

Third National Health and Nutrition Examination Survey
(NHANES III), 1988-94

NHANES III Priority Toxicant Reference Range Study Data File

Series 11, No. 4A

September 2000

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Introduction

The National Center for Health Statistics (NCHS) of the Centers for Disease Control and Prevention (CDC) collects, analyzes, and disseminates data on the health status of U.S. residents. The results of surveys, analyses, and studies are made known through a number of data release mechanisms including publications, mainframe computer data files, CD-ROMs (Search and Retrieval Software, Statistical Export and Tabulation System (SETS)), and the Internet.

The National Health and Nutrition Examination Survey (NHANES) is a periodic survey conducted by NCHS. The third National Health and Nutrition Examination Survey (NHANES III), conducted from 1988 through 1994, was the seventh in a series of these surveys based on a complex, multi-stage sample design. It was designed to provide national estimates of the health and nutritional status of the United States' civilian, noninstitutionalized population aged two months and older.

The following table summarizes the NHANES III data which are currently available on CD-ROM or through other release mechanisms such as the Internet.

This release, Series 11 No. 4A, contains priority toxicant reference range study data. This release does not replace the previous NHANES III data releases (series 11 Nos. 1A, 2A, 3A and 6A).

Table 1. Available NHANES III Data

Data Release Number	Release Date	Size in Megabytes	Data Files / Description
NHANES III, 1988-94, Series 11, No. 6A, ASCII Version	January 2000	2.7	Healthy Eating Index (HEI) Data File and documentation includes number of servings by Food Guide Pyramid food groups and HEI
NHANES III, 1988-94, Series 11, No. 5A, ASCII Version	October 2000	54	Supplemental Nutrition Survey of older Americans (SNS) contains subsets of individual foods and total nutrients intake data files and documentation
NHANES III, 1988-94, Series 11, No. 4A, ASCII Version (this release)	September 2000	0.5	Priority toxicant reference range study data file and documentation
NHANES III, 1988-94, Series 11, No. 3A, ASCII Version	July 1999	33	Second exam sample files for dietary recall, examination, laboratory, additional laboratory analytes and documentation

Table 1. (continued) Available NHANES III Data

Data Release Number	Release Date	Size in Megabytes	Data Files / Description
NHANES III, 1988-94, Series 11, No. 2A, ASCII Version	April 1998	407	Dietary recall (replacement), electrocardiography, laboratory (additional analytes), and vitamins/medicines data files and documentation
NHANES III, 1988-94, Series 11, No. 1, Revised SETS Version 1.22a	October 1997	285	Adult and youth household questionnaire, examination, and laboratory data files and documentation, plan and operation, analytic and reporting guidelines, weighting and estimation methodology, field operations, non-response bias
NHANES III, 1988-94, Series 11, No. 1A, ASCII Version	July 1997	454	Adult and youth household questionnaire, dietary recall, examination, and laboratory data files and documentation
NHANES III, 1988-94, Series 11, No. 1, SETS Version 1.22a *	July 1997	285	Adult and youth household questionnaire, examination, and laboratory data files and documentation
NHANES III Reference Manuals and Reports October 1996	October 1996	152	Plan and operation, analytic and reporting guidelines, weighting and estimation methodology, field operations, non-response bias

* Do not use this CD-ROM It had technical problems and has been superseded by the revised SETS version 1.22a, Series 11, No. 1, released in October 1997.

Table 2. Location of the interview and examination components in the NHANES III public use data files

Data File

Topic	HA	HY	EXAM	LAB	DIET	VMS	ECG
Sample weights	X	X	X	X	.	.	X
Age/race/sex	X	X	X	X	.	.	X
Ethnic background	X	X	.	.	.	.	.
Household composition	X	X	.	.	.	.	.
Individual characteristics	X	X	.	.	.	.	.
Health insurance	X	X	.	.	.	.	.
Family background	X	X	.	.	.	.	.
Occupation of family head	X	X	.	.	.	.	.
Housing characteristics	X	X	.	.	.	.	.
Family characteristics	X	X	.	.	.	.	.
Orientation	X	X	.	.	.	.	.
Health services	X	X	.	.	.	.	.
Selected health conditions	X	X	X	.	.	.	.
Diabetes questions	X	.	.	.	.	.	.
High blood pressure and cholesterol questions	X	.	.	.	.	.	.
Cardiovascular disease questions	X	.	.	.	.	.	.
Musculoskeletal conditions	X	.	.	.	.	.	.
Physical functioning questions	X	.	.	.	.	.	.
Gallbladder disease questions	X	.	.	.	.	.	.

