

National Health and Nutrition Examination Survey 2003-2004

Documentation, Codebook, and Frequencies

Laboratory Component:
Organochlorine Pesticides

Survey Years:
2003 to 2004

SAS Export File:
L28OCP_C.XPT



First Release: April 2008
Last Revised: N/A

NHANES 2003–2004 Data Documentation

Laboratory Assessment: Laboratory 28-Organochlorines

First Published: April 2008

L28OCP_C

Last Revised: N/A

Component Description

Organochlorines are diverse, synthetic chemicals that are persistent in the environment and tend to bioaccumulate. Most of these chemicals are banned in the U.S. Assessment of exposure to persistent organochlorines in a representative sample of the U.S. population is needed to determine current prevalence and level of exposure and the potential for human health threat from exposure to these chemicals.

Eligible Sample

Participants aged 12 years and older who met the subsample requirements.

Description of Laboratory Methodology

Thirty-eight ortho-substituted polychlorinated biphenyls (PCBs), 13 persistent chlorinated pesticides, and selected pesticide metabolites are measured in serum by high-resolution gas chromatography/isotope-dilution high-resolution mass spectrometry (HRGC/ID-HRMS). All serum specimens are handled using Universal Precautions.

Serum specimens (1–1.5 mL) to be analyzed for PCBs and persistent pesticides are spiked with $^{13}\text{C}_{12}$ -labeled internal standards and the analytes of interest are isolated in hexane using a C_{18} solid phase extraction (SPE) procedure followed by extraction through neutral silica and Florosil SPE columns. PCBs and pesticides are eluted from the Florosil column with hexane and 1:1 dichloromethane /hexane. For PCBs and pesticides, each analytical run consists of nine unknown specimens, one method blank, and two quality control samples. Before quantification, the vials are reconstituted with 10 μL ^{13}C -labeled external standard. Sample extracts are then analyzed simultaneously for PCBs and pesticides by HRGC/ID-HRMS where 1 μL is injected, using a GC Pal (Leap Technology) auto sampler, into a Hewlett-Packard 6890 gas chromatograph operated in the splitless injection mode with a flow of 1 mL/min helium through a DB-5ms capillary column (30 m x 0.25 mm x 0.25 μm film thickness) where analytes are separated prior to entering a Thermo Finnigan MAT95 XP (5 kV) magnetic sector mass spectrometer operated in EI mode at 40 eV, using selected ion monitoring (SIM) at 10,000 resolving power (10% valley). Two ion current responses corresponding to two masses are monitored for each native (^{12}C) compound and its corresponding ^{13}C -internal standard. The instrumental response factor for each analyte is calculated as the sum of the two ^{12}C

isomers divided by the sum of two ¹³C- isomers

Calibration of mass spectrometer response factor vs. concentration is performed using calibration standards containing known concentrations of each ¹²C compound and its corresponding ¹³C internal standard. The concentration of each analyte is derived by interpolation from individual linear calibration curves and is adjusted for sample weight. The validity of all mass spectrometry data are evaluated using a variety of established criteria, such as signal-to-noise ratio ≥ 3 for the smallest native ion mass, instrument resolving power $\geq 10,000$, chromatographic isomer specificity index with 95% limits, relative retention time ratio of native to isotopically labeled analyte within 3 parts-per-thousand compared to a standard, response ratios of the two ¹²C and ¹³C ions must be within $\pm 20\%$ of their theoretical values and analyte recovery $\geq 10\%$ and $\leq 120\%$. In addition, the calculated mean and range of each analyte in the quality control sample must be within their respective confidence intervals. The method detection limit (MDL) for each analyte is calculated correcting for sample weight and recovery. The total lipid content of each specimen is estimated from its total cholesterol and triglycerides values using a "summation" method. Analytical results for PCBs and pesticides are reported on a whole-weight [ng/g or parts-per-billion (ppb)] and lipid-adjusted basis [ng/g or ppb]. International toxicity equivalents (I-TEQs) are also reported for PCDDs, PCDFs, cPCBs and other "dioxin-like" PCBs, based on the WHO-TEF system. Prior to reporting results, all quality control (QC) data undergo a final review by a Division of Laboratory Science quality control officer.

