National Health and Nutrition Examination Survey

August 2021-August 2023 Data Documentation, Codebook, and Frequencies

Volatile Organic Compounds and Trihalomethanes/MTBE - Blood (VOCWB_L)

Data File: VOCWB_L.xpt

First Published: September 2025

Last Revised: NA

Component Description

Volatile Organic Compounds and Trihalomethanes/MTBE (Whole Blood)

Volatile organic compounds (VOCs) are a large group of chemicals that have been used as solvents, degreasers, and cleaning agents in industry and consumer products. Many of the VOCs were found to contaminate ground water and drinking water sources. Because of human health concerns, these VOCs have been banned or restricted from most uses.

Halogenated solvents are VOCs consisting of a hydrocarbon chain or one hydrocarbon substituted with one or more chlorine or bromine atoms. Most of these chemicals are used as degreasers and solvents in various products, such as paint. In the past, 1,1,1-trichloroethane was used as a dry-cleaning agent, insect fumigant, and solvent in consumer products. Methylene chloride, tetrachloroethene, and trichloroethene are other VOCs that were widely used in the past.

Benzene, toluene, ethylbenzene, xylene, and styrene, collectively referred to as BTEXS, are components of tobacco smoke. Along with 2,5-dimethylfuran, these VOCs are usually detected in the blood of cigarette smokers at higher levels than in non-smokers. Chlorobenzene (monochlorobenzene) and the three dichlorobenzenes are halogenated aromatic hydrocarbons primarily used in industrial and chemical synthetic processes. Chlorobenzene has been used to produce DDT, phenol, and nitrobenzene. The dichlorobenzenes are also chemical intermediates in the synthesis of dyes, pesticides, and other industrial products. 1,4-Dichlorobenzene (para-dichlorobenzene) is used also as a moth repellent and as a deodorizer. Disinfection by-products (DBP), including bromodichloromethane, dibromochloromethane, bromoform, and chloroform are formed when chlorine interacts with natural organic materials found in water. Primary sources of DBPs are chlorinated drinking water and recreational water bodies, such as swimming pools.

The prevalence of disinfection by-products in drinking water supplies has raised concerns about possible adverse health effects from chronic exposure to these potentially carcinogenic compounds. Methyl-tert-butyl ether (MTBE) was used as an additive to replace lead in gasoline, but its use was banned after widespread ground water contamination was discovered.

Inhalation is the most common VOC route of exposure in the general population, including indoor sources such as paints, adhesives, cleaning solutions, and aerosolized insecticide sprays; industries producing these solvents; and contaminated waste disposal sites. Drinking water may contribute to exposure when underground drinking water supplies are contaminated. After they are absorbed in the body, VOCs are rapidly eliminated in exhaled breath, or may be rapidly metabolized and eliminated in the urine.

Eligible Sample

Examined participants aged 12 years and older from a one-half sample were eligible.

Description of Laboratory Methodology

An automated analytical method was developed using capillary gas chromatography (GC) and mass spectrometry (MS) with selected-ion monitoring (SIM) detection and isotope-dilution. This method quantifies levels of individual VOCs and Trihalomethanes (THMs) and methyl tert-butyl ether (MTBE) in whole blood to low-parts-per-trillion range. Because non-occupationally exposed individuals have blood VOC concentrations within this range, this method is applicable for determining these quantities and investigating cases of sustained or recent low-level exposure.

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

There were no changes to the lab method, lab equipment, or lab site for this component in the NHANES August 2021-August 2023 cycle.

Laboratory Method Files

Volatile Organic Compounds (VOCs) & Trihalomethanes/MTBE Laboratory Procedure Manual (September 2025)

Laboratory Quality Assurance and Monitoring

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

Detailed instructions on specimen collection and processing are discussed in the NHANES Laboratory Procedures Manual (LPM). Vials are stored under appropriate refrigerated (2-8°C) conditions until they are shipped to National Center for Environmental Health for testing.

The NHANES quality assurance and quality control (QA/QC) protocols meet the 1988 Clinical Laboratory Improvement Amendment mandates. Detailed QA/QC instructions are discussed in the NHANES LPM.

Mobile Examination Centers (MECs)

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

Analytical Laboratories

NHANES uses several methods to monitor the quality of the analyses performed by the contract laboratories. In the MEC, these methods include performing blind split samples

collected on “dry run” sessions. In addition, contract laboratories randomly perform repeat testing on 2% of all specimens.

NCHS developed and distributed a QC protocol for all CDC and contract laboratories, which outlined the use of Westgard rules (Westgard et. al., 1981) when testing NHANES specimens. Progress reports containing any problems encountered during shipping or receipt of specimens, summary statistics for each control pool, QC graphs, instrument calibration, reagents, and any special considerations are submitted to NCHS quarterly. The reports are reviewed for trends or shifts in the data. The laboratories are required to explain any identified areas of concern.

