

ICPSR 25504

**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: Blood Total  
Mercury and Blood Inorganic Mercury

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# National Health and Nutrition Examination Survey 2005–2006

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## Documentation, Codebook, and Frequencies

### Blood Total Mercury and Blood Inorganic Mercury

Laboratory

Survey Years:  
2005 to 2006

SAS Transport File:  
THGIHG\_D.XPT



April 2008

# NHANES 2005–2006 Data Documentation

## Laboratory Assessment: Blood Total Mercury and Blood Inorganic Mercury (THG1HG\_D)

First Published: April 2008

Last Revised: N/A

### Component Description

#### Total Blood Mercury, Inorganic Mercury

Uncertainties exist regarding levels of exposure to methyl mercury from fish consumption and potential health effects resulting from this exposure. Past estimates of exposure to methyl mercury have been obtained from results of food consumption surveys and measures of methyl mercury in fish. Measures of a biomarker of exposure are needed for improved exposure assessments. Blood mercury levels will be assessed in two subpopulations particularly vulnerable to the health effects from mercury exposure: children 1–5 years old and women of childbearing age.

Blood measures of total and inorganic mercury will be important for evaluation of exposure from exposure to mercury in interior latex paints.

### Eligible Sample

#### Total Blood Mercury and Inorganic Mercury

Participants aged 1 year and older who do not meet any of the exclusion criteria are eligible.

### Description of Laboratory Methodology

#### Blood Total Mercury

Whole blood Hg concentrations are determined using inductively coupled plasma mass spectrometry. This multi-element analytical technique is based on quadrupole ICP-MS technology. Coupling radio frequency power into a flowing argon stream seeded with electrons creates the plasma. Predominate species in the plasma are positive argon ions and electrons. Diluted whole blood samples are converted into an aerosol using a nebulizer inserted within a spray chamber. A portion of the aerosol is transported through the spray chamber and then through the central channel of the plasma, where it experiences temperatures of 6000–8000 K. This thermal energy atomizes and ionizes the sample. The ions, along with the argon, enter the mass spectrometer through an interface that separates the ICP, operating at atmospheric pressure (approximately 760 torr), from the mass spectrometer, operating at approximately  $10^{-5}$  torr. The mass spectrometer permits detection of ions at each mass-to-charge ratio in rapid sequence, allowing individual isotopes of an element to be determined. Once inside the mass spectrometer, the ions first pass

through the ion optics, then the mass analyzing quadrupole before being detected as they strike the surface of the detector. The ion optics focuses the ion beam using an electrical field. Electrical signals resulting from the detection of the ions are processed into digital information that is used to indicate the intensity of the ions and subsequently the concentration of the element. In this method, blood samples are diluted with 18 Mega-ohm water and with diluent, containing 1% v/v tetramethylammonium hydroxide (TMAH), 0.5% disodium ethylenediamine tetraacetate (EDTA), 10% ethyl alcohol, 0.05% Triton X-100. Au is added to reduce intrinsic Hg memory effects, Rh for internal standardization of Cd, and Bi for internal standardization of Hg and Pb. The samples were prepared with the following ratio:

Sample:Water:Diluent = 1:1:48 correspondingly.

### **Inorganic Mercury**

Inorganic mercury in blood is measured using stannous chloride as a reductant, also utilizing microwave digestion. Mercury vapor (reduced from inorganic mercury compounds) is measured via the same quartz cell at 253.7 nm.

The difference between total and inorganic mercury represents the organic mercury in blood. Mercury analysis identifies cases of mercury toxicity. The main organs affected by mercury are the brain and kidneys. Psychic and emotional disturbances are the initial signs of chronic intoxication by elemental mercury vapor or salts. Parasthesia and neuralgia may develop. Renal disease, digestive disturbances, and ocular lesions can also develop. Kidney toxicity is an important consequence of exposure to mercury salts.

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

### **Laboratory Quality Control and Monitoring**

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

A detailed description of the quality assurance and quality control procedures can be found on the NHANES website.

## **Data Processing and Editing**

Whole blood specimens are processed, stored, and shipped to the Division of Laboratory Sciences, National Center for Environmental Health, and Centers for Disease Control and Prevention for analysis.

Detailed specimen collection and processing instructions are discussed in the NHANES LPM. Vials are stored under appropriate frozen ( $-20^{\circ}\text{C}$ ) conditions until they are shipped to National Center for Environmental Health for testing.