Laboratory Quality Control and Monitoring

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

Detailed specimen collection and processing instructions are discussed in the NHANES Laboratory/Medical Technologists Procedures Manual (LPM). Vials are stored under appropriate frozen (-20°C) conditions until they are shipped to National Center for Environmental Health for testing.

Mobile Examination Centers (MECs)

Laboratory team performance is monitored using several techniques. NCHS and contract consultants use a structured quality assurance evaluation during unscheduled visits to evaluate both the quality of the laboratory work and the quality-control procedures. Each laboratory staff person is observed for equipment operation, specimen collection and preparation; testing procedures and constructive feedback are given to each staff. Formal retraining sessions are conducted annually to ensure that required skill levels were maintained.

The NHANES QA/QC protocols meet the 1988 Clinical Laboratory Improvement Act mandates. Detailed QA/QC instructions are discussed in the NHANES LPM.

Analytical Laboratories

NHANES uses several methods to monitor the quality of the analyses performed by the laboratories. In the MEC, these methods include performing blind split samples collected on “dry run” sessions. In addition, contract laboratories randomly perform repeat testing on 2.0% of all specimens.

NCEH developed and distributed a quality control protocol for all the laboratories which outlined the Westgard rules used when running NHANES specimens. Any problems encountered during shipping or receipt of specimens, instrument calibration, reagents, and any special considerations are submitted to NCHS and Westat. Summary statistics for each control pool, QC graphs, are reviewed by NCHS for trends or shifts in the data. The laboratories are required to explain any identified areas of concern.

All QC procedures recommended by the manufacturers were followed. Reported results for all assays meet the Division of Laboratory Sciences' quality control and quality assurance performance criteria for accuracy and precision (similar to specifications outlined by Westgard (1981)).

Analytic Notes

Measures of organochlorines are assessed in participants aged 12 years and older on a one-third subsample.

Use the special weights included in this data file when analyzing data. Read the “Special Sample Weights for this Dataset” information provided before beginning analysis.

Subsample weights

Measures of organochlorines were measured in a one third subsample of persons 12 years and over. Special sample weights are required to analyze these data properly. Specific sample weights for this subsample are included in this data file and should be used when analyzing these data.

Variance estimation

The analysis of NHANES 2003-2004 laboratory data must be conducted with the key survey design and basic demographic variables. The NHANES 2003-2004 Demographic Data File contains demographic and sample design variables. The recommended procedure for variance estimation requires use of stratum and PSU variables (SDMVSTRA and SDMVPSU, respectively) in the demographic data file.

Links to NHANES Data Files

This laboratory data file can be linked to the other NHANES 2003-2004 data files using the unique survey participant identifier SEQN.

Detection Limits

The detection limits were variable for all of the 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.

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

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Cleanup and Mass Spectrometry

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Locator Fields

Title: Organochlorines

Contact Number: 1-866-441-NCHS

Years of Content: 2003–2004

First Published: April 2008

Revised: N/A

Access Constraints: None

Use Constraints: None

Geographic Coverage: National

Subject: Organochlorines were collected in serum on a one-third subsample.

Record Source: NHANES 2003–2004

Survey Methodology: NHANES 2003–2004 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 (2003-2004)**

**Organochlorine Pesticides (L28OCP_C)
Person Level Data**

First Published: April 2008

Last Revised: N/A



SEQN	Target
	B(12 Yrs. to 150 Yrs.)
Hard Edits	SAS Label
	Respondent sequence number
English Text: Respondent sequence number.	
English Instructions:	

WTSB2YR	Target
	B(12 Yrs. to 150 Yrs.)
Hard Edits	SAS Label
	Two-year MEC weights of subsample B
English Text: Two-year MEC weights of subsample B	
English Instructions:	

Code or Value	Description	Count	Cumulative	Skip to Item
0 to 435025.30254	Range of Values	2337	2337	
.	Missing	0	2337	