All QC procedures recommended by the manufacturers were followed. Reported results for all assays meet the Division of Laboratory Services’ QA/QC performance criteria for accuracy and precision, similar to the Westgard rules (Caudill et. al., 2008).

Data Processing and Editing

The data were reviewed. Incomplete data or improbable values were sent to the performing laboratory for confirmation.

Analytic Notes

There are over 800 laboratory tests performed on NHANES participants. However, not all participants provided biospecimens or enough volume for all the tests to be performed.

Analyst should evaluate the extent of missing data in the dataset related to the outcome of interest as well as any predictor variables used in the analyses to determine whether additional re-weighting for item non-response is necessary.

Please refer to the NHANES Analytic Guidelines and the on-line NHANES Tutorial for details on the use of sample weights and analytic issues.

Volatile Toxicant Questionnaire

A volatile toxicant questionnaire (VTQ) was administered on the mobile examination center (MEC), by trained interviewers, using the Computer-Assisted Personal Interview (CAPI) system. The VTQ section includes data about the participant’s home, activities, amount of time spent in various locations, and exposure to different chemicals over the past 48 hours. This questionnaire data can be used in conjunction with the VOC laboratory dataset and found in the Volatile Toxicant Data File in the NHANES August 2021 – August 2023 Questionnaire Data section.

Subsample Weights

Whole blood VOCs were measured in a one-half subsample of participants 12 years and older. 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.

Demographic and Other Related Variables

The analysis of NHANES laboratory data must be conducted using the appropriate survey design and demographic variables. The NHANES August 2021-August 2023 Demographics File contains demographic data, health indicators, and other related information collected during household interviews as well as the 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.

The Fasting Questionnaire File includes auxiliary information such as fasting status, length of fast and the time of venipuncture.

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

Detection limits

The detection limits were constant for all of the analytes in the data set. Two variables are provided for each of these analytes. The variable name ending in "LC" (ex., LBD2DFLC) indicates whether the result was below the limit of detection: "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 prefixed LBX (ex., LBX2DF) provides the analytic result for that analyte. For analytes with analytic results below the lower limit of detection (ex., LBD2DFLC=1), an imputed fill value was placed in the analyte results field. This value is the lower limit of detection divided by square root of 2 (LLOD/sqrt [2]).

Lower Limit of Detection (LLOD, in ng/mL) for Whole Blood VOCs:

VARIABLE NAME	SAS LABEL	LLOD
LBX2DF	Blood 2,5-Dimethylfuran (ng/mL)	0.0110
LBXV06	Blood Hexane (ng/mL)	0.122
LBXV07N	Blood Heptane (ng/mL)	0.100
LBXV08N	Blood Octane (ng/mL)	0.100
LBXV1D	Blood 1,2-Dichlorobenzene (ng/mL)	0.0250
LBXV2A	Blood 1,2-Dichloroethane (ng/mL)	0.0100
LBXV3B	Blood 1,3-Dichlorobenzene (ng/mL)	0.0250
LBXV4C	Blood Tetrachloroethene (ng/mL)	0.0480
LBXVAPN	Blood a-pinene (ng/mL)	0.0200
LBXVBF	Blood Bromoform (ng/mL)	0.0080
LBXVBM	Blood Bromodichloromethane (ng/mL)	0.0060
LBXVBZ	Blood Benzene (ng/mL)	0.0240
LBXVBZN	Blood Benzonitrile (ng/mL)	0.150
LBXVC6	Blood Cyclohexane (ng/mL)	0.0200
LBXVCB	Blood Chlorobenzene (ng/mL)	0.0110
LBXVCF	Blood Chloroform (ng/mL)	0.0080
LBXVCM	Blood Dibromochloromethane (ng/mL)	0.0050
LBXVCT	Blood Carbon Tetrachloride (ng/mL)	0.0050
LBXVDB	Blood 1,4-Dichlorobenzene (ng/mL)	0.0400
LBXVDEE	Blood Diethyl Ether (ng/mL)	0.0400
LBXVEA	Blood Ethyl Acetate (ng/mL)	0.158
LBXVEB	Blood Ethylbenzene (ng/mL)	0.0240
LBXVEC	Blood Chloroethane (ng/mL)	0.0450
LBXVFN	Blood Furan (ng/mL)	0.0250
LBXVIBN	Blood Isobutyronitrile (ng/mL)	0.0400
LBXVIPB	Blood Isopropylbenzene (ng/mL)	0.0400
LBXVMC	Blood Methylene Chloride (ng/mL)	0.250
LBXVMCP	Blood Methylcyclopentane (ng/mL)	0.0200
LBXVME	Blood MTBE (ng/mL)	0.0100
LBXVMIK	Blood Methyl Isobutyl Ketone (ng/mL)	0.100
LBXVOX	Blood o-Xylene (ng/mL)	0.0240
LBXVST	Blood Styrene (ng/mL)	0.0300
LBXVTC	Blood Trichloroethene (ng/mL)	0.0120
LBXVTE	Blood 1,1,1-Trichloroethane (ng/mL)	0.0100
LBXVTHF	Blood Tetrahydrofuran (ng/mL)	0.125
LBXVTO	Blood Toluene (ng/mL)	0.0250