Table 2. (continued) Location of the interview and examination components in the NHANES III public use data files

	Data File							
Topic	HA	HY	EXAM	LAB	DIET	VMS	ECG	
Kidney conditions	X	.	.	.	.	.	.	.
Respiratory and allergy questions	X	X	.	.	.	.	.	.
Diet questions	X	.	.	.	.	.	.	.
Food frequency	X	.	X	.	.	.	.	.
Vision questions	X	X	.	.	.	.	.	.
Hearing questions	X	X	.	.	.	.	.	.
Dental care and status	X	X	.	.	.	.	.	.
Tobacco	X	.	X	.	.	.	.	.
Occupation	X	.	.	.	.	.	.	.
Language usage	X	X	.	.	.	.	.	.
Exercise	X	.	.	.	.	.	.	.
Social support/residence	X	.	.	.	.	.	.	.
Vitamin/mineral/medicine usage	X	X	X	.	.	.	.	.
Blood pressure measurement	X	.	X	.	.	.	.	.
Birth	.	X	X	.	.	.	.	.
Infant feeding practices/diet	.	X	.	.	.	.	.	.
Motor and social development	.	X	.	.	.	.	.	.
Functional impairment	X	X	.	.	.	.	.	.
School attendance	.	X	.	.	.	.	.	.
Cognitive function	.	X	X	.	.	.	.	.

Table 2. (continued) Location of the interview and examination components in the NHANES III public use data files

Data File

Topic	HA	HY	EXAM	LAB	DIET	VMS	ECG
Alcohol and drug use	.	.	X	.	.	.	.
Reproductive health	.	.	X	.	.	.	.
Diagnostic interview schedule	.	.	X	.	.	.	.
Activity	.	.	X	.	.	.	.
Physician's examination	.	.	X	.	.	.	.
Height and weight	.	.	X	.	.	.	.
Body measurements	.	.	X	.	.	.	.
Dental examination	.	.	X	.	.	.	.
Allergy skin test	.	.	X	.	.	.	.
Audiometry	.	.	X	.	.	.	.
Tympanometry	.	.	X	.	.	.	.
WISC and WRAT	.	.	X	.	.	.	.
Spirometry	.	.	X	.	.	.	.
Bone densitometry	.	.	X	.	.	.	.
Gallbladder ultrasonography	.	.	X	.	.	.	.
Central nervous system function evaluation	.	.	X	.	.	.	.
Fundus photography	.	.	X	.	.	.	.
Physical function evaluation	.	.	X	.	.	.	.
Fasting questions	.	.	.	X	.	.	.

Table 2. (continued) Location of the interview and examination components in the NHANES III public use data files

Topic	Data File							
	HA	HY	EXAM	LAB	DIET	VMS	ECG	
Laboratory tests on blood and urine	.	.	.	X	.	.	.	
Total nutrient intakes	.	.	X	.	.	.	.
Individual foods	.	.	.	.	X	.	.
Combination foods	.	.	.	.	X	.	.
Ingredients	.	.	.	.	X	.	.
Prescription Medicines	X	X	.	.	.	X	.	
Vitamins and Minerals	X	X	.	.	.	X	.	
Electrocardiography	.	.	.	.	.	.	X

Data File Definitions

- HA - Household Adult Data File
- HY - Household Youth Data File
- EXAM - Examination Data File
- LAB - Laboratory Data File and Second Laboratory Data File
- DIET - Dietary Recall Data Files
- VMS - Vitamin Mineral Supplement Data File
- ECG - Electrocardiography Data File

This document includes the documentation for the Priority Toxicant Reference Range Study Data File and also contains a general overview of the survey and the use of the data files. The general overview includes five sections. The first section, entitled "Guidelines for Data Users," contains important information about the use of the data files. The second section, "Survey Description," is a brief overview of the survey plan and operation. The third section, "Sample Design and Analysis Guidelines," describes some technical aspects of the sampling plan and discusses some analytic issues particularly related to the use of data from complex sample surveys. The "Data Preparation and Processing Procedures" section describes the editing conventions and the codes used to represent the data. The last and fifth section, "General References," includes a reference list for the survey overview sections of the document.

