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# National Health and Nutrition Examination Survey (NHANES), 2005-2006

*United States Department of Health and Human Services. Centers for Disease Control and Prevention. National Center for Health Statistics*

NCHS User Guide -- Laboratory: HDL Cholesterol

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National Health and Nutrition Examination Survey 2005–2006

# Documentation, Codebook, and Frequencies

## HDL-Cholesterol

**Laboratory**

**Survey Years:**
**2005 to 2006**

**SAS Transport File:**
**HDL_D.XPT**


**First Published: December 2007**
**Last Revised: April 2008**

# NHANES 2005–2006 Data Documentation

**Laboratory Assessment: HDL-Cholesterol (HDL_D)**

**First Published:** December 2007 **Last Revised:** April 2008

**Added note in the Analytical Notes Section; see:** "Change in Assay Methods Most Likely Responsible for Increased HDL Cholesterol values in NHANES 2003-2006 when compared to NHANES 1999-2002".

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## Component Description

The data will be used to monitor the status of hyperlipidemia and the success of the National Cholesterol Education Program.

The main element of the cardiovascular disease laboratory component in NHANES is blood lipid levels. Cardiovascular disease is the leading cause of death in the United States. The data will be used to monitor the status of hyperlipidemia and the success of the National Cholesterol Education Program.

## Eligible Sample

Participants aged 6 years and older were tested.

## Description of Laboratory Methodology

HDL-Cholesterol is measured directly in serum. The apolipoprotein B containing lipoproteins in the specimen are reacted with a blocking reagent that renders them non-reactive with the enzymatic cholesterol reagent under conditions of the assay.

The procedure uses the Roche/Boehringer-Mannheim Diagnostics direct HDL method. The method uses sulfated alpha-cyclodextrin in the presence of Mg+2, which forms complexes with apoB containing lipoproteins, and polyethylene glycol-coupled cholesteryl esterase and cholesterol oxidase for the HDL-cholesterol measurement.

There was a change in the equipment from the Hitachi 717 to the Hitachi 912 during 2005-2006. The lab method was similar and the lab site was the same for HDL Cholesterol in NHANES 2003-2004. A detailed description of the laboratory method used can be found in Laboratory Procedures Manuals on the NHANES web site.

## Laboratory Quality Control and Monitoring

The NHANES quality assurance and quality control (QA/QC) protocols 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. A detailed description of the QA/QC procedures can be found on the NHANES web site.

## Data Processing and Editing

Blood specimens were processed, stored, and shipped to Johns Hopkins Hospital, Baltimore, MD for analysis. Detailed specimen collection and processing instructions are discussed in the NHANES Laboratory/Medical Technologists Procedures Manual (LPM). Read the LABDOC file for detailed data processing and editing protocols. The analytical methods are described in the Description of the Laboratory Methodology section.

One derived variable was created in this data file. The formula for its derivation is as follows:

LBDHDDSI:
The HDL-cholesterol in mg/dL (LBXHDD) was converted to mmol/L (LBDHDDSI) by multiplying by 0.02586.

Detailed instructions on specimen collection and processing can be found on the NHANES web site.

## Analytic Notes

Change in Assay Methods Most Likely Responsible for Increased HDL Cholesterol values in NHANES 2003-2006 when compared to NHANES 1999-2002

<u>Researchers are cautioned to interpret trends in HDL cholesterol for NHANES 1999-2006 in view of probable HDL cholesterol method effects.</u>
The HDL cholesterol values showed an average increase of 3.0 mg/dL in NHANES 2003-2006 compared to NHANES 1999-2002. The HDL cholesterol was analyzed in 1999-2002 using two methods - heparin manganese precipitation and a direct HDL immunoassay depending on the participant age and amount of specimen. Most participants in 1999-2002 were measured by the precipitation method. Starting in 2003, all

HDL cholesterol samples were analyzed using the direct HDL cholesterol immunoassay method. The heparin-manganese precipitation method and direct immunoassay method for 1999-2000, 2001-2002 and 2005-2006 showed an undesirable bias (>4%) when compared to the laboratory's HDL-cholesterol quality controls (Solomon Park Research Laboratories, Kirkland, WA) that were assigned values established by the Centers for Disease Control and Prevention. The CDC HDL cholesterol reference method uses heparin-manganese to precipitate HDL-cholesterol and the Abell-Kendall method to measure cholesterol. The HDL cholesterol for 1999-2000, 2001-2002 and 2005-2006 were adjusted using: Corrected HDL = [(Solomon Park assigned HDL value) x (Participant HDL)] /(Quality Control HDL value associated with participant sample). The bias for the HDL cholesterol method for 2003-2004 was acceptable (<4%) and the participant results were not corrected. In addition, there was a change in instrumentation in 2005-2006 and there were several modifications of the direct HDL cholesterol method. To control for these differences in methods and instrumentation, the HDL cholesterol was corrected using the Solomon Lab quality controls as described above.

Despite this correction procedure, all age, gender, and race-ethnicity groups showed an increase in mean HDL cholesterol after 2003. It is most likely that the change from the precipitation method to the direct method in 2003 was responsible for the increase in HDL cholesterol values. Other covariates (body mass index, medications, physical exercise, smoking and alcohol consumption) may explain some of the HDL cholesterol increased values, but it is unlikely to account for the majority of the mean increase in HDL cholesterol. Further investigations will be done to attempt to explain the increased HDL cholesterol values and provide further guidance on the interpretation of HDL cholesterols for NHANES 1999-2006.

Correction of the HDL Cholesterol Method:

The HDL was corrected for the 2005-2006 data. The method showed an unacceptable bias of -5% (bias < -4%) when compared to known HDL-cholesterol controls (Solomon Park Research Laboratories, Kirkland, WA) with assigned values established by reference methods at the Centers for Disease Control and Prevention. The CDC HDL-cholesterol reference method uses heparin-manganese to precipitate HDL and the Abell-Kendall method to measure cholesterol.

The participants' HDL-cholesterol values for HDL cholesterol method was corrected as follows:

$$\text{Corrected HDL} = \frac{(\text{Solomon Park assigned HDL value}) \times (\text{Participant HDL}}{(\text{HDL QC value associated with participant sample})}$$

A batch of participants' HDL-cholesterol values was run with Solomon Park quality controls during 2005-2006. Each participant's HDL-cholesterol was adjusted by comparing the associated Solomon Park quality control value to the assigned HDL-cholesterol value.

General Notes:

The analysis of NHANES 2005–2006 laboratory data must be conducted with the key survey design and basic demographic variables. The NHANES 2005–2006 Household Questionnaire Data Files contain demographic data, health indicators, and other related information collected during household interviews. They also contain all survey design variables and sample weights for these age groups. The phlebotomy file includes auxiliary information such as the conditions precluding venipuncture. The household questionnaire and phlebotomy files may be linked to the laboratory data file using the unique survey participant identifier SEQN.

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

## References

N/A

## Locator Fields

**Title:** HDL-Cholesterol

**Contact Number:** 1-866-441-NCHS

**Years of Content:** 2005–2006

**First Published:** December 2007

**Last Revised:** April 2008

**Access Constraints:** None

**Use Constraints:** None

**Geographic Coverage:** National

**Subject:** HDL-Cholesterol

**Record Source:** NHANES 2005–2006

**Survey Methodology:** NHANES 2005–2006 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 (2005-2006)

## HDL-Cholesterol (HDL_D)
## Person Level Data

December 2007

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

| LBDHDD | Target |
|---|---|
| | B(6 Yrs. to 150 Yrs.) |
| **Hard Edits** | **SAS Label** |
| | Direct HDL-Cholesterol (mg/dL) |
| **English Text:** Direct HDL-Cholesterol (mg/dL) | |
| **English Instructions:** | |

| Code or Value | Description | Count | Cumulative | Skip to Item |
|---|---|---|---|---|
| 15 to 188 | Range of Values | 7360 | 7360 | |
| . | Missing | 726 | 8086 | |

| LBDHDDSI | Target |
|---|---|
| | B(6 Yrs. to 150 Yrs.) |
| **Hard Edits** | **SAS Label** |
| | Direct HDL-Cholesterol (mmol/L) |
| **English Text:** Direct HDL-Cholesterol (mmol/L) | |
| **English Instructions:** | |

| Code or Value | Description | Count | Cumulative | Skip to Item |
|---|---|---|---|---|
| 0.39 to 4.86 | Range of Values | 7360 | 7360 | |
| . | Missing | 726 | 8086 | |

These chemicals are either currently being measured or planned to be measured in blood, serum or urine specimens from NHANES by the Division of Laboratory Sciences (DLS), National Center for Environmental Health, CDC. The chemicals were chosen based on potential for human exposure, known or potential health effects from exposure, and technical feasibility of measurement. To be reported, results for these chemicals must pass DLS quality control and quality assurance criteria for accuracy, precision, analytical sensitivity and analytical specificity.

| Chemical / Metabolite Name | Matrix | 03-04 | 05-06 | 07-08 | 09-10 |
|---|---|---|---|---|---|
| **Tobacco Smoke** | | | | | |
| Cotinine | serum | • | • | • | • |
| 4-(Methylnitrosamino)-1-(3-pyridyl)-1-Butanol (NNAL) | urine | | | • | • |
| **Metals** | | | | | |
| Lead | whole blood | • | • | • | • |
| Lead | urine | • | • | • | • |
| Cadmium | whole blood | • | • | • | • |
| Cadmium | urine | • | • | • | • |
| Mercury (total) | whole blood | • | • | • | • |
| Mercury (total) | urine | • | • | • | • |
| Inorganic Mercury | whole blood | • | • | • | • |
| Methyl Mercury | whole blood | | | | • |
| Ethyl Mercury | whole blood | | | | • |
| Arsenic (total) | urine | • | • | • | • |
| Arsenous (III) acid | urine | • | • | • | • |
| Arsenic (V) acid | urine | • | • | • | • |
| Monomethylarsonic acid | urine | • | • | • | • |
| Dimethylarsinic acid | urine | • | • | • | • |
| Arsenobetaine | urine | • | • | • | • |
| Arsenocholine | urine | • | • | • | • |
| Trimethylarsine oxide | urine | • | • | • | • |
| Antimony | urine | • | • | • | • |
| Barium | urine | • | • | • | • |
| Beryllium | urine | • | • | • | • |
| Cesium | urine | • | • | • | • |
| Cobalt | urine | • | • | • | • |
| Molybdenum | urine | • | • | • | • |
| Platinum | urine | • | • | • | • |
| Thallium | urine | • | • | • | • |
| Tungsten | urine | • | • | • | • |
| Uranium | urine | • | • | • | • |
| **Phytoestrogens** | | | | | |
| Daidzein | urine | • | • | • | • |
| Enterodiol | urine | • | • | • | • |
| Enterolactone | urine | • | • | • | • |
| Equol | urine | • | • | • | • |
| Genistein | urine | • | • | • | • |
| O-Desmethylangolensin | urine | • | • | • | • |
| **Phthalates** | | | | | |
| Mono-methyl phthalate | urine | • | • | • | |
| Mono-ethyl phthalate | urine | • | • | • | • |
| Mono-n-butyl phthalate | urine | • | • | • | • |
| Mono-iso-butyl phthalate | urine | • | • | • | • |
| Mono-benzyl phthalate | urine | • | • | • | • |
| Mono-cyclohexyl phthalate | urine | • | • | • | |
| Mono-2-ethylhexyl phthalate | urine | • | • | • | • |
| Mono-(2-ethyl-5-oxohexyl) phthalate | urine | • | • | • | • |
| Mono-(2-ethyl-5-hydroxyhexyl) phthalate | urine | • | • | • | • |
| Mono-(3-carboxypropyl) phthalate | urine | • | • | • | • |
| Mono-n-octyl phthalate | urine | • | • | • | |
| Mono-isononyl phthalate | urine | • | • | • | |
| Mono-(2-ethyl-5-carboxypentyl) phthalate | urine | • | • | • | • |
| Mono-(2,6-dimethyl-6-carboxyhexyl) phthalate | urine | | | • | • |
| Mono-(2,7-dimethyl-7-carboxyheptyl) phthalate | urine | | | • | • |

| Chemical / Metabolite Name | Matrix | 03-04 | 05-06 | 07-08 | 09-10 |
|---|---|---|---|---|---|
| **Polycyclic Aromatic Hydrocarbons** | | | | | |
| 2-Hydroxyfluorene | urine | • | • | • | • |
| 3-Hydroxyfluorene | urine | • | • | • | • |
| 9-Hydroxyfluorene | urine | • | • | • | • |
| 1-Hydroxyphenanthrene | urine | • | • | • | • |
| 2-Hydroxyphenanthrene | urine | • | • | • | • |
| 3-Hydroxyphenanthrene | urine | • | • | • | • |
| 4-Hydroxyphenanthrene | urine | • | • | • | • |
| 1-Hydroxypyrene | urine | • | • | • | • |
| 1-Hydroxynapthalene (1-Naphthol) | urine | • | • | • | • |
| 2-Hydroxynapthalene (2-Naphthol) | urine | • | • | • | • |
| **PAH Hemoglobin Adducts** | | | | | |
| (+/-)-Benzo[a]pyrene-r-7,t-8,t-9,c-10-tetrol | packed cells | | | | • |
| (+/-)-Benzo[a]pyrene-r-7,t-8,t-9,t-10-tetrol | packed cells | | | | • |
| (+/-)-Benzo[a]pyrene-r-7,t-8,c-9,t-10-tetrol | packed cells | | | | • |
| (+/-)-Benzo[a]pyrene-r-7,t-8,c-9,c-10-tetrol | packed cells | | | | • |
| **Methylated Naphthols** | | | | | |
| 4-Methyl-2-Naphthol, 7-Methyl-2-Naphthol, and 6-Methyl-2-Naphthol | urine | | | | • |
| 7-Methyl-1-Naphthol, 8-Methyl-2-Naphthol, and 3-Methyl-1-Naphthol | urine | | | | • |
| 1-Methyl-2-Naphthol and 8-Methyl-1-Naphthol | urine | | | | • |
| 3-Methyl-2-Naphthol and 6-Methyl-1-Naphthol | urine | | | | • |
| 4-Methyl-1-Naphthol | urine | | | | • |
| 2-Methyl-1-Naphthol | urine | | | | • |
| 5-Methyl-1-Naphthol | urine | | | | • |
| 5-Methyl-2-Naphthol | urine | | | | • |
| **Organophosphate Insecticides: Dialkyl Phosphate Metabolites** | | | | | |
| Dimethylphosphate | urine | • | • | • | • |
| Dimethylthiophosphate | urine | • | • | • | • |
| Dimethyldithiophosphate | urine | • | • | • | • |
| Diethylphosphate | urine | • | • | • | • |
| Diethylthiophosphate | urine | • | • | • | • |
| Diethyldithiophosphate | urine | • | • | • | • |
| **Organophosphate Insecticides: Specific Pesticides and Metabolites** | | | | | |
| Malathion dicarboxylic acid | urine | • | • | • | • |
| Chlorpyrifos | plasma | | | • | • |
| 3,5,6-Trichloro-2-pyridinol | urine | • | • | • | • |
| Diazinon | plasma | | | • | • |
| 2-Isopropyl-4-methyl-6-hydroxypyrimidine | urine | • | • | • | • |
| Methyl parathion | plasma | | | • | • |
| Parathion | plasma | | | • | • |
| *para*- Nitrophenol | urine | • | • | • | • |
| Dimethoate | urine | • | • | • | • |
| *O*- methoate | urine | • | • | • | • |
| 2-(diethylamino)-6-methylpyrimidin-4-ol/one | urine | • | • | • | • |
| 3-Chloro-7-hydroxy-4-methyl-2H-chromen-2-one/ol | urine | • | • | • | • |
| 5-Chloro-1,2-dihydro-1-isopropyl-[3H]-1,2,4-triazol-3-one | urine | • | • | • | • |
| Dichlorovos | plasma | | | • | • |
| Fonophos | plasma | | | • | • |
| Phorate | plasma | | | • | • |
| Terbufos | plasma | | | • | • |
| Acephate | urine | • | • | • | • |
| Methamidaphos | urine | • | • | • | • |

| Chemical / Metabolite Name | Matrix | 03-04 | 05-06 | 07-08 | 09-10 |
|---|---|---|---|---|---|
| **Pyrethroid Pesticides** | | | | | |
| *trans* -Permethrin | plasma | | | • | • |
| *cis* -Permethrin | plasma | | | • | • |
| *cis* -3-(2,2-Dichlorovinyl)-2,2-dimethylcyclopropane carboxylic acid | urine | • | • | • | • |
| *trans* -3-(2,2-Dichlorovinyl)-2,2-dimethylcyclopropane carboxylic acid | urine | • | • | • | • |
| 3-Phenoxybenzoic acid | urine | • | • | • | • |
| 4-Fluoro-3-phenoxybenzoic acid | urine | • | • | • | • |
| *cis/trans* -Dimethylvinylcyclopropane carboxylic diacid | urine | • | • | • | • |
| *cis* -3-(2,2-Dibromovinyl)-2,2-dimethylcyclopropane carboxylic acid | urine | • | • | • | • |
| Cyfluthrin | plasma | | | • | • |
| Cyhalothrin | plasma | | | • | • |
| Cypermethrin | plasma | | | • | • |
| Deltamethrin | plasma | | | • | • |
| Resmethrin | plasma | | | • | • |
| Tetramethrin | plasma | | | • | • |
| **Organochlorine Pesticides** | | | | | |
| Hexachlorobenzene | serum | • | • | • | • |
| *beta* -Hexachlorocyclohexane | serum | • | • | • | • |
| *gamma* -Hexachlorocyclohexane | serum | • | • | • | • |
| *p,p'*- DDT | serum | • | • | • | • |
| *p,p'* -DDE | serum | • | • | • | • |
| *o,p'* -DDT | serum | • | | | |
| Oxychlordane | serum | • | • | • | • |
| *trans* -Nonachlor | serum | • | • | • | • |
| Heptachlor Epoxide | serum | • | | | |
| Mirex | serum | • | • | • | • |
| Aldrin | serum | • | | | |
| Dieldrin | serum | • | | | |
| Endrin | serum | • | | | |
| alpha-Hexachlorocyclohexane (HCCH) | serum | | • | • | • |
| *cis* -Chlordane (or alpha) | serum | | • | • | • |
| *trans* -Chlordane (or gamma) | serum | | • | • | • |
| *cis* -Nonachlor | serum | | • | • | • |
| *o,p* '-DDE | serum | | • | • | • |
| Octachlorosytrene | serum | | • | • | • |
| Pentachloroanisole | serum | | • | • | • |
| Monohydroxy methoxychlor | urine | • | • | • | • |
| Dihydroxy methoxychlor | urine | • | • | • | • |
| Endosulfan-ether | urine | • | • | • | • |
| Endosulfan-lactone | urine | • | • | • | • |
| Endosulfan-sulfate | urine | • | • | • | • |
| **Other Pesticides** | | | | | |
| Propoxur | plasma | | | • | • |
| 2-Isopropoxyphenol | urine | • | • | • | • |
| Carbofuranphenol | urine | • | • | • | • |
| N,N-diethyl-3-methylbenzamide (DEET) | plasma | • | • | • | • |
| N,N-diethyl-3-methylbenzamide (DEET) | urine | • | • | • | • |
| 3-(diethylcarbamoyl) benzoic acid (DEET acid) | urine | | • | • | • |
| N-ethyl-3-methylbenzamide (Desethyl DEET) | urine | | • | • | • |
| N,N-diethyl-3-hydroxymethylbenzamide (Desethyl hydroxy DEET) | urine | | • | • | • |
| 2,5-Dichlorophenol | urine | • | • | • | • |
| Bendiocarb | plasma | | | • | • |
| Piperonyl butoxide | plasma | | | • | • |

