National Health and Nutrition Examination Survey

2015-2016 Data Documentation, Codebook, and Frequencies

Personal Care and Consumer Product Chemicals and Metabolites (EPHPP_I)

Data File: EPHPP_I.xpt

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Component Description

Biomonitoring of environmental phenols, parabens, and triclocarban is used to assess prevalence and relevance of exposure in public health. The routes of human exposure to these compounds include industrial pollution, pesticide use, food consumption, and use of personal care products.

Bisphenol A (BPA) is used in the manufacture of polycarbonate plastics and epoxy resins, which can be used in protective coatings on food containers and as composites and sealants in dentistry. Concerns over potential health risks of BPA have led to restrictions on the use of BPA in certain baby and children products (U.S. Food and Drug Administration 2014). BPA alternatives, such as bisphenol S (BPS, 4,4'-sulfonyldiphenol) and bisphenol F (BPF, 4,4′-dihydroxydiphenylmethane), have been introduced in the market to replace BPA (Liao et al. 2012). Some phenols are used as sunscreen agents for skin protection, and as UV filters in cosmetic products and plastics to improve stability (e.g., benzophenone-3). Phenols are also used as bactericides (e.g., triclosan) in soap and are found in other personal care products. Other chlorophenols have been used in the wood preservation industry as intermediates in the production of pesticides, and as disinfectants or fungicides for industrial and indoor home use. The manufacture of certain chlorinated aromatic compounds can also produce chlorophenols as byproducts.

Parabens, a group of alkyl (e.g., methyl, ethyl, propyl, butyl) esters of p-hydroxybenzoic acid, are widely used as antimicrobial preservatives in personal care products, and can also be used in pharmaceuticals, as well as in food and beverage processing.

Triclocarban and triclosan have been used as an antimicrobial agent in consumer and personal care products, as well as in cleansing preparations in hospitals and other medical settings. Their uses for consumer soap, however, have been banned by FDA (the ban went into effect in 2017).

Eligible Sample

Examined participants aged 3 years and older from a one-third sample were eligible.

Description of Laboratory Methodology

A sensitive method for measuring BPA, benzophenone-3, triclosan, four parabens, two dichlorophenols, and triclocarban was developed based on a previously published approach (Zhou et al, 2014). The method uses on-line solid phase extraction coupled to high performance liquid chromatography and tandem mass spectrometry. With the use of isotopically labeled internal standards, the detection limits in 100 µL of urine are 0.1 – 1.7 micrograms per liter (µg/L), sufficient for measuring urinary levels of phenols, parabens, and triclocarban in non-occupationally exposed subjects.

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 2015-2016 cycle.

Laboratory Method Files

Personal Care and Consumer Product (January 2019)

Laboratory Quality Assurance and Monitoring

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

Detailed specimen collection and processing instructions are discussed in the NHANES Laboratory Procedures Manual (LPM). Vials are stored under appropriate frozen (20°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 Act 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 quality-control 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 quality control protocol for all CDC and contract laboratories, which outlined the Westgard rules (Westgard et al, 1981) used when running 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. 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 Sciences' quality control and quality assurance 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

Refer to the 2015-2016 Laboratory Data Overview for general information on NHANES laboratory data.

Subsample weights

Urinary environmental phenols, parabens and triclocarban were measured in a full sample of participants ages 3-5 and a one-third subsample of participants 6 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 with the key survey design and basic demographic variables. The NHANES 2015-2016 Demographic Data 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.

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

Starting in the 2015-2016 NHANES cycle, the variable URXUCR (urine creatinine) will not be reported in this file. URXUCR can be found in the data file titled "Albumin & Creatinine –

Urine".

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., URDBPHLC) indicates whether the result was below the limit of detection: the value "0" means that the result was at or above the limit of detection, "1" indicates that the result was below the limit of detection. For analytes with analytic results below the lower limit of detection (ex., URDBPHLC=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]). The other variable prefixed URX (ex., URXBPH) provides the analytic result for that analyte.