LBXHCB	Target
	B(12 Yrs. to 150 Yrs.)
Hard Edits	SAS Label
	Hexachlorobenzene (ng/g)
English Text: Hexachlorobenzene (ng/g)	
English Instructions:	

Code or Value	Description	Count	Cumulative	Skip to Item
0.0116 to 1.1847	Range of Values	1961	1961	
.	Missing	376	2337	

LBXHCBLA	Target			
	B(12 Yrs. to 150 Yrs.)			
Hard Edits	SAS Label			
	Hexachlorobenzene Lipid Adj (ng/g)			
English Text: Hexachlorobenzene Lipid Adjusted (ng/g)				
English Instructions:				
Code or Value	Description	Count	Cumulative	Skip to Item
1.5556 to 174	Range of Values	1961	1961	
.	Missing	376	2337	

LBDHCBLC	Target			
	B(12 Yrs. to 150 Yrs.)			
Hard Edits	SAS Label			
	Hexachlorobenzene Comment Code			
English Text: Hexachlorobenzene Comment Code				
English Instructions:				
Code or Value	Description	Count	Cumulative	Skip to Item
0	At or above the detection limit	1959	1959	
1	Below lower detection limit	2	1961	
.	Missing	376	2337	

LBXBHC	Target			
	B(12 Yrs. to 150 Yrs.)			
Hard Edits	SAS Label			
	Beta-hexachlorocyclohexane (ng/g)			
English Text: Beta-hexachlorocyclohexane (ng/g)				
English Instructions:				
Code or Value	Description	Count	Cumulative	Skip to Item
0.0065 to 22.9709	Range of Values	1959	1959	
.	Missing	378	2337	

LBXBHCLA	Target			
	B(12 Yrs. to 150 Yrs.)			
Hard Edits	SAS Label			
	B-hexachlorocyclohexane Lipid Adj (ng/g)			
English Text: Beta-hexachlorocyclohexane Lipid Adjusted (ng/g)				
English Instructions:				
Code or Value	Description	Count	Cumulative	Skip to Item
0.9 to 2850	Range of Values	1959	1959	
.	Missing	378	2337	

LBDBHCLC	Target			
	B(12 Yrs. to 150 Yrs.)			
Hard Edits	SAS Label			
	Beta-hexachlorocyclohexane Comment Code			
English Text: Beta-hexachlorocyclohexane Comment Code				
English Instructions:				
Code or Value	Description	Count	Cumulative	Skip to Item
0	At or above the detection limit	1252	1252	
1	Below lower detection limit	707	1959	
.	Missing	378	2337	

LBXGHC	Target			
	B(12 Yrs. to 150 Yrs.)			
Hard Edits	SAS Label			
	Gamma-hexachlorocyclohexane (ng/g)			
English Text: Gamma-hexachlorocyclohexane (ng/g)				
English Instructions:				
Code or Value	Description	Count	Cumulative	Skip to Item
0.0062 to 1.7438	Range of Values	1960	1960	
.	Missing	377	2337	

LBXGHCLA	Target			
	B(12 Yrs. to 150 Yrs.)			
Hard Edits	SAS Label			
	G-hexachlorocyclohexane Lipid Adj (ng/g)			
English Text: Gamma-hexachlorocyclohexane Lipid Adjusted (ng/g)				
English Instructions:				
Code or Value	Description	Count	Cumulative	Skip to Item
0.3536 to 304	Range of Values	1960	1960	
.	Missing	377	2337	

LBDGHCLC	Target			
	B(12 Yrs. to 150 Yrs.)			
Hard Edits	SAS Label			
	Gamma-hexachlorocyclohexane Comment Code			
English Text: Gamma-hexachlorocyclohexane Comment code				
English Instructions:				
Code or Value	Description	Count	Cumulative	Skip to Item
0	At or above the detection limit	18	18	
1	Below lower detection limit	1942	1960	
.	Missing	377	2337	