| Chemical / Metabolite Name | Matrix | 03-04 | 05-06 | 07-08 | 09-10 |
|---|---|---|---|---|---|
| **Fungicides** | | | | | |
| *ortho* -Phenylphenol | urine | • | • | • | |
| Chlorothalonil | serum | • | • | • | • |
| Metalaxyl | serum | • | • | • | • |
| Dichloran | serum | • | • | • | • |
| Ethylenethio urea (ETU) | urine | • | • | • | • |
| Propylenethio urea (PTU) | urine | • | • | • | • |
| Phthalimide | serum | • | • | • | • |
| Tetrahydrophthalimide | serum | • | • | • | • |
| **Herbicides: Substituted Ureas** | | | | | |
| Diuron | urine | • | • | • | • |
| Linuron | urine | • | • | • | • |
| Dimethoxy pyrimidine | urine | • | • | • | • |
| Dimethyl pyrimidine | urine | • | • | • | • |
| Dichlorophenyl methyl urea | urine | • | • | • | • |
| Dichlorophenyl urea | urine | • | • | • | • |
| Methyl methoxytriazine | urine | • | • | • | • |
| Bensulfuron-methyl | urine | • | • | • | • |
| Foramsulfuron | urine | • | • | • | • |
| Halosulfuron | urine | • | • | • | • |
| Nicosulfuron | urine | • | • | • | • |
| Primisulfuron-methyl | urine | • | • | • | • |
| Rimsulfuron | urine | • | • | • | • |
| Sulfometuron-methyl | urine | • | • | • | • |
| Sulfosulfuron | urine | • | • | • | • |
| Chlorsulfuron | urine | • | • | • | • |
| Oxasulfuron | urine | • | • | • | • |
| Ethametsulfuron-methyl | urine | • | • | • | • |
| Mesosulfuron-methyl | urine | • | • | • | • |
| Metsulfuron-methyl | urine | • | • | • | • |
| Prosulfuron | urine | • | • | • | • |
| Thifensulfuron-methyl | urine | • | • | • | • |
| Triasulfuron | urine | • | • | • | • |
| Triflusulfuron-methyl | urine | • | • | • | • |
| **Other Herbicides** | | | | | |
| 2,4,5-Trichlorophenoxyacetic acid | urine | • | • | • | • |
| 2,4-Dichlorophenoxyacetic acid | urine | • | • | • | • |
| 2,4-Dichlorophenol | urine | • | • | • | • |
| Acetochlor | serum | • | • | • | • |
| Acetochlor mercapturate | urine | • | • | • | • |
| Alachlor | serum | • | • | • | • |
| Alachlor mercapturate | urine | • | • | • | • |
| Atrazine | serum | • | • | • | • |
| Atrazine | urine | • | • | • | • |
| Atrazine mercapturate | urine | • | • | • | • |
| Diaminochlorotriazine | urine | • | • | • | • |
| Desethylatrazine | urine | • | • | • | • |
| Desethylatrazine mercapturate | urine | • | • | • | • |
| Desisopropylatrazine | urine | • | • | • | • |
| Hydroxyatrazine | urine | | • | • | • |
| Metolachlor | serum | • | • | • | • |
| Metolachlor mercapturate | urine | • | • | • | • |
| Glyphosate | urine | | • | • | • |
| Dacthal | serum | • | • | • | • |
| Trifluralin | serum | • | • | • | • |
| Aminomethyl phosphonic acid | urine | | • | • | • |

| Chemical / Metabolite Name | Matrix | 03-04 | 05-06 | 07-08 | 09-10 |
|---|---|---|---|---|---|
| **Halogenated Phenolic Compounds** | | | | | |
| 2,4,5-Trichlorophenol | urine | • | • | • | |
| 2,4,6-Trichlorophenol | urine | • | • | • | |
| Pentachlorophenol | serum | | • | • | • |
| Pentachlorophenol | urine | • | • | • | • |
| 5-Chloro-2-(2,4-dichlorophenoxy)-phenol (Triclosan) | serum | | • | • | • |
| Pentabromphenol | serum | | • | • | • |
| **Perfluorinated Compounds** | | | | | |
| Perfluorooctanoic acid | serum | • | • | • | • |
| Perfluorooctane sulfonic acid | serum | • | • | • | • |
| Perfluorohexane sulfonic acid | serum | • | • | • | • |
| 2-(N-Ethyl- Perfluorooctane sulfonamido) acetic acid | serum | • | • | • | |
| 2-(N-Methyl-perfluorooctane sulfonamido) acetic acid | serum | • | • | • | • |
| Pefluorodecanoic acid | serum | • | • | • | • |
| Perfluorobutane sulfonic acid | serum | • | • | • | |
| Perfluoroheptanoic acid | serum | • | • | • | |
| Perfluorononanoic acid | serum | • | • | • | • |
| Perfluorooctane sulfonamide | serum | • | • | • | |
| Perfluoroundecanoic acid | serum | • | • | • | |
| Perflurododecanoic acid | serum | • | • | • | |
| **Environmental Phenols** | | | | | |
| Bisphenol A | urine | • | • | • | • |
| 2-Hydroxy-4-methoxybenzophenone (Benzophenone-3) | urine | • | • | • | • |
| 4-*tert*-Octyl phenol | urine | • | • | • | |
| 2,4,4'-Trichloro-2'-hydroxyphenyl ether (Triclosan) | urine | • | • | • | • |
| Methyl paraben | urine | | | • | • |
| Ethyl paraben | urine | | | • | • |
| Propyl paraben | urine | | | • | • |
| Butyl paraben | urine | | | • | • |

| Chemical / Metabolite Name | Matrix | 03-04 | 05-06 | 07-08 | 09-10 |
|---|---|---|---|---|---|
| **Polychlorinated Dibenzo-*p*-dioxins and Dibenzofurans** | | | | | |
| 1,2,3,4,6,7,8,9-Octachlorodibenzo-*p*-dioxin (OCDD) | serum | • | pooled samples | • | pooled samples |
| 1,2,3,4,6,7,8-Heptachlorodibenzo-*p*-dioxin (HpCDD) | serum | • | pooled samples | • | pooled samples |
| 1,2,3,4,7,8-Hexachlorodibenzo-*p*-dioxin (HxCDD) | serum | • | pooled samples | • | pooled samples |
| 1,2,3,6,7,8-Hexachlorodibenzo-*p*-dioxin (HxCDD) | serum | • | pooled samples | • | pooled samples |
| 1,2,3,7,8,9-Hexachlorodibenzo-*p*-dioxin (HxCDD) | serum | • | pooled samples | • | pooled samples |
| 1,2,3,7,8-Pentachlorodibenzo-*p*-dioxin (PeCDD) | serum | • | pooled samples | • | pooled samples |
| 2,3,7,8-Tetrachlorodibenzo-*p*-dioxin (TCDD) | serum | • | pooled samples | • | pooled samples |
| 1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF) | serum | • | pooled samples | • | pooled samples |
| 1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF) | serum | • | pooled samples | • | pooled samples |
| 1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF) | serum | • | pooled samples | • | pooled samples |
| 1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF) | serum | • | pooled samples | • | pooled samples |
| 1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF) | serum | • | pooled samples | • | pooled samples |
| 1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF) | serum | • | pooled samples | • | pooled samples |
| 1,2,3,7,8-Pentachlorodibenzofuran (PeCDF) | serum | • | pooled samples | • | pooled samples |
| 2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF) | serum | • | pooled samples | • | pooled samples |
| 2,3,4,7,8-Pentachlorodibenzofuran (PeCDF) | serum | • | pooled samples | • | pooled samples |
| 2,3,7,8-Tetrachlorodibenzofuran (TCDF) | serum | • | pooled samples | • | pooled samples |

| Chemical / Metabolite Name | Matrix | 03-04 | 05-06 | 07-08 | 09-10 |
|---|---|---|---|---|---|
| **Polybrominated Dibenzo-*p*-dioxins and Dibenzofurans** | | | | | |
| 2,3,7,8-Tetrabromorodienzo-*p*-dioxin (TBDD) | serum | | pooled samples | • | pooled samples |
| 1,2,3,7,8-Pentabromodibenzo-*p*-dioxin (PeBDD) | serum | | pooled samples | • | pooled samples |
| 1,2,3,4,7,8-Hexabromorodibenzo-*p*-dioxin (HxBDD) | serum | | pooled samples | • | pooled samples |
| 1,2,3,6,7,8-Hexabromodibenzo-*p*-dioxin (HxBDD) | serum | | pooled samples | • | pooled samples |
| 1,2,3,7,8,9-Hexabromodibenzo-*p*-dioxin (HxBDD) | serum | | pooled samples | • | pooled samples |
| 1,2,3,4,6,7,8-Heptabromoodibenzo-*p*-dioxin (HpBDD) | serum | | pooled samples | | pooled samples |
| 1,2,3,4,6,7,8,9-Octabromodibenzo-*p*-dioxin (OBDD) | serum | | pooled samples | • | pooled samples |
| 2,3,7,8,-Tetrabromodibenzofuran (TBDF) | serum | | pooled samples | • | pooled samples |
| 1,2,3,7,8-Pentabromodibenzofuran (PeBDF) | serum | | pooled samples | • | pooled samples |
| 2,3,4,7,8-Pentabromodibenzofuran (PeBDF) | serum | | pooled samples | • | pooled samples |
| 1,2,3,4,7,8-Hexabromodibenzofuran (HxBDF) | serum | | pooled samples | • | pooled samples |
| 1,2,3,4,6,7,8-Heptabromodibenzofuran (HpBDF) | serum | | pooled samples | • | pooled samples |
| 1,2,3,4,6,7,8,9-Octabromodibenzofuran (OBDF) | serum | | pooled samples | • | pooled samples |
| **Dioxin-like Polychlorinated Biphenyls - cPCBs** | | | | | |
| 3,3',4,4'-Tetrachlorobiphenyl (PCB 77) | serum | | pooled samples | • | pooled samples |
| 3,4,4',5-Tetrachlorobiphenyl (PCB 81) | serum | • | pooled samples | • | pooled samples |
| 3,3',4,4',5-Pentachlorobiphenyl (PCB 126) | serum | • | pooled samples | • | pooled samples |
| 3,3',4,4',5,5'-Hexachlorobiphenyl (PCB 169) | serum | • | pooled samples | • | pooled samples |
| **Dioxin-like Polychlorinated Biphenyls - mPCBs** | | | | | |
| 2,4,4'-Trichlorobiphenyl (PCB 28) | serum | • | • | • | • |
| 2,3',4,4'-Tetrachlorobiphenyl (PCB 66) | serum | • | • | • | • |
| 2,4,4',5-Tetrachlorobiphenyl (PCB 74) | serum | • | • | • | • |
| 2,3,3',4,4'-Pentachlorobiphenyl (PCB 105) | serum | • | • | • | • |
| 2,3,3',4,4'-Pentachlorobiphenyl (PCB 114) | serum | | • | • | • |
| 2,3',4,4',5-Pentachlorobiphenyl (PCB 118) | serum | • | • | • | • |
| 2',3,4,4',5-Pentachlorobiphenyl (PCB 123) | serum | | • | • | • |
| 2,3,3',4,4',5-Hexachlorobiphenyl (PCB 156) | serum | • | • | • | • |
| 2,3,3',4,4',5'-Hexachlorobiphenyl (PCB 157) | serum | • | • | • | • |
| 2,3',4,4',5,5'-Hexachlorobiphenyl (PCB 167) | serum | • | • | • | • |
| 2,3,3',4,4',5,5'-Heptachlorobiphenyl (PCB 189) | serum | • | • | • | • |

| Chemical / Metabolite Name | Matrix | 03-04 | 05-06 | 07-08 | 09-10 |
|---|---|---|---|---|---|
| **Non-dioxin-like Polychlorinated Biphenyls** | | | | | |
| 2,2'3,5'-Tetrachloro biphenyl (PCB 44) | serum | • | • | • | • |
| 2,2',4,5'-Tetrachloro biphenyl (PCB 49) | serum | • | • | • | • |
| 2,2',5,5'-Tetrachlorobiphenyl (PCB 52) | serum | • | • | • | • |
| 2,2',3,4,5'-Pentachlorobiphenyl (PCB 87) | serum | • | • | • | • |
| 2,2',4,4',5-Pentachlorobiphenyl (PCB 99) | serum | • | • | • | • |
| 2,2',4,5,5'-Pentachlorobiphenyl (PCB 101) | serum | • | • | • | • |
| 2,3,3',4',6-Pentachlorobiphenyl (PCB 110) | serum | • | • | • | • |
| 2,2',3,3',4,4'-Hexachlorobiphenyl (PCB 128) | serum | • | • | • | • |
| 2,2',3,4,4',5' and 2,3,3',4,4',6-Hexachlorobiphenyl (PCB 138 & 158) | serum | • | • | • | • |
| 2,2',3,4',5,5'-Hexachlorobiphenyl (PCB 146) | serum | • | • | • | • |
| 2,2',3,4',5',6-Hexachlorobiphenyl (PCB 149) | serum | • | • | • | • |
| 2,2',3,5,5',6-Hexachlorobiphenyl (PCB 151) | serum | • | • | • | • |
| 2,2',4,4',5,5'-Hexachlorobiphenyl (PCB 153) | serum | • | • | • | • |
| 2,2',3,3',4,4',5-Heptachlorobiphenyl (PCB 170) | serum | • | • | • | • |
| 2,2',3,3',4,5,5'-Heptachlorobiphenyl (PCB 172) | serum | • | • | • | • |
| 2,2',3,3',4,5',6'-Heptachlorobiphenyl (PCB 177) | serum | • | • | • | • |
| 2,2',3,3',5,5',6-Heptachlorobiphenyl (PCB 178) | serum | • | • | • | • |
| 2,2',3,4,4',5,5'-Heptachlorobiphenyl (PCB 180) | serum | • | • | • | • |
| 2,2',3,4,4',5',6-Heptachlorobiphenyl (PCB 183) | serum | • | • | • | • |
| 2,2',3,4',5,5',6-Heptachlorobiphenyl (PCB 187) | serum | • | • | • | • |
| 2,2',3,3',4,4',5,5'-Octachlorobiphenyl (PCB 194) | serum | • | • | • | • |
| 2,2',3,3',4,4',5,6-Octachlorobiphenyl (PCB 195) | serum | • | • | • | • |
| 2,2',3,3',4,4',5,6' and 2,2',3,4,4',5,5',6-Octachlorobiphenyl (PCB 196 & 203) | serum | • | • | • | • |
| 2,2',3,3',4,5,5',6-Octachlorobiphenyl (PCB 199)<br>(change in nomenclature; previously referred to as PCB 201) | serum | • | • | • | • |
| 2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl (PCB 206) | serum | • | • | • | • |
| 2,2',3,3',4,4',5,5',6,6'-Decachloro biphenyl (PCB 209) | serum | • | • | • | • |
| **Hydroxylated Polychlorinated Biphenyls** | | | | | |
| 2,3,3',4',5-pentachloro-4-biphenylol (4-HO-CB107) | serum | | • | • | • |
| 2,2',3,4',5,5'-hexachloro-4-biphenylol (4-HO-CB146) | serum | | • | • | • |
| 2,2',3,4',5,5,6'-heptachloro-4-biphenylol (4-HO-CB187) | serum | | • | • | • |
| **Polybrominated Diphenyl Ethers** | | | | | |
| 2,2',4'-Tribromodiphenyl ether (BDE 17) | serum | • | • | • | • |
| 2,4,4'-Tribromodiphenyl ether (BDE 28) | serum | • | • | • | • |
| 2,2',4,4'-Tetrabromodiphenyl ether (BDE 47) | serum | • | • | • | • |
| 2,3',4,4'-Tetrabromodiphenyl ether (BDE 66) | serum | • | • | • | • |
| 2,2',3,4,4'-Pentabromodiphenyl ether (BDE 85) | serum | • | • | • | • |
| 2,2',4,4',5-Pentabromodiphenyl ether (BDE 99) | serum | • | • | • | • |
| 2,2',4,4',6-Pentabromodiphenyl ether (BDE 100) | serum | • | • | • | • |
| 2,2',4,4',5,5'-Hexabromobiphenyl (BB 153) | serum | • | • | • | • |
| 2,2',4,4',5,6'-Hexabromodiphenyl ether (BDE 154) | serum | • | • | • | • |
| 2,2',4,4',5,5'-Hexabromodiphenyl ether (BDE 153) | serum | • | • | • | • |
| 2,2',3,4,4',5',6-Heptabromodiphenyl ether (BDE 183) | serum | • | • | • | • |
| 2,2',3,3',4,4',5,5',6,6'-Decabromodiphenyl ether (BDE 209) | serum | | • | • | • |
| Hexabromobenzene (HBB) | serum | | • | • | • |
| **Polychlorinated Naphthalenes** | | | | | |
| 1,2,3,4-Tetrachlorinated naphthalene (PCN 27) | serum | | | • | • |
| 1,2,3,5,7- and 1,2,4,6,7-Pentachlorinated naphthalene (PNC 52 & 60) | serum | | | • | • |
| 1,2,3,4,5,7- and 1,2,3,5,6,8-Hexachlorinated naphthalene (PNC 64 & 68) | serum | | | • | • |
| 1,2,3,4,6,7- and 1,2,3,5,6,7-Hexachlorinated naphthalene (PNC 66 & 67) | serum | | | • | • |
| 1,2,3,5,7,8-Hexachlorinated naphthalene (PCN 69) | serum | | | • | • |
| 1,2,3,4,5,6,7-Heptachlorinated naphthalene (PCN 73) | serum | | | • | • |
| **Toxaphenes** | | | | | |
| Parlar 26<br>2-Endo,3-exo,5-endo,6-exo,8b,8c,10a,10c-octachlorobornane | serum | | • | • | • |
| Parlar 50<br>2-Endo,3-exo,5-endo,6-exo,8b,8c,9c,10a,10c-nonachlorobornane | serum | | • | • | • |
| Parlar 62<br>2,2,5,5,8c,9b,9c,10a,10b-nonachlorobornane | serum | | • | • | • |

| Chemical / Metabolite Name | Matrix | 03-04 | 05-06 | 07-08 | 09-10 |
|---|---|---|---|---|---|
| **Volatile Organic Compounds (VOCs)** | | | | | |
| 1,1,1-Trichloroethane | whole blood | • | • | • | • |
| 1,1,2,2-Tetrachloroethane | whole blood | • | • | • | • |
| 1,1,2-Trichloroethane | whole blood | • | • | • | • |
| 1,1-Dichloroethane | whole blood | • | • | • | • |
| 1,1-Dichloroethene | whole blood | • | • | • | • |
| 1,2-dibromo-3-chloropropane | whole blood | • | • | • | • |
| 1,2-Dichlorobenzene | whole blood | • | • | • | • |
| 1,2-Dichloroethane | whole blood | • | • | • | • |
| 1,2-Dichloropropane | whole blood | • | • | • | • |
| 1,3-Dichlorobenzene | whole blood | • | • | • | • |
| 1,4-Dichlorobenzene | whole blood | • | • | • | • |
| 2,5-Dimethylfuran | whole blood | • | • | • | • |
| Acrylonitrile | whole blood | | | • | • |
| Benzene | whole blood | • | • | • | • |
| Bromodichloromethane | whole blood | • | • | • | • |
| Bromodichloromethane | water | • | • | • | • |
| Bromoform | whole blood | • | • | • | • |
| Bromoform | water | • | • | • | • |
| Carbon Tetrachloride | whole blood | • | • | • | • |
| Chlorobenzene | whole blood | • | • | • | • |
| Chloroform | whole blood | • | • | • | • |
| Chloroform | water | • | • | • | • |
| *cis* -1,2-Dichloroethene | whole blood | • | • | • | • |
| Dibromochloromethane | whole blood | • | • | • | • |
| Dibromochloromethane | water | • | • | • | • |
| Dibromomethane | whole blood | • | • | • | • |
| Ethylbenzene | whole blood | • | • | • | • |
| Furan | whole blood | | | • | • |
| Hexachloroethane | whole blood | • | • | • | • |
| m-/p-Xylene | whole blood | • | • | • | • |
| Methylene Chloride | whole blood | • | • | • | • |
| Methyl-tert-Butyl Ether (MTBE) | whole blood | • | • | • | • |
| Methyl-tert-Butyl Ether (MTBE) | water | • | • | • | • |
| Nitrobenzene | whole blood | • | • | • | • |
| *o* -Xylene | whole blood | • | • | • | • |
| Styrene | whole blood | • | • | • | • |
| Tetrachloroethene | whole blood | • | • | • | • |
| Toluene | whole blood | • | • | • | • |
| *trans* -1,2-Dichloroethene | whole blood | • | • | • | • |
| Trichloroethene | whole blood | • | • | • | • |
| 1,4-Dioxane | whole blood | | | • | • |
| 1,2-Dibromoethane | whole blood | | | • | • |
| n-Hexane | whole blood | | | • | • |
| Nitromethane | whole blood | | | • | • |
| 1,1,1,2-Tetrachloroethane | whole blood | | | • | • |
| Cumene | whole blood | | | • | • |
| 1,2,3-Trichloropropane | whole blood | | | • | • |
| ***trans* Fatty Acids** | | | | | |
| *trans* -9-Hexadecenoic acid | plasma | | • | • | • |
| *trans* -9-Octadecenoic acid | plasma | | • | • | • |
| *trans,trans* -9,12-Octadecadienoic acid | plasma | | • | • | • |
| *trans-6-* Octadecanoic acid | plasma | | | • | • |
| *trans-11-* Octadecanoic acid | plasma | | | • | • |

| Chemical / Metabolite Name | Matrix | 03-04 | 05-06 | 07-08 | 09-10 |
|---|---|---|---|---|---|
| **Other** | | | | | |
| Perchlorate | urine | ● | ● | ● | ● |
| Perchlorate | water | | ● | ● | ● |
| Thiocyanate | urine | | ● | ● | ● |
| Nitrate | urine | | ● | ● | ● |
| Nitrate | water | | ● | ● | ● |
| Iodide | water | ● | ● | ● | ● |
| Ethylene Oxide | packed cells | | | | ● |
| Acrylamide | packed cells | ● | ● | ● | ● |
| Glycidamide | packed cells | ● | ● | ● | ● |

# Blood and Urine Collection

## *Venipuncture*

### Public Health Objectives:

Venipuncture is performed to obtain laboratory results that provide prevalence estimates of disease, risk factors for exam components, and baseline information on health and nutritional status of the population.