VARIABLE NAME	SAS LABEL	LLOD
LBXVTP	Blood 1,2,3-Trichloropropane (ng/mL)	0.0400
LBXVXY	Blood m-/p-Xylene (ng/mL)	0.0340

References

- Caudill, S.P., Schleicher, R.L., Pirkle, J.L. Multi-rule quality control for the age-related eye disease study. Statist. Med. (2008) 27(20):4094-40106.
- Westgard J.O., Barry P.L., Hunt M.R., Groth T. A multi-rule Shewhart chart for quality control in clinical chemistry. Clin Chem (1981) 27:493-501.

Codebook and Frequencies

SEQN - Respondent sequence number

Variable Name:	SEQN
SAS Label:	Respondent sequence number
English Text:	Respondent sequence number.
Target:	Both males and females 12 YEARS - 150 YEARS

WTSVOC2Y - VOC Subsample Weight

Variable Name: WTSVOC2Y

SAS Label: VOC Subsample Weight

English Text: VOC Subsample Weight

Target: Both males and females 12 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
11386.962716 to 543590.56928	Range of Values	2960	2960	
0	No Lab Result	658	3618	
.	Missing	0	3618	

LBX2DF - Blood 2,5-Dimethylfuran (ng/mL)

Variable Name: LBX2DF

SAS Label: Blood 2,5-Dimethylfuran (ng/mL)

English Text: Blood 2,5-Dimethylfuran (ng/mL)

Target: Both males and females 12 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0.0078 to 0.857	Range of Values	2960	2960	
.	Missing	658	3618	

LBD2DFLC - Blood 2,5-Dimethylfuran Comment Code

Variable Name: LBD2DFLC

SAS Label: Blood 2,5-Dimethylfuran Comment Code

English Text: Blood 2,5-Dimethylfuran Comment Code

Target: Both males and females 12 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0	At or above detection limit	411	411	
1	Below lower detection limit	2549	2960	
.	Missing	658	3618	

LBXV06 - Blood Hexane (ng/mL)

Variable Name: LBXV06

SAS Label: Blood Hexane (ng/mL)

English Text: Blood Hexane (ng/mL)

Target: Both males and females 12 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0.086 to 14	Range of Values	2914	2914	
.	Missing	704	3618	

LBDV06LC - Blood Hexane Comment Code

Variable Name: LBDV06LC

SAS Label: Blood Hexane Comment Code

English Text: Blood Hexane Comment Code

Target: Both males and females 12 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0	At or above detection limit	4	4	
1	Below lower detection limit	2910	2914	
.	Missing	704	3618	

LBXV07N - Blood Heptane (ng/mL)

Variable Name: LBXV07N

SAS Label: Blood Heptane (ng/mL)

English Text: Blood Heptane (ng/mL)

Target: Both males and females 12 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0.071 to 0.598	Range of Values	2931	2931	
.	Missing	687	3618	

LBDV07LC - Blood Heptane Comment Code

Variable Name: LBDV07LC

SAS Label: Blood Heptane Comment Code

English Text: Blood Heptane Comment Code

Target: Both males and females 12 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0	At or above detection limit	11	11	
1	Below lower detection limit	2920	2931	
.	Missing	687	3618	

LBXV08N - Blood Octane (ng/mL)

Variable Name: LBXV08N

SAS Label: Blood Octane (ng/mL)

English Text: Blood Octane (ng/mL)

Target: Both males and females 12 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0.071 to 0.295	Range of Values	2959	2959	
.	Missing	659	3618	

LBDV08LC - Blood Octane Comment Code

Variable Name: LBDV08LC

SAS Label: Blood Octane Comment Code

English Text: Blood Octane Comment Code

Target: Both males and females 12 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0	At or above detection limit	5	5	
1	Below lower detection limit	2954	2959	
.	Missing	659	3618	

LBXV1D - Blood 1,2-Dichlorobenzene (ng/mL)

Variable Name: LBXV1D

SAS Label: Blood 1,2-Dichlorobenzene (ng/mL)

English Text: Blood 1,2-Dichlorobenzene (ng/mL)