LBXPDE	Target			
	B(12 Yrs. to 150 Yrs.)			
Hard Edits	SAS Label			
	p,p'-DDE (ng/g)			
English Text: p,p'-DDE (ng/g)				
English Instructions:				
Code or Value	Description	Count	Cumulative	Skip to Item
0.011 to 160.5999	Range of Values	1956	1956	
.	Missing	381	2337	

LBXPDELA	Target			
	B(12 Yrs. to 150 Yrs.)			
Hard Edits	SAS Label			
	p,p'-DDE Lipid Adj (ng/g)			
English Text: p,p'-DDE Lipid Adjusted (ng/g)				
English Instructions:				
Code or Value	Description	Count	Cumulative	Skip to Item
1.556 to 22900	Range of Values	1956	1956	
.	Missing	381	2337	

LBDPDEL		Target		
		B(12 Yrs. to 150 Yrs.)		
Hard Edits		SAS Label		
		p,p'-DDE Comment Code		
English Text: p,p'-DDE Comment Code				
English Instructions:				
Code or Value	Description	Count	Cumulative	Skip to Item
0	At or above the detection limit	1951	1951	
1	Below lower detection limit	5	1956	
.	Missing	381	2337	

LBXPDT		Target		
		B(12 Yrs. to 150 Yrs.)		
Hard Edits		SAS Label		
		p,p'-DDT (ng/g)		
English Text: p,p'-DDT (ng/g)				
English Instructions:				
Code or Value	Description	Count	Cumulative	Skip to Item
0.0071 to 7.4432	Range of Values	1965	1965	
.	Missing	372	2337	

LBXPDTLA	Target			
	B(12 Yrs. to 150 Yrs.)			
Hard Edits	SAS Label			
	p,p'-DDT Lipid Adj (ng/g)			
English Text: p,p'-DDT Lipid Adjusted (ng/g)				
English Instructions:				
Code or Value	Description	Count	Cumulative	Skip to Item
0.9 to 1040	Range of Values	1965	1965	
.	Missing	372	2337	

LBDPDTLC	Target			
	B(12 Yrs. to 150 Yrs.)			
Hard Edits	SAS Label			
	p,p'-DDT Comment Code			
English Text: p,p'-DDT Comment Code				
English Instructions:				
Code or Value	Description	Count	Cumulative	Skip to Item
0	At or above the detection limit	1400	1400	
1	Below lower detection limit	565	1965	
.	Missing	372	2337	

LBXODT	Target			
	B(12 Yrs. to 150 Yrs.)			
Hard Edits	SAS Label			
	o,p'-DDT (ng/g)			
English Text: o,p'-DDT (ng/g)				
English Instructions:				
Code or Value	Description	Count	Cumulative	Skip to Item
0.0063 to 1.7937	Range of Values	1946	1946	
.	Missing	391	2337	

LBXODTLA	Target			
	B(12 Yrs. to 150 Yrs.)			
Hard Edits	SAS Label			
	o,p'-DDT Lipid Adj (ng/g)			
English Text: o,p'-DDT Lipid Adjusted (ng/g)				
English Instructions:				
Code or Value	Description	Count	Cumulative	Skip to Item
0.495 to 223	Range of Values	1946	1946	
.	Missing	391	2337	

LBDODTLC	Target			
	B(12 Yrs. to 150 Yrs.)			
Hard Edits	SAS Label			
	o,p'-DDT Comment Code			
English Text: o,p'-DDT Comment Code				
English Instructions:				
Code or Value	Description	Count	Cumulative	Skip to Item
0	At or above the detection limit	115	115	
1	Below lower detection limit	1831	1946	
.	Missing	391	2337	

LBXOXY	Target			
	B(12 Yrs. to 150 Yrs.)			
Hard Edits	SAS Label			
	Oxychlordan (ng/g)			
English Text: Oxychlordan (ng/g)				
English Instructions:				
Code or Value	Description	Count	Cumulative	Skip to Item
0.0067 to 2.0588	Range of Values	1978	1978	
.	Missing	359	2337	