The lower limits of detection (LLOD, in ng/mL) for the environmental phenols, parabens, and triclocarban:

Variable Name	SAS Label	LLOD
URXBP3	Urinary Benzophenone-3 (ng/mL)	0.4
URXBPH	Urinary Bisphenol A (ng/mL)	0.2
URXBPF	Urinary Bisphenol F (ng/mL)	0.2
URXBPS	Urinary Bisphenol S (ng/mL)	0.1
URXTLC	Urinary Triclocarban (ng/mL)	0.1
URXTRS	Urinary Triclosan (ng/mL)	1.7
URXBUP	Butyl paraben (ng/mL)	0.1
URXEPB	Ethyl paraben (ng/mL)	1.0
URXMPB	Methyl paraben (ng/mL)	1.0
URXPPB	Propyl paraben (ng/mL)	0.1
URXDCB	Urinary 2,4-dichlorophenol (ng/mL)	0.1
URX14D	Urinary 2,5-dichlorophenol (ng/mL)	0.1

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

References

- Caudill SP, Schleicher RL, Pirkle JL. Multi-rule quality control for the age-related eye disease study. Statist Med 2008;27:4094-4106.
- Liao CY, Liu F, Moon HB, Yamashita N, Yun SH, Kannan K. 2012. Bisphenol Analogues in Sediments from Industrialized Areas in the United States, Japan, and Korea: Spatial and Temporal Distributions. Environ Sci Technol 46: 11558-11565.
- U.S. Food and Drug Administration. 2014. Bisphenol A (BPA): Use in Food Contact Application. In: U.S. Food and Drug Administration.
- Westgard JO, Barry PL, Hunt MR, Groth T. A multi-rule Shewhart chart for quality control in clinical chemistry. Clin Chem. 1981 Mar;27(3):493-501.

- Zhou X, Ye X, Calafat AM. Automated on-line column-switching HPLC-MS/MS method for the quantification of triclocarban and its oxidative metabolites in human urine and serum. J Chromatogr B Analyt Technol Biomed Life Sci. 2012 Jan; 881-882:27-33.

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 3 YEARS - 150 YEARS

WTSB2YR - Subsample B weights

Variable Name: WTSB2YR

SAS Label: Subsample B weights

English Text: Subsample B weights

Target: Both males and females 3 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
7005.984297 to 874638.01159	Range of Values	2747	2747	
0	No Lab Result	56	2803	
.	Missing	0	2803	

URXBP3 - Urinary Benzophenone-3 (ng/mL)

Variable Name: URXBP3

SAS Label: Urinary Benzophenone-3 (ng/mL)

English Text: Urinary 2-Hydroxy-4-metoxybenzophenone (Benzophenone-3)

Target: Both males and females 3 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0.28 to 99886.7	Range of Values	2651	2651	
.	Missing	152	2803	

URDBP3LC - Urinary Benzophenone-3 Comment Code

Variable Name: URDBP3LC

SAS Label: Urinary Benzophenone-3 Comment Code

English Text: Urinary 2-Hydroxy-4-metoxybenzophenone (Benzophenone-3) Comment Code

Target: Both males and females 3 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0	At or above the detection limit	2532	2532	
1	Below lower detection limit	119	2651	
.	Missing	152	2803	

URXBPH - Urinary Bisphenol A (ng/mL)

Variable Name: URXBPH

SAS Label: Urinary Bisphenol A (ng/mL)

English Text: Urinary Bisphenol A (ng/mL)

Target: Both males and females 3 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0.14 to 425.5	Range of Values	2651	2651	
.	Missing	152	2803	

URDBPHLC - Urinary Bisphenol A Comment Code

Variable Name: URDBPHLC

SAS Label: Urinary Bisphenol A Comment Code

English Text: Urinary Bisphenol A Comment Code

Target: Both males and females 3 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0	At or above the detection limit	2513	2513	
1	Below lower detection limit	138	2651	
.	Missing	152	2803	

URXBPF - Urinary Bisphenol F (ng/mL)

Variable Name: URXBPF

SAS Label: Urinary Bisphenol F (ng/mL)

English Text: Urinary 4.4' dihydroxydiphenylmethane (Bisphenol F)

Target: Both males and females 3 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0.14 to 241.1	Range of Values	2651	2651	
.	Missing	152	2803	

URDBPFLC - Urinary Bisphenol F Comment Code

Variable Name: URDBPFLC

SAS Label: Urinary Bisphenol F Comment Code

English Text: Urinary 4.4' dihydroxydiphenylmethane (Bisphenol F) Comment Code

Target: Both males and females 3 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0	At or above the detection limit	1162	1162	
1	Below lower detection limit	1489	2651	
.	Missing	152	2803	