Information regarding a bibliography (on disk) of journal articles citing data from all the NHANES and the availability of NHANES III data on CD-ROM and the internet can be obtained from the Data Dissemination Branch at:

Data Dissemination Branch
National Center for Health Statistics
Room 1018
6525 Belcrest Road
Hyattsville, Maryland 20782

Phone: (301) 458-4636

URL:<http://www.cdc.gov/nchswww>

Copies of all NHANES III questionnaires and data collection forms are included in the Plan and Operation of the Third National Health and Nutrition Examination Survey, 1988-94 (NCHS, 1994; U.S. DHHS, 1996). This publication, along with detailed information on NHANES procedures, interviewing, data collection, quality control techniques, survey design, nonresponse, and sample weighting can be found on the NHANES III Reference Manuals and Reports CD-ROM (U.S. DHHS, 1996). Information on how to order this CD-ROM is also available from the Data Dissemination Branch at NCHS at the address and telephone number given above.

NHANES III Background Documents

- o The Plan and Operation of the Third National Health and Nutrition Examination Survey, 1988-94, (NCHS, 1994; U.S. DHHS, 1996) provides an overview of the survey and includes copies of the survey forms.
- o The sample design, nonresponse, and analytic guidelines documents on the NHANES III Reference Manuals and Reports CD-ROM (U.S. DHHS, 1996) discuss the reasons that sample weights and the complex survey design should be taken into account when conducting any analysis.
- o Instruction manuals, laboratory procedures, and other NHANES III reference manuals on the NHANES III Reference Manuals and Reports CD-ROM (U.S. DHHS, 1996) are also available for further information on the details of the survey.

Analytic Data Set Preparation

- o Most NHANES III survey design and demographic variables are found only on the Adult and Youth Household Data Files available on the first release. In preparing a data set for analysis, other data files must be merged with either or both of these files to obtain many important analytic variables.
- o All of the NHANES III public use data files are linked with the common survey participant identification number (SEQN). Merging information from multiple NHANES III data files using this variable ensures that the appropriate information for each survey participant is linked correctly.
- o NHANES III public use data files do not have the same number of records on each file. The Household Questionnaire Files (divided into two files, Adult and Youth) contain more records than the Examination Data File because not everyone who was interviewed completed the examination. The Laboratory Data File contains data only for persons

aged one year and older. The Individual Foods Data File based on the dietary recall has multiple records for each person rather than the one record per sample person contained in the other data files.

- o For each data file, SAS program code with standard variable names and labels is provided as separate text files on the CD-ROM that contains the data files. This SAS program code can be used to create a SAS data set from the data file.
- o Modifications were made to items in the questionnaires, laboratory, and examination components over the course of the survey; as a result, data may not be available for certain variables for the full six years. In addition, variables may differ by phase since some changes were implemented between phases. Users are encouraged to read the Notes sections of this document carefully for information about changes.
- o Extremely high and low values have been verified whenever possible, and numerous consistency checks have been performed. Nonetheless, users should examine the range and frequency of values before analyzing data.
- o Some data were not ready for release at the time of this publication due to continued processing of the data or analysis of laboratory specimens. A listing of those data are available in the general information section of each data file.
- o Confidential and administrative data are not being released to the public. Additionally, some variables have been recoded to help protect the confidentiality of the survey participants. For example, all age-related variables were recoded to 90+ years for persons who were 90 years of age and older.
- o Some variable names may differ from those used in the Phase 1 NHANES III Provisional Data Release and some variables included in the Phase 1 provisional release may not appear on these files.
- o Although the data files have been edited carefully, errors may be detected. Please notify NCHS staff (301-458-4636) of any errors in the data file or the documentation.