### Staff:

Certified Phlebotomist

### Protocol:

### Methods:

Blood is drawn from the examinee's arm. In the laboratory the blood is processed, stored and shipped to various laboratories for analysis. The complete blood count (CBC) results are reported in the MEC and all other results are reported from NCHS to the participant.

The volume of blood drawn by age follows.

- 1-2 years, 9 ml (0.3 ounces), 0.6 tablespoons
- 3-5 years, 20 ml (0.7 ounces), 1.3 tablespoons
- 6-11 years, 35 ml (1.1 ounces), 2.3 tablespoons
- 12+ 104 ml (3.4 ounces), 7.0 tablespoons

### Time Allotment:

Depending on age of participant. Range 5-10 minutes.

### Health Measures:

Laboratory test results.

### Eligibility:

Sample persons aged 1 year and older who do not meet any of the exclusion criteria.

### Exclusion Criteria:

- Hemophiliacs
- Participants who received chemotherapy within last 4 weeks
- The presence of the following on both arms: rashes, gauze dressings, casts, edema, paralysis, tubes, open sores or wounds, withered arms

or limbs missing, damaged, sclerosed or occluded veins, allergies to cleansing reagents, burned or scarred tissue, shunt or IV.

## Justification for using vulnerable populations:

- Minors are included in this component because they are an important target population group. Laboratory data are linked to other household interview and health component data and are used to track changes that occur in health over time.
- There is no reason to exclude mentally impaired or handicapped individuals because there is no contraindication.

## Risks:

The following are known risks associated with venipuncture:

- Hematoma
- Swelling, tenderness and inflammation at the site
- Persistent bleeding
- Vasovagal response - dizziness, sweating, coldness of skin, numbness and tingling of hands and feet, nausea, vomiting, possible visual disturbance, syncope and injury fall from fainting.

## Rare adverse effects:

- Thrombosis of the vein due to trauma.
- Infection which results in thrombophlebitis.

## Special precautions:

- Sterile equipment issued with all sample persons.
- Physician on call in case an adverse affect occurs.

## Report of Findings:

## Reported in the MEC:

Complete Blood Count (CBC)

## Reported from NCHS:

Other laboratory results

## *Urine Collection*

**Public Health Objectives:**

Urine is collected to obtain laboratory results that provide prevalence estimates of disease, risk factors for exam components, and baseline information on health and nutritional status of the population.

**Staff:**

MEC Coordinator

**Protocol:**

**Methods:**

Urine is collected from individuals aged 6 years and above.

**Time Allotment:**

2 minutes

**Health Measures:**

Laboratory test results.

**Eligibility:**

Sample persons aged 6 years and above.

**Exclusion Criteria:**

None

**Justification for using vulnerable populations:**

- Minors are included in this component because they are an important target population group. Laboratory data are linked to other household interview and health component data and are used to track changes that occur in health over time.
- There is no reason to exclude mentally impaired or handicapped individuals because there is no contraindication.

**Risks:**

None

**Special precautions:**

None

**Report of Findings:**

Reported in the MEC: Pregnancy Test
Reported from NCHS: Other laboratory results

## Bone Mineral Status Markers

### Laboratory Measures:

Vitamin D and serum parathyroid hormone

### Public Health Objectives:

Evaluation of bone mineral status will utilize an evaluation of vitamin D status based on two analytes: serum 25-hydroxyvitamin D and parathyroid hormone. Vitamin D is essential for active intestinal calcium absorption and plays a central role in maintaining calcium homeostasis and skeletal integrity. In addition, vitamin D has recently been linked to other non-skeletal conditions of public health significance, such as hypertension, and cancer. Vitamin D is derived mainly from cutaneous synthesis in the presence of ultraviolet sunlight while dietary intake constitutes a minor fraction. Serum 25(OH) D is the best indicator of vitamin D status. It is converted in the kidney, stimulated by parathyroid hormone (PTH), to the hormonally active metabolite 1,25-dihydroxyvitamin D (1,25 (OH)2D). Serum parathyroid hormone concentration is a very sensitive indicator of calcium homeostasis and vitamin D deficiency. The inclusion of this measure to the NHANES laboratory protocol will increase the usefulness of the vitamins D measurement in evaluating vitamin D status particularly as it relates to skeletal status. The inclusion of both these markers in the NHANES survey will provide a more complete picture of vitamin D status.

Inclusion of serum 25(OH)D in NHANES will allow us to continue to assess vitamin D status in the population, while inclusion of PTH will help us better interpret the meaning of low 25(OH)D values in various groups. Interest in vitamin D status in the US has increased significantly in recent year. For example, questions have been raised recently about the extent of vitamin D deficiency and insufficiency in the U.S. population. Furthermore, the adequacy of the 1997 Dietary Reference Intake recommendations for vitamin D in the U.S. are now being questioned, especially since new data suggests that optimal serum 25(OH)D levels may be noticeably higher than previously thought. Finally, recent studies have clarified that rickets still occurs in the U.S. Thus, it is important to include these two measures of vitamin D status in the NHANES survey. In addition, these measures can be linked with other measures included in the survey, such as blood pressure and bone mineral density, in order to evaluate its role in both skeletal and nonskeletal conditions.

It has been estimated that the annual cost of osteoporosis is about $10 billion. The magnitude of this problem is likely to increase dramatically over the next few decades as the population ages. The

risk of hip fractures (the most costly fractures in terms of morbidity, mortality and health care costs) begins to increase exponentially after age 65.

Important pieces of data are not currently available about the changes in bone mass in the population, especially in minority populations. There are no data on total body bone measures from a nationally representative sample. Measures of total body bone mineral content or density will allow researchers to gain insights into age, sex, and racial/ethnic differences in the skeleton relative to other measures of body composition such as total muscle and fat mass, as well as behavioral factors such as diet and activity.

Childhood and adolescence are the periods to target for intervention strategies in osteoporosis. Measurement in younger individuals will provide insight into early racial/ethnic differences in the rate of bone accretion. Furthermore, correlation of DXA measures with bone markers over age can provide information about the utility of these markers as surrogates for bone density or content when seeking age of peak bone mass or indicators of high or low bone turnover. This information is crucial to understanding when the best and most effective dietary intervention can be implemented to maximize peak bone mass.

NHANES is the only nationally representative survey that can shed light on when peak bone mass is attained and the degree of total body bone loss with age. This information is vital to all aspects of treatment and prevention of this disease and is particularly critical to government funding of related research, medical screening, treatment, and reimbursement programs.

Data on bone status and its relationship to age among racial ethnic groups can be used to target osteoporosis prevention programs to the most important age groups. The data from the DXA scans and the bone marker studies will also provide important reference distributions and allow studies of the association between bone status, diet, activity, and other body composition measures.

**Health Measures, Eligibility, Report of Findings:**

| Health Measure | Eligibility | Volume Required | Report of Findings Level | | |
|---|---|---|---|---|---|
| | | | 1 | 2 | 3 |
| Vitamin D | 1 and older | 300-500 uL | | | |
| Parathyroid hormone | 6 and older | 1 mL | | Yes | Yes |

Vitamin D deficiency leads to a decrease in calcium absorption in the gastrointestinal tract and overproduction of parathyroid hormone.

Increased PTH may also be found with other conditions such as hyperthyroidism, malabsorption and some cancers. PTH levels outside the normal range will be reported to NHANES participants.

Normal ranges: age <45 years: 10-45 pg/ml [intact immunoradiometric assay (IRMA)]

Age 45+: 10-65 pg/ml references ranges.

## Diabetes Profile

### Laboratory Measures:

Fasting Glucose, Insulin, and Glycohemoglobin

### Public Health Objectives:

Diabetes mellitus will be assessed by fasting measures of plasma glucose, insulin, c-peptide and glycohemoglobin in 12 years and over.

Diabetes is a large, growing, and costly public health problem in the United States and disproportionately affects racial and ethnic minorities. About 17 million Americans have diabetes and over 1 million new cases of diabetes are diagnosed each year. Diabetes is the leading cause of kidney failure, non- traumatic lower extremity amputation, and blindness in working-age adults, and an estimated $135 billion were spent on direct and indirect medical costs for diabetes in 2002. Alarmingly, type 2 diabetes (formerly considered an adult disease) is now being diagnosed in children and adolescents and there has been a large increase in diagnosed diabetes among adults <40 years of age.

Information on the prevalence of diabetes disease, especially in its early stages, and associated risk factors will be used to help develop early intervention and prevention programs for the disabling consequences of this condition.

Specifically, the diabetes disease examination will provide population data to:

1. determine a national estimate of diabetes disease prevalence (diagnosed and undiagnosed), including those at high risk for the late complications of the disease;
2. identify the risk factors of diabetes disease;
3. permit a national cohort to be established for follow-up studies of this condition; and
4. provide critical information to clinicians and public health officials for the development of preventive care and community-based interventions.

**Health Measures, Eligibility, Report of Findings:**

| Health Measure | Eligibility | Volume Required | Report of Findings Level | | |
|---|---|---|---|---|---|
| | | | 1 | 2 | 3 |
| Glucose | 12 and older | 500 uL | | Yes | Yes |
| Insulin | 12 and older | 1 mL | | | |
| Glycohemoglobin | 12 and older | 400uL | | Yes | Yes |

## Infectious Disease Profile

**Laboratory Measures**:

Hepatitis virus

**Public Health Objectives**:

**Hepatitis viruses**

Viruses that primarily infect the liver constitute a major public health problem because of the morbidity and mortality associated with the acute and chronic consequences of these infections. New immunization strategies have been developed to eliminate transmission of hepatitis B and hepatitis A viruses in the United States. Because of the high rate of asymptomatic infection with both viruses, NHANES will provide the best means for determining the age-specific effectiveness of immunization strategies to prevent these infections. In addition, NHANES provides the means to better define the epidemiology of hepatitis viruses that were recently characterized, such as hepatitis C and G virus along with D and possibly F. In NHANES testing for markers of infection with the hepatitis viruses will be used to determine secular trends in infection rates across most age and racial/ethnic groups, and will provide a national picture of the epidemiologic determinants of these infections.

**Health Measures, Eligibility, Report of Findings:**

| Health Measure | Eligibility | Volume Required | Report of Findings Level | | |
|---|---|---|---|---|---|
| | | | 1 | 2 | 3 |
| Hepatitis virus | 6+ | 200 ml, 1.5 ml | | Yes | |

## Miscellaneous Laboratory Assays

### Laboratory Measures:

C-reactive protein, Standard Biochemical Profile includes Alanine Aminotransferase (ALT), Albumin, Alkaline Phosphatase (ALP), Aspartate Aminotransferase (AST), Bicarbonate ($HCO_3$), Blood Urea Nitrogen (BUN), Calcium, Cholesterol, Creatinine, Gamma Glutamyltransaminase (γ-GT), Glucose, Iron, Lactate Dehydrogenase (LDH), Phosphorus, Sodium, Potassium, and Chloride, Total Bilirubin, Total Protein, Triglycerides, and Uric Acid.

### Public Health Objectives:

### C-reactive protein

C-reactive protein is considered to be one of the best measures of the acute phase response to an infectious disease or other cause of tissue damage and inflammation. It is used to correct the iron status measures which are affected by inflammation. It can also be used to measure the body's response to inflammation from chronic conditions, such as arthritis, and environmental exposures to agents such as tobacco smoke.

### Standard biochemical profile

This battery of measurements are used in the diagnosis and treatment of certain liver, heart, and kidney diseases, acid-base imbalance in the respiratory and metabolic systems, other diseases involving lipid metabolism and various endocrine disorders as well as other metabolic or nutritional disorders.

A. Alanine Aminotransferase (ALT)
   Alanine aminotransferase measurements are used in the diagnosis and treatment of certain liver diseases (e.g., viral hepatitis and cirrhosis) and heart diseases. Elevated levels of the transaminases can indicate myocardial infarction, hepatic disease, muscular dystrophy, or organ damage. Serum elevations of ALT activity are rarely observed except in parenchymal liver disease, since ALT is a more liver-specific enzyme than aspartate aminotransferase (AST).

B. Albumin
   Albumin measurements are used in the diagnosis and treatment of numerous diseases primarily involving the liver or kidneys.

C. Alkaline Phosphatase (ALP)
Increased ALP activity is associated with two groups of diseases: those affecting liver function and those involving osteoblastic activity in the bones. In hepatic disease, an increase in ALP activity is generally accepted as an indication of biliary obstruction. An increase in serum phosphatase activity is associated with primary hyperparathyroidism, secondary hyperparathyroidism owing to chronic renal disease, rickets, and osteitis deformans juvenilia due to vitamin D deficiency and malabsorption or renal tubular dystrophies. Increased levels of ALP are also associated with Von Recklinghausen's disease with bone involvement and malignant infiltrations of bone. Low levels are associated with hyperthyroidism, and with the rare condition of idiopathic hypophosphatasia associated with rickets and the excretion of excess phosphatidyl ethanolamine in the urine.

D. Aspartate Aminotransferase (AST)
AST measurements are used in the diagnosis and treatment of certain types of liver and heart disease. Elevated levels of the transaminases can signal myocardial infarction, hepatic disease, muscular dystrophy, or organ damage.

E. Bicarbonate ($HCO_3$)
Together with pH determination, bicarbonate measurements are used in the diagnosis and treatment of numerous potentially serious disorders associated with acid-base imbalance in the respiratory and metabolic systems.

F. Blood Urea Nitrogen (BUN)
BUN measurements are used in the diagnosis of certain renal and metabolic diseases. The determination of serum urea nitrogen is the most widely used test for the evaluation of kidney function. The test is frequently requested in conjunction with the serum creatinine test for the differential diagnosis of prerenal, renal, and postrenal uremia. High BUN levels are associated with impaired renal function, increased protein catabolism, nephritis, intestinal obstruction, urinary obstruction, metallic poisoning, cardiac failure, peritonitis, dehydration, malignancy, pneumonia, surgical shock, Addison's disease, and uremia. Low BUN levels are associated with amyloidosis, acute liver disease, pregnancy, and nephrosis. Normal variations are observed according to a person's age and sex, the time of day, and diet, particularly protein intake.

G. Calcium
Elevated total serum calcium levels are associated with idiopathic hypercalcemia, vitamin D intoxication, hyperparathyroidism, sarcoidosis, pneumocystic carinii pneumonia and blue diaper syndrome. Low calcium levels are associated with hypoparathyroidism, pseudohypoparathyroidism, chronic renal failure, rickets, infantile tetany, and steroid therapy.

H. Cholesterol
An elevated cholesterol level is associated with diabetes, nephrosis, hypothyroidism, biliary obstruction, and those rare cases of idiopathic hypercholesterolemia and hyperlipidemia; low levels are associated with hyperthyroidism, hepatitis, and sometimes severe anemia or infection.

I. Creatinine
Creatinine measurement serves as a test for normal glomerular filtration. Elevated levels are associated with acute and chronic renal insufficiency and urinary tract obstruction. Levels below 0.6 mg/dL are of no significance.

J. Gamma Glutamyltransaminase (γ-GT)
γ-GT measurement is principally used to diagnose and monitor hepatobiliary disease. It is currently the most sensitive enzymatic indicator of liver disease, with normal values rarely found in the presence of hepatic disease. It is also used as a sensitive screening test for occult alcoholism. Elevated levels are found in patients who chronically take drugs such as phenobarbital and phenytoin.

K. Glucose
Glucose measurements are used in the diagnosis and treatment of pancreatic islet cell carcinoma and of carbohydrate metabolism disorders, including diabetes mellitus, neonatal hypoglycemia, and idiopathic hypoglycemia.

L. Iron
Iron (non-heme) measurements are used in the diagnosis and treatment of diseases such as iron deficiency anemia, chronic renal disease, and hemochromatosis (a disease associated with widespread deposit in the tissues of two iron-containing pigments, hemosiderin and hemofuscin, and characterized by pigmentation of the skin).

M. Lactate Dehydrogenase (LDH)
LDH measurements are used in the diagnosis and treatment of liver diseases such as acute viral hepatitis, cirrhosis, and metastatic carcinoma of the liver; cardiac diseases such as myocardial infarction; and tumors of the lungs or kidneys.

N. Phosphorus
There is a reciprocal relationship between serum calcium and inorganic phosphorus. Any increase in the level of inorganic phosphorus causes a decrease in the calcium level by a mechanism not clearly understood. Hyperphosphatemia is associated with vitamin D hypervitaminosis, hypoparathyroidism, and renal failure. Hypophosphatemia is associated with rickets, hyperparathyroidism, and Fanconi syndrome. Measurements of inorganic phosphorus are used in the diagnosis and treatment of various disorders, including parathyroid gland and kidney diseases and vitamin D imbalance.

O. Sodium, Potassium, and Chloride
Hyponatremia (low serum sodium level) is associated with a variety of conditions, including severe polyuria, metabolic acidosis, Addison's disease, diarrhea, and renal tubular disease. Hypernatremia (increased serum sodium level) is associated with Cushing's syndrome, severe dehydration due to primary water loss, certain types of brain injury, diabetic coma after therapy with insulin, and excess treatment with sodium salts.

Hypokalemia (low serum potassium level) is associated with body potassium deficiency, excessive potassium loss caused by prolonged diarrhea or prolonged periods of vomiting and increased secretion of mineralocorticosteroids. Hyperkalemia (increased serum potassium level) is associated with oliguria, anuria, and urinary obstruction.

Low serum chloride values are associated with salt-losing nephritis, Addisonian crisis, prolonged vomiting, and metabolic acidosis caused by excessive production or diminished excretion of acids. High serum chloride values are associated with dehydration and conditions causing decreased renal blood flow, such as congestive heart failure.

P. Total Bilirubin
Elevated levels are associated with hemolytic jaundice, paroxysmal hemoglobinuria, pernicious anemia, polycythemia, icterus neonatorum, internal hemorrhage, acute hemolytic anemia, malaria, and septicemia. Low bilirubin levels are associated with aplastic anemia, and certain types of secondary anemia resulting from toxic therapy for carcinoma and chronic nephritis.

Q. Total Protein
Total protein measurements are used in the diagnosis and treatment of a variety of diseases involving the liver, kidney, or bone marrow, as well as other metabolic or nutritional disorders.

R. Triglycerides
Triglyceride measurements are used in the diagnosis of diabetes mellitus, nephrosis, liver obstruction, and other diseases involving lipid metabolism and various endocrine disorders and in the treatment of patients with these diseases.

S. Uric Acid
Uric acid measurements are used in the diagnosis and treatment of numerous renal and metabolic disorders, including renal failure, gout, leukemia, psoriasis, starvation or other wasting conditions and in the treatment of patients receiving cytotoxic drugs.

## Health Measures, Eligibility, Report of Findings:

| Health Measure | | Eligibility | Volume Required | Report of Findings Level | | |
|---|---|---|---|---|---|---|
| | | | | 1 | 2 | 3 |
| C-reactive protein | | 1 and older | 500 uL | | | |
| Biochemistry profile | | 12+ | 800 uL | | | |
| | ALT | | | | Yes | Yes |
| | AST | | | | Yes | Yes |
| | Albumin | | | | Yes | Yes |
| | Alkaline Phosphatase | | | | | Yes |
| | Bicarbonate ($HCO_3$) | | | | Yes | Yes |
| | BUN | | | | Yes | Yes |
| | Calcium | | | | Yes | Yes |
| | Cholesterol | | | | | |
| | Creatinine | | | | Yes | Yes |
| | GGT | | | | | Yes |
| | Glucose | | | | Yes* | Yes* |
| | Iron | | | | | Yes* |
| | LDH | | | | | Yes |
| | Phosphorus | | | | Yes | Yes |
| | Sodium | | | | Yes | Yes |
| | Potassium Chloride | | | | Yes | Yes |
| | Total Bilirubin | | | | Yes | Yes |
| | Total Protein | | | | Yes | Yes |
| | Triglycerides | | | | Yes* | Yes* |
| | Uric Acid | | | | Yes | Yes |

* Value may be reported from different assay

## Kidney Disease Profile

**Laboratory Measures:**

Serum creatinine, blood urea nitrogen, urinary albumin and creatinine

**Public Health Objectives:**

The purpose of the kidney and urologic diseases portion of the NHANES is to determine prevalence of specific nephrologic and urologic conditions in the population; to determine the association between health conditions such as diabetes and hypertension and the development of kidney and urologic diseases; to monitor trends in the prevalence of these diseases and their risk factors over time. These data will be used to assist in planning for initiatives and other programs for the prevention and treatment of nephrologic and urologic diseases.

Blood specimens will be used to obtain measures of serum creatinine, blood urea nitrogen, urinary albumin and creatinine will be measured. Self-reported information on chronic analgesic use and incontinence will be collected.

The incidence of end stage kidney failure is increasing rapidly in the U.S. in adults of all age groups which implies that the prevalence of progressive renal impairment is also increasing. However, little information is known about the prevalence of chronic renal impairment on a national level. Urologic disease, including urinary incontinence affects a large proportion of the population. Little nationally representative data on the prevalence and risk factors associated with these conditions are available.