Target: Both males and females 12 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0.0177 to 0.0177	Range of Values	2936	2936	
.	Missing	682	3618	

LBDV1DLC - Blood 1,2-Dichlorobenzene Comment Code

Variable Name: LBDV1DLC

SAS Label: Blood 1,2-Dichlorobenzene Comment Code

English Text: Blood 1,2-Dichlorobenzene Comment Code

Target: Both males and females 12 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0	At or above detection limit	0	0	
1	Below lower detection limit	2936	2936	
.	Missing	682	3618	

LBXV2A - Blood 1,2-Dichloroethane (ng/mL)

Variable Name: LBXV2A

SAS Label: Blood 1,2-Dichloroethane (ng/mL)

English Text: Blood 1,2-Dichloroethane (ng/mL)

Target: Both males and females 12 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0.0071 to 0.141	Range of Values	2939	2939	
.	Missing	679	3618	

LBDV2ALC - Blood 1,2-Dichloroethane Comment Code

Variable Name: LBDV2ALC

SAS Label: Blood 1,2-Dichloroethane Comment Code

English Text: Blood 1,2-Dichloroethane Comment Code

Target: Both males and females 12 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0	At or above detection limit	52	52	
1	Below lower detection limit	2887	2939	
.	Missing	679	3618	

LBXV3B - Blood 1,3-Dichlorobenzene (ng/mL)

Variable Name: LBXV3B

SAS Label: Blood 1,3-Dichlorobenzene (ng/mL)

English Text: Blood 1,3-Dichlorobenzene (ng/mL)

Target: Both males and females 12 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0.0177 to 0.0177	Range of Values	2960	2960	
.	Missing	658	3618	

LBDV3BLC - Blood 1,3-Dichlorobenzene Comment Code

Variable Name: LBDV3BLC

SAS Label: Blood 1,3-Dichlorobenzene Comment Code

English Text: Blood 1,3-Dichlorobenzene Comment Code

Target: Both males and females 12 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0	At or above detection limit	0	0	
1	Below lower detection limit	2960	2960	
.	Missing	658	3618	

LBXV4C - Blood Tetrachloroethene (ng/mL)

Variable Name: LBXV4C

SAS Label: Blood Tetrachloroethene (ng/mL)

English Text: Blood Tetrachloroethene (ng/mL)

Target: Both males and females 12 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0.0339 to 3.63	Range of Values	2960	2960	
.	Missing	658	3618	

LBDV4CLC - Blood Tetrachloroethene Comment Code

Variable Name: LBDV4CLC

SAS Label: Blood Tetrachloroethene Comment Code

English Text: Blood Tetrachloroethene Comment Code

Target: Both males and females 12 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0	At or above detection limit	171	171	
1	Below lower detection limit	2789	2960	
.	Missing	658	3618	

LBXVAPN - Blood a-pinene (ng/mL)

Variable Name: LBXVAPN

SAS Label: Blood a-pinene (ng/mL)

English Text: Blood a-pinene (ng/mL)

Target: Both males and females 12 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0.0141 to 5.49	Range of Values	2934	2934	
.	Missing	684	3618	

LBDVAPLC - Blood a-pinene Comment Code

Variable Name: LBDVAPLC

SAS Label: Blood a-pinene Comment Code

English Text: Blood a-pinene Comment Code

Target: Both males and females 12 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0	At or above detection limit	2020	2020	
1	Below lower detection limit	914	2934	
.	Missing	684	3618	

LBXVBF - Blood Bromoform (ng/mL)

Variable Name: LBXVBF

SAS Label: Blood Bromoform (ng/mL)

English Text: Blood Bromoform (ng/mL)

Target: Both males and females 12 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0.0057 to 3.48	Range of Values	2960	2960	
.	Missing	658	3618	

LBDVBFLC - Blood Bromoform Comment Code

Variable Name: LBDVBFLC

SAS Label: Blood Bromoform Comment Code

English Text: Blood Bromoform Comment Code

Target: Both males and females 12 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0	At or above detection limit	60	60	
1	Below lower detection limit	2900	2960	
.	Missing	658	3618	

LBXVBM - Blood Bromodichloromethane (ng/mL)

Variable Name: LBXVBM

SAS Label: Blood Bromodichloromethane (ng/mL)

English Text: Blood Bromodichloromethane (ng/mL)

Target: Both males and females 12 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0.0042 to 0.0441	Range of Values	2960	2960	
.	Missing	658	3618	

LBDVBMLC - Blood Bromodichloromethane Comment Code

Variable Name: LBDVBMLC

SAS Label: Blood Bromodichloromethane Comment Code

English Text: Blood Bromodichloromethane Comment Code

Target: Both males and females 12 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0	At or above detection limit	264	264	
1	Below lower detection limit	2696	2960	
.	Missing	658	3618	