Analytic Considerations

- o NHANES III (1988-94) was designed so that the survey's first three years, 1988-91, its last three years, 1991-94, and the entire six years were national probability samples. Analysts are encouraged to use all six years of survey results.
- o Sample weights are available for analyzing NHANES III data. One of the following three sample weights will be appropriate for nearly all analyses: interviewed sample final weight (WTPFQX6), examined sample final weight (WTPFEX6), and mobile examination center (MEC)- and home-examined sample final weight (WTPFHX6). Choosing which of these sample weights to use in any analysis depends on the variables being used. A good rule of thumb is to use "the least common denominator" approach. In this approach, the user checks the variables of

interest. The variable that was collected on the smallest number of persons is the "least common denominator," and the sample weight that applies to that variable is the appropriate one to use for that analysis. For more detailed information, see the Analytic and Reporting Guidelines for NHANES III (U.S. DHHS, 1996).

Referencing or Citing NHANES III Data

- o In publications, please acknowledge NCHS as the original data source. For instance, the reference for the NHANES III Priority Toxicants Reference Range Study Data File on this release is:

U.S. Department of Health and Human Services (DHHS). National Center for Health Statistics. Third National Health and Nutrition Examination Survey, 1988-1994, NHANES III Priority Toxicants Reference Range Study Data File (Series 11, No. 4A). Hyattsville, MD.: Centers for Disease Control and Prevention, 2000.

- o Please place the acronym "NHANES III" in the titles or abstracts of journal articles and other publications in order to facilitate the retrieval of such materials in bibliographic searches.

SURVEY DESCRIPTION

The third National Health and Nutrition Examination Survey (NHANES III) was the seventh in a series of large health examination surveys conducted in the United States beginning in 1960. Three of these surveys, the National Health Examination Surveys (NHES), were conducted in the 1960's (NCHS, 1965; NCHS, 1967; NCHS, 1969). In 1970, an expanded nutrition component was added to provide data with which to assess nutritional status and dietary practices, and the name was changed to the National Health and Nutrition Examination Survey (Miller, 1973; Engel, 1978; McDowell, 1981). A special survey of Hispanic populations in the United States was conducted during 1982-1984 (NCHS, 1985).

The general structure of the NHANES III sample design was similar to that of the previous NHANES. All of the surveys used complex, multi-stage, stratified, clustered samples of civilian, noninstitutionalized populations. NHANES III was the first NHANES without an upper age limit; in fact, the age range for the survey was two months and older. A home examination option was employed for the first time in order to obtain examination data for very young children and for elderly persons who were unable to visit the mobile examination center (MEC). The home examination included only a subset of the components used in the full MEC examination since it would have been difficult to collect some types of data in a home setting. A detailed description of design specifications and copies of the data collection forms can be found in the Plan and Operation of the Third National Health and Nutrition Examination Survey, 1988-1994 (NCHS, 1994; U.S. DHHS, 1996).

NHANES III was conducted from October 1988 through October 1994 in two phases, each of which comprised a national probability sample. The first phase was conducted from October 18, 1988, through October 24, 1991, at 44 locations. The second phase was conducted from September 20, 1991, through October 15, 1994, at 45 different locations. In NHANES III, 39,695 persons were selected over the six years; of those, 33,994 (86%) were interviewed in their homes. All interviewed persons were invited to the MEC for a medical examination. Seventy-eight percent (30,818) of the selected persons were examined in the MEC, and an additional 493 persons were given a special, limited examination in their homes.

Data collection began with a household interview. Several questionnaires were administered in the household: Household Screener Questionnaire, Family Questionnaire, Household Adult Questionnaire, and Household Youth Questionnaire.

At the MEC, an examination was performed, and five automated questionnaires or interviews were administered: MEC Adult Questionnaire, MEC Youth Questionnaire, MEC Proxy Questionnaire, 24-Hour Dietary Recall, and Dietary Food Frequency (ages 12-16 years). The health examination component included a variety of tests and procedures. The examinee's age at the time of the interview and other factors determined which procedures were administered. Blood and urine specimens were obtained, and a number of tests and measurements were performed including body measurements, spirometry, fundus photography, x-rays, electrocardiography, allergy and glucose tolerance tests, and ultrasonography. Measurements were taken of bone density, hearing, and physical, cognitive, and central nervous system

functions. A physician performed a limited standardized medical examination and a dentist performed a standardized dental examination. While some of the blood and urine analyses were performed in the MEC laboratory, most analyses were conducted elsewhere by contract laboratories.