Two derived variables were created in this data file. The formula for their derivation is as follows:

The total mercury in  $\mu\text{g/L}$  was converted to  $\text{nmol/L}$  by multiplying by 4.99.

The inorganic mercury in  $\mu\text{g/L}$  was converted to  $\text{nmol/L}$  by multiplying by 4.99.

### **Detection Limits**

The detection limits were variable for the analytes in the data set. Two variables are provided for each of these analytes. The variable named LBD\_\_\_LC indicates whether the result was below the limit of detection. There are two values: "0" and "1". "0" means that the result was at or above the limit of detection. "1" indicates that the result was below the limit of detection. The other variable named LBX\_\_\_ provides the analytic result for that analyte. In cases, where the result was below the limit of detection, the value for that variable is the detection limit divided by the square root of two.

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

**Analytic 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. The Household Questionnaire Data Files also contain all survey design variables and sample weights required to analyze these data. The Phlebotomy Examination file includes auxiliary information on duration of fasting, the time of day of the venipuncture, and the conditions precluding venipuncture. The Household Questionnaire and Phlebotomy Exam files may be linked to the laboratory data file using the unique survey participant identifier SEQN.

**References** N/A

## Locator Fields

**Title:** Blood Total Mercury and Blood Inorganic Mercury

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

**Years of Content:** 2005–2006

**First Published:** April 2008

**Last Revised:** N/A

**Access Constraints:** None

**Use Constraints:** None

**Geographic Coverage:** National

**Subject:** Blood Total Mercury and Blood Inorganic Mercury

**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)**

**Blood Total Mercury and Blood Inorganic Mercury (THGIHG\_D)**

April 2008



<b>SEQN</b>	<b>Target</b>
	B(1 Yrs. to 150 Yrs.)
<b>Hard Edits</b>	<b>SAS Label</b>
	Respondent sequence number
<b>English Text:</b> Respondent sequence number.	
<b>English Instructions:</b>	

<b>LBXTHG</b>	<b>Target</b>
	B(1 Yrs. to 150 Yrs.)
<b>Hard Edits</b>	<b>SAS Label</b>
	Mercury, total (ug/L)
<b>English Text:</b> Mercury, total (ug/L)	
<b>English Instructions:</b>	

Code or Value	Description	Count	Cumulative	Skip to Item
0.2 to 33.2	Range of Values	6267	6267	
0.14	First Below Detection Limit Fill Value	33	6300	
0.23	Second Below Detection Limit Fill Value	2107	8407	
.	Missing	1033	9440	

<b>LBDTHGSI</b>		<b>Target</b>		
		B(1 Yrs. to 150 Yrs.)		
<b>Hard Edits</b>		<b>SAS Label</b>		
		Mercury, total (umol/L )		
<b>English Text:</b> Mercury, total (umol/L )				
<b>English Instructions:</b>				
<b>Code or Value</b>	<b>Description</b>	<b>Count</b>	<b>Cumulative</b>	<b>Skip to Item</b>
1 to 165.67	Range of Values	6267	6267	
0.7	First Below Detection Limit Fill Value	33	6300	
1.15	Second Below Detection Limit Fill Value	2107	8407	
.	Missing	1033	9440	

<b>LBDTHGLC</b>		<b>Target</b>		
		B(1 Yrs. to 150 Yrs.)		
<b>Hard Edits</b>		<b>SAS Label</b>		
		Mercury, total comment code		
<b>English Text:</b> Mercury, total comment code				
<b>English Instructions:</b>				
<b>Code or Value</b>	<b>Description</b>	<b>Count</b>	<b>Cumulative</b>	<b>Skip to Item</b>
0	At or above the detection limit	6267	6267	
1	Below lower detection limit	2140	8407	
.	Missing	1033	9440	

LBXIHG	Target			
	B(1 Yrs. to 150 Yrs.)			
Hard Edits	SAS Label			
	Mercury, inorganic (ug/L)			
English Text: Mercury, inorganic (ug/L)				
English Instructions:				
Code or Value	Description	Count	Cumulative	Skip to Item
0.35 to 15	Range of Values	2116	2116	
0.25	First Below Detection Limit Fill Value	6141	8257	
0.28	Second Below Detection Limit Fill Value	114	8371	
.	Missing	1069	9440	