LBXVBZ - Blood Benzene (ng/mL)

Variable Name: LBXVBZ

SAS Label: Blood Benzene (ng/mL)

English Text: Blood Benzene (ng/mL)

Target: Both males and females 12 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0.017 to 2.15	Range of Values	2934	2934	
.	Missing	684	3618	

LBDVBZLC - Blood Benzene Comment Code

Variable Name: LBDVBZLC

SAS Label: Blood Benzene Comment Code

English Text: Blood Benzene Comment Code

Target: Both males and females 12 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0	At or above detection limit	709	709	
1	Below lower detection limit	2225	2934	
.	Missing	684	3618	

LBXVBZN - Blood Benzonitrile (ng/mL)

Variable Name: LBXVBZN

SAS Label: Blood Benzonitrile (ng/mL)

English Text: Blood Benzonitrile (ng/mL)

Target: Both males and females 12 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0.106 to 1.6	Range of Values	2957	2957	
.	Missing	661	3618	

LBDVZBLC - Blood Benzonitrile Comment Code

Variable Name: LBDVZBLC

SAS Label: Blood Benzonitrile Comment Code

English Text: Blood Benzonitrile Comment Code

Target: Both males and females 12 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0	At or above detection limit	133	133	
1	Below lower detection limit	2824	2957	
.	Missing	661	3618	

LBXVC6 - Blood Cyclohexane (ng/mL)

Variable Name: LBXVC6

SAS Label: Blood Cyclohexane (ng/mL)

English Text: Blood Cyclohexane (ng/mL)

Target: Both males and females 12 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0.0141 to 3.49	Range of Values	2934	2934	
.	Missing	684	3618	

LBDVC6LC - Blood Cyclohexane Comment Code

Variable Name: LBDVC6LC

SAS Label: Blood Cyclohexane Comment Code

English Text: Blood Cyclohexane Comment Code

Target: Both males and females 12 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0	At or above detection limit	20	20	
1	Below lower detection limit	2914	2934	
.	Missing	684	3618	

LBXVCB - Blood Chlorobenzene (ng/mL)

Variable Name: LBXVCB

SAS Label: Blood Chlorobenzene (ng/mL)

English Text: Blood Chlorobenzene (ng/mL)

Target: Both males and females 12 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0.0078 to 0.158	Range of Values	2949	2949	
.	Missing	669	3618	

LBDVCBLC - Blood Chlorobenzene Comment Code

Variable Name: LBDVCBLC

SAS Label: Blood Chlorobenzene Comment Code

English Text: Blood Chlorobenzene Comment Code

Target: Both males and females 12 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0	At or above detection limit	2	2	
1	Below lower detection limit	2947	2949	
.	Missing	669	3618	

LBXVCF - Blood Chloroform (ng/mL)

Variable Name: LBXVCF

SAS Label: Blood Chloroform (ng/mL)

English Text: Blood Chloroform (ng/mL)

Target: Both males and females 12 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0.0057 to 0.685	Range of Values	2939	2939	
.	Missing	679	3618	

LBDVCFLC - Blood Chloroform Comment Code

Variable Name: LBDVCFLC

SAS Label: Blood Chloroform Comment Code

English Text: Blood Chloroform Comment Code

Target: Both males and females 12 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0	At or above detection limit	1616	1616	
1	Below lower detection limit	1323	2939	
.	Missing	679	3618	

LBXVCM - Blood Dibromochloromethane (ng/mL)

Variable Name: LBXVCM

SAS Label: Blood Dibromochloromethane (ng/mL)

English Text: Blood Dibromochloromethane (ng/mL)

Target: Both males and females 12 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0.0035 to 0.035	Range of Values	2959	2959	
.	Missing	659	3618	

LBDVCMLC - Blood Dibromochloromethane Comment Code

Variable Name: LBDVCMLC

SAS Label: Blood Dibromochloromethane Comment Code

English Text: Blood Dibromochloromethane Comment Code

Target: Both males and females 12 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0	At or above detection limit	228	228	
1	Below lower detection limit	2731	2959	
.	Missing	659	3618	

LBXVCT - Blood Carbon Tetrachloride (ng/mL)

Variable Name: LBXVCT

SAS Label: Blood Carbon Tetrachloride (ng/mL)

English Text: Blood Carbon Tetrachloride (ng/mL)

Target: Both males and females 12 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0.0035 to 0.0524	Range of Values	2960	2960	
.	Missing	658	3618	

LBDVCTLC - Blood Carbon Tetrachloride Comment Code

Variable Name: LBDVCTLC

SAS Label: Blood Carbon Tetrachloride Comment Code

English Text: Blood Carbon Tetrachloride Comment Code

Target: Both males and females 12 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0	At or above detection limit	9	9	
1	Below lower detection limit	2951	2960	
.	Missing	658	3618	