**Health Measures, Eligibility, Report of Findings:**

| Health Measure | Eligibility | Volume Required | Report of Findings level | | |
|---|---|---|---|---|---|
| | | | 1 | 2 | 3 |
| Serum Creatinine/blood urea nitrogen | 12 and older | 1 mL | | Yes | Yes |
| Urinary albumin and creatinine | 6 and older | 3 mL | | | |

## Pregnancy Test and Prostate Specific Antigen (PSA)

**Laboratory Measures**:

Pregnancy test, PSA

**Public Health Objectives:**

**Pregnancy test**

Information on current pregnancy status will be used to exclude participants from the DXA examination and for interpretation of current nutritional status and body measures.

**PSA test**

Prostate cancer is the most common non-skin malignancy among men with approximately 180,000 new cases diagnosed and 37,000 deaths in 1999. The total and free PSA tests have been recognized as tumor markers for the screening, diagnosis and management of prostate cancer. The total PSA is not specific for prostate cancer. Mildly elevated total PSA (above the cutoff of 4 ng/mL) can be seen in benign prostatic hypertrophy and prostatitis. Falsely low PSA may be seen in men treated with finasteride or taking herbals such as Saw Palmetto. The more recent free PSA assay is recommended to increase the specificity when the total PSA is between 4-10 ng/mL. A percent free PSA (free/total PSA X 100%) of less than 25% suggests prostate cancer

**Health Measures, Eligibility, Report of Findings:**

| Health Measure | Eligibility | Volume Required | Report of Findings level | | |
|---|---|---|---|---|---|
| | | | 1 | 2 | 3 |
| Urine: Pregnancy Test | 8-59 females | 1 mL | | | Yes |
| PSA Test | Males 40+ | 1 ml | | Yes | Yes |

**Report of Findings:**

**PSA:**

Male survey participants tested for PSA will receive test results in their Final Report of Findings. If the result is greater than 4 ng/mL, an early reporting letter will be sent.

## Nutritional Biochemistries and Hematologies

### Laboratory Measures:

- Complete blood count
- Erythrocyte protoporphyrin
- Serum folate
- RBC folate
- Serum iron & TIBC
- Serum ferritin
- Transferrin receptor (TfR)
- Transferrin saturation (TS) (calculated from iron and TIBC)
- Serum vitamin C
- Serum vitamin A/E/carotenoids
- Plasma homocysteine
- Serum vitamin $B_{12}$
- Serum vitamin $B_6$

### Public Health Objectives:

The objectives of this component are to:

1) Provide data for monitoring secular trends in measures of nutritional status in the U.S. population;
2) Evaluate the effect of people's habits and behaviors such as physical activity and the use of alcohol, tobacco, and dietary supplements on people's nutritional status; and
3) Evaluate the effect of changes in nutrition and public health policies including welfare reform legislation, food fortification policy, and child nutrition programs on the nutritional status of the U.S. population.

These data will be used to estimate deficiencies and toxicities of specific nutrients in the population and subgroups, to provide population reference data, and to estimate the contribution of diet, supplements, and other factors to serum levels of nutrients. Data will be used for research to further define nutrient requirements as well as optimal levels for disease prevention and health promotion.

## Health Measures, Eligibility, Report of Findings:

| Health Measure | Eligibility | Volume Required | Report of Findings level | | |
|---|---|---|---|---|---|
| | | | 1 | 2 | 3 |
| Complete blood count | 1 and older | 1.5 mL | | Yes | Yes |
| Erthrocyte protoporphryin | 3-5 yrs, 12- | 400 uL | | | Yes |

| | | | | | |
|---|---|---|---|---|---|
| | 49F | | | | |
| Serum folate/Vitamin $B_{12}$ | 1 and older | 700 uL-1 mL | | Yes | Yes |
| Serum iron & TIBC | 1 and older | 100 uL | | Yes | Yes |
| Serum ferritin/TfR | 3-5 yrs, 12-59F | 300-500 uL | | | Yes |
| Serum vitamin A, E, carotenoids, & retinyl esters | 6 and older | 400-500 uL | | Yes | Yes |
| Vitamin C | 6 and older | 100 uL | | | |
| Plasma homocysteine | 20 and older | 1 mL | | | |
| Serum vitamin $B_6$ | 6 and older | 200-500 uL | | | |

## Sexually Transmitted Disease Profile

### Laboratory Measures:

Chlamydia trachomatis, Neisseria gonorrhoeae, Herpes simplex 1 and 2, HIV, Human papillomavirus virus (HPV) (antigen from vaginal swabs, females age 14- 59 years and HPV 16 antibody, all, age 14-59 years).

### Public Health Objectives:

### *Chlamydia trachomatis* and *Neisseria gonorrhoeae* (Urine Test)

Sexually transmitted infections caused by *Chlamydia trachomatis* and *Neisseria gonorrhoeae* may lead to pelvic inflammatory disease, ectopic pregnancy, infertility, and chronic pelvic pain in women. They may also increase the risk of HIV transmission in women. Pregnant women may transmit infection to their newborn causing serious medical complications. At the present the prevalence of chlamydial and gonococcal infection in the general population of the United States is unknown. NHANES offers an opportunity to assess the prevalence of chlamydial and gonococcal infection in the general population and to monitor trends in prevalence as prevention programs are established and expanded.

### Herpes simplex 1 and 2 (Blood Test)

Sera from NHANES subjects ages 14-49 will be tested for antibody to Herpes simplex 1 and 2 (HSV-1/2) to continue to monitor the prevalence of HSV-1/2 infection in the U.S. HSV-1 is a common chronic infection that is associated with lower socioeconomic status. HSV-2 is an index of sexually transmitted infections. In addition, questions about those sexual behaviors that are risk factors for sexually transmitted infections and that are the focus of major national HIV and sexually transmitted diseases risk reduction efforts will be included. The joint availability of sexually transmitted infection and risk factor data in a national sample on a periodic basis is a unique and invaluable resource for evaluation of national HIV/STD risk reduction efforts and for risk-based modeling of the frequency and trends of sexually transmitted infections.

HSV-2 infections are rarely life threatening, but morbidity due to recurrent genital ulcerations is substantial. Just as important, HSV-2 infection is the best current marker of sexual behavior risk factors leading to sexually transmitted infections, generally, because: (a) HSV-2 infections are common and, thus, HSV-2 rates are a sensitive measure of sexually transmitted infection risk factors; (b) HSV-2 infection is almost always a result of sexual transmission and, thus, a specific measure of sexually transmitted infection; (c) HSV-2 infections are not curable and, thus, HSV-2 risk is not influenced by health care seeking factors; and (d) sensitive, specific, and relatively inexpensive tests for HSV-2 antibody are available. HSV-2 is a very important index of the success of large national efforts, motivated by the acquired immunodeficiency epidemic, to reduce risky sexual behaviors.

**HIV antibody (Blood or Urine Test)**

The estimated prevalence of human immunodeficiency virus (HIV) infection in the United States population is an important measure of the extent of the medical and financial burden the nation faces due to this virus. NHANES III data on HIV infection during 1988-94 will serve as a baseline for monitoring the changes in the epidemic over time in the general population of the United States. In addition to HIV testing in NHANES, whole blood samples will be collected and stored for future CD4 testing once the HIV status of the sample is known. This will allow CDC to determine the distribution of CD4 cells in a random sample of HIV positive individuals. NHANES is now the only national survey collecting blood on a population based sample, therefore it will be a key element in future estimates. If the participant refuses phlebotomy but does not refuse the HIV test urine will be tested for HIV antibody.

**Human papillomavirus (HPV) (Vaginal swab – DNA test; Blood test for antibody HPV**

Genital human papillomavirus (HPV) infection is likely the most common sexually transmitted infection in the U.S., and cervical infection with certain types of HPV, especially HPV-16, is the single strongest risk factor for cervical cancer. No surveillance systems exist for HPV infections, the majority of which are subclinical. Serum from participants age 14-59 years will be tested for antibody to HPV-16, the antigenic type most linked with cervical cancer to estimate the percentage of individuals of both genders who have ever been infected with this virus. Testing of HPV DNA from vaginal swabs from women 14-59 will provide an estimate of current infection. Vaginal swabs will be tested for HPV DNA by the FDA approved Hybrid Capture II method (Digene) and by consensus PCR with type specific analysis. The Hybrid Capture assay will detect overall high risk HPV types, but cannot identify specific types. The PCR will allow identification of specific HPV type. Participants will be notified of their Hybrid Capture results and specific messages will be developed to explain the implications of the findings based on their age group.

## Health Measures, Eligibility, Report of Findings:

| Health Measure | Eligibility | Volume Required | Report of Findings Level | | |
|---|---|---|---|---|---|
| | | | 1 | 2 | 3 |
| Chlamydia trachomatis Neisseria gonorrhoeae | 14-39 | 10 ml | | Yes | Yes |
| Herpes 1 and 2 antibody | 14-49 | 200 ul | | Yes | Yes |
| HIV antibody | 18-49 | 500 ul | | Yes | Yes |
| HPV | 14-59 | 500 µL | | | |

* Persons with positive STD or HIV findings will be referred for counseling and treatment.

**Justification for using vulnerable populations:**

- Teenagers are included because they are at increasing risk for STD's. A pilot study in NHANES III demonstrated an increased prevalence chlamydial infection starting at age 14 years (whites 4%, blacks 12% Mexican Americans 6%).
- Mentally impaired persons will be excluded from the STD profile due to NCHS' inability to provide adequate support and counseling to this group with the test result.

## Blood Lipids

**Laboratory Measures:**

Total Cholesterol, HDL- Cholesterol, LDL-Cholesterol, Triglycerides

**Public Health Objectives:**

The goals of this component are to:

1. Monitor the prevalence and trends in major cardiovascular conditions and risk factors in the U.S.;
2. Evaluate prevention and treatment programs targeting cardiovascular disease in the U.S.

The main element of the cardiovascular disease laboratory component in NHANES is blood lipid levels. Cardiovascular disease is the leading cause of death in the United States. An estimated 4.8 million Americans have congestive heart failure. Increasing prevalence, hospitalizations, and deaths have made congestive heart failure a major chronic condition in the United States.

The data will be used to:

1. Monitor the status of hypertension prevalence, awareness, treatment and control and the success of the National HBP Education Program;
2. monitor the status of hyperlipidemia and the success of the National Cholesterol Education Program;
3. Estimate the prevalence of congestive heart failure and compare to the baseline data from the NHANES I.

**Health Measures, Eligibility, Report of Findings:**

| Health Measure | Eligibility | Volume Required | Report of Findings Level | | |
|---|---|---|---|---|---|
| | | | 1 | 2 | 3 |
| Total Cholesterol | 3 and older | +++ | | Yes | Yes |
| HDL-Cholesterol | 3 and older | +++ | | | Yes |
| LDL-Cholesterol | 3 and older | calculated | | | Yes |
| Triglycerides* | 3 and older | +++ | | Yes | Yes |

+++ For all four assays and 1 ml used for persons 6 years and older

**NHANES 2005-2006 Data Release**
**November 2007**

# General Information for the Public Files of the 2005-2006 Laboratory Data

## Laboratory Component Description

The NHANES 2005-2006 laboratory data files include findings from analyses of blood, urine, vaginal swabs, as well as dust and water samples. Blood, urine and the vaginal swab specimens were collected at the mobile examination centers (MECs). The dust and water samples were collected in participants' homes.

The specific laboratory test target populations are based on the survey participants' gender and age, at the time of the Household Interview. Blood and urine collection methods and exclusion criteria are described in this section. The collection of vaginal swabs, water samples, and dust samples is described in the respective manuals for the physician, household interviewer and allergy technician.

The urine collection procedure consisted of urine specimen collection and processing, and pregnancy testing. The blood collection procedure consisted of administering a questionnaire to screen for conditions that exclude participants from the blood draw. Fasting status was also recorded.

## Venipuncture Exclusion Criteria

The following exclusion criteria applied to all tests that required blood specimens:

- Hemophiliacs
- Participants who received chemotherapy within the last 4 weeks
- The presence of rashes, gauze dressings, casts, edema, paralysis, tubes, open sores or wounds, withered arms or limbs missing, damaged, sclerosed or occluded veins, allergies to cleansing reagents, burned or scarred tissue, shunt or intravenous lines on both arms.

Beginning in 2005, an oral glucose tolerance test (OGTT) was added to the laboratory protocol. A fasting glucose blood test was performed on all participants 12 years and older, who were examined in the morning session, after a 9 hour fast. After the initial venipuncture, participants were asked to drink a calibrated dose (generally 75 grams of glucose) of Trutol™ and had a second venipuncture 2 hours (plus or minus 15 minutes) after drinking the Trutol™.

There were seven OGTT exclusion criteria, including hemophilia and chemotherapy safety exclusions, fasting < 9 hours, taking insulin or oral medications for diabetes, refusing phlebotomy, and not drinking all the entire Trutol™ solution within the allotted time.

## Data Collection

Automated data collection procedures were used. In the MECs and analytical laboratories, data for the laboratory component was recorded directly into a computerized database. Survey forms were also automated. The laboratory data collection and reporting systems were integrated with the main NHANES survey database. The complete blood count and pregnancy analyses were performed in the MEC laboratory. Other laboratory analyses were conducted off-site. For 2005-2006, 28 laboratories, across the United States, analyzed NHANES specimens.

**Laboratory Component Staff**

The NHANES 2005-2006 laboratory staff consisted of medical technologists and phlebotomists. The American Society for Clinical Pathologists or other organizations certified these staff members.

**Training**

All laboratory staff completed comprehensive training in standardized laboratory procedures, before they began working in the MEC. The medical technologists hold baccalaureates in medical technology. The MEC phlebotomists completed comprehensive training in pediatric phlebotomy techniques, including instruction by a pediatric nurse practitioner. All MEC staff completed required training in safety, subject privacy and confidentiality, and cardio-pulmonary resuscitation (CPR).

**Spanish Language Instructions**

Standardized scripts were used to describe the laboratory procedures to survey participants. All scripts were developed and pretested in both English and Spanish. The MEC staff were trained extensively, to ensure the quality and comparability of staff interactions with Spanish-speaking respondents.

**Data Collection Forms**

Detailed specimen collection and processing instructions are discussed in the NHANES Laboratory/Medical Technologists Procedures Manual (LPM). Each chapter in the LPM specifies the procedures to be used for collecting, labeling, processing, preserving, and transporting specimens for each method used in the survey.

**Quality Control Procedures:**

**Mobile Examination Center (MEC)**

Laboratory team performance was monitored using several techniques. NCHS and contract consultants used structured quality assurance evaluations, during unscheduled site visits, to evaluate the quality of the laboratory work and the implementation of required quality control procedures. Laboratory staff were observed and given feedback with respect to equipment operation, specimen collection and preparation, interaction with survey participants, and implementation of the survey protocol. Formal staff retraining sessions were conducted annually to ensure that required skill levels were maintained.

The NHANES quality control and quality assurance protocols met the 1988 Clinical Laboratory Improvement Act requirements. Detailed quality control and quality assurance instructions are discussed in the NHANES LPM.

**Laboratory**

As part of the overall quality assurance process for the survey, all collection materials, vacutainer tubes, and storage containers used for trace elements assays were initially pre-screened by the CDC/NCEH, Environmental Health Laboratory Sciences Laboratory for background contamination levels of lead, cadmium, total and speciated mercury. Lead, cadmium, and total and speciated mercury are fairly ubiquitous contaminants. Blood was collected in red-top tubes after the acceptability of the test tubes had been confirmed. Special lead-free tubes were not required. Ordinary EDTA tubes were similarly used, after prescreening confirmed that they had no contamination.

## Analytical Laboratories

NCHS used several methods to monitor the quality of the analyses performed by the NHANES contract laboratories. In the MEC, these methods included analyzing "blind" split samples collected during practice ("dry run") sessions. In addition, contract laboratories randomly performed repeat testing on two percent of all specimens.

NCHS developed and distributed a quality control (QC) protocol to each NHANES contract laboratory. The Westgard rules, to be used when running NHANES specimens, were included in the protocols. Progress reports, prepared by the contract laboratories, documented problems encountered during shipping or receipt of specimens. Summary statistics for each control pool, QC graphs, instrument calibration, reagents, and any special considerations were submitted to NCHS and Westat quarterly. The reports were reviewed for trends or shifts in the data. The laboratories were required to explain any identified areas of concern. NCHS and Westat reviewed the progress reports.

## Data Processing and Preparation

The NHANES data processing guidelines provided NCHS and contractor staff with standards for naming variables, filling missing values, and handling missing records. NCHS staff, assisted by contract staff, developed data editing specifications that checked data sets for valid codes, ranges, and skip pattern consistencies and examined the consistency of values between interrelated variables. Comments were reviewed and recoded. NCHS staff verified extremely high and low values. Numerous consistency checks were performed during data preparation. Nevertheless, data users should examine variable ranges, frequencies and other descriptive statistics before analyzing the data.

## Low Detection Limits

For laboratory tests with a lower detection limit, results below the lower detection limit were replaced with a value equal to the detection limit, divided by the square root of two. This value was created to help users distinguish a nondetectable laboratory test result from a measured laboratory test result.

## Special Notes for the Laboratory Data

The analysis of NHANES 2005-2006 phlebotomy data must be conducted using the appropriate survey design and demographic variables. The NHANES 2005-2006 Household Questionnaire Data Files contain demographic data, health indicators, and other related information collected during household interviews. The questionnaire files also contain the survey design variables and sample weight variables. The Phlebotomy File includes auxiliary information such as fasting status, the time of venipuncture, and the conditions precluding venipuncture. The household questionnaire and phlebotomy files may be linked to the laboratory data file using the unique survey participant identifier SEQN.

**NHANES 2005-2006 Lab Data Items**

**August 2009**

**Note:** Two versions of the complete list of variables are presented as **Table A** and **Table B**, respectively, in this document.

Variables in **Table A** are sorted by "Component" and variable position in the data.
Variables in **Table B** are sorted alphabetically by "Label".

