National Health and Nutrition Examination Survey

2015-2016 Data Documentation, Codebook, and Frequencies

Fluoride - Plasma (FLDEP_I)

Data File: FLDEP_I.xpt

First Published: September 2017

Last Revised: NA

Component Description

In 2010, a panel of federal scientists representing CDC/Division of Oral Health and National Institute of Dental (DOH) and Craniofacial Research (NIDCR) participated in the development of a new HHS recommendation for optimal fluoride level in drinking water (community water fluoridation), as well as the development of guidelines for maximum fluoride levels in naturally fluoridated water. One of the recommendations of the federal panel was to strengthen the surveillance of dental caries and dental fluorosis with emphasis on determining fluoride exposures.

Eligible Sample

Examined participants aged 6 to 19 years were eligible.

Description of Laboratory Methodology

Fluoride in Plasma:
Fluoride concentrations in plasma and appropriate aqueous standards are measured electrometrically using the ion-specific electrode. Because the limit of detection (LOD) of the electrode, ~1 µmole/L (0.019 mg/L), is close to or actually higher than most plasma fluoride concentrations, the hexamethyldisiloxane (HMDS) facilitated diffusion method is employed to quantitatively transfer fluoride from the plasma sample into an alkaline trapping solution of smaller volume. This process results in fluoride concentrations in the solution that is finally analyzed that are well above the LOD and on the linear portion of the standard curve.

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

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

Laboratory Method Files

Fluoride - Plasma (September 2017)

Laboratory Quality Assurance and Monitoring

Plasma samples are processed, stored, and shipped to the College of Dental Medicine, Georgia Regents University, Augusta, 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 Georgia Regents University 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 Westgard rules (Westgard et al., 1981) 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 College of Dental Medicine at Georgia Regents University’s quality control and quality assurance performance criteria for accuracy and precision, similar to the Westgard rules.

Data Processing and Editing

The data were reviewed. Incomplete data or improbable 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.

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 Demographics File contains demographic data, health indicators, and other related information collected during household interviews as well as the sample weight variables. The recommended procedure for variance estimation requires use of stratum and PSU variables (SDMVSTRA and SDMVPSU, respectively) in the demographic data file.

This laboratory data file can be linked to other NHANES data files using the unique survey participant identifier (i.e., SEQN).

Plasma fluoride was measured in duplicate using the same sample. Since the variability between test results A and B is not statistically significant, the average of the two results are being released.

Detection Limits

The detection limits were constant for the analyte in the data set. Two variables are provided for each of these analytes. The variable name ending “LC” (ex., LBAPFLLC) 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., LBAPFLLC=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 LBX (ex., LBXPFL) provides the analytic result for that analyte.

The lower limit of detection (LLOD, in nanomoles) for fluoride:

Variable Name	SAS Label	LLOD
Fluoride, Plasma, (Averaged)	LBDPFL	0.25 nmol

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

- 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 6 YEARS - 19 YEARS

LBDPFL - Fluoride, plasma (umol/L) average 2

Variable Name: LBDPFL

SAS Label: Fluoride, plasma (umol/L) average 2

English Text: Fluoride, plasma (umol/L) average 2 values

Target: Both males and females 6 YEARS - 19 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0.09 to 4.02	Range of Values	2145	2145	
.	Missing	402	2547	