URXBPS - Urinary Bisphenol S (ng/mL)

Variable Name: URXBPS

SAS Label: Urinary Bisphenol S (ng/mL)

English Text: Urinary 4,4' Sulfonyldiphenol (Bisphenol S)

Target: Both males and females 3 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0.07 to 177.6	Range of Values	2651	2651	
.	Missing	152	2803	

URDBPSLC - Urinary Bisphenol S Comment Code

Variable Name: URDBPSLC

SAS Label: Urinary Bisphenol S Comment Code

English Text: Urinary 4,4' Sulfonyldiphenol (Bisphenol S) Comment Code

Target: Both males and females 3 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0	At or above the detection limit	2392	2392	
1	Below lower detection limit	259	2651	
.	Missing	152	2803	

URXTLC - Urinary Triclocarban (ng/mL)

Variable Name: URXTLC

SAS Label: Urinary Triclocarban (ng/mL)

English Text: Urinary Triclocarban (ng/mL)

Target: Both males and females 3 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0.07 to 778.4	Range of Values	2651	2651	
.	Missing	152	2803	

URDTLCLC - Urinary Triclocarban Comment Code

Variable Name: URDTLCLC

SAS Label: Urinary Triclocarban Comment Code

English Text: Urinary Triclocarban Comment Code

Target: Both males and females 3 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0	At or above the detection limit	902	902	
1	Below lower detection limit	1749	2651	
.	Missing	152	2803	

URXTRS - Urinary Triclosan (ng/mL)

Variable Name: URXTRS

SAS Label: Urinary Triclosan (ng/mL)

English Text: Urinary 2,4,4'-Trichloro-2'-hydroxyphenyl ether (Triclosan)

Target: Both males and females 3 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
1.2 to 3629.1	Range of Values	2651	2651	
.	Missing	152	2803	

URDTRSLC - Urinary Triclosan Comment Code

Variable Name: URDTRSLC

SAS Label: Urinary Triclosan Comment Code

English Text: Urinary 2,4,4'-Trichloro-2'-hydroxyphenyl ether (Triclosan) Comment Code

Target: Both males and females 3 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0	At or above the detection limit	1739	1739	
1	Below lower detection limit	912	2651	
.	Missing	152	2803	

URXBUP - Butyl paraben (ng/mL)

Variable Name: URXBUP

SAS Label: Butyl paraben (ng/mL)

English Text: Butyl paraben (ng/mL)

Target: Both males and females 3 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0.07 to 287.6	Range of Values	2651	2651	
.	Missing	152	2803	

URDBUPLC - Butyl paraben Comment Code

Variable Name: URDBUPLC

SAS Label: Butyl paraben Comment Code

English Text: Butyl paraben Comment Code

Target: Both males and females 3 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0	At or above the detection limit	644	644	
1	Below lower detection limit	2007	2651	
.	Missing	152	2803	

URXEPB - Ethyl paraben (ng/mL)

Variable Name: URXEPB

SAS Label: Ethyl paraben (ng/mL)

English Text: Ethyl paraben (ng/mL)

Target: Both males and females 3 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0.71 to 1971.1	Range of Values	2651	2651	
.	Missing	152	2803	