A home examination was conducted for those sample persons aged 2-11 months and aged 20 years or older who were unable to visit the mobile examination center. The home examination consisted of an abbreviated version of the tests and interviews performed in the MEC. Depending on age of the sample person, the components included body measurements, blood pressure, spirometry, venipuncture, physical function evaluation, and a questionnaire to inquire about infant feeding, selected health conditions, cognitive function, tobacco use, and reproductive history.

SAMPLE DESIGN AND ANALYSIS GUIDELINES

Sample Design

The general structure of the NHANES III sample design is the same as that of the previous NHANES. Each of these surveys used a stratified, multi-stage probability design. The major design parameters of the two previous NHANES and the special Hispanic HANES, as well as NHANES III, have been previously summarized (Miller, 1973; McDowell, 1981; NCHS, 1985; NCHS, 1994). The NHANES III sample was designed to be self-weighting within a primary sampling unit (PSU) for subdomains (age, sex, and race-ethnic groups). While the sample was fairly close to self-weighting nationally for each of these subdomain groups, it was not representative of the total population, which includes institutionalized, non-civilian persons that were outside the scope of the survey.

The NHANES III sample represented the total civilian, noninstitutionalized population, two months of age or over, in the 50 states and the District of Columbia of the United States. The first stage of the design consisted of selecting a sample of 81 PSU's that were mostly individual counties. In a few cases, adjacent counties were combined to keep PSU's above a minimum population size. The PSU's were stratified and selected with probability proportional to size (PPS). Thirteen large counties (strata) were chosen with certainty (probability of one). For operational reasons, these 13 certainty PSU's were divided into 21 survey locations. After the 13 certainty strata were designated, the remaining PSU's in the United States were grouped into 34 strata, and two PSU's were selected per stratum (68 survey locations). The selection was done with PPS and without replacement. The NHANES III sample therefore consists of 81 PSU's or 89 locations.

The 89 locations were randomly divided into two groups, one for each phase. The first group consisted of 44 and the other of 45 locations. One set of PSU's was allocated to the first three-year survey period (1988-91) and the other set to the second three-year period (1991-94). Therefore, unbiased estimates (from the point of view of sample selection) of health and nutrition characteristics can be independently produced for both Phase 1 and Phase 2 as well as for both phases combined.

For most of the sample, the second stage of the design consisted of area segments composed of city or suburban blocks, combinations of blocks, or other area segments in places where block statistics were not produced in the 1980 Census. In the first phase of NHANES III, the area segments were used only for a sample of persons who lived in housing units built before 1980. For units built in 1980 and later, the second stage consisted of sets of addresses selected from building permits issued in 1980 or later. These are referred to as "new construction segments." In the second phase, 1990 Census data and maps were used to define the area segments. Because the second phase followed within a few years of the 1990 Census, new construction did not account for a significant part of the sample, and the entire sample came from the area segments.

The third stage of sample selection consisted of households and certain types of group quarters, such as dormitories. All households and eligible

group quarters in the sample segments were listed, and a subsample was designated for screening to identify potential sample persons. The subsampling rates enabled production of a national, approximately equal-probability sample of households in most of the United States with higher rates for the geographic strata with high Mexican-American populations. Within each geographic stratum, there was a nearly equal-probability sample of households across all 89 stands. Persons within the sample of households or group quarters were the fourth stage of sample selection. All eligible members within a household were listed, and a subsample of individuals was selected based on sex, age, and race or ethnicity. The definitions of the sex, age, race or ethnic classes, subsampling rates, and designation of potential sample persons within screened households were developed to provide approximately self-weighting samples for each subdomain within geographic strata and at the same time to maximize the average number of sample persons per sample household. Previous NHANES indicated that this increased the overall participation rate. Although the exact sample sizes were not known until data collection was completed, estimates were made. Below is a summary of the sample sizes for the full six-year NHANES III at each stage of selection:

Number of PSU's	81
Number of stands (survey locations)	89
Number of segments	2,144
Number of households screened	93,653
Number of households with sample persons	19,528
Number of designated sample persons	39,695
Number of interviewed sample persons	33,994
Number of MEC-examined sample persons	30,818
Number of home-examined sample persons	493

More detailed information on the sample design and weighting and estimation procedures for NHANES III can be found in the Plan and Operation of the Third National Health and Nutrition Examination Survey, 1988-94 (NCHS, 1994; U.S. DHHS, 1996) and in the Analytic and Reporting Guidelines: Third National Health and Nutrition Examination Survey (NHANES III), 1988-94 (U.S. DHHS, 1996).