**Table A: List of variables sorted by "Component" and variable position in the data.**

| Item # | File name | Component | Variable ID | Label |
|---|---|---|---|---|
| 1 | AL_IGE_D | Allergen IgE Serum Tests | SEQN | Respondent sequence number |
| 2 | AL_IGE_D | Allergen IgE Serum Tests | LBXIGE | Serum total IgE antibody (kU/L) |
| 3 | AL_IGE_D | Allergen IgE Serum Tests | LBDIGELC | Serum total IgE antibody comment code |
| 4 | AL_IGE_D | Allergen IgE Serum Tests | LBXID2 | D. Farinae IgE antibody (kU/L) |
| 5 | AL_IGE_D | Allergen IgE Serum Tests | LBDID2LC | D. Farinae IgE antibody comment code |
| 6 | AL_IGE_D | Allergen IgE Serum Tests | LBXID1 | D. Pteronyssinus IgE antibody (kU/L) |
| 7 | AL_IGE_D | Allergen IgE Serum Tests | LBDID1LC | D. Pteronyssin IgE antibody comment code |
| 8 | AL_IGE_D | Allergen IgE Serum Tests | LBXIE1 | Cat IgE antibody (kU/L) |
| 9 | AL_IGE_D | Allergen IgE Serum Tests | LBDIE1LC | Cat IgE antibody comment code |
| 10 | AL_IGE_D | Allergen IgE Serum Tests | LBXIE5 | Dog IgE antibody (kU/L) |
| 11 | AL_IGE_D | Allergen IgE Serum Tests | LBDIE5LC | Dog IgE antibody comment code |
| 12 | AL_IGE_D | Allergen IgE Serum Tests | LBXII6 | Cockroach IgE antibody (kU/L) |
| 13 | AL_IGE_D | Allergen IgE Serum Tests | LBDII6LC | Cockroach IgE antibody comment code |
| 14 | AL_IGE_D | Allergen IgE Serum Tests | LBXIM6 | Alternaria IgE antibody (kU/L) |
| 15 | AL_IGE_D | Allergen IgE Serum Tests | LBDIM6LC | Alternaria IgE comment code |
| 16 | AL_IGE_D | Allergen IgE Serum Tests | LBXF13 | Peanut IgE antibody (kU/L) |
| 17 | AL_IGE_D | Allergen IgE Serum Tests | LBDF13LC | Peanut IgE antibody comment code |
| 18 | AL_IGE_D | Allergen IgE Serum Tests | LBXIF1 | Egg IgE antibody (kU/L) |
| 19 | AL_IGE_D | Allergen IgE Serum Tests | LBDIF1LC | Egg IgE antibody comment code |
| 20 | AL_IGE_D | Allergen IgE Serum Tests | LBXIF2 | Milk IgE antibody (kU/L) |
| 21 | AL_IGE_D | Allergen IgE Serum Tests | LBDIF2LC | Milk IgE antibody comment code |
| 22 | AL_IGE_D | Allergen IgE Serum Tests | LBXIW1 | Ragweed IgE antibody (kU/L) |
| 23 | AL_IGE_D | Allergen IgE Serum Tests | LBDIW1LC | Ragweed IgE antibody comment code |
| 24 | AL_IGE_D | Allergen IgE Serum Tests | LBXIG5 | Rye grass IgE antibody (kU/L) |
| 25 | AL_IGE_D | Allergen IgE Serum Tests | LBDIG5LC | Rye grass IgE antibody comment code |

| Item # | File name | Component | Variable ID | Label |
|---|---|---|---|---|
| 26 | AL_IGE_D | Allergen IgE Serum Tests | LBXIG2 | Bermuda grass IgE antibody (kU/L) |
| 27 | AL_IGE_D | Allergen IgE Serum Tests | LBDIG2LC | Bermuda grass IgE antibody comment code |
| 28 | AL_IGE_D | Allergen IgE Serum Tests | LBXIT7 | Oak IgE antibody (kU/L) |
| 29 | AL_IGE_D | Allergen IgE Serum Tests | LBDIT7LC | Oak IgE antibody comment code |
| 30 | AL_IGE_D | Allergen IgE Serum Tests | LBXIT3 | Birch IgE antibody (kU/L) |
| 31 | AL_IGE_D | Allergen IgE Serum Tests | LBDIT3LC | Birch IgE antibody comment code |
| 32 | AL_IGE_D | Allergen IgE Serum Tests | LBXF24 | Shrimp IgE antibody (kU/L) |
| 33 | AL_IGE_D | Allergen IgE Serum Tests | LBDF24LC | Shrimp IgE antibody comment code |
| 34 | AL_IGE_D | Allergen IgE Serum Tests | LBXIM3 | Aspergillus IgE antibody (kU/L) |
| 35 | AL_IGE_D | Allergen IgE Serum Tests | LBDIM3LC | Aspergillus IgE comment code |
| 36 | AL_IGE_D | Allergen IgE Serum Tests | LBXW11 | Thistle IgE antibody (kU/L) |
| 37 | AL_IGE_D | Allergen IgE Serum Tests | LBDW11LC | Thistle IgE antibody comment code |
| 38 | AL_IGE_D | Allergen IgE Serum Tests | LBXE72 | Mouse IgE antibody (kU/L) |
| 39 | AL_IGE_D | Allergen IgE Serum Tests | LBDE72LC | Mouse IgE comment code |
| 40 | AL_IGE_D | Allergen IgE Serum Tests | LBXE74 | Rat IgE antibody (kU/L) |
| 41 | AL_IGE_D | Allergen IgE Serum Tests | LBDE74LC | Rat IgE antibody comment code |
| 42 | ALB_CR_D | Urinary Albumin and Creatinine | SEQN | Respondent sequence number |
| 43 | ALB_CR_D | Urinary Albumin and Creatinine | URXUMA | Albumin, urine (ug/mL) |
| 44 | ALB_CR_D | Urinary Albumin and Creatinine | URXUMS | Albumin, urine (mg/L) |
| 45 | ALB_CR_D | Urinary Albumin and Creatinine | URXUCR | Creatinine, urine (mg/dL) |
| 46 | ALB_CR_D | Urinary Albumin and Creatinine | URXCRS | Creatinine, urine (umol/L) |
| 47 | B12_D | Vitamin B12 | SEQN | Respondent sequence number |
| 48 | B12_D | Vitamin B12 | LBXB12 | Vitamin B12 ( pg/mL) |
| 49 | B12_D | Vitamin B12 | LBDB12SI | Vitamin B12 (pmol/L) |
| 50 | BIOPRO_D | Standard Biochemistry Profile | SEQN | Respondent sequence number |
| 51 | BIOPRO_D | Standard Biochemistry Profile | LBXSAL | Albumin (g/dL) |
| 52 | BIOPRO_D | Standard Biochemistry Profile | LBDSALSI | Albumin (g/L) |
| 53 | BIOPRO_D | Standard Biochemistry Profile | LBXSATSI | Alanine aminotransferase ALT (U/L) |
| 54 | BIOPRO_D | Standard Biochemistry Profile | LBXSASSI | Aspartate aminotransferase AST (U/L) |
| 55 | BIOPRO_D | Standard Biochemistry Profile | LBXSAPSI | Alkaline phosphotase (U/L) |
| 56 | BIOPRO_D | Standard Biochemistry Profile | LBXSBU | Blood urea nitrogen (mg/dL) |
| 57 | BIOPRO_D | Standard Biochemistry Profile | LBDSBUSI | Blood urea nitrogen (mmol/L) |
| 58 | BIOPRO_D | Standard Biochemistry Profile | LBXSCA | Total calcium (mg/dL) |
| 59 | BIOPRO_D | Standard Biochemistry Profile | LBDSCASI | Total calcium (mmol/L) |
| 60 | BIOPRO_D | Standard Biochemistry Profile | LBXSCH | Cholesterol (mg/dL) |
| 61 | BIOPRO_D | Standard Biochemistry Profile | LBDSCHSI | Cholesterol (mmol/L) |

| Item # | File name | Component | Variable ID | Label |
|---|---|---|---|---|
| 62 | BIOPRO_D | Standard Biochemistry Profile | LBXSC3SI | Bicarbonate (mmol/L) |
| 63 | BIOPRO_D | Standard Biochemistry Profile | LBXSCR | Creatinine (mg/dL) |
| 64 | BIOPRO_D | Standard Biochemistry Profile | LBDSCRSI | Creatinine (umol/L) |
| 65 | BIOPRO_D | Standard Biochemistry Profile | LBXSGTSI | Gamma glutamyl transferase (U/L) |
| 66 | BIOPRO_D | Standard Biochemistry Profile | LBXSGL | Glucose, serum (mg/dL) |
| 67 | BIOPRO_D | Standard Biochemistry Profile | LBDSGLSI | Glucose, serum (mmol/L) |
| 68 | BIOPRO_D | Standard Biochemistry Profile | LBXSIR | Iron, refigerated (ug/dL) |
| 69 | BIOPRO_D | Standard Biochemistry Profile | LBDSIRSI | Iron, refigerated (umol/L) |
| 70 | BIOPRO_D | Standard Biochemistry Profile | LBXSLDSI | Lactate dehydrogenase LDH (U/L) |
| 71 | BIOPRO_D | Standard Biochemistry Profile | LBXSPH | Phosphorus (mg/dL) |
| 72 | BIOPRO_D | Standard Biochemistry Profile | LBDSPHSI | Phosphorus (mmol/L) |
| 73 | BIOPRO_D | Standard Biochemistry Profile | LBXSTB | Total bilirubin (mg/dL) |
| 74 | BIOPRO_D | Standard Biochemistry Profile | LBDSTBSI | Bilirubin, total (umol/L) |
| 75 | BIOPRO_D | Standard Biochemistry Profile | LBXSTP | Total protein (g/dL) |
| 76 | BIOPRO_D | Standard Biochemistry Profile | LBDSTPSI | Total protein (g/L) |
| 77 | BIOPRO_D | Standard Biochemistry Profile | LBXSTR | Triglycerides (mg/dL) |
| 78 | BIOPRO_D | Standard Biochemistry Profile | LBDSTRSI | Triglycerides (mmol/L) |
| 79 | BIOPRO_D | Standard Biochemistry Profile | LBXSUA | Uric acid (mg/dL) |
| 80 | BIOPRO_D | Standard Biochemistry Profile | LBDSUASI | Uric acid (umol/L) |
| 81 | BIOPRO_D | Standard Biochemistry Profile | LBXSNASI | Sodium (mmol/L) |
| 82 | BIOPRO_D | Standard Biochemistry Profile | LBXSKSI | Potassium (mmol/L) |
| 83 | BIOPRO_D | Standard Biochemistry Profile | LBXSCLSI | Chloride (mmol/L) |
| 84 | BIOPRO_D | Standard Biochemistry Profile | LBXSOSSI | Osmolality (mmol/Kg) |
| 85 | BIOPRO_D | Standard Biochemistry Profile | LBXSGB | Globulin (g/dL) |
| 86 | BIOPRO_D | Standard Biochemistry Profile | LBDSGBSI | Globulin (g/L) |
| 87 | CBC_D | Complete Blood Count | SEQN | Respondent sequence number |
| 88 | CBC_D | Complete Blood Count | LBXWBCSI | White blood cell count (1000 cells/uL) |
| 89 | CBC_D | Complete Blood Count | LBXLYPCT | Lymphocyte percent (%) |
| 90 | CBC_D | Complete Blood Count | LBXMOPCT | Monocyte percent (%) |
| 91 | CBC_D | Complete Blood Count | LBXNEPCT | Segmented neutrophils percent (%) |
| 92 | CBC_D | Complete Blood Count | LBXEOPCT | Eosinophils percent (%) |
| 93 | CBC_D | Complete Blood Count | LBXBAPCT | Basophils percent (%) |
| 94 | CBC_D | Complete Blood Count | LBDLYMNO | Lymphocyte number (1000 cells/uL) |
| 95 | CBC_D | Complete Blood Count | LBDMONO | Monocyte number (1000 cells/uL) |
| 96 | CBC_D | Complete Blood Count | LBDNENO | Segmented neutrophils num (1000 cell/uL) |
| 97 | CBC_D | Complete Blood Count | LBDEONO | Eosinophils number (1000 cells/uL) |

| Item # | File name | Component | Variable ID | Label |
|---|---|---|---|---|
| 98 | CBC_D | Complete Blood Count | LBDBANO | Basophils number (1000 cells/uL) |
| 99 | CBC_D | Complete Blood Count | LBXRBCSI | Red blood cell count (million cells/uL) |
| 100 | CBC_D | Complete Blood Count | LBXHGB | Hemoglobin (g/dL) |
| 101 | CBC_D | Complete Blood Count | LBXHCT | Hematocrit (%) |
| 102 | CBC_D | Complete Blood Count | LBXMCVSI | Mean cell volume (fL) |
| 103 | CBC_D | Complete Blood Count | LBXMCHSI | Mean cell hemoglobin (pg) |
| 104 | CBC_D | Complete Blood Count | LBXMC | MCHC (g/dL) |
| 105 | CBC_D | Complete Blood Count | LBXRDW | Red cell distribution width (%) |
| 106 | CBC_D | Complete Blood Count | LBXPLTSI | Platelet count SI (1000 cells/uL) |
| 107 | CBC_D | Complete Blood Count | LBXMPSI | Mean platelet volume (fL) |
| 108 | CHLMDA_D | Urinary Chlamydia and Gonorrhea | SEQN | Respondent sequence number |
| 109 | CHLMDA_D | Urinary Chlamydia and Gonorrhea | URXUCL | Urinary Chlamydia |
| 110 | CHLMDA_D | Urinary Chlamydia and Gonorrhea | URXUGC | Urinary Gonorrhea |
| 111 | COT_D | Serum Cotinine | SEQN | Respondent sequence number |
| 112 | COT_D | Serum Cotinine | LBXCOT | Cotinine (ng/mL) |
| 113 | CRP_D | C-Reactive Protein | SEQN | Respondent sequence number |
| 114 | CRP_D | C-Reactive Protein | LBXCRP | C-reactive protein(mg/dL) |
| 115 | EPH_D | Environmental Phenols | SEQN | Respondent sequence number |
| 116 | EPH_D | Environmental Phenols | WTSB2YR | Two-year MEC weights of subsample B |
| 117 | EPH_D | Environmental Phenols | URXUCR | Urinary creatinine |
| 118 | EPH_D | Environmental Phenols | URXBPH | Urinary Bisphenol A (ng/mL) |
| 119 | EPH_D | Environmental Phenols | URDBPHLC | Urinary Bisphenol A comment |
| 120 | EPH_D | Environmental Phenols | URXBP3 | Urinary Benzophenone-3 (ng/mL) |
| 121 | EPH_D | Environmental Phenols | URDBP3LC | Urinary Benzophenone-3 comment |
| 122 | EPH_D | Environmental Phenols | URX4TO | Urinary 4-tert-octylphenol (ng/mL) |
| 123 | EPH_D | Environmental Phenols | URD4TOLC | Urinary 4-tert-octylphenol comment |
| 124 | EPH_D | Environmental Phenols | URXTRS | Urinary Triclosan (ng/mL) |
| 125 | EPH_D | Environmental Phenols | URDTRSLC | Urinary Triclosan comment |
| 126 | EPH_D | Environmental Phenols | URXBUP | Butyl paraben (ng/ml) |
| 127 | EPH_D | Environmental Phenols | URDBUPLC | Butyl paraben comment |
| 128 | EPH_D | Environmental Phenols | URXEPB | Ethyl paraben (ng/ml) |
| 129 | EPH_D | Environmental Phenols | URDEPBLC | Ethyl paraben comment |
| 130 | EPH_D | Environmental Phenols | URXMPB | Methyl paraben (ng/ml) |
| 131 | EPH_D | Environmental Phenols | URDMPBLC | Methyl paraben comment |
| 132 | EPH_D | Environmental Phenols | URXPPB | Propyl paraben (ng/ml) |
| 133 | EPH_D | Environmental Phenols | URDPPBLC | Propyl paraben comment |

| Item # | File name | Component | Variable ID | Label |
|---|---|---|---|---|
| 134 | EPP_D | Erythrocyte Protoporphyrin (EPP) | SEQN | Respondent sequence number |
| 135 | EPP_D | Erythrocyte Protoporphyrin (EPP) | LBXEPP | Protoporphyrin(ug/dL RBC) |
| 136 | EPP_D | Erythrocyte Protoporphyrin (EPP) | LBDEPPSI | Protoporphyrin (umol/L RBC) |
| 137 | FASTQX_D | Phlebotomy Fasting Questionnaire | SEQN | Respondent sequence number |
| 138 | FASTQX_D | Phlebotomy Fasting Questionnaire | PHQ020 | Coffee or tea with cream or sugar? |
| 139 | FASTQX_D | Phlebotomy Fasting Questionnaire | PHACOFHR | Coffee/tea fast time (hours) |
| 140 | FASTQX_D | Phlebotomy Fasting Questionnaire | PHACOFMN | Coffee/tea fast time (minutes) |
| 141 | FASTQX_D | Phlebotomy Fasting Questionnaire | PHQ030 | Alcohol, such as beer, wine, or liquor? |
| 142 | FASTQX_D | Phlebotomy Fasting Questionnaire | PHAALCHR | Alcohol fast time (hours) |
| 143 | FASTQX_D | Phlebotomy Fasting Questionnaire | PHAALCMN | Alcohol fast time (minutes) |
| 144 | FASTQX_D | Phlebotomy Fasting Questionnaire | PHQ040 | Gum, mints, lozenges or cough drops |
| 145 | FASTQX_D | Phlebotomy Fasting Questionnaire | PHAGUMHR | Gum, mints cough drops fast time (hours) |
| 146 | FASTQX_D | Phlebotomy Fasting Questionnaire | PHAGUMMN | Gum, mints, cough fast time (minutes) |
| 147 | FASTQX_D | Phlebotomy Fasting Questionnaire | PHQ050 | Antacids, laxatives, or anti-diarrheals? |
| 148 | FASTQX_D | Phlebotomy Fasting Questionnaire | PHAANTHR | Antacids, laxatives fast time (hours) |
| 149 | FASTQX_D | Phlebotomy Fasting Questionnaire | PHAANTMN | Antacids, laxatives fast time (minutes) |
| 150 | FASTQX_D | Phlebotomy Fasting Questionnaire | PHQ060 | Dietary supplements? |
| 151 | FASTQX_D | Phlebotomy Fasting Questionnaire | PHASUPHR | Dietary supplements fast time (hours) |
| 152 | FASTQX_D | Phlebotomy Fasting Questionnaire | PHASUPMN | Dietary supplements fast time (minutes) |
| 153 | FASTQX_D | Phlebotomy Fasting Questionnaire | PHAFSTHR | Total length of "food fast," hours |
| 154 | FASTQX_D | Phlebotomy Fasting Questionnaire | PHAFSTMN | Total length of "food fast," minutes |
| 155 | FASTQX_D | Phlebotomy Fasting Questionnaire | PHDSESN | Session in which SP was examined |
| 156 | FERTIN_D | Ferritin | SEQN | Respondent sequence number |
| 157 | FERTIN_D | Ferritin | LBXFER | Ferritin(ng/mL) |
| 158 | FERTIN_D | Ferritin | LBDFERSI | Ferritin(ug/L) |
| 159 | FETIB_D | Iron, TIBC, Transferrin Saturation | SEQN | Respondent sequence number |
| 160 | FETIB_D | Iron, TIBC, Transferrin Saturation | LBXIRN | Iron, Frozen Serum (ug/dL) |
| 161 | FETIB_D | Iron, TIBC, Transferrin Saturation | LBDIRNSI | Iron, Frozen Serum (umol/L) |
| 162 | FETIB_D | Iron, TIBC, Transferrin Saturation | LBXTIB | TIBC, Frozen Serum (ug/dL) |
| 163 | FETIB_D | Iron, TIBC, Transferrin Saturation | LBDTIBSI | TIBC, Frozen Serum (umol/L) |
| 164 | FETIB_D | Iron, TIBC, Transferrin Saturation | LBDPCT | Transferrin saturation (%) |
| 165 | FOLATE_D | Erythrocyte (RBC) Folate and Serum Folate | SEQN | Respondent sequence number |
| 166 | FOLATE_D | Erythrocyte (RBC) Folate and Serum Folate | LBXRBF | Folate, RBC (ng/mL RBC) |
| 167 | FOLATE_D | Erythrocyte (RBC) Folate and Serum Folate | LBDRBFSI | Folate, RBC(nmol/L RBC) |
| 168 | FOLATE_D | Erythrocyte (RBC) Folate and Serum Folate | LBXFOL | Folate, serum (ng/mL) |
| 169 | FOLATE_D | Erythrocyte (RBC) Folate and Serum Folate | LBDFOLSI | Folate, serum (nmol/L) |

| Item # | File name | Component | Variable ID | Label |
|---|---|---|---|---|
| 170 | GHB_D | Glycohemoglobin | SEQN | Respondent sequence number |
| 171 | GHB_D | Glycohemoglobin | LBXGH | Glycohemoglobin (%) |
| 172 | HCY_D | Homocysteine | SEQN | Respondent sequence number |
| 173 | HCY_D | Homocysteine | LBXHCY | Homocysteine (umol/L) |
| 174 | HDL_D | HDL-Cholesterol | SEQN | Respondent sequence number |
| 175 | HDL_D | HDL-Cholesterol | LBDHDD | Direct HDL-Cholesterol (mg/dL) |
| 176 | HDL_D | HDL-Cholesterol | LBDHDDSI | Direct HDL-Cholesterol (mmol/L) |
| 177 | HEPA_D | Hepatitis A Antibody | SEQN | Respondent sequence number |
| 178 | HEPA_D | Hepatitis A Antibody | LBXHA | Hepatitis A Antibody (Anti-HAV) |
| 179 | HEPB_S_D | Hepatitis B surface antibody | SEQN | Respondent sequence number |
| 180 | HEPB_S_D | Hepatitis B surface antibody | LBXHBS | Hepatitis B Surface Antibody |
| 181 | HEPBD_D | Hepatitis B and D | SEQN | Respondent sequence number |
| 182 | HEPBD_D | Hepatitis B and D | LBXHBC | Hepatitis B core antibody |
| 183 | HEPBD_D | Hepatitis B and D | LBDHBG | Hepatitis B surface antigen |
| 184 | HEPBD_D | Hepatitis B and D | LBDHD | Hepatitis D (anti-HDV) |
| 185 | HEPC_D | Hepatitis C antibody | SEQN | Respondent sequence number |
| 186 | HEPC_D | Hepatitis C antibody | LBDHCV | Hepatitis C antibody (confirmed) |
| 187 | HEPC_D | Hepatitis C antibody | LBXHCR | Hepatitis C RNA (HCV-RNA) |
| 188 | HEPC_D | Hepatitis C antibody | LBXHCG | Hepatitis HCV genotype |
| 189 | HIV_D | Human Immunodeficiency Virus (HIV) | SEQN | Respondent sequence number |
| 190 | HIV_D | Human Immunodeficiency Virus (HIV) | LBDHI | HIV antibody test result |
| 191 | HIV_D | Human Immunodeficiency Virus (HIV) | LBXCD4 | CD4 counts (cells/mm3) |
| 192 | HIV_D | Human Immunodeficiency Virus (HIV) | LBXCD8 | CD8 counts (cells/mm3) |
| 193 | HSV_D | Herpes Simplex Virus I and II | SEQN | Respondent sequence number |
| 194 | HSV_D | Herpes Simplex Virus I and II | LBXHE1 | Herpes Simplex Virus I |
| 195 | HSV_D | Herpes Simplex Virus I and II | LBXHE2 | Herpes Simplex Virus II |
| 196 | OGTT_D | Two Hour Oral Glucose Tolerance Test | SEQN | Respondent sequence number |
| 197 | OGTT_D | Two Hour Oral Glucose Tolerance Test | WTSOG2YR | OGTT Subsample 2 Year MEC Weight |
| 198 | OGTT_D | Two Hour Oral Glucose Tolerance Test | LBXGLT | Two Hour Glucose(OGTT) (mg/dL) |
| 199 | OGTT_D | Two Hour Oral Glucose Tolerance Test | LBDGLTSI | Two Hour Glucose(OGTT) (mmol/L) |
| 200 | OGTT_D | Two Hour Oral Glucose Tolerance Test | PHAFSTHR | Total length of 'food fast', hours |
| 201 | OGTT_D | Two Hour Oral Glucose Tolerance Test | PHAFSTMN | Total length of 'food fast', minutes |
| 202 | PBCD_D | Blood Lead and Blood Cadmium | SEQN | Respondent sequence number |
| 203 | PBCD_D | Blood Lead and Blood Cadmium | LBXBCD | Cadmium (ug/L) |
| 204 | PBCD_D | Blood Lead and Blood Cadmium | LBDBCDSI | Cadmium (nmol/L) |
| 205 | PBCD_D | Blood Lead and Blood Cadmium | LBXBPB | Lead (ug/dL) |