URDEPBLC - Ethyl paraben Comment Code

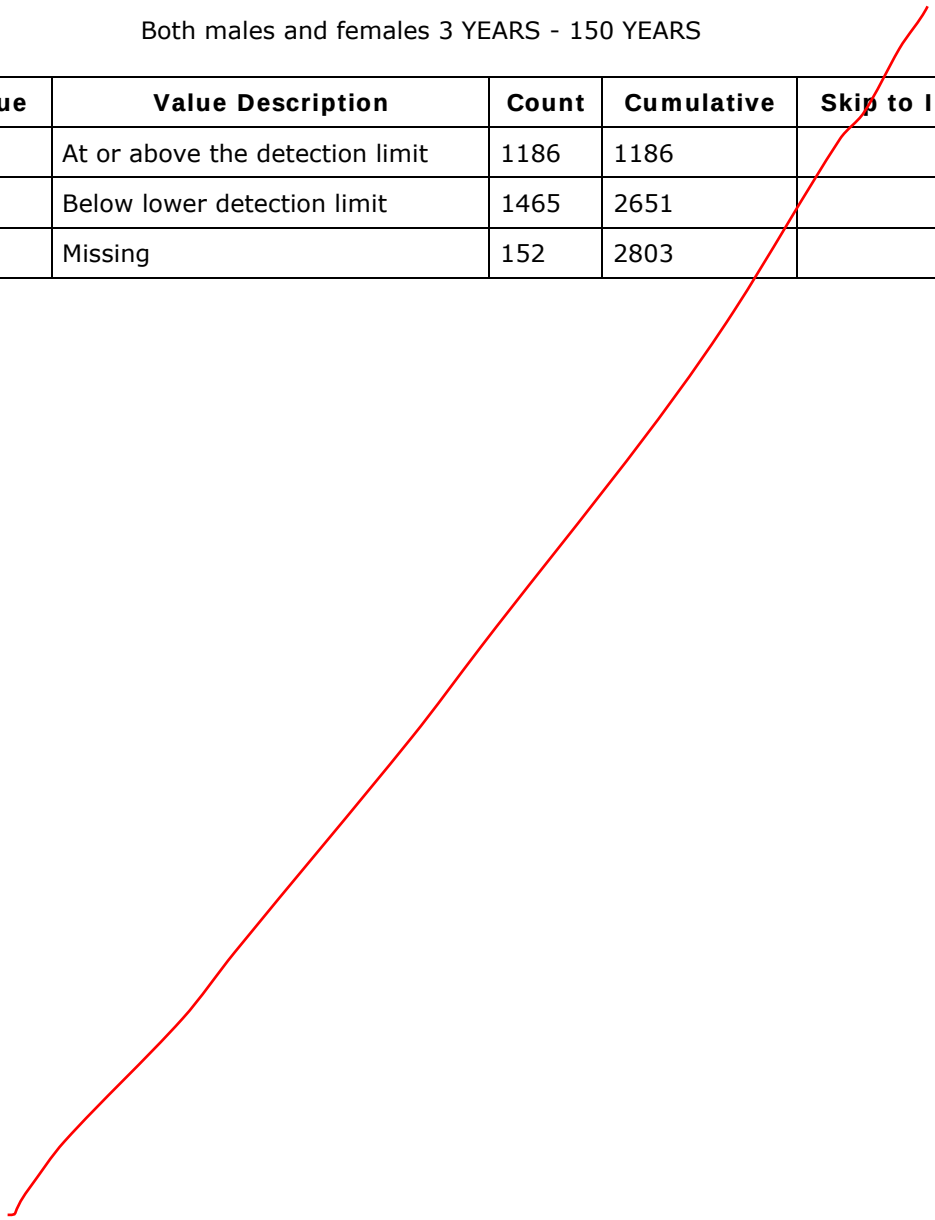
Variable Name: URDEPBLC

SAS Label: Ethyl paraben Comment Code

English Text: Ethyl paraben Comment Code

Target: Both males and females 3 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0	At or above the detection limit	1186	1186	
1	Below lower detection limit	1465	2651	
.	Missing	152	2803	



URXMPB - Methyl paraben (ng/mL)

Variable Name: URXMPB

SAS Label: Methyl paraben (ng/mL)

English Text: Methyl paraben (ng/mL)

Target: Both males and females 3 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0.71 to 24888.4	Range of Values	2651	2651	
.	Missing	152	2803	

URDMPBLC - Methyl paraben Comment Code

Variable Name: URDMPBLC

SAS Label: Methyl paraben Comment Code

English Text: Methyl paraben Comment Code

Target: Both males and females 3 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0	At or above the detection limit	2595	2595	
1	Below lower detection limit	56	2651	
.	Missing	152	2803	

URXPPB - Propyl paraben (ng/mL)

Variable Name: URXPPB

SAS Label: Propyl paraben (ng/mL)

English Text: Propyl paraben (ng/mL)

Target: Both males and females 3 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0.07 to 6399.6	Range of Values	2651	2651	
.	Missing	152	2803	