LBDIHGSI		Target		
		B(1 Yrs. to 150 Yrs.)		
Hard Edits		SAS Label		
		Mercury, inorganic (umol/L )		
English Text: Mercury, inorganic (umol/L )				
English Instructions:				
Code or Value	Description	Count	Cumulative	Skip to Item
1.75 to 74.85	Range of Values	2116	2116	
1.4	First Below Detection Limit Fill Value	114	2230	
1.25	Second Below Detection Limit Fill Value	6141	8371	
.	Missing	1069	9440	

LBDIHGLC	Target			
	B(1 Yrs. to 150 Yrs.)			
Hard Edits	SAS Label			
	Mercury, inorganic comment code			
English Text: Mercury, inorganic comment code				
English Instructions:				
Code or Value	Description	Count	Cumulative	Skip to Item
0	At or above the detection limit	2116	2116	
1	Below lower detection limit	6255	8371	
.	Missing	1069	9440	

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
<b>Tobacco Smoke</b>					
Cotinine	serum	•	•	•	•
4-(Methylnitrosamino)-1-(3-pyridyl)-1-Butanol (NNAL)	urine			•	•
<b>Metals</b>					
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	•	•	•	•
<b>Phytoestrogens</b>					
Daidzein	urine	•	•	•	•
Enterodiol	urine	•	•	•	•
Enterolactone	urine	•	•	•	•
Equol	urine	•	•	•	•
Genistein	urine	•	•	•	•
O-Desmethylangolensin	urine	•	•	•	•
<b>Phthalates</b>					
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
<b>Polycyclic Aromatic Hydrocarbons</b>					
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-Hydroxynaphthalene (1-Naphthol)	urine	•	•	•	•
2-Hydroxynaphthalene (2-Naphthol)	urine	•	•	•	•
<b>PAH Hemoglobin Adducts</b>					
(+/-)-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				•
<b>Methylated Naphthols</b>					
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				•
<b>Organophosphate Insecticides: Dialkyl Phosphate Metabolites</b>					
Dimethylphosphate	urine	•	•	•	•
Dimethylthiophosphate	urine	•	•	•	•
Dimethyldithiophosphate	urine	•	•	•	•
Diethylphosphate	urine	•	•	•	•
Diethylthiophosphate	urine	•	•	•	•
Diethyldithiophosphate	urine	•	•	•	•
<b>Organophosphate Insecticides: Specific Pesticides and Metabolites</b>					
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			•	•
<i>para</i> -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
<b>Pyrethroid Pesticides</b>					
<i>trans</i> -Permethrin	plasma			•	•
<i>cis</i> -Permethrin	plasma			•	•
<i>cis</i> -3-(2,2-Dichlorovinyl)-2,2-dimethylcyclopropane carboxylic acid	urine	•	•	•	•
<i>trans</i> -3-(2,2-Dichlorovinyl)-2,2-dimethylcyclopropane carboxylic acid	urine	•	•	•	•
3-Phenoxybenzoic acid	urine	•	•	•	•
4-Fluoro-3-phenoxybenzoic acid	urine	•	•	•	•
<i>cis/trans</i> -Dimethylvinylcyclopropane carboxylic diacid	urine	•	•	•	•
<i>cis</i> -3-(2,2-Dibromovinyl)-2,2-dimethylcyclopropane carboxylic acid	urine	•	•	•	•
Cyfluthrin	plasma			•	•
Cyhalothrin	plasma			•	•
Cypermethrin	plasma			•	•
Deltamethrin	plasma			•	•
Resmethrin	plasma			•	•
Tetramethrin	plasma			•	•
<b>Organochlorine Pesticides</b>					
Hexachlorobenzene	serum	•	•	•	•
<i>beta</i> -Hexachlorocyclohexane	serum	•	•	•	•
<i>gamma</i> -Hexachlorocyclohexane	serum	•	•	•	•
<i>p,p'</i> -DDT	serum	•	•	•	•
<i>p,p'</i> -DDE	serum	•	•	•	•
<i>o,p'</i> -DDT	serum	•			
Oxychlordane	serum	•	•	•	•
<i>trans</i> -Nonachlor	serum	•	•	•	•
Heptachlor Epoxide	serum	•			
Mirex	serum	•	•	•	•
Aldrin	serum	•			
Dieldrin	serum	•			
Endrin	serum	•			
alpha-Hexachlorocyclohexane (HCCH)	serum		•	•	•
<i>cis</i> -Chlordane (or alpha)	serum		•	•	•
<i>trans</i> -Chlordane (or gamma)	serum		•	•	•
<i>cis</i> -Nonachlor	serum		•	•	•
<i>o,p'</i> -DDE	serum		•	•	•
Octachlorosytrene	serum		•	•	•
Pentachloroanisole	serum		•	•	•
Monohydroxy methoxychlor	urine	•	•	•	•
Dihydroxy methoxychlor	urine	•	•	•	•
Endosulfan-ether	urine	•	•	•	•
Endosulfan-lactone	urine	•	•	•	•
Endosulfan-sulfate	urine	•	•	•	•
<b>Other Pesticides</b>					
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
<b>Fungicides</b>					
<i>ortho</i> -Phenylphenol	urine	•	•	•	