| Item # | File name | Component | Variable ID | Label |
|---|---|---|---|---|
| 206 | PBCD_D | Blood Lead and Blood Cadmium | LBDBPBSI | Lead (umol/L) |
| 207 | PFC_D | Polyfluorochemicals Compounds | SEQN | Respondent sequence number |
| 208 | PFC_D | Polyfluorochemicals Compounds | WTSA2YR | Two-year MEC weights of subsample A |
| 209 | PFC_D | Polyfluorochemicals Compounds | LBXPFOA | Perfluorooctanoic acid |
| 210 | PFC_D | Polyfluorochemicals Compounds | LBDPFOAL | Perfluorooctanoic acid comment |
| 211 | PFC_D | Polyfluorochemicals Compounds | LBXPFOS | Perfluorooctane sulfonic acid |
| 212 | PFC_D | Polyfluorochemicals Compounds | LBDPFOSL | Perfluorooctane sulfonic acid comment |
| 213 | PFC_D | Polyfluorochemicals Compounds | LBXPFHS | Perfluorohexane sulfonic acid |
| 214 | PFC_D | Polyfluorochemicals Compounds | LBDPFHSL | Perfluorohexane sulfonic acid comment |
| 215 | PFC_D | Polyfluorochemicals Compounds | LBXEPAH | 2-(N-ethyl-PFOSA) acetate |
| 216 | PFC_D | Polyfluorochemicals Compounds | LBDEPAHL | 2-(N-ethyl-PFOSA) acetate comment |
| 217 | PFC_D | Polyfluorochemicals Compounds | LBXMPAH | 2-(N-methyl-PFOSA) acetate |
| 218 | PFC_D | Polyfluorochemicals Compounds | LBDMPAHL | 2-(N-methyl-PFOSA) acetate comment |
| 219 | PFC_D | Polyfluorochemicals Compounds | LBXPFDE | Perfluorodecanoic acid |
| 220 | PFC_D | Polyfluorochemicals Compounds | LBDPFDEL | Perfluorodecanoic acid comment |
| 221 | PFC_D | Polyfluorochemicals Compounds | LBXPFBS | Perfluorobutane sulfonic acid |
| 222 | PFC_D | Polyfluorochemicals Compounds | LBDPFBSL | Perfluorobutane sulfonic acid comment |
| 223 | PFC_D | Polyfluorochemicals Compounds | LBXPFHP | Perfluoroheptanoic acid |
| 224 | PFC_D | Polyfluorochemicals Compounds | LBDPFHPL | Perfluoroheptanoic acid comment |
| 225 | PFC_D | Polyfluorochemicals Compounds | LBXPFNA | Perfluorononanoic acid |
| 226 | PFC_D | Polyfluorochemicals Compounds | LBDPFNAL | Perfluorononanoic acid comment |
| 227 | PFC_D | Polyfluorochemicals Compounds | LBXPFSA | Perfluorooctane sulfonamide |
| 228 | PFC_D | Polyfluorochemicals Compounds | LBDPFSAL | Perfluorooctane sulfonamide comment |
| 229 | PFC_D | Polyfluorochemicals Compounds | LBXPFUA | Perfluoroundecanoic acid |
| 230 | PFC_D | Polyfluorochemicals Compounds | LBDPFUAL | Perfluoroundecanoic acid comment |
| 231 | PFC_D | Polyfluorochemicals Compounds | LBXPFDO | Perfluorododecanoic acid |
| 232 | PFC_D | Polyfluorochemicals Compounds | LBDPFDOL | Perfluorododecanoic acid comment |
| 233 | PSA_D | PSA and Questions | SEQN | Respondent sequence number |
| 234 | PSA_D | PSA and Questions | KIQ110 | Willing to have blood tested for PSA |
| 235 | PSA_D | PSA and Questions | KIQ115 | Infection or inflammation of prostate |
| 236 | PSA_D | PSA and Questions | KIQ185 | Rectal exam in the last 7 days |
| 237 | PSA_D | PSA and Questions | KIQ191 | prostate biopsy or surgery in last 4 wks |
| 238 | PSA_D | PSA and Questions | KIQ195 | Cystoscopy in the last 4 weeks |
| 239 | PSA_D | PSA and Questions | KIQ201 | Diagnosed with prostate cancer |
| 240 | PSA_D | PSA and Questions | KID221 | Age at diagnosis of prostate cancer |
| 241 | PSA_D | PSA and Questions | KIQ241 | Ever had prostate surgery |

| Item # | File name | Component | Variable ID | Label |
|---|---|---|---|---|
| 242 | PSA_D | PSA and Questions | KIQ282 | Surgery for prostate cancer? |
| 243 | PSA_D | PSA and Questions | KIQ301 | Radiation treatment for prostate cancer |
| 244 | PSA_D | PSA and Questions | KIQ311 | Taken medicines for prostate cancer |
| 245 | PSA_D | PSA and Questions | LBXP1 | Total prostate specific antigen (ng/mL) |
| 246 | PSA_D | PSA and Questions | LBXP2 | Free prostate specific antigen (ng/mL) |
| 247 | PSA_D | PSA and Questions | LBDP3 | Prostate specific antigen ratio (%) |
| 248 | PTH_D | Parathyroid Hormone | SEQN | Respondent sequence number |
| 249 | PTH_D | Parathyroid Hormone | LBXPT21 | Parathyroid Hormone(Elecys method) pg/mL |
| 250 | TCHOL_D | Total Cholesterol | SEQN | Respondent sequence number |
| 251 | TCHOL_D | Total Cholesterol | LBXTC | Total cholesterol (mg/dL) |
| 252 | TCHOL_D | Total Cholesterol | LBDTCSI | Total Cholesterol( mmol/L) |
| 253 | TFR_D | Transferrin Receptor | SEQN | Respondent sequence number |
| 254 | TFR_D | Transferrin Receptor | LBXTFR | Transferrin Receptor (mg/L) |
| 255 | THGIHG_D | Total Mercury and Inorganic Mercury | SEQN | Respondent sequence number |
| 256 | THGIHG_D | Total Mercury and Inorganic Mercury | LBXTHG | Mercury, total (ug/L) |
| 257 | THGIHG_D | Total Mercury and Inorganic Mercury | LBDTHGSI | Mercury, total (umol/L ) |
| 258 | THGIHG_D | Total Mercury and Inorganic Mercury | LBDTHGLC | Mercury, total comment code |
| 259 | THGIHG_D | Total Mercury and Inorganic Mercury | LBXIHG | Mercury, inorganic (ug/L) |
| 260 | THGIHG_D | Total Mercury and Inorganic Mercury | LBDIHGSI | Mercury, inorganic (umol/L ) |
| 261 | THGIHG_D | Total Mercury and Inorganic Mercury | LBDIHGLC | Mercury, inorganic comment code |
| 262 | TRIGLY_D | Triglyceride, LDL, Apo B | SEQN | Respondent sequence number |
| 263 | TRIGLY_D | Triglyceride, LDL, Apo B | WTSAF2YR | Fasting Subsample 2 Year MEC Weight |
| 264 | TRIGLY_D | Triglyceride, LDL, Apo B | LBXTR | Triglyceride (mg/dL) |
| 265 | TRIGLY_D | Triglyceride, LDL, Apo B | LBDTRSI | Triglyceride (mmol/L) |
| 266 | TRIGLY_D | Triglyceride, LDL, Apo B | LBDLDL | LDL-cholesterol (mg/dL) |
| 267 | TRIGLY_D | Triglyceride, LDL, Apo B | LBDLDLSI | LDL-cholesterol (mmol/L) |
| 268 | TRIGLY_D | Triglyceride, LDL, Apo B | LBXAPB | Apolipoprotein (B) (mg/dL) |
| 269 | TRIGLY_D | Triglyceride, LDL, Apo B | LBDAPBSI | Apolipoprotein (B) (g/L) |
| 270 | UAS_D | Arsenics | SEQN | Respondent sequence number |
| 271 | UAS_D | Arsenics | WTSA2YR | Environmental A two year weights |
| 272 | UAS_D | Arsenics | URXUCR | Creatinine, urine (mg/dL) |
| 273 | UAS_D | Arsenics | URXUAS | Urinary total arsenic (ug/L) |
| 274 | UAS_D | Arsenics | URDUASLC | Urinary Arsenic comment code |
| 275 | UAS_D | Arsenics | URXUAS3 | Urinary arsenous acid (ug/L) |
| 276 | UAS_D | Arsenics | URDUA3LC | Urinary Arsenous acid comment code |
| 277 | UAS_D | Arsenics | URXUAS5 | Urinary Arsenic acid (ug/L) |

| Item # | File name | Component | Variable ID | Label |
|---|---|---|---|---|
| 278 | UAS_D | Arsenics | URDUA5LC | Urinary Arsenic acid comment code |
| 279 | UAS_D | Arsenics | URXUAB | Urinary Arsenobetaine (ug/L) |
| 280 | UAS_D | Arsenics | URDUABLC | Urinary Arsenobetaine comment code |
| 281 | UAS_D | Arsenics | URXUAC | Urinary Arsenocholine (ug/L) |
| 282 | UAS_D | Arsenics | URDUACLC | Urinary Arsenocholine comment code |
| 283 | UAS_D | Arsenics | URXUDMA | Urinary Dimethylarsonic acid (ug/L) |
| 284 | UAS_D | Arsenics | URDUDALC | Urinary Dimethylarsonic acid comment |
| 285 | UAS_D | Arsenics | URXUMMA | Urinary Monomethylacrsonic acid (ug/L) |
| 286 | UAS_D | Arsenics | URDUMMAL | Urinary Monomethylacrsonic acid comment |
| 287 | UAS_D | Arsenics | URXUTM | Urinary Trimethylarsine Oxide (ug/L) |
| 288 | UAS_D | Arsenics | URDUTMLC | Urinary Trimethylarsine Oxide comment |
| 289 | UCPREG_D | Urine Pregnancy Test | SEQN | Respondent sequence number |
| 290 | UCPREG_D | Urine Pregnancy Test | URXPREG | Pregnancy test result |
| 291 | UHG_D | Urinary Mercury | SEQN | Respondent sequence number |
| 292 | UHG_D | Urinary Mercury | URXUHG | Mercury, urine (ng/mL) |
| 293 | UHG_D | Urinary Mercury | URDUHGLC | Urinary mercury comment code |
| 294 | UHG_D | Urinary Mercury | URXUCR | Creatinine, urine (mg/dL) |
| 295 | UHG_D | Urinary Mercury | WTSA2YR | Environmental A 2 year weights |
| 296 | UHM_D | Urinary Heavy Metals | SEQN | Respondent sequence number |
| 297 | UHM_D | Urinary Heavy Metals | WTSA2YR | Two-year MEC weights of subsample A |
| 298 | UHM_D | Urinary Heavy Metals | URXUCR | Creatinine, urine (mg/dL) |
| 299 | UHM_D | Urinary Heavy Metals | URXUBA | Barium, urine (ug/L) |
| 300 | UHM_D | Urinary Heavy Metals | URDUBALC | Urinary Barium comment code |
| 301 | UHM_D | Urinary Heavy Metals | URXUBE | Beryllium, urine (ug/L) |
| 302 | UHM_D | Urinary Heavy Metals | URDUBELC | Urinary Beryllium comment code |
| 303 | UHM_D | Urinary Heavy Metals | URXUCD | Cadmium, urine (ug/L) |
| 304 | UHM_D | Urinary Heavy Metals | URDUCDLC | Urinary Cadmium comment code |
| 305 | UHM_D | Urinary Heavy Metals | URXUCO | Cobalt, urine (ug/L) |
| 306 | UHM_D | Urinary Heavy Metals | URDUCOLC | Urinary Cobalt comment code |
| 307 | UHM_D | Urinary Heavy Metals | URXUCS | Cesium, urine (ug/L) |
| 308 | UHM_D | Urinary Heavy Metals | URDUCSLC | Urinary Cesium comment code |
| 309 | UHM_D | Urinary Heavy Metals | URXUMO | Molybdenum, urine (ug/L) |
| 310 | UHM_D | Urinary Heavy Metals | URDUMOLC | Urinary Molybden comment code |
| 311 | UHM_D | Urinary Heavy Metals | URXUPB | Lead, urine (ug/L) |
| 312 | UHM_D | Urinary Heavy Metals | URDUPBLC | Urinary Lead comment code |
| 313 | UHM_D | Urinary Heavy Metals | URXUPT | Platinum, urine (ug/L) |

| Item # | File name | Component | Variable ID | Label |
|---|---|---|---|---|
| 314 | UHM_D | Urinary Heavy Metals | URDUPTLC | Urinary Platinum comment code |
| 315 | UHM_D | Urinary Heavy Metals | URXUSB | Antimony, urine (ug/L) |
| 316 | UHM_D | Urinary Heavy Metals | URDUSBLC | Urinary Antimony comment code |
| 317 | UHM_D | Urinary Heavy Metals | URXUTL | Thallium, urine (ug/L) |
| 318 | UHM_D | Urinary Heavy Metals | URDUTLLC | Urinary Thallium comment code |
| 319 | UHM_D | Urinary Heavy Metals | URXUTU | Tungsten, urine (ug/L) |
| 320 | UHM_D | Urinary Heavy Metals | URDUTULC | Urinary Tungsten comment code |
| 321 | UHM_D | Urinary Heavy Metals | URXUUR | Uranium, urinary (ug/L) |
| 322 | UHM_D | Urinary Heavy Metals | URDUURLC | Urinary Uranium comment code |
| 323 | UIO_D | Urinary Iodine | SEQN | Respondent sequence number |
| 324 | UIO_D | Urinary Iodine | URXUIO | Iodine, urine (ng/mL) |
| 325 | UIO_D | Urinary Iodine | URXUCR | Creatinine, urine (mg/dL) |
| 326 | UIO_D | Urinary Iodine | WTSC2YR | Two-year MEC weights of subsample C |
| 327 | VIC_D | Vitamin C | SEQN | Respondent sequence number |
| 328 | VIC_D | Vitamin C | LBXVIC | Vitamin C (mg/dL) |
| 329 | VIC_D | Vitamin C | LBDVICSI | Vitamin C (umol/L) |
| 330 | VID_D | Vitamin D | SEQN | Respondent sequence number |
| 331 | VID_D | Vitamin D | LBXVID | Vitamin D (ng/mL) |
| 332 | VITAEC_D | Vitamins A, E, and Carotenoids | SEQN | Respondent sequence number |
| 333 | VITAEC_D | Vitamins A, E, and Carotenoids | LBXALC | Alpha-carotene (ug/dL) |
| 334 | VITAEC_D | Vitamins A, E, and Carotenoids | LBDALCSI | Alpha-carotene (umol/L) |
| 335 | VITAEC_D | Vitamins A, E, and Carotenoids | LBXBEC | trans-Beta carotene (ug/dL) |
| 336 | VITAEC_D | Vitamins A, E, and Carotenoids | LBDBECSI | trans-Beta carotene (umol/L) |
| 337 | VITAEC_D | Vitamins A, E, and Carotenoids | LBXCBC | cis-Beta carotene (ug/dL) |
| 338 | VITAEC_D | Vitamins A, E, and Carotenoids | LBDCBCSI | cis-Beta carotene (umol/L) |
| 339 | VITAEC_D | Vitamins A, E, and Carotenoids | LBXCRY | b-Cryptoxanthin (ug/dL) |
| 340 | VITAEC_D | Vitamins A, E, and Carotenoids | LBDCRYSI | b-Cryptoxanthin (umol/L) |
| 341 | VITAEC_D | Vitamins A, E, and Carotenoids | LBXGTC | g-Tocopherol (ug/dL) |
| 342 | VITAEC_D | Vitamins A, E, and Carotenoids | LBDGTCSI | g-Tocopherol (umol/L) |
| 343 | VITAEC_D | Vitamins A, E, and Carotenoids | LBXLUZ | Lutein and zeaxanthin (ug/dL) |
| 344 | VITAEC_D | Vitamins A, E, and Carotenoids | LBDLUZSI | Lutein and zeaxanthin (umol/L) |
| 345 | VITAEC_D | Vitamins A, E, and Carotenoids | LBXLYC | trans-Lycopene (ug/dL) |
| 346 | VITAEC_D | Vitamins A, E, and Carotenoids | LBDLYCSI | trans-Lycopene (umol/L) |
| 347 | VITAEC_D | Vitamins A, E, and Carotenoids | LBXRPL | Retinyl Palmitate (ug/dL) |
| 348 | VITAEC_D | Vitamins A, E, and Carotenoids | LBDRPLSI | Retinyl Palmitate (umol/L) |
| 349 | VITAEC_D | Vitamins A, E, and Carotenoids | LBXRST | Retinyl Stearate (ug/dL) |

| Item # | File name | Component | Variable ID | Label |
|---|---|---|---|---|
| 350 | VITAEC_D | Vitamins A, E, and Carotenoids | LBDRSTSI | Retinyl Stearate (umol/L) |
| 351 | VITAEC_D | Vitamins A, E, and Carotenoids | LBXVIA | Vitamin A (ug/dL) |
| 352 | VITAEC_D | Vitamins A, E, and Carotenoids | LBDVIASI | Vitamin A (umol/L) |
| 353 | VITAEC_D | Vitamins A, E, and Carotenoids | LBXVIE | Vitamin E (ug/dL) |
| 354 | VITAEC_D | Vitamins A, E, and Carotenoids | LBDVIESI | Vitamin E (umol/L) |
| 355 | VITAEC_D | Vitamins A, E, and Carotenoids | LBDTLY | Total (cis- and trans-)Lycopene (ug/dL) |
| 356 | VITAEC_D | Vitamins A, E, and Carotenoids | LBDTLYSI | Total (cis- and trans-)Lycopene (umol/L) |
| 357 | WPIN_D | Perchlorate | SEQN | Respondent sequence number |
| 358 | WPIN_D | Perchlorate | WTSPC2YR | Two-year MEC weight of water perchlorate |
| 359 | WPIN_D | Perchlorate | LBXWIO | Iodide, water (ng/mL) |
| 360 | WPIN_D | Perchlorate | LBDWIOLC | Iodide, water comment code |
| 361 | WPIN_D | Perchlorate | LBXWNO | Nitrate, water (ng/mL) |
| 362 | WPIN_D | Perchlorate | LBDWNOLC | Nitrate, water comment code |
| 363 | WPIN_D | Perchlorate | LBXWP8 | Perchlorate, water (ng/mL) |
| 364 | WPIN_D | Perchlorate | LBDWP8LC | Perchlorate, water comment code |