URDPPBLC - Propyl paraben Comment Code

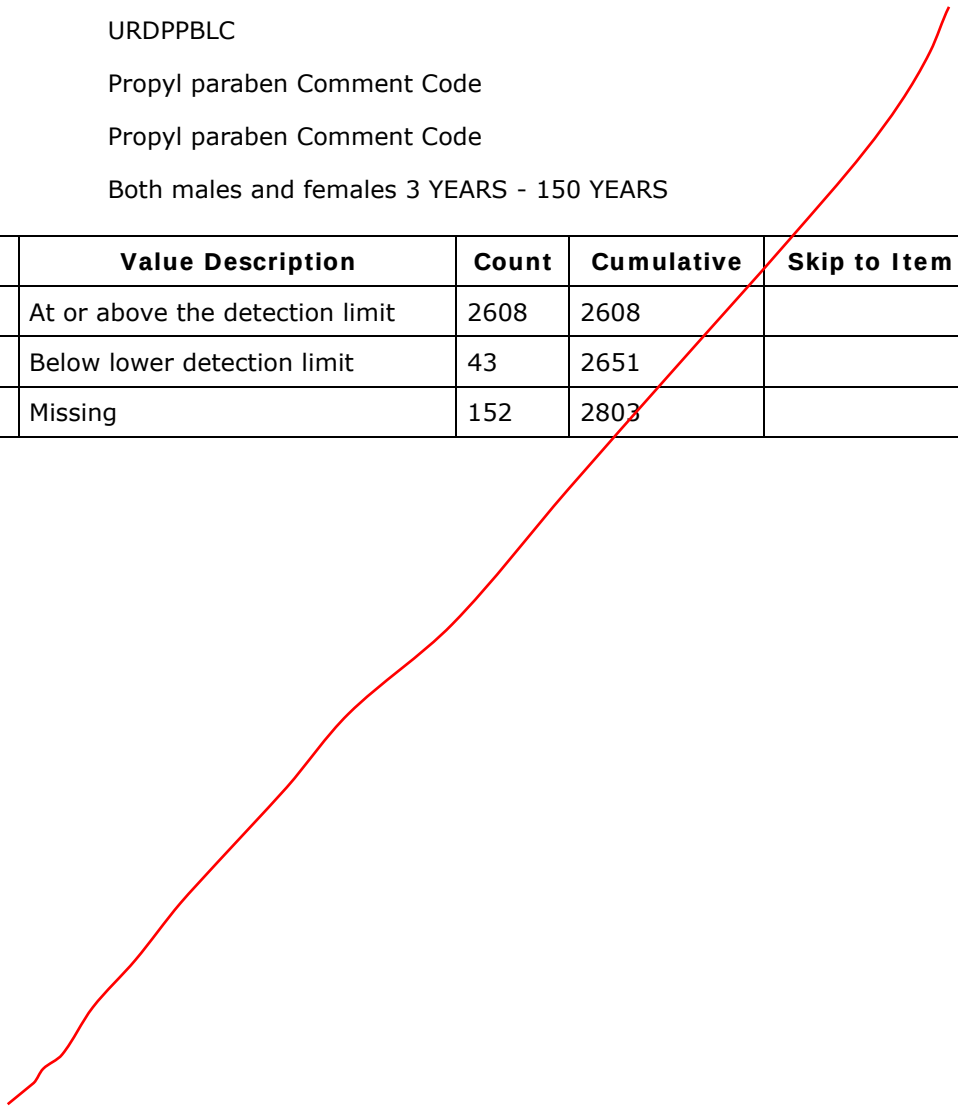
Variable Name: URDPPBLC

SAS Label: Propyl paraben Comment Code

English Text: Propyl paraben Comment Code

Target: Both males and females 3 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0	At or above the detection limit	2608	2608	
1	Below lower detection limit	43	2651	
.	Missing	152	2803	



URX14D - 2,5-dichlorophenol (ng/mL)

Variable Name: URX14D

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

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

Target: Both males and females 3 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0.07 to 41600	Range of Values	2651	2651	
.	Missing	152	2803	