LBXVDB - Blood 1,4-Dichlorobenzene (ng/mL)

Variable Name: LBXVDB

SAS Label: Blood 1,4-Dichlorobenzene (ng/mL)

English Text: Blood 1,4-Dichlorobenzene (ng/mL)

Target: Both males and females 12 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0.0283 to 101	Range of Values	2942	2942	
.	Missing	676	3618	

LBDVDBLC - Blood 1,4-Dichlorobenzene Comment Code

Variable Name: LBDVDBLC

SAS Label: Blood 1,4-Dichlorobenzene Comment Code

English Text: Blood 1,4-Dichlorobenzene Comment Code

Target: Both males and females 12 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0	At or above detection limit	845	845	
1	Below lower detection limit	2097	2942	
.	Missing	676	3618	

LBXVDEE - Blood Diethyl Ether (ng/mL)

Variable Name: LBXVDEE

SAS Label: Blood Diethyl Ether (ng/mL)

English Text: Blood Diethyl Ether (ng/mL)

Target: Both males and females 12 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0.0283 to 0.508	Range of Values	2914	2914	
.	Missing	704	3618	

LBDVEELC - Blood Diethyl Ether Comment Code

Variable Name: LBDVEELC

SAS Label: Blood Diethyl Ether Comment Code

English Text: Blood Diethyl Ether Comment Code

Target: Both males and females 12 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0	At or above detection limit	3	3	
1	Below lower detection limit	2911	2914	
.	Missing	704	3618	

LBXVEA - Blood Ethyl Acetate (ng/mL)

Variable Name: LBXVEA

SAS Label: Blood Ethyl Acetate (ng/mL)

English Text: Blood Ethyl Acetate (ng/mL)

Target: Both males and females 12 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0.112 to 43.3	Range of Values	2797	2797	
.	Missing	821	3618	

LBDVEALC - Blood Ethyl Acetate Comment Code

Variable Name: LBDVEALC

SAS Label: Blood Ethyl Acetate Comment Code

English Text: Blood Ethyl Acetate Comment Code

Target: Both males and females 12 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0	At or above detection limit	45	45	
1	Below lower detection limit	2752	2797	
.	Missing	821	3618	

LBXVEB - Blood Ethylbenzene (ng/mL)

Variable Name: LBXVEB

SAS Label: Blood Ethylbenzene (ng/mL)

English Text: Blood Ethylbenzene (ng/mL)

Target: Both males and females 12 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0.017 to 4.92	Range of Values	2936	2936	
.	Missing	682	3618	

LBDVEBLC - Blood Ethylbenzene Comment Code

Variable Name: LBDVEBLC

SAS Label: Blood Ethylbenzene Comment Code

English Text: Blood Ethylbenzene Comment Code

Target: Both males and females 12 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0	At or above detection limit	543	543	
1	Below lower detection limit	2393	2936	
.	Missing	682	3618	

LBXVEC - Blood Chloroethane (ng/mL)

Variable Name: LBXVEC

SAS Label: Blood Chloroethane (ng/mL)

English Text: Blood Chloroethane (ng/mL)

Target: Both males and females 12 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0.0318 to 1.81	Range of Values	2890	2890	
.	Missing	728	3618	

LBDVECLC - Blood Chloroethane Comment Code

Variable Name: LBDVECLC

SAS Label: Blood Chloroethane Comment Code

English Text: Blood Chloroethane Comment Code

Target: Both males and females 12 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0	At or above detection limit	8	8	
1	Below lower detection limit	2882	2890	
.	Missing	728	3618	

LBXVFN - Blood Furan (ng/mL)

Variable Name: LBXVFN

SAS Label: Blood Furan (ng/mL)

English Text: Blood Furan (ng/mL)

Target: Both males and females 12 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0.0177 to 0.35	Range of Values	2937	2937	
.	Missing	681	3618	

LBDVFNLC - Blood Furan Comment Code

Variable Name: LBDVFNLC

SAS Label: Blood Furan Comment Code

English Text: Blood Furan Comment Code

Target: Both males and females 12 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0	At or above detection limit	386	386	
1	Below lower detection limit	2551	2937	
.	Missing	681	3618	

LBXVIBN - Blood Isobutyronitrile (ng/mL)

Variable Name: LBXVIBN

SAS Label: Blood Isobutyronitrile (ng/mL)

English Text: Blood Isobutyronitrile (ng/mL)

Target: Both males and females 12 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0.0283 to 0.665	Range of Values	2918	2918	
.	Missing	700	3618	