Chlorothalonil	serum	•	•	•	•
Metalaxyl	serum	•	•	•	•
Dichloran	serum	•	•	•	•
Ethylenethio urea (ETU)	urine	•	•	•	•
Propylenethio urea (PTU)	urine	•	•	•	•
Phthalimide	serum	•	•	•	•
Tetrahydrophthalimide	serum	•	•	•	•
<b>Herbicides: Substituted Ureas</b>					
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	•	•	•	•
Triflusaluron-methyl	urine	•	•	•	•
<b>Other Herbicides</b>					
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
<b>Halogenated Phenolic Compounds</b>					
2,4,5-Trichlorophenol	urine	•	•	•	
2,4,6-Trichlorophenol	urine	•	•	•	
Pentachlorophenol	serum		•	•	•
Pentachlorophenol	urine	•	•	•	•
5-Chloro-2-(2,4-dichlorophenoxy)-phenol (Triclosan)	serum		•	•	•
Pentabromophenol	serum		•	•	•
<b>Perfluorinated Compounds</b>					
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	•	•	•	•
Perfluorodecanoic acid	serum	•	•	•	•
Perfluorobutane sulfonic acid	serum	•	•	•	
Perfluoroheptanoic acid	serum	•	•	•	
Perfluorononanoic acid	serum	•	•	•	•
Perfluorooctane sulfonamide	serum	•	•	•	
Perfluoroundecanoic acid	serum	•	•	•	
Perfluorododecanoic acid	serum	•	•	•	
<b>Environmental Phenols</b>					
Bisphenol A	urine	•	•	•	•
2-Hydroxy-4-methoxybenzophenone (Benzophenone-3)	urine	•	•	•	•
4- <i>tert</i> -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
<b>Polychlorinated Dibenzo-<i>p</i>-dioxins and Dibenzofurans</b>					
1,2,3,4,6,7,8,9-Octachlorodibenzo- <i>p</i> -dioxin (OCDD)	serum	•	pooled samples	•	pooled samples
1,2,3,4,6,7,8-Heptachlorodibenzo- <i>p</i> -dioxin (HpCDD)	serum	•	pooled samples	•	pooled samples
1,2,3,4,7,8-Hexachlorodibenzo- <i>p</i> -dioxin (HxCDD)	serum	•	pooled samples	•	pooled samples
1,2,3,6,7,8-Hexachlorodibenzo- <i>p</i> -dioxin (HxCDD)	serum	•	pooled samples	•	pooled samples
1,2,3,7,8,9-Hexachlorodibenzo- <i>p</i> -dioxin (HxCDD)	serum	•	pooled samples	•	pooled samples
1,2,3,7,8-Pentachlorodibenzo- <i>p</i> -dioxin (PeCDD)	serum	•	pooled samples	•	pooled samples
2,3,7,8-Tetrachlorodibenzo- <i>p</i> -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
<b>Polybrominated Dibenzo-<i>p</i>-dioxins and Dibenzofurans</b>					
2,3,7,8-Tetrabromodibenzo- <i>p</i> -dioxin (TBDD)	serum		pooled samples	•	pooled samples
1,2,3,7,8-Pentabromodibenzo- <i>p</i> -dioxin (PeBDD)	serum		pooled samples	•	pooled samples
1,2,3,4,7,8-Hexabromodibenzo- <i>p</i> -dioxin (HxBDD)	serum		pooled samples	•	pooled samples
1,2,3,6,7,8-Hexabromodibenzo- <i>p</i> -dioxin (HxBDD)	serum		pooled samples	•	pooled samples
1,2,3,7,8,9-Hexabromodibenzo- <i>p</i> -dioxin (HxBDD)	serum		pooled samples	•	pooled samples
1,2,3,4,6,7,8-Heptabromodibenzo- <i>p</i> -dioxin (HpBDD)	serum		pooled samples		pooled samples
1,2,3,4,6,7,8,9-Octabromodibenzo- <i>p</i> -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
<b>Dioxin-like Polychlorinated Biphenyls - cPCBs</b>					
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
<b>Dioxin-like Polychlorinated Biphenyls - mPCBs</b>					
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
<b>Non-dioxin-like Polychlorinated Biphenyls</b>					
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) (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'-Decachloro biphenyl (PCB 209)	serum	•	•	•	•
<b>Hydroxylated Polychlorinated Biphenyls</b>					
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		•	•	•
<b>Polybrominated Diphenyl Ethers</b>					
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'-Decabromodiphenyl ether (BDE 209)	serum		•	•	•
Hexabromobenzene (HBB)	serum		•	•	•
<b>Polychlorinated Naphthalenes</b>					
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			•	•
<b>Toxaphenes</b>					
Parlar 26 2-Endo,3-exo,5-endo,6-exo,8b,8c,10a,10c-octachlorobornane	serum		•	•	•
Parlar 50 2-Endo,3-exo,5-endo,6-exo,8b,8c,9c,10a,10c-nonachlorobornane	serum		•	•	•
Parlar 62 2,2,5,5,8c,9b,9c,10a,10b-nonachlorobornane	serum		•	•	•