**NHANES 2005-2006 Lab Data Items**

**August 2009**

**Table B: List of variables sorted alphabetically by "Label"**

| Item # | File name | Component | Variable ID | Label |
|---|---|---|---|---|
| 1 | PFC_D | Polyfluorochemicals Compounds | LBXEPAH | 2-(N-ethyl-PFOSA) acetate |
| 2 | PFC_D | Polyfluorochemicals Compounds | LBDEPAHL | 2-(N-ethyl-PFOSA) acetate comment |
| 3 | PFC_D | Polyfluorochemicals Compounds | LBXMPAH | 2-(N-methyl-PFOSA) acetate |
| 4 | PFC_D | Polyfluorochemicals Compounds | LBDMPAHL | 2-(N-methyl-PFOSA) acetate comment |
| 5 | PSA_D | PSA and Questions | KID221 | Age at diagnosis of prostate cancer |
| 6 | BIOPRO_D | Standard Biochemistry Profile | LBXSATSI | Alanine aminotransferase ALT (U/L) |
| 7 | BIOPRO_D | Standard Biochemistry Profile | LBXSAL | Albumin (g/dL) |
| 8 | BIOPRO_D | Standard Biochemistry Profile | LBDSALSI | Albumin (g/L) |
| 9 | ALB_CR_D | Urinary Albumin and Creatinine | URXUMS | Albumin, urine (mg/L) |
| 10 | ALB_CR_D | Urinary Albumin and Creatinine | URXUMA | Albumin, urine (ug/mL) |
| 11 | FASTQX_D | Phlebotomy Fasting Questionnaire | PHAALCHR | Alcohol fast time (hours) |
| 12 | FASTQX_D | Phlebotomy Fasting Questionnaire | PHAALCMN | Alcohol fast time (minutes) |
| 13 | FASTQX_D | Phlebotomy Fasting Questionnaire | PHQ030 | Alcohol, such as beer, wine, or liquor? |

| Item # | File name | Component | Variable ID | Label |
|---|---|---|---|---|
| 14 | BIOPRO_D | Standard Biochemistry Profile | LBXSAPSI | Alkaline phosphotase (U/L) |
| 15 | VITAEC_D | Vitamins A, E, and Carotenoids | LBXALC | Alpha-carotene (ug/dL) |
| 16 | VITAEC_D | Vitamins A, E, and Carotenoids | LBDALCSI | Alpha-carotene (umol/L) |
| 17 | AL_IGE_D | Allergen IgE Serum Tests | LBXIM6 | Alternaria IgE antibody (kU/L) |
| 18 | AL_IGE_D | Allergen IgE Serum Tests | LBDIM6LC | Alternaria IgE comment code |
| 19 | FASTQX_D | Phlebotomy Fasting Questionnaire | PHAANTHR | Antacids, laxatives fast time (hours) |
| 20 | FASTQX_D | Phlebotomy Fasting Questionnaire | PHAANTMN | Antacids, laxatives fast time (minutes) |
| 21 | FASTQX_D | Phlebotomy Fasting Questionnaire | PHQ050 | Antacids, laxatives, or anti-diarrheals? |
| 22 | UHM_D | Urinary Heavy Metals | URXUSB | Antimony, urine (ug/L) |
| 23 | TRIGLY_D | Triglyceride, LDL, Apo B | LBDAPBSI | Apolipoprotein (B) (g/L) |
| 24 | TRIGLY_D | Triglyceride, LDL, Apo B | LBXAPB | Apolipoprotein (B) (mg/dL) |
| 25 | BIOPRO_D | Standard Biochemistry Profile | LBXSASSI | Aspartate aminotransferase AST (U/L) |
| 26 | AL_IGE_D | Allergen IgE Serum Tests | LBXIM3 | Aspergillus IgE antibody (kU/L) |
| 27 | AL_IGE_D | Allergen IgE Serum Tests | LBDIM3LC | Aspergillus IgE comment code |
| 28 | VITAEC_D | Vitamins A, E, and Carotenoids | LBXCRY | b-Cryptoxanthin (ug/dL) |
| 29 | VITAEC_D | Vitamins A, E, and Carotenoids | LBDCRYSI | b-Cryptoxanthin (umol/L) |
| 30 | UHM_D | Urinary Heavy Metals | URXUBA | Barium, urine (ug/L) |
| 31 | CBC_D | Complete Blood Count | LBDBANO | Basophils number (1000 cells/uL) |
| 32 | CBC_D | Complete Blood Count | LBXBAPCT | Basophils percent (%) |
| 33 | AL_IGE_D | Allergen IgE Serum Tests | LBXIG2 | Bermuda grass IgE antibody (kU/L) |
| 34 | AL_IGE_D | Allergen IgE Serum Tests | LBDIG2LC | Bermuda grass IgE antibody comment code |
| 35 | UHM_D | Urinary Heavy Metals | URXUBE | Beryllium, urine (ug/L) |
| 36 | BIOPRO_D | Standard Biochemistry Profile | LBXSC3SI | Bicarbonate (mmol/L) |
| 37 | BIOPRO_D | Standard Biochemistry Profile | LBDSTBSI | Bilirubin, total (umol/L) |
| 38 | AL_IGE_D | Allergen IgE Serum Tests | LBXIT3 | Birch IgE antibody (kU/L) |
| 39 | AL_IGE_D | Allergen IgE Serum Tests | LBDIT3LC | Birch IgE antibody comment code |
| 40 | BIOPRO_D | Standard Biochemistry Profile | LBXSBU | Blood urea nitrogen (mg/dL) |
| 41 | BIOPRO_D | Standard Biochemistry Profile | LBDSBUSI | Blood urea nitrogen (mmol/L) |
| 42 | EPH_D | Environmental Phenols | URXBUP | Butyl paraben (ng/ml) |
| 43 | EPH_D | Environmental Phenols | URDBUPLC | Butyl paraben comment |
| 44 | CRP_D | C-Reactive Protein | LBXCRP | C-reactive protein(mg/dL) |
| 45 | PBCD_D | Blood Lead and Blood Cadmium | LBDBCDSI | Cadmium (nmol/L) |
| 46 | PBCD_D | Blood Lead and Blood Cadmium | LBXBCD | Cadmium (ug/L) |
| 47 | UHM_D | Urinary Heavy Metals | URXUCD | Cadmium, urine (ug/L) |
| 48 | AL_IGE_D | Allergen IgE Serum Tests | LBXIE1 | Cat IgE antibody (kU/L) |
| 49 | AL_IGE_D | Allergen IgE Serum Tests | LBDIE1LC | Cat IgE antibody comment code |

| Item # | File name | Component | Variable ID | Label |
|---|---|---|---|---|
| 50 | HIV_D | Human Immunodeficiency Virus (HIV) | LBXCD4 | CD4 counts (cells/mm3) |
| 51 | HIV_D | Human Immunodeficiency Virus (HIV) | LBXCD8 | CD8 counts (cells/mm3) |
| 52 | UHM_D | Urinary Heavy Metals | URXUCS | Cesium, urine (ug/L) |
| 53 | BIOPRO_D | Standard Biochemistry Profile | LBXSCLSI | Chloride (mmol/L) |
| 54 | BIOPRO_D | Standard Biochemistry Profile | LBXSCH | Cholesterol (mg/dL) |
| 55 | BIOPRO_D | Standard Biochemistry Profile | LBDSCHSI | Cholesterol (mmol/L) |
| 56 | VITAEC_D | Vitamins A, E, and Carotenoids | LBXCBC | cis-Beta carotene (ug/dL) |
| 57 | VITAEC_D | Vitamins A, E, and Carotenoids | LBDCBCSI | cis-Beta carotene (umol/L) |
| 58 | UHM_D | Urinary Heavy Metals | URXUCO | Cobalt, urine (ug/L) |
| 59 | AL_IGE_D | Allergen IgE Serum Tests | LBXII6 | Cockroach IgE antibody (kU/L) |
| 60 | AL_IGE_D | Allergen IgE Serum Tests | LBDII6LC | Cockroach IgE antibody comment code |
| 61 | FASTQX_D | Phlebotomy Fasting Questionnaire | PHQ020 | Coffee or tea with cream or sugar? |
| 62 | FASTQX_D | Phlebotomy Fasting Questionnaire | PHACOFHR | Coffee/tea fast time (hours) |
| 63 | FASTQX_D | Phlebotomy Fasting Questionnaire | PHACOFMN | Coffee/tea fast time (minutes) |
| 64 | COT_D | Serum Cotinine | LBXCOT | Cotinine (ng/mL) |
| 65 | BIOPRO_D | Standard Biochemistry Profile | LBXSCR | Creatinine (mg/dL) |
| 66 | BIOPRO_D | Standard Biochemistry Profile | LBDSCRSI | Creatinine (umol/L) |
| 67 | ALB_CR_D | Urinary Albumin and Creatinine | URXUCR | Creatinine, urine (mg/dL) |
| 68 | UAS_D | Arsenics | URXUCR | Creatinine, urine (mg/dL) |
| 69 | UHG_D | Urinary Mercury | URXUCR | Creatinine, urine (mg/dL) |
| 70 | UHM_D | Urinary Heavy Metals | URXUCR | Creatinine, urine (mg/dL) |
| 71 | UIO_D | Urinary Iodine | URXUCR | Creatinine, urine (mg/dL) |
| 72 | ALB_CR_D | Urinary Albumin and Creatinine | URXCRS | Creatinine, urine (umol/L) |
| 73 | PSA_D | PSA and Questions | KIQ195 | Cystoscopy in the last 4 weeks |
| 74 | AL_IGE_D | Allergen IgE Serum Tests | LBXID2 | D. Farinae IgE antibody (kU/L) |
| 75 | AL_IGE_D | Allergen IgE Serum Tests | LBDID2LC | D. Farinae IgE antibody comment code |
| 76 | AL_IGE_D | Allergen IgE Serum Tests | LBDID1LC | D. Pteronyssin IgE antibody comment code |
| 77 | AL_IGE_D | Allergen IgE Serum Tests | LBXID1 | D. Pteronyssinus IgE antibody (kU/L) |
| 78 | PSA_D | PSA and Questions | KIQ201 | Diagnosed with prostate cancer |
| 79 | FASTQX_D | Phlebotomy Fasting Questionnaire | PHASUPHR | Dietary supplements fast time (hours) |
| 80 | FASTQX_D | Phlebotomy Fasting Questionnaire | PHASUPMN | Dietary supplements fast time (minutes) |
| 81 | FASTQX_D | Phlebotomy Fasting Questionnaire | PHQ060 | Dietary supplements? |
| 82 | HDL_D | HDL-Cholesterol | LBDHDD | Direct HDL-Cholesterol (mg/dL) |
| 83 | HDL_D | HDL-Cholesterol | LBDHDDSI | Direct HDL-Cholesterol (mmol/L) |
| 84 | AL_IGE_D | Allergen IgE Serum Tests | LBXIE5 | Dog IgE antibody (kU/L) |
| 85 | AL_IGE_D | Allergen IgE Serum Tests | LBDIE5LC | Dog IgE antibody comment code |

| Item # | File name | Component | Variable ID | Label |
|---|---|---|---|---|
| 86 | AL_IGE_D | Allergen IgE Serum Tests | LBXIF1 | Egg IgE antibody (kU/L) |
| 87 | AL_IGE_D | Allergen IgE Serum Tests | LBDIF1LC | Egg IgE antibody comment code |
| 88 | UHG_D | Urinary Mercury | WTSA2YR | Environmental A 2 year weights |
| 89 | UAS_D | Arsenics | WTSA2YR | Environmental A two year weights |
| 90 | CBC_D | Complete Blood Count | LBDEONO | Eosinophils number (1000 cells/uL) |
| 91 | CBC_D | Complete Blood Count | LBXEOPCT | Eosinophils percent (%) |
| 92 | EPH_D | Environmental Phenols | URXEPB | Ethyl paraben (ng/ml) |
| 93 | EPH_D | Environmental Phenols | URDEPBLC | Ethyl paraben comment |
| 94 | PSA_D | PSA and Questions | KIQ241 | Ever had prostate surgery |
| 95 | TRIGLY_D | Triglyceride, LDL, Apo B | WTSAF2YR | Fasting Subsample 2 Year MEC Weight |
| 96 | FERTIN_D | Ferritin | LBXFER | Ferritin(ng/mL) |
| 97 | FERTIN_D | Ferritin | LBDFERSI | Ferritin(ug/L) |
| 98 | FOLATE_D | Erythrocyte (RBC) Folate and Serum Folate | LBXRBF | Folate, RBC (ng/mL RBC) |
| 99 | FOLATE_D | Erythrocyte (RBC) Folate and Serum Folate | LBDRBFSI | Folate, RBC(nmol/L RBC) |
| 100 | FOLATE_D | Erythrocyte (RBC) Folate and Serum Folate | LBXFOL | Folate, serum (ng/mL) |
| 101 | FOLATE_D | Erythrocyte (RBC) Folate and Serum Folate | LBDFOLSI | Folate, serum (nmol/L) |
| 102 | PSA_D | PSA and Questions | LBXP2 | Free prostate specific antigen (ng/mL) |
| 103 | VITAEC_D | Vitamins A, E, and Carotenoids | LBXGTC | g-Tocopherol (ug/dL) |
| 104 | VITAEC_D | Vitamins A, E, and Carotenoids | LBDGTCSI | g-Tocopherol (umol/L) |
| 105 | BIOPRO_D | Standard Biochemistry Profile | LBXSGTSI | Gamma glutamyl transferase (U/L) |
| 106 | BIOPRO_D | Standard Biochemistry Profile | LBXSGB | Globulin (g/dL) |
| 107 | BIOPRO_D | Standard Biochemistry Profile | LBDSGBSI | Globulin (g/L) |
| 108 | BIOPRO_D | Standard Biochemistry Profile | LBXSGL | Glucose, serum (mg/dL) |
| 109 | BIOPRO_D | Standard Biochemistry Profile | LBDSGLSI | Glucose, serum (mmol/L) |
| 110 | GHB_D | Glycohemoglobin | LBXGH | Glycohemoglobin (%) |
| 111 | FASTQX_D | Phlebotomy Fasting Questionnaire | PHAGUMHR | Gum, mints cough drops fast time (hours) |
| 112 | FASTQX_D | Phlebotomy Fasting Questionnaire | PHAGUMMN | Gum, mints, cough fast time (minutes) |
| 113 | FASTQX_D | Phlebotomy Fasting Questionnaire | PHQ040 | Gum, mints, lozenges or cough drops |
| 114 | CBC_D | Complete Blood Count | LBXHCT | Hematocrit (%) |
| 115 | CBC_D | Complete Blood Count | LBXHGB | Hemoglobin (g/dL) |
| 116 | HEPA_D | Hepatitis A Antibody | LBXHA | Hepatitis A Antibody (Anti-HAV) |
| 117 | HEPBD_D | Hepatitis B and D | LBXHBC | Hepatitis B core antibody |
| 118 | HEPB_S_D | Hepatitis B surface antibody | LBXHBS | Hepatitis B Surface Antibody |
| 119 | HEPBD_D | Hepatitis B and D | LBDHBG | Hepatitis B surface antigen |
| 120 | HEPC_D | Hepatitis C antibody | LBDHCV | Hepatitis C antibody (confirmed) |
| 121 | HEPC_D | Hepatitis C antibody | LBXHCR | Hepatitis C RNA (HCV-RNA) |

| Item # | File name | Component | Variable ID | Label |
|---|---|---|---|---|
| 122 | HEPBD_D | Hepatitis B and D | LBDHD | Hepatitis D (anti-HDV) |
| 123 | HEPC_D | Hepatitis C antibody | LBXHCG | Hepatitis HCV genotype |
| 124 | HSV_D | Herpes Simplex Virus I and II | LBXHE1 | Herpes Simplex Virus I |
| 125 | HSV_D | Herpes Simplex Virus I and II | LBXHE2 | Herpes Simplex Virus II |
| 126 | HIV_D | Human Immunodeficiency Virus (HIV) | LBDHI | HIV antibody test result |
| 127 | HCY_D | Homocysteine | LBXHCY | Homocysteine (umol/L) |
| 128 | PSA_D | PSA and Questions | KIQ115 | Infection or inflammation of prostate |
| 129 | WPIN_D | Perchlorate | LBXWIO | Iodide, water (ng/mL) |
| 130 | WPIN_D | Perchlorate | LBDWIOLC | Iodide, water comment code |
| 131 | UIO_D | Urinary Iodine | URXUIO | Iodine, urine (ng/mL) |
| 132 | FETIB_D | Iron, TIBC, Transferrin Saturation | LBXIRN | Iron, Frozen Serum (ug/dL) |
| 133 | FETIB_D | Iron, TIBC, Transferrin Saturation | LBDIRNSI | Iron, Frozen Serum (umol/L) |
| 134 | BIOPRO_D | Standard Biochemistry Profile | LBXSIR | Iron, refigerated (ug/dL) |
| 135 | BIOPRO_D | Standard Biochemistry Profile | LBDSIRSI | Iron, refigerated (umol/L) |
| 136 | BIOPRO_D | Standard Biochemistry Profile | LBXSLDSI | Lactate dehydrogenase LDH (U/L) |
| 137 | TRIGLY_D | Triglyceride, LDL, Apo B | LBDLDL | LDL-cholesterol (mg/dL) |
| 138 | TRIGLY_D | Triglyceride, LDL, Apo B | LBDLDLSI | LDL-cholesterol (mmol/L) |
| 139 | PBCD_D | Blood Lead and Blood Cadmium | LBXBPB | Lead (ug/dL) |
| 140 | PBCD_D | Blood Lead and Blood Cadmium | LBDBPBSI | Lead (umol/L) |
| 141 | UHM_D | Urinary Heavy Metals | URXUPB | Lead, urine (ug/L) |
| 142 | VITAEC_D | Vitamins A, E, and Carotenoids | LBXLUZ | Lutein and zeaxanthin (ug/dL) |
| 143 | VITAEC_D | Vitamins A, E, and Carotenoids | LBDLUZSI | Lutein and zeaxanthin (umol/L) |
| 144 | CBC_D | Complete Blood Count | LBDLYMNO | Lymphocyte number (1000 cells/uL) |
| 145 | CBC_D | Complete Blood Count | LBXLYPCT | Lymphocyte percent (%) |
| 146 | CBC_D | Complete Blood Count | LBXMC | MCHC (g/dL) |
| 147 | CBC_D | Complete Blood Count | LBXMCHSI | Mean cell hemoglobin (pg) |
| 148 | CBC_D | Complete Blood Count | LBXMCVSI | Mean cell volume (fL) |
| 149 | CBC_D | Complete Blood Count | LBXMPSI | Mean platelet volume (fL) |
| 150 | THGIHG_D | Total Mercury and Inorganic Mercury | LBXIHG | Mercury, inorganic (ug/L) |
| 151 | THGIHG_D | Total Mercury and Inorganic Mercury | LBDIHGSI | Mercury, inorganic (umol/L ) |
| 152 | THGIHG_D | Total Mercury and Inorganic Mercury | LBDIHGLC | Mercury, inorganic comment code |
| 153 | THGIHG_D | Total Mercury and Inorganic Mercury | LBXTHG | Mercury, total (ug/L) |
| 154 | THGIHG_D | Total Mercury and Inorganic Mercury | LBDTHGSI | Mercury, total (umol/L ) |
| 155 | THGIHG_D | Total Mercury and Inorganic Mercury | LBDTHGLC | Mercury, total comment code |
| 156 | UHG_D | Urinary Mercury | URXUHG | Mercury, urine (ng/mL) |
| 157 | EPH_D | Environmental Phenols | URXMPB | Methyl paraben (ng/ml) |

| Item # | File name | Component | Variable ID | Label |
|---|---|---|---|---|
| 158 | EPH_D | Environmental Phenols | URDMPBLC | Methyl paraben comment |
| 159 | AL_IGE_D | Allergen IgE Serum Tests | LBXIF2 | Milk IgE antibody (kU/L) |
| 160 | AL_IGE_D | Allergen IgE Serum Tests | LBDIF2LC | Milk IgE antibody comment code |
| 161 | UHM_D | Urinary Heavy Metals | URXUMO | Molybdenum, urine (ug/L) |
| 162 | CBC_D | Complete Blood Count | LBDMONO | Monocyte number (1000 cells/uL) |
| 163 | CBC_D | Complete Blood Count | LBXMOPCT | Monocyte percent (%) |
| 164 | AL_IGE_D | Allergen IgE Serum Tests | LBXE72 | Mouse IgE antibody (kU/L) |
| 165 | AL_IGE_D | Allergen IgE Serum Tests | LBDE72LC | Mouse IgE comment code |
| 166 | WPIN_D | Perchlorate | LBXWNO | Nitrate, water (ng/mL) |
| 167 | WPIN_D | Perchlorate | LBDWNOLC | Nitrate, water comment code |
| 168 | AL_IGE_D | Allergen IgE Serum Tests | LBXIT7 | Oak IgE antibody (kU/L) |
| 169 | AL_IGE_D | Allergen IgE Serum Tests | LBDIT7LC | Oak IgE antibody comment code |
| 170 | OGTT_D | Two Hour Oral Glucose Tolerance Test | WTSOG2YR | OGTT Subsample 2 Year MEC Weight |
| 171 | BIOPRO_D | Standard Biochemistry Profile | LBXSOSSI | Osmolality (mmol/Kg) |
| 172 | PTH_D | Parathyroid Hormone | LBXPT21 | Parathyroid Hormone(Elecys method) pg/mL |
| 173 | AL_IGE_D | Allergen IgE Serum Tests | LBXF13 | Peanut IgE antibody (kU/L) |
| 174 | AL_IGE_D | Allergen IgE Serum Tests | LBDF13LC | Peanut IgE antibody comment code |
| 175 | WPIN_D | Perchlorate | LBXWP8 | Perchlorate, water (ng/mL) |
| 176 | WPIN_D | Perchlorate | LBDWP8LC | Perchlorate, water comment code |
| 177 | PFC_D | Polyfluorochemicals Compounds | LBXPFBS | Perfluorobutane sulfonic acid |
| 178 | PFC_D | Polyfluorochemicals Compounds | LBDPFBSL | Perfluorobutane sulfonic acid comment |
| 179 | PFC_D | Polyfluorochemicals Compounds | LBXPFDE | Perfluorodecanoic acid |
| 180 | PFC_D | Polyfluorochemicals Compounds | LBDPFDEL | Perfluorodecanoic acid comment |
| 181 | PFC_D | Polyfluorochemicals Compounds | LBXPFDO | Perfluorododecanoic acid |
| 182 | PFC_D | Polyfluorochemicals Compounds | LBDPFDOL | Perfluorododecanoic acid comment |
| 183 | PFC_D | Polyfluorochemicals Compounds | LBXPFHP | Perfluoroheptanoic acid |
| 184 | PFC_D | Polyfluorochemicals Compounds | LBDPFHPL | Perfluoroheptanoic acid comment |
| 185 | PFC_D | Polyfluorochemicals Compounds | LBXPFHS | Perfluorohexane sulfonic acid |
| 186 | PFC_D | Polyfluorochemicals Compounds | LBDPFHSL | Perfluorohexane sulfonic acid comment |
| 187 | PFC_D | Polyfluorochemicals Compounds | LBXPFNA | Perfluorononanoic acid |
| 188 | PFC_D | Polyfluorochemicals Compounds | LBDPFNAL | Perfluorononanoic acid comment |
| 189 | PFC_D | Polyfluorochemicals Compounds | LBXPFSA | Perfluorooctane sulfonamide |
| 190 | PFC_D | Polyfluorochemicals Compounds | LBDPFSAL | Perfluorooctane sulfonamide comment |
| 191 | PFC_D | Polyfluorochemicals Compounds | LBXPFOS | Perfluorooctane sulfonic acid |
| 192 | PFC_D | Polyfluorochemicals Compounds | LBDPFOSL | Perfluorooctane sulfonic acid comment |
| 193 | PFC_D | Polyfluorochemicals Compounds | LBXPFOA | Perfluorooctanoic acid |