LBXOXYLA	Target			
	B(12 Yrs. to 150 Yrs.)			
Hard Edits	SAS Label			
	Oxychlordane Lipid Adj (ng/g)			
English Text: Oxychlordane Lipid Adjusted (ng/g)				
English Instructions:				
Code or Value	Description	Count	Cumulative	Skip to Item
1.0607 to 159	Range of Values	1978	1978	
.	Missing	359	2337	

LBDOXYLC	Target			
	B(12 Yrs. to 150 Yrs.)			
Hard Edits	SAS Label			
	Oxychlordane Comment Code			
English Text: Oxychlordane Comment Code				
English Instructions:				
Code or Value	Description	Count	Cumulative	Skip to Item
0	At or above the detection limit	1453	1453	
1	Below lower detection limit	525	1978	
.	Missing	359	2337	

LBXTNA	Target			
	B(12 Yrs. to 150 Yrs.)			
Hard Edits	SAS Label			
	Trans-nonachlor (ng/g)			
English Text: Trans-nonachlor (ng/g)				
English Instructions:				
Code or Value	Description	Count	Cumulative	Skip to Item
0.0071 to 3.1553	Range of Values	1955	1955	
.	Missing	382	2337	

LBXTNALA	Target			
	B(12 Yrs. to 150 Yrs.)			
Hard Edits	SAS Label			
	Trans-nonachlor Lipid Adj (ng/g)			
English Text: Trans-nonachlor Lipid Adjusted (ng/g)				
English Instructions:				
Code or Value	Description	Count	Cumulative	Skip to Item
1.2728 to 355	Range of Values	1955	1955	
.	Missing	382	2337	

LBDTNALC	Target			
	B(12 Yrs. to 150 Yrs.)			
Hard Edits	SAS Label			
	Trans-nonachlor Comment Code			
English Text: Trans-nonachlor Comment Code				
English Instructions:				
Code or Value	Description	Count	Cumulative	Skip to Item
0	At or above the detection limit	1701	1701	
1	Below lower detection limit	254	1955	
.	Missing	382	2337	

LBXHPE	Target			
	B(12 Yrs. to 150 Yrs.)			
Hard Edits	SAS Label			
	Heptachlor Epoxide (ng/g)			
English Text: Heptachlor Epoxide (ng/g)				
English Instructions:				
Code or Value	Description	Count	Cumulative	Skip to Item
0.0065 to 1.2601	Range of Values	1963	1963	
.	Missing	374	2337	

LBXHPELA	Target			
	B(12 Yrs. to 150 Yrs.)			
Hard Edits	SAS Label			
	Heptachlor Epoxide Lipid Adj (ng/g)			
English Text: Heptachlor Epoxide Lipid Adjusted (ng/g)				
English Instructions:				
Code or Value	Description	Count	Cumulative	Skip to Item
1.1 to 154	Range of Values	1963	1963	
.	Missing	374	2337	

LBDHPELC	Target			
	B(12 Yrs. to 150 Yrs.)			
Hard Edits	SAS Label			
	Heptachlor Epoxide Comment Code			
English Text: Heptachlor Epoxide Comment Code				
English Instructions:				
Code or Value	Description	Count	Cumulative	Skip to Item
0	At or above the detection limit	1019	1019	
1	Below lower detection limit	944	1963	
.	Missing	374	2337	

LBXMIR	Target			
	B(12 Yrs. to 150 Yrs.)			
Hard Edits	SAS Label			
	Mirex (ng/g)			
English Text: Mirex (ng/g)				
English Instructions:				
Code or Value	Description	Count	Cumulative	Skip to Item
0.0065 to 1.1989	Range of Values	1951	1951	
.	Missing	386	2337	

LBXMIRLA	Target			
	B(12 Yrs. to 150 Yrs.)			
Hard Edits	SAS Label			
	Mirex Lipid Adj (ng/g)			
English Text: Mirex Lipid Adjusted (ng/g)				
English Instructions:				
Code or Value	Description	Count	Cumulative	Skip to Item
0.495 to 166	Range of Values	1951	1951	
.	Missing	386	2337	