LBDVIBLC - Blood Isobutyronitrile Comment Code

Variable Name: LBDVIBLC

SAS Label: Blood Isobutyronitrile Comment Code

English Text: Blood Isobutyronitrile Comment Code

Target: Both males and females 12 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0	At or above detection limit	204	204	
1	Below lower detection limit	2714	2918	
.	Missing	700	3618	

LBXVIPB - Blood Isopropylbenzene (ng/mL)

Variable Name: LBXVIPB

SAS Label: Blood Isopropylbenzene (ng/mL)

English Text: Blood Isopropylbenzene (ng/mL)

Target: Both males and females 12 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0.0283 to 0.205	Range of Values	2959	2959	
.	Missing	659	3618	

LBDVIPLC - Blood Isopropylbenzene Comment Code

Variable Name: LBDVIPLC

SAS Label: Blood Isopropylbenzene Comment Code

English Text: Blood Isopropylbenzene Comment Code

Target: Both males and females 12 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0	At or above detection limit	2	2	
1	Below lower detection limit	2957	2959	
.	Missing	659	3618	

LBXVMC - Blood Methylene Chloride (ng/mL)

Variable Name: LBXVMC

SAS Label: Blood Methylene Chloride (ng/mL)

English Text: Blood Methylene Chloride (ng/mL)

Target: Both males and females 12 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0.177 to 15.7	Range of Values	2937	2937	
.	Missing	681	3618	

LBDVMCLC - Blood Methylene Chloride Comment Code

Variable Name: LBDVMCLC

SAS Label: Blood Methylene Chloride Comment Code

English Text: Blood Methylene Chloride Comment Code

Target: Both males and females 12 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0	At or above detection limit	7	7	
1	Below lower detection limit	2930	2937	
.	Missing	681	3618	

LBXVMCP - Blood Methylcyclopentane (ng/mL)

Variable Name: LBXVMCP

SAS Label: Blood Methylcyclopentane (ng/mL)

English Text: Blood Methylcyclopentane (ng/mL)

Target: Both males and females 12 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0.0141 to 15.6	Range of Values	2914	2914	
.	Missing	704	3618	

LBDVMPLC - Blood Methylcyclopentane Comment Code

Variable Name: LBDVMPLC

SAS Label: Blood Methylcyclopentane Comment Code

English Text: Blood Methylcyclopentane Comment Code

Target: Both males and females 12 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0	At or above detection limit	22	22	
1	Below lower detection limit	2892	2914	
.	Missing	704	3618	

LBXVME - Blood MTBE (ng/mL)

Variable Name: LBXVME

SAS Label: Blood MTBE (ng/mL)

English Text: Blood Methyl-tert-butyl ether (MTBE) (ng/mL)

Target: Both males and females 12 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0.0071 to 0.0631	Range of Values	2944	2944	
.	Missing	674	3618	

LBDVMELC - Blood MTBE Comment Code

Variable Name: LBDVMELC

SAS Label: Blood MTBE Comment Code

English Text: Blood Methyl-tert-butyl ether (MTBE) Comment Code

Target: Both males and females 12 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0	At or above detection limit	20	20	
1	Below lower detection limit	2924	2944	
.	Missing	674	3618	

LBXVMIK - Blood Methyl Isobutyl Ketone (ng/mL)

Variable Name: LBXVMIK

SAS Label: Blood Methyl Isobutyl Ketone (ng/mL)

English Text: Blood Methyl Isobutyl Ketone (ng/mL)

Target: Both males and females 12 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0.071 to 0.238	Range of Values	2942	2942	
.	Missing	676	3618	

LBDVMKLC - Blood Methyl Isobutyl Ketone Comt Code

Variable Name: LBDVMKLC

SAS Label: Blood Methyl Isobutyl Ketone Comt Code

English Text: Blood Methyl Isobutyl Ketone Comment Code

Target: Both males and females 12 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0	At or above detection limit	21	21	
1	Below lower detection limit	2921	2942	
.	Missing	676	3618	

LBXVOX - Blood o-Xylene (ng/mL)

Variable Name: LBXVOX

SAS Label: Blood o-Xylene (ng/mL)

English Text: Blood o-Xylene (ng/mL)

Target: Both males and females 12 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0.017 to 5.96	Range of Values	2960	2960	
.	Missing	658	3618	

LBDVOXLC - Blood o-Xylene Comment Code

Variable Name: LBDVOXLC

SAS Label: Blood o-Xylene Comment Code

English Text: Blood o-Xylene Comment Code

Target: Both males and females 12 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0	At or above detection limit	548	548	
1	Below lower detection limit	2412	2960	
.	Missing	658	3618	

LBXVST - Blood Styrene (ng/mL)

Variable Name: LBXVST

SAS Label: Blood Styrene (ng/mL)

English Text: Blood Styrene (ng/mL)