Analysis Guidelines

Because of the complex survey design used in NHANES III, traditional methods of statistical analysis based on the assumption of a simple random sample are not applicable. Detailed descriptions of this issue and possible analytic methods for analyzing NHANES data have been described earlier (NCHS, 1985; Yetley, 1987; Landis, 1982; Delgado, 1990). Recent analytic and reporting guidelines that should be used for most NHANES III analyses and publications are contained in Analytic and Reporting Guidelines (U.S. DHHS, 1996). These recommendations differ slightly from those used by analysts for previous NHANES surveys. These suggested guidelines provide a framework to users for producing estimates that conform to the analytic design of the survey. All users are strongly urged to review these analytic and reporting guidelines before beginning any analyses of NHANES III data.

It is important to remember that this set of statistical guidelines is not absolute. When conducting analyses, the analyst needs to use his/her subject matter knowledge (including methodological issues) as well as information about the survey design. The more one deviates from the original

analytic categories defined in the sample design, the more important it is to evaluate the results carefully and to interpret the findings cautiously.

In NHANES III, 89 survey locations were randomly divided into two sets or phases, the first consisting of 44 and the other of 45 locations. One set of PSU's was allocated to the first three-year survey period (1988-91) and the other set to the second three-year period (1991-94). Therefore, unbiased national estimates of health and nutrition characteristics can be independently produced for each phase as well as for both phases combined. Computation of national estimates from both phases combined (i.e., total NHANES III) is the preferred option; individual phase estimates may be highly variable. In addition, individual phase estimates are not statistically independent. It is also difficult to evaluate whether differences in individual phase estimates are real or due to methodological differences. That is, differences may be due to changes in sampling methods or data collection methodology over time. At this time, there is no valid statistical test for examining differences between Phase 1 and Phase 2. Therefore, although point estimates can be produced separately for each phase, no test is available to test whether those estimates are significantly different from each other.

NHANES III is based on a complex, multi-stage probability sample design. Several aspects of the NHANES design must be taken into account in data analysis, including the sample weights and the complex survey design. Appropriate sample weights are needed to estimate prevalence, means, medians, and other statistics. Sample weights are used to produce correct population estimates because each sample person does not have the same probability of selection. The sample weights incorporate the differential probabilities of selection and include adjustments for noncoverage and nonresponse. A detailed discussion of nonresponse adjustments and issues related to survey coverage have been published (U.S. DHHS, 1996). With the large oversampling of young children, older persons, black persons, and Mexican-Americans in NHANES III, it is essential that the sample weights be used in all analyses. Otherwise, a misinterpretation of results is highly likely. Other aspects of the design that must be taken into account in data analyses are the strata and PSU pairings from the sample design. These pairings should be used to estimate variances and test for statistical significance. For weighted analyses, analysts can use special computer software packages that use an appropriate method for estimating variances for complex samples such as SUDAAN (Shah, 1995) and WesVarPC (Westat, 1996).

Although initial exploratory analyses may be performed on unweighted data using standard statistical packages and assuming simple random sampling, final analyses should be done on weighted data using appropriate sample weights. A summary of the weighting methodology and the type of sample weights developed for NHANES III is included in Weighting and Estimation Methodology (U.S. DHHS, 1996).