Chemical / Metabolite Name	Matrix	03-04	05-06	07-08	09-10
<b>Volatile Organic Compounds (VOCs)</b>					
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			•	•
<b>trans Fatty Acids</b>					
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
<b>Other</b>					
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. Alarming, 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 ( $\text{HCO}_3$ ), Blood Urea Nitrogen (BUN), Calcium, Cholesterol, Creatinine, Gamma Glutamyltransaminase ( $\gamma$ -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 ( $\text{HCO}_3$ )

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 ( $\gamma$ -GT)

$\gamma$ -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 <sub>3</sub> )				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 ( $\text{free/total PSA} \times 100\%$ ) 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<sub>12</sub>
- Serum vitamin B<sub>6</sub>

### 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
Erythrocyte protoporphyrin	3-5 yrs, 12-	400 uL			Yes

	49F				
Serum folate/Vitamin B <sub>12</sub>	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 <sub>6</sub>	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 phosphatase (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	LBDS CASI	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, refrigerated (ug/dL)
69	BIOPRO_D	Standard Biochemistry Profile	LBDSIRSI	Iron, refrigerated (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	LBXSOSI	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	LBDHGB	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	LBDFPFOAL	Perfluorooctanoic acid comment
211	PFC_D	Polyfluorochemicals Compounds	LBXPFOS	Perfluorooctane sulfonic acid
212	PFC_D	Polyfluorochemicals Compounds	LBDFPFOSL	Perfluorooctane sulfonic acid comment
213	PFC_D	Polyfluorochemicals Compounds	LBXPFHS	Perfluorohexane sulfonic acid
214	PFC_D	Polyfluorochemicals Compounds	LBDFPFHSL	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	LBDFPFDEL	Perfluorodecanoic acid comment
221	PFC_D	Polyfluorochemicals Compounds	LBXPFBFS	Perfluorobutane sulfonic acid
222	PFC_D	Polyfluorochemicals Compounds	LBDFPFBSL	Perfluorobutane sulfonic acid comment
223	PFC_D	Polyfluorochemicals Compounds	LBXPFHFP	Perfluoroheptanoic acid
224	PFC_D	Polyfluorochemicals Compounds	LBDFPFHPL	Perfluoroheptanoic acid comment
225	PFC_D	Polyfluorochemicals Compounds	LBXPFNFA	Perfluorononanoic acid
226	PFC_D	Polyfluorochemicals Compounds	LBDFPFNAL	Perfluorononanoic acid comment
227	PFC_D	Polyfluorochemicals Compounds	LBXPFSA	Perfluorooctane sulfonamide
228	PFC_D	Polyfluorochemicals Compounds	LBDFPFSAL	Perfluorooctane sulfonamide comment
229	PFC_D	Polyfluorochemicals Compounds	LBXPFUUA	Perfluoroundecanoic acid
230	PFC_D	Polyfluorochemicals Compounds	LBDFPFUAL	Perfluoroundecanoic acid comment
231	PFC_D	Polyfluorochemicals Compounds	LBXPFDOL	Perfluorododecanoic acid
232	PFC_D	Polyfluorochemicals Compounds	LBDFPFDOL	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	WTS2YR	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 Monomethylarsonic acid (ug/L)
286	UAS_D	Arsenics	URDUMMAL	Urinary Monomethylarsonic 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	WTS2YR	Environmental A 2 year weights
296	UHM_D	Urinary Heavy Metals	SEQN	Respondent sequence number
