accuracy and precision, similar to the Westgard rules (Caudill et al., 2008).

Data Processing and Editing

The data were reviewed. Incomplete data or improbably values were sent to the performing laboratory for confirmation.

Analytic Notes

Refer to the [2015-2016 Laboratory Data Overview](#) for general information on NHANES laboratory data.

Subsample Weights

Urinary iodine was measured in a full sample of participants ages 3-5 and a one-third subsample of persons 6 years and older. 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.

Demographic and Other Related Variables

The analysis of NHANES laboratory data must be conducted using the appropriate survey

design and demographic variables. The NHANES [2015-2016 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.

Starting in the 2015-2016 NHANES cycle, the variable URXUCR (urine creatinine) will not be reported in this file. URXUCR can be found in the data file titled Albumin & Creatinine - Urine.

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

Detection Limits

The detection limits were constant for this analyte in the data set. Two variables are provided for each of these analytes. The variable name ending in LC (ex., URDUIOLC) indicates whether the result was below the limit of detection: the value "0" means that the result was at or above the limit of detection, "1" indicates that the result was below the limit of detection. For analytes with analytic results below the lower limit of detection (ex., URDUIOLC=1), an imputed fill value was placed in the analyte results field. This value is the lower limit of detection divided by the square root of 2 (LLOD/sqrt [2]). The other variable prefixed URX (ex., URXUIO) provides the analytic result for that analyte.

The lower limit of detection (LLOD, in µg/L) for the urinary metals in the data set is:

Variable Name	SAS Label	LLOD
URXUIO	Urinary iodine (ug/L)	2.4

Please refer to the NHANES [Analytic Guidelines](#) and the on-line NHANES [Tutorial](#) for further details on the use of sample weights and other analytic issues.

References

- Caudill SP, Schleicher RL, Pirkle JL. Multi-rule quality control for the age-related eye disease study. Statist Med 2008;27: 4094-106.
- Westgard J.O., Barry P.L., Hunt M.R., Groth T. A multi-rule Shewhart chart for quality control in clinical chemistry. Clin Chem (1981) 27: 493-501.


Codebook and Frequencies

SEQN - Respondent sequence number

Variable Name:	SEQN
SAS Label:	Respondent sequence number
English Text:	Respondent sequence number
Target:	Both males and females 3 YEARS - 150 YEARS

WTS2YR - Subsample A weights

Variable Name: WTS2YR
SAS Label: Subsample A weights
English Text: Subsample A weights
Target: Both males and females 3 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
6552.119284 to 708844.24678	Range of Values	3231	3231	
0 	Participants 6+ years with no lab specimen	48	3279	
.	Missing	0	3279	

URXUIO - Iodine, urine (ng/mL)

Variable Name: URXUIO**SAS Label:** Iodine, urine (ng/mL)**English Text:** Iodine, urine (ng/mL)**Target:** Both males and females 3 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
8.9 to 72155.3	Range of Values	3079	3079	
.	Missing	200	3279	

URDUIOLC - Iodine, urine comment code

Variable Name: URDUIOLC
SAS Label: Iodine, urine comment code
English Text: Iodine, urine comment code
Target: Both males and females 3 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0	At or above detection limit	3079	3079	
1	Below lower detection limit	0	3079	
.	Missing	200	3279	