URD14DLC - 2,5-dichlorophenol Comment Code

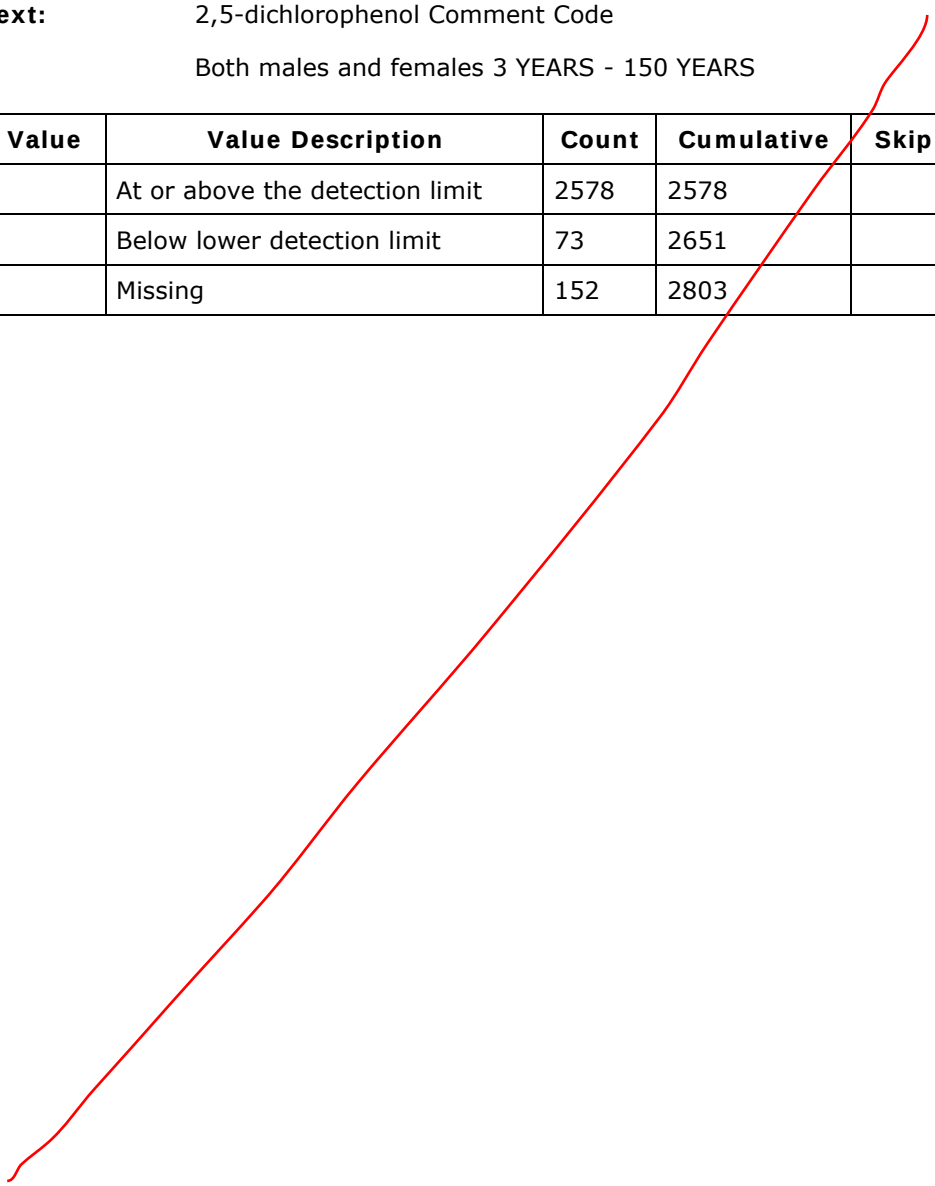
Variable Name: URD14DLC

SAS Label: 2,5-dichlorophenol Comment Code

English Text: 2,5-dichlorophenol Comment Code

Target: Both males and females 3 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0	At or above the detection limit	2578	2578	
1	Below lower detection limit	73	2651	
.	Missing	152	2803	



URXDCB - 2,4-dichlorophenol (ng/mL)

Variable Name: URXDCB

SAS Label: 2,4-dichlorophenol (ng/mL)

English Text: 2,4-dichlorophenol (ng/mL)

Target: Both males and females 3 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0.07 to 1260.6	Range of Values	2651	2651	
.	Missing	152	2803	

URDDCBLC - 2,4-dichlorophenol Comment Code

Variable Name: URDDCBLC

SAS Label: 2,4-dichlorophenol Comment Code

English Text: 2,4-dichlorophenol Comment Code

Target: Both males and females 3 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0	At or above the detection limit	2439	2439	
1	Below lower detection limit	212	2651	
.	Missing	152	2803