

**National Health and Nutrition
Examination Survey 2005–2006**

**Documentation, Codebook,
and Frequencies**

Blood Lead and Blood Cadmium

Laboratory

**Survey Years:
2005 to 2006**

**SAS Transport File:
PBCD_D.XPT**



April 2008

NHANES 2005–2006 Data Documentation

Laboratory Assessment: Blood Lead and Blood Cadmium (PbCd_D)

First Published: April 2008

Last Revised: N/A

Component Description

Lead

Lead is a known environmental toxin that has been shown to deleteriously affect the nervous, hematopoietic, endocrine, renal, and reproductive systems. In young children, lead exposure is a particular hazard because children more readily absorb lead than do adults, and children's developing nervous systems also make them more susceptible to the effects of lead. The primary sources of exposure for children are lead-laden paint chips and dust as a result of deteriorating lead-based paint. The risk for lead exposure is disproportionately higher for children who are poor, non-Hispanic black, living in large metropolitan areas, or living in older housing. Among adults, the most common high exposure sources are occupational. Blood lead levels measured in previous NHANES programs have been the cornerstone of lead exposure surveillance in the U.S. The data have been used to document the burden and dramatic decline of elevated blood lead levels, to promote the reduction of lead use, and to help to redefine national lead poisoning prevention guidelines, standards, and abatement activities.

Cadmium

A cadmium assay is performed to identify cases of cadmium toxicity. Occupational exposure is the most common cause of elevated cadmium levels.

Eligible Sample

Blood Lead and Cadmium

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

Description of Laboratory Methodology

Blood Lead and Cadmium

Whole blood lead (Pb) and cadmium (Cd) 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),

There were no changes to the equipment, method 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°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 cadmium in $\mu\text{g/L}$ was converted to $\mu\text{mol/L}$ by multiplying by 8.897.

The lead in $\mu\text{g/L}$ was converted to $\mu\text{mol/L}$ by multiplying by 0.0483.

Detection Limits

The detection limit for cadmium was constant in the data set. The lower detection limit for cadmium was $0.20 \mu\text{g/L}$. The detection limit for lead was variable in the data set. The two lower detection limits for lead were $0.25 \mu\text{g/dL}$ and $0.30 \mu\text{g/dL}$. One variable is provided for each of these analytes. The 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 Lead and Cadmium

Contact Number: 1-866-441-NCHS

Years of Content: 2003–2004

First Published: April 2008

Last Revised: N/A

Access Constraints: None

Use Constraints: None

Geographic Coverage: National

Subject: Blood Lead and Cadmium

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 Lead and Blood Cadmium (PBCD_D)

April 2008



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

LBXBCD	Target
	B(1 Yrs. to 150 Yrs.)
Hard Edits	SAS Label
	Cadmium (ug/L)
English Text: Cadmium (ug/L)	
English Instructions:	

Code or Value	Description	Count	Cumulative	Skip to Item
0.19 to 10.8	Range of Values	4715	4715	
0.14	Below Detection Limit Fill Value	3692	8407	
.	Missing	1033	9440	

LBDBCDSI		Target		
		B(1 Yrs. to 150 Yrs.)		
Hard Edits		SAS Label		
		Cadmium (nmol/L)		
English Text: Cadmium (nmol/L)				
English Instructions:				
Code or Value	Description	Count	Cumulative	Skip to Item
1.69 to 96.09	Range of Values	4715	4715	
1.25	Below Detection Limit Fill Value	3692	8407	
.	Missing	1033	9440	

LBXBPB		Target		
		B(1 Yrs. to 150 Yrs.)		
Hard Edits		SAS Label		
		Lead (ug/dL)		
English Text: Lead (ug/dL)				
English Instructions:				
Code or Value	Description	Count	Cumulative	Skip to Item
0.25 to 55.2	Range of Values	8373	8373	
0.18	First Below Detection Limit Fill Value	32	8405	
0.21	Second Below Detection Limit Fill Value	2	8407	
.	Missing	1033	9440	

LBDBPBSI		Target		
		B(1 Yrs. to 150 Yrs.)		
Hard Edits		SAS Label		
		Lead (umol/L)		
English Text: Lead (umol/L)				
English Instructions:				
Code or Value	Description	Count	Cumulative	Skip to Item
0.012 to 2.666	Range of Values	8373	8373	
0.009	First Below Detection Limit Fill Value	32	8405	
0.01	Second Below Detection Limit Fill Value	2	8407	
.	Missing	1033	9440	