The purpose of weighting the sample data is to permit analysts to produce estimates of statistics that would have been obtained if the entire sampling frame (the United States) had been surveyed. Sample weights can be considered as measures of the number of persons the particular sample observation represents. Weighting takes into account several features of the survey: the specific probabilities of selection for the individual domains that were oversampled as well as nonresponse and differences between the sample and the total U.S. population. Differences between the sample and

the population may arise due to sampling variability, differential undercoverage in the survey among demographic groups, and possibly other types of response errors, such as differential response rates or misclassification errors. Sample weighting in NHANES III was used to:

1. Compensate for differential probabilities of selection among subgroups (i.e., age-sex-race-ethnicity subdomains where persons living in different geographic strata were sampled at different rates);
2. Reduce biases arising from the fact that nonrespondents may be different from those who participate;
3. Bring sample data up to the dimensions of the target population totals;
4. Compensate, to the extent possible, for inadequacies in the sampling frame (resulting from omissions of some housing units in the listing of area segments, omissions of persons with no fixed address, etc.); and
5. To reduce variances in the estimation procedure by using auxiliary information that is known with a high degree of accuracy.

In NHANES III, the sample weighting was carried out in three stages. The first stage involved the computation of weights to compensate for unequal probabilities of selection (objective 1, above). The second stage adjusted for nonresponse (objective 2). The third stage used poststratification of the sample weights to Census Bureau estimates of the U.S. population to accomplish the third, fourth, and fifth objectives simultaneously. In NHANES III, several types of sample weights (see the sample weights table that follows) were computed for the interviewed and examined sample and are included in the NHANES III data file. Also, sample weights were computed separately for Phase 1 (1988-91), Phase 2 (1991-94), and total NHANES III (1988-94) to facilitate analysis of items collected only in Phase 1, only in Phase 2, and over six years of the survey. Three sets of pseudo strata and PSU pairings are provided to use with SUDAAN in variance estimation. Since NHANES III is based on a complex, multi-stage sample design, appropriate sample weights should be used in analyses to produce national estimates of prevalence and associated variances while accounting for unequal probability of selection of sample persons. For example, the final interview weight, WTPFQX6, should be used for analysis of the items or questions from the family or household questionnaires, and the final MEC examination weight, WTPFEX6, should be used for analysis of the questionnaires and measurements administered in the MEC. Furthermore, for a combined analysis of measurements from the MEC examinations and associated medical history questions from the household interview, the final MEC examination weight, WTPFEX6, should be used. We recommend using SUDAAN (Shah, 1995) to estimate statistics of interest and the associated variance. However, one can also use other published methods for variance estimation. Application of SUDAAN and alternative methods, such as the average design effect approach, balance repeated replication (BRR) methods, or jackknife methods for variance estimation, are discussed in Weighting and Estimation Methodology (U.S. DHHS, 1996).

Appropriate Uses of the NHANES III Sample Weights

Final interview weight, WTPFQX6

Use only in conjunction with the sample interviewed at home and with items collected during the household interview.

Final examination (MEC only) weight, WTPFEX6

Use only in conjunction with the MEC-examined sample and with interview and examination items collected at the MEC.

Final MEC+home examination weight, WTPFHX6

Use only in conjunction with the MEC+home-examined sample and with items collected at both the MEC and home.

Final allergy weight, WTPFALG6

Use only in conjunction with the allergy subsample and with items collected as part of the allergy component of the exam.

Final CNS weight, WTPFCNS6

Use only in conjunction with the CNS subsample and with items collected as part of the CNS component of the exam.

Final morning examination (MEC only) subsample weight, WTPFSD6

Use only in conjunction with the MEC-examined persons assigned to the morning subsample and only with items collected in the MEC exam.

Final afternoon/evening examination (MEC only) subsample weight, WTPFMD6

Use only in conjunction with the MEC-examined persons assigned to the afternoon/evening subsample and only with items collected in the MEC exam.

Final morning examination (MEC+home) subsample weight, WTPFHSD6

Use only in conjunction with the MEC- and home-examined persons assigned to the morning subsample and with items collected during the MEC and home examinations.

Final afternoon/evening examination (MEC+home) weight, WTPFHMD6

Use only in conjunction with the MEC- and home-examined persons assigned to the afternoon/evening subsample and with items collected during the MEC and home examinations.