297	UHM_D	Urinary Heavy Metals	WTS2YR	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	LBDVICS	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	LBXCRI	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	LBDRLPSI	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 phosphatase (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	LBXSBUSI	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	WTS2YR	Environmental A 2 year weights
89	UAS_D	Arsenics	WTS2YR	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	URDEPBL	Ethyl paraben comment
94	PSA_D	PSA and Questions	KIQ241	Ever had prostate surgery
95	TRIGLY_D	Triglyceride, LDL, Apo B	WTS2YR	Fasting Subsample 2 Year MEC Weight
96	FERTIN_D	Ferritin	LBXFER	Ferritin(ng/mL)
97	FERTIN_D	Ferritin	LBDFFSI	Ferritin(ug/L)
98	FOLATE_D	Erythrocyte (RBC) Folate and Serum Folate	LBXRF	Folate, RBC (ng/mL RBC)
99	FOLATE_D	Erythrocyte (RBC) Folate and Serum Folate	LBDFFSI	Folate, RBC(nmol/L RBC)
100	FOLATE_D	Erythrocyte (RBC) Folate and Serum Folate	LBXFL	Folate, serum (ng/mL)
101	FOLATE_D	Erythrocyte (RBC) Folate and Serum Folate	LBDFFSI	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	LBDGTCI	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	LBDGGBSI	Globulin (g/L)
108	BIOPRO_D	Standard Biochemistry Profile	LBXSGL	Glucose, serum (mg/dL)
109	BIOPRO_D	Standard Biochemistry Profile	LBDGGLSI	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	LBDHGB	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, refrigerated (ug/dL)
135	BIOPRO_D	Standard Biochemistry Profile	LBDIRSIS	Iron, refrigerated (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	LBDPBPSI	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	LBXSOSI	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	LBXPFB	Perfluorobutane sulfonic acid
178	PFC_D	Polyfluorochemicals Compounds	LBDPFB	Perfluorobutane sulfonic acid comment
179	PFC_D	Polyfluorochemicals Compounds	LBXPFD	Perfluorodecanoic acid
180	PFC_D	Polyfluorochemicals Compounds	LBDPFD	Perfluorodecanoic acid comment
181	PFC_D	Polyfluorochemicals Compounds	LBXPFD	Perfluorododecanoic acid
182	PFC_D	Polyfluorochemicals Compounds	LBDPFD	Perfluorododecanoic acid comment
183	PFC_D	Polyfluorochemicals Compounds	LBXPFH	Perfluoroheptanoic acid
184	PFC_D	Polyfluorochemicals Compounds	LBDPFH	Perfluoroheptanoic acid comment
185	PFC_D	Polyfluorochemicals Compounds	LBXPFH	Perfluorohexane sulfonic acid
186	PFC_D	Polyfluorochemicals Compounds	LBDPFH	Perfluorohexane sulfonic acid comment
187	PFC_D	Polyfluorochemicals Compounds	LBXPFN	Perfluorononanoic acid
188	PFC_D	Polyfluorochemicals Compounds	LBDPFN	Perfluorononanoic acid comment
189	PFC_D	Polyfluorochemicals Compounds	LBXPFS	Perfluorooctane sulfonamide
190	PFC_D	Polyfluorochemicals Compounds	LBDPFS	Perfluorooctane sulfonamide comment
191	PFC_D	Polyfluorochemicals Compounds	LBXPFO	Perfluorooctane sulfonic acid
192	PFC_D	Polyfluorochemicals Compounds	LBDPFO	Perfluorooctane sulfonic acid comment
193	PFC_D	Polyfluorochemicals Compounds	LBXPFO	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	WTS2YR	Two-year MEC weights of subsample A
307	WPIN_D	Perchlorate	WTSPC2YR	Two-year MEC weight of water perchlorate
308	PFC_D	Polyfluorochemicals Compounds	WTS2YR	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 Monomethylarsonic acid (ug/L)
344	UAS_D	Arsenics	URDUMMAL	Urinary Monomethylarsonic 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	LBDVICS	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	LBDVIES	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