Target: Both males and females 12 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0.0212 to 9.16	Range of Values	2933	2933	
.	Missing	685	3618	

LBDVSTLC - Blood Styrene Comment Code

Variable Name: LBDVSTLC

SAS Label: Blood Styrene Comment Code

English Text: Blood Styrene Comment Code

Target: Both males and females 12 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0	At or above detection limit	1388	1388	
1	Below lower detection limit	1545	2933	
.	Missing	685	3618	

LBXVTC - Blood Trichloroethene (ng/mL)

Variable Name: LBXVTC

SAS Label: Blood Trichloroethene (ng/mL)

English Text: Blood Trichloroethene (ng/mL)

Target: Both males and females 12 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0.0085 to 0.5	Range of Values	2960	2960	
.	Missing	658	3618	

LBDVTCLC - Blood Trichloroethene Comment Code

Variable Name: LBDVTCLC

SAS Label: Blood Trichloroethene Comment Code

English Text: Blood Trichloroethene Comment Code

Target: Both males and females 12 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0	At or above detection limit	15	15	
1	Below lower detection limit	2945	2960	
.	Missing	658	3618	

LBXVTE - Blood 1,1,1-Trichloroethane (ng/mL)

Variable Name: LBXVTE

SAS Label: Blood 1,1,1-Trichloroethane (ng/mL)

English Text: Blood 1,1,1-Trichloroethane (ng/mL)

Target: Both males and females 12 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0.0071 to 0.122	Range of Values	2958	2958	
.	Missing	660	3618	

LBDVTELC - Blood 1,1,1-Trichloroethane Comment Code

Variable Name: LBDVTELC

SAS Label: Blood 1,1,1-Trichloroethane Comment Code

English Text: Blood 1,1,1-Trichloroethane Comment Code

Target: Both males and females 12 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0	At or above detection limit	17	17	
1	Below lower detection limit	2941	2958	
.	Missing	660	3618	

LBXVTHF - Blood Tetrahydrofuran (ng/mL)

Variable Name: LBXVTHF

SAS Label: Blood Tetrahydrofuran (ng/mL)

English Text: Blood Tetrahydrofuran (ng/mL)

Target: Both males and females 12 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0.088 to 19.7	Range of Values	2940	2940	
.	Missing	678	3618	

LBDVHTLC - Blood Tetrahydrofuran Comment Code

Variable Name: LBDVHTLC

SAS Label: Blood Tetrahydrofuran Comment Code

English Text: Blood Tetrahydrofuran Comment Code

Target: Both males and females 12 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0	At or above detection limit	5	5	
1	Below lower detection limit	2935	2940	
.	Missing	678	3618	

LBXVTO - Blood Toluene (ng/mL)

Variable Name: LBXVTO

SAS Label: Blood Toluene (ng/mL)

English Text: Blood Toluene (ng/mL)

Target: Both males and females 12 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0.0177 to 16.7	Range of Values	2924	2924	
.	Missing	694	3618	

LBDVTOLC - Blood Toluene Comment Code

Variable Name: LBDVTOLC

SAS Label: Blood Toluene Comment Code

English Text: Blood Toluene Comment Code

Target: Both males and females 12 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0	At or above detection limit	2425	2425	
1	Below lower detection limit	499	2924	
.	Missing	694	3618	

LBXVTP - Blood 1,2,3-Trichloropropane (ng/mL)

Variable Name: LBXVTP

SAS Label: Blood 1,2,3-Trichloropropane (ng/mL)

English Text: Blood 1,2,3-Trichloropropane (ng/mL)

Target: Both males and females 12 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0.0283 to 0.0283	Range of Values	2960	2960	
.	Missing	658	3618	

LBDVTPLC - Blood 1,2,3-Trichloropropane Comt Code

Variable Name: LBDVTPLC

SAS Label: Blood 1,2,3-Trichloropropane Comt Code

English Text: Blood 1,2,3-Trichloropropane Comment Code

Target: Both males and females 12 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0	At or above detection limit	0	0	
1	Below lower detection limit	2960	2960	
.	Missing	658	3618	

LBXVXY - Blood m-/p-Xylene (ng/mL)

Variable Name: LBXVXY

SAS Label: Blood m-/p-Xylene (ng/mL)

English Text: Blood m-/p-Xylene (ng/mL)

Target: Both males and females 12 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0.024 to 12.6	Range of Values	2956	2956	
.	Missing	662	3618	

LBDVXYLC - Blood m-/p-Xylene Comment Code

Variable Name: LBDVXYLC

SAS Label: Blood m-/p-Xylene Comment Code

English Text: Blood m-/p-Xylene Comment Code

Target: Both males and females 12 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0	At or above detection limit	981	981	
1	Below lower detection limit	1975	2956	
.	Missing	662	3618	