LBDMIRLC	Target			
	B(12 Yrs. to 150 Yrs.)			
Hard Edits	SAS Label			
	Mirex Comment Code			
English Text: Mirex Comment Code				
English Instructions:				
Code or Value	Description	Count	Cumulative	Skip to Item
0	At or above the detection limit	695	695	
1	Below lower detection limit	1256	1951	
.	Missing	386	2337	

LBXALD	Target			
	B(12 Yrs. to 150 Yrs.)			
Hard Edits	SAS Label			
	Aldrin (ng/g)			
English Text: Aldrin (ng/g)				
English Instructions:				
Code or Value	Description	Count	Cumulative	Skip to Item
0.0062 to 0.3567	Range of Values	1946	1946	
.	Missing	391	2337	

LBXALDLA	Target			
	B(12 Yrs. to 150 Yrs.)			
Hard Edits	SAS Label			
	Aldrin Lipid Adj (ng/g)			
English Text: Aldrin Lipid Adjusted (ng/g)				
English Instructions:				
Code or Value	Description	Count	Cumulative	Skip to Item
0.3536 to 58.1	Range of Values	1946	1946	
.	Missing	391	2337	

LBDALDLC	Target			
	B(12 Yrs. to 150 Yrs.)			
Hard Edits	SAS Label			
	Aldrin Comment Code			
English Text: Aldrin Comment Code				
English Instructions:				
Code or Value	Description	Count	Cumulative	Skip to Item
0	At or above the detection limit	2	2	
1	Below lower detection limit	1944	1946	
.	Missing	391	2337	

LBXDIE	Target			
	B(12 Yrs. to 150 Yrs.)			
Hard Edits	SAS Label			
	Dieldrin (ng/g)			
English Text: Dieldrin (ng/g)				
English Instructions:				
Code or Value	Description	Count	Cumulative	Skip to Item
0.007 to 3.1761	Range of Values	1952	1952	
.	Missing	385	2337	

LBXDIELA	Target			
	B(12 Yrs. to 150 Yrs.)			
Hard Edits	SAS Label			
	Dieldrin Lipid Adj (ng/g)			
English Text: Dieldrin Lipid Adjusted (ng/g)				
English Instructions:				
Code or Value	Description	Count	Cumulative	Skip to Item
1.2 to 448	Range of Values	1952	1952	
.	Missing	385	2337	

LBDDIELC	Target			
	B(12 Yrs. to 150 Yrs.)			
Hard Edits	SAS Label			
	Dieldrin Comment Code			
English Text: Dieldrin Comment Code				
English Instructions:				
Code or Value	Description	Count	Cumulative	Skip to Item
0	At or above the detection limit	1597	1597	
1	Below lower detection limit	355	1952	
.	Missing	385	2337	

LBXEND	Target			
	B(12 Yrs. to 150 Yrs.)			
Hard Edits	SAS Label			
	Endrin (ng/g)			
English Text: Endrin (ng/g)				
English Instructions:				
Code or Value	Description	Count	Cumulative	Skip to Item
0.0062 to 0.0383	Range of Values	1825	1825	
.	Missing	512	2337	

LBXENDLA	Target			
	B(12 Yrs. to 150 Yrs.)			
Hard Edits	SAS Label			
	Endrin Lipid Adj (ng/g)			
English Text: Endrin Lipid Adjusted (ng/g)				
English Instructions:				
Code or Value	Description	Count	Cumulative	Skip to Item
0.3536 to 6.1	Range of Values	1825	1825	
.	Missing	512	2337	

LBDENDLC	Target			
	B(12 Yrs. to 150 Yrs.)			
Hard Edits	SAS Label			
	Endrin Comment Code			
English Text: Endrin Comment Code				
English Instructions:				
Code or Value	Description	Count	Cumulative	Skip to Item
0	At or above the detection limit	2	2	
1	Below lower detection limit	1823	1825	
.	Missing	512	2337	