| Item # | File name | Component | Variable ID | Label |
|---|---|---|---|---|
| 194 | PFC_D | Polyfluorochemicals Compounds | LBDPFOAL | Perfluorooctanoic acid comment |
| 195 | PFC_D | Polyfluorochemicals Compounds | LBXPFUA | Perfluoroundecanoic acid |
| 196 | PFC_D | Polyfluorochemicals Compounds | LBDPFUAL | Perfluoroundecanoic acid comment |
| 197 | BIOPRO_D | Standard Biochemistry Profile | LBXSPH | Phosphorus (mg/dL) |
| 198 | BIOPRO_D | Standard Biochemistry Profile | LBDSPHSI | Phosphorus (mmol/L) |
| 199 | CBC_D | Complete Blood Count | LBXPLTSI | Platelet count SI (1000 cells/uL) |
| 200 | UHM_D | Urinary Heavy Metals | URXUPT | Platinum, urine (ug/L) |
| 201 | BIOPRO_D | Standard Biochemistry Profile | LBXSKSI | Potassium (mmol/L) |
| 202 | UCPREG_D | Urine Pregnancy Test | URXPREG | Pregnancy test result |
| 203 | EPH_D | Environmental Phenols | URXPPB | Propyl paraben (ng/ml) |
| 204 | EPH_D | Environmental Phenols | URDPPBLC | Propyl paraben comment |
| 205 | PSA_D | PSA and Questions | KIQ191 | prostate biopsy or surgery in last 4 wks |
| 206 | PSA_D | PSA and Questions | LBDP3 | Prostate specific antigen ratio (%) |
| 207 | EPP_D | Erythrocyte Protoporphyrin (EPP) | LBDEPPSI | Protoporphyrin (umol/L RBC) |
| 208 | EPP_D | Erythrocyte Protoporphyrin (EPP) | LBXEPP | Protoporphyrin(ug/dL RBC) |
| 209 | PSA_D | PSA and Questions | KIQ301 | Radiation treatment for prostate cancer |
| 210 | AL_IGE_D | Allergen IgE Serum Tests | LBXIW1 | Ragweed IgE antibody (kU/L) |
| 211 | AL_IGE_D | Allergen IgE Serum Tests | LBDIW1LC | Ragweed IgE antibody comment code |
| 212 | AL_IGE_D | Allergen IgE Serum Tests | LBXE74 | Rat IgE antibody (kU/L) |
| 213 | AL_IGE_D | Allergen IgE Serum Tests | LBDE74LC | Rat IgE antibody comment code |
| 214 | PSA_D | PSA and Questions | KIQ185 | Rectal exam in the last 7 days |
| 215 | CBC_D | Complete Blood Count | LBXRBCSI | Red blood cell count (million cells/uL) |
| 216 | CBC_D | Complete Blood Count | LBXRDW | Red cell distribution width (%) |
| 217 | AL_IGE_D | Allergen IgE Serum Tests | SEQN | Respondent sequence number |
| 218 | ALB_CR_D | Urinary Albumin and Creatinine | SEQN | Respondent sequence number |
| 219 | B12_D | Vitamin B12 | SEQN | Respondent sequence number |
| 220 | BIOPRO_D | Standard Biochemistry Profile | SEQN | Respondent sequence number |
| 221 | CBC_D | Complete Blood Count | SEQN | Respondent sequence number |
| 222 | CHLMDA_D | Urinary Chlamydia and Gonorrhea | SEQN | Respondent sequence number |
| 223 | COT_D | Serum Cotinine | SEQN | Respondent sequence number |
| 224 | CRP_D | C-Reactive Protein | SEQN | Respondent sequence number |
| 225 | EPH_D | Environmental Phenols | SEQN | Respondent sequence number |
| 226 | EPP_D | Erythrocyte Protoporphyrin (EPP) | SEQN | Respondent sequence number |
| 227 | FASTQX_D | Phlebotomy Fasting Questionnaire | SEQN | Respondent sequence number |
| 228 | FERTIN_D | Ferritin | SEQN | Respondent sequence number |
| 229 | FETIB_D | Iron, TIBC, Transferrin Saturation | SEQN | Respondent sequence number |

| Item # | File name | Component | Variable ID | Label |
|---|---|---|---|---|
| 230 | FOLATE_D | Erythrocyte (RBC) Folate and Serum Folate | SEQN | Respondent sequence number |
| 231 | GHB_D | Glycohemoglobin | SEQN | Respondent sequence number |
| 232 | HCY_D | Homocysteine | SEQN | Respondent sequence number |
| 233 | HDL_D | HDL-Cholesterol | SEQN | Respondent sequence number |
| 234 | HEPA_D | Hepatitis A Antibody | SEQN | Respondent sequence number |
| 235 | HEPB_S_D | Hepatitis B surface antibody | SEQN | Respondent sequence number |
| 236 | HEPBD_D | Hepatitis B and D | SEQN | Respondent sequence number |
| 237 | HEPC_D | Hepatitis C antibody | SEQN | Respondent sequence number |
| 238 | HIV_D | Human Immunodeficiency Virus (HIV) | SEQN | Respondent sequence number |
| 239 | HSV_D | Herpes Simplex Virus I and II | SEQN | Respondent sequence number |
| 240 | OGTT_D | Two Hour Oral Glucose Tolerance Test | SEQN | Respondent sequence number |
| 241 | PBCD_D | Blood Lead and Blood Cadmium | SEQN | Respondent sequence number |
| 242 | PFC_D | Polyfluorochemicals Compounds | SEQN | Respondent sequence number |
| 243 | PSA_D | PSA and Questions | SEQN | Respondent sequence number |
| 244 | PTH_D | Parathyroid Hormone | SEQN | Respondent sequence number |
| 245 | TCHOL_D | Total Cholesterol | SEQN | Respondent sequence number |
| 246 | TFR_D | Transferrin Receptor | SEQN | Respondent sequence number |
| 247 | THGIHG_D | Total Mercury and Inorganic Mercury | SEQN | Respondent sequence number |
| 248 | TRIGLY_D | Triglyceride, LDL, Apo B | SEQN | Respondent sequence number |
| 249 | UAS_D | Arsenics | SEQN | Respondent sequence number |
| 250 | UCPREG_D | Urine Pregnancy Test | SEQN | Respondent sequence number |
| 251 | UHG_D | Urinary Mercury | SEQN | Respondent sequence number |
| 252 | UHM_D | Urinary Heavy Metals | SEQN | Respondent sequence number |
| 253 | UIO_D | Urinary Iodine | SEQN | Respondent sequence number |
| 254 | VIC_D | Vitamin C | SEQN | Respondent sequence number |
| 255 | VID_D | Vitamin D | SEQN | Respondent sequence number |
| 256 | VITAEC_D | Vitamins A, E, and Carotenoids | SEQN | Respondent sequence number |
| 257 | WPIN_D | Perchlorate | SEQN | Respondent sequence number |
| 258 | VITAEC_D | Vitamins A, E, and Carotenoids | LBXRPL | Retinyl Palmitate (ug/dL) |
| 259 | VITAEC_D | Vitamins A, E, and Carotenoids | LBDRPLSI | Retinyl Palmitate (umol/L) |
| 260 | VITAEC_D | Vitamins A, E, and Carotenoids | LBXRST | Retinyl Stearate (ug/dL) |
| 261 | VITAEC_D | Vitamins A, E, and Carotenoids | LBDRSTSI | Retinyl Stearate (umol/L) |
| 262 | AL_IGE_D | Allergen IgE Serum Tests | LBXIG5 | Rye grass IgE antibody (kU/L) |
| 263 | AL_IGE_D | Allergen IgE Serum Tests | LBDIG5LC | Rye grass IgE antibody comment code |
| 264 | CBC_D | Complete Blood Count | LBDNENO | Segmented neutrophils num (1000 cell/uL) |
| 265 | CBC_D | Complete Blood Count | LBXNEPCT | Segmented neutrophils percent (%) |

| Item # | File name | Component | Variable ID | Label |
|---|---|---|---|---|
| 266 | AL_IGE_D | Allergen IgE Serum Tests | LBXIGE | Serum total IgE antibody (kU/L) |
| 267 | AL_IGE_D | Allergen IgE Serum Tests | LBDIGELC | Serum total IgE antibody comment code |
| 268 | FASTQX_D | Phlebotomy Fasting Questionnaire | PHDSESN | Session in which SP was examined |
| 269 | AL_IGE_D | Allergen IgE Serum Tests | LBXF24 | Shrimp IgE antibody (kU/L) |
| 270 | AL_IGE_D | Allergen IgE Serum Tests | LBDF24LC | Shrimp IgE antibody comment code |
| 271 | BIOPRO_D | Standard Biochemistry Profile | LBXSNASI | Sodium (mmol/L) |
| 272 | PSA_D | PSA and Questions | KIQ282 | Surgery for prostate cancer? |
| 273 | PSA_D | PSA and Questions | KIQ311 | Taken medicines for prostate cancer |
| 274 | UHM_D | Urinary Heavy Metals | URXUTL | Thallium, urine (ug/L) |
| 275 | AL_IGE_D | Allergen IgE Serum Tests | LBXW11 | Thistle IgE antibody (kU/L) |
| 276 | AL_IGE_D | Allergen IgE Serum Tests | LBDW11LC | Thistle IgE antibody comment code |
| 277 | FETIB_D | Iron, TIBC, Transferrin Saturation | LBXTIB | TIBC, Frozen Serum (ug/dL) |
| 278 | FETIB_D | Iron, TIBC, Transferrin Saturation | LBDTIBSI | TIBC, Frozen Serum (umol/L) |
| 279 | VITAEC_D | Vitamins A, E, and Carotenoids | LBDTLY | Total (cis- and trans-)Lycopene (ug/dL) |
| 280 | VITAEC_D | Vitamins A, E, and Carotenoids | LBDTLYSI | Total (cis- and trans-)Lycopene (umol/L) |
| 281 | BIOPRO_D | Standard Biochemistry Profile | LBXSTB | Total bilirubin (mg/dL) |
| 282 | BIOPRO_D | Standard Biochemistry Profile | LBXSCA | Total calcium (mg/dL) |
| 283 | BIOPRO_D | Standard Biochemistry Profile | LBDSCASI | Total calcium (mmol/L) |
| 284 | TCHOL_D | Total Cholesterol | LBXTC | Total cholesterol (mg/dL) |
| 285 | TCHOL_D | Total Cholesterol | LBDTCSI | Total Cholesterol( mmol/L) |
| 286 | FASTQX_D | Phlebotomy Fasting Questionnaire | PHAFSTMN | Total length of "food fast," minutes |
| 287 | FASTQX_D | Phlebotomy Fasting Questionnaire | PHAFSTHR | Total length of "food fast," hours |
| 288 | OGTT_D | Two Hour Oral Glucose Tolerance Test | PHAFSTHR | Total length of 'food fast', hours |
| 289 | OGTT_D | Two Hour Oral Glucose Tolerance Test | PHAFSTMN | Total length of 'food fast', minutes |
| 290 | PSA_D | PSA and Questions | LBXP1 | Total prostate specific antigen (ng/mL) |
| 291 | BIOPRO_D | Standard Biochemistry Profile | LBXSTP | Total protein (g/dL) |
| 292 | BIOPRO_D | Standard Biochemistry Profile | LBDSTPSI | Total protein (g/L) |
| 293 | VITAEC_D | Vitamins A, E, and Carotenoids | LBXBEC | trans-Beta carotene (ug/dL) |
| 294 | VITAEC_D | Vitamins A, E, and Carotenoids | LBDBECSI | trans-Beta carotene (umol/L) |
| 295 | VITAEC_D | Vitamins A, E, and Carotenoids | LBXLYC | trans-Lycopene (ug/dL) |
| 296 | VITAEC_D | Vitamins A, E, and Carotenoids | LBDLYCSI | trans-Lycopene (umol/L) |
| 297 | TFR_D | Transferrin Receptor | LBXTFR | Transferrin Receptor (mg/L) |
| 298 | FETIB_D | Iron, TIBC, Transferrin Saturation | LBDPCT | Transferrin saturation (%) |
| 299 | TRIGLY_D | Triglyceride, LDL, Apo B | LBXTR | Triglyceride (mg/dL) |
| 300 | TRIGLY_D | Triglyceride, LDL, Apo B | LBDTRSI | Triglyceride (mmol/L) |
| 301 | BIOPRO_D | Standard Biochemistry Profile | LBXSTR | Triglycerides (mg/dL) |

| Item # | File name | Component | Variable ID | Label |
|---|---|---|---|---|
| 302 | BIOPRO_D | Standard Biochemistry Profile | LBDSTRSI | Triglycerides (mmol/L) |
| 303 | UHM_D | Urinary Heavy Metals | URXUTU | Tungsten, urine (ug/L) |
| 304 | OGTT_D | Two Hour Oral Glucose Tolerance Test | LBXGLT | Two Hour Glucose(OGTT) (mg/dL) |
| 305 | OGTT_D | Two Hour Oral Glucose Tolerance Test | LBDGLTSI | Two Hour Glucose(OGTT) (mmol/L) |
| 306 | UHM_D | Urinary Heavy Metals | WTSA2YR | Two-year MEC weights of subsample A |
| 307 | WPIN_D | Perchlorate | WTSPC2YR | Two-year MEC weight of water perchlorate |
| 308 | PFC_D | Polyfluorochemicals Compounds | WTSA2YR | Two-year MEC weights of subsample A |
| 309 | EPH_D | Environmental Phenols | WTSB2YR | Two-year MEC weights of subsample B |
| 310 | UIO_D | Urinary Iodine | WTSC2YR | Two-year MEC weights of subsample C |
| 311 | UHM_D | Urinary Heavy Metals | URXUUR | Uranium, urinary (ug/L) |
| 312 | BIOPRO_D | Standard Biochemistry Profile | LBXSUA | Uric acid (mg/dL) |
| 313 | BIOPRO_D | Standard Biochemistry Profile | LBDSUASI | Uric acid (umol/L) |
| 314 | EPH_D | Environmental Phenols | URX4TO | Urinary 4-tert-octylphenol (ng/mL) |
| 315 | EPH_D | Environmental Phenols | URD4TOLC | Urinary 4-tert-octylphenol comment |
| 316 | UHM_D | Urinary Heavy Metals | URDUSBLC | Urinary Antimony comment code |
| 317 | UAS_D | Arsenics | URXUAS5 | Urinary Arsenic acid (ug/L) |
| 318 | UAS_D | Arsenics | URDUA5LC | Urinary Arsenic acid comment code |
| 319 | UAS_D | Arsenics | URDUASLC | Urinary Arsenic comment code |
| 320 | UAS_D | Arsenics | URXUAB | Urinary Arsenobetaine (ug/L) |
| 321 | UAS_D | Arsenics | URDUABLC | Urinary Arsenobetaine comment code |
| 322 | UAS_D | Arsenics | URXUAC | Urinary Arsenocholine (ug/L) |
| 323 | UAS_D | Arsenics | URDUACLC | Urinary Arsenocholine comment code |
| 324 | UAS_D | Arsenics | URXUAS3 | Urinary arsenous acid (ug/L) |
| 325 | UAS_D | Arsenics | URDUA3LC | Urinary Arsenous acid comment code |
| 326 | UHM_D | Urinary Heavy Metals | URDUBALC | Urinary Barium comment code |
| 327 | EPH_D | Environmental Phenols | URXBP3 | Urinary Benzophenone-3 (ng/mL) |
| 328 | EPH_D | Environmental Phenols | URDBP3LC | Urinary Benzophenone-3 comment |
| 329 | UHM_D | Urinary Heavy Metals | URDUBELC | Urinary Beryllium comment code |
| 330 | EPH_D | Environmental Phenols | URXBPH | Urinary Bisphenol A (ng/mL) |
| 331 | EPH_D | Environmental Phenols | URDBPHLC | Urinary Bisphenol A comment |
| 332 | UHM_D | Urinary Heavy Metals | URDUCDLC | Urinary Cadmium comment code |
| 333 | UHM_D | Urinary Heavy Metals | URDUCSLC | Urinary Cesium comment code |
| 334 | CHLMDA_D | Urinary Chlamydia and Gonorrhea | URXUCL | Urinary Chlamydia |
| 335 | UHM_D | Urinary Heavy Metals | URDUCOLC | Urinary Cobalt comment code |
| 336 | EPH_D | Environmental Phenols | URXUCR | Urinary creatinine |
| 337 | UAS_D | Arsenics | URXUDMA | Urinary Dimethylarsonic acid (ug/L) |

| Item # | File name | Component | Variable ID | Label |
|---|---|---|---|---|
| 338 | UAS_D | Arsenics | URDUDALC | Urinary Dimethylarsonic acid comment |
| 339 | CHLMDA_D | Urinary Chlamydia and Gonorrhea | URXUGC | Urinary Gonorrhea |
| 340 | UHM_D | Urinary Heavy Metals | URDUPBLC | Urinary Lead comment code |
| 341 | UHG_D | Urinary Mercury | URDUHGLC | Urinary mercury comment code |
| 342 | UHM_D | Urinary Heavy Metals | URDUMOLC | Urinary Molybden comment code |
| 343 | UAS_D | Arsenics | URXUMMA | Urinary Monomethylacrsonic acid (ug/L) |
| 344 | UAS_D | Arsenics | URDUMMAL | Urinary Monomethylacrsonic acid comment |
| 345 | UHM_D | Urinary Heavy Metals | URDUPTLC | Urinary Platinum comment code |
| 346 | UHM_D | Urinary Heavy Metals | URDUTLLC | Urinary Thallium comment code |
| 347 | UAS_D | Arsenics | URXUAS | Urinary total arsenic (ug/L) |
| 348 | EPH_D | Environmental Phenols | URXTRS | Urinary Triclosan (ng/mL) |
| 349 | EPH_D | Environmental Phenols | URDTRSLC | Urinary Triclosan comment |
| 350 | UAS_D | Arsenics | URXUTM | Urinary Trimethylarsine Oxide (ug/L) |
| 351 | UAS_D | Arsenics | URDUTMLC | Urinary Trimethylarsine Oxide comment |
| 352 | UHM_D | Urinary Heavy Metals | URDUTULC | Urinary Tungsten comment code |
| 353 | UHM_D | Urinary Heavy Metals | URDUURLC | Urinary Uranium comment code |
| 354 | VITAEC_D | Vitamins A, E, and Carotenoids | LBXVIA | Vitamin A (ug/dL) |
| 355 | VITAEC_D | Vitamins A, E, and Carotenoids | LBDVIASI | Vitamin A (umol/L) |
| 356 | B12_D | Vitamin B12 | LBXB12 | Vitamin B12 ( pg/mL) |
| 357 | B12_D | Vitamin B12 | LBDB12SI | Vitamin B12 (pmol/L) |
| 358 | VIC_D | Vitamin C | LBXVIC | Vitamin C (mg/dL) |
| 359 | VIC_D | Vitamin C | LBDVICSI | Vitamin C (umol/L) |
| 360 | VID_D | Vitamin D | LBXVID | Vitamin D (ng/mL) |
| 361 | VITAEC_D | Vitamins A, E, and Carotenoids | LBXVIE | Vitamin E (ug/dL) |
| 362 | VITAEC_D | Vitamins A, E, and Carotenoids | LBDVIESI | Vitamin E (umol/L) |
| 363 | CBC_D | Complete Blood Count | LBXWBCSI | White blood cell count (1000 cells/uL) |
| 364 | PSA_D | PSA and Questions | KIQ110 | Willing to have blood tested for PSA |