DATA PREPARATION AND PROCESSING PROCEDURES

Automated data collection procedures for the survey were introduced in NHANES III. In the mobile examination centers, data for the interview and examination components were recorded directly onto a computerized data collection form. With the exception of a few independently automated systems, the system was centrally integrated. This operation allowed for ongoing monitoring of much of the data. Before the introduction of the computer-assisted personal interview (CAPI), the household questionnaire data were reviewed manually by field editors and interviewers. CAPI (1992-1994 only) questionnaires featured built-in edits to prevent entering inconsistencies and out-of-range responses. The multi-level data collection and quality control systems are discussed in detail in the Plan and Operation of the Third National Health and Nutrition Examination Survey, 1988-1994 (NCHS, 1994; U.S. DHHS, 1996). All interview, laboratory, and examination data were sent to NCHS for final processing.

Guidelines were developed that provided standards for naming variables, filling missing values and coding conventional responses, handling missing records, and standardizing two-part quantity/unit questionnaire variables. 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, collected in both interviews and examination components, were reviewed and recoded when possible. Responses to "Other" and "Specify" were recoded either to existing code categories or to new categories. The documentation for each data set includes notes for those variables that have been recoded and standardized and for those variables that differ significantly from what appears in the original data collection instrument. While the data have undergone many quality control and editing procedures, there still may be values that appear extreme or illogical. Values that varied considerably from what was expected were examined by analysts who checked for comments or other responses that might help to clarify unusual values. Generally, values were retained unless they could not possibly be true, in which case they were changed to "Blank but applicable." Therefore, the user must review each data set for extreme or inconsistent values and determine the status of each value for analysis.

Several editing conventions were used in the creation of final analytic data sets:

1. Standardized variables were created to replace all two-part quantity/unit questions using standard conversion factors. Standardized variables have the same name as the variable of the two-part question with an "S" suffix. For instance, MAPF18S (Months received WIC benefits) in the MEC Adult Questionnaire was created from the two-part response option to question F18, "How long did you receive benefits from the WIC program?," using the conversion factor 12 months per year.
2. Recoded variables were created by combining responses from two or more like variables, or by collapsing responses to create a summary variable for the purpose of confidentiality. Recoded variables have the original variable name with an R suffix. For example, place of birth

variable (HFA6X) in the Family Questionnaire was collapsed to a three level response category (U.S., Mexico, Other) and renamed HFA6XR. Generally, only the recoded variable has been included in the data file.

3. Fill values, a series of one or more digits, were used to represent certain specific conditions or responses. Below is a list of the fill values that were employed. Some of the fill values pertain only to questionnaire data, although 8-fill and blank-fill values are found in all data sets. Other fill values, not included in this list, are used to represent component-specific conditions.

6-fills = Varies/varied. (Questionnaires only)

7-fills = Fewer than the smallest number that could be reported within the question structure (e.g., fewer than one cigarette per day). (Questionnaires only)

8-fills = Blank but applicable/cannot be determined. This means that a respondent was eligible to receive the question, test, or component but did not because of refusal, lack of time, lack of staff, loss of data, broken vial, language barrier, unreliability, or other similar reasons.

9-fills = Don't know. This fill was used only when a respondent did not know the response to a question and said, "I don't know." (Questionnaires only)

Blank fills = Inapplicable. If a respondent was not eligible for a questionnaire, test, or component because of age, gender, or specific reason, the variable was blank-filled. In the questionnaire, if a respondent was not asked a question because of a skip-pattern, variables corresponding to the question were blank-filled. For examination or laboratory components, if a person was excluded by a defined protocol (e.g., screening exclusion questions) and these criteria are included in the data set, then the corresponding variables were blank-filled for that person. For home examinees, variables for examination components and blood tests not performed as part of the home examination protocol were blank-filled.

4. For variables describing discrete data, codes of zero (0) were used to mean "none," "never," or the equivalent. Value labels for which "0" is used include: "has not had," "never regularly," "still taking," or "never stopped using." Unless otherwise labeled, for variables containing continuous data, "zero" means "zero."
5. Where there are logical skip patterns in the flow of the questionnaire or examination component, the skip was indicated by placing the variable label of the skip destination in parentheses as part of the value label of the response generating the skip. For example, in the Physical Function Evaluation, the variable PFPWC (in wheelchair) has a value label, "2 No (PFPSCOOT)" that means that the next item for persons not in a wheelchair would be represented by the variable, PFPSCOOT.

Variable Nomenclature

A unique name was assigned to every NHANES III variable using a standard convention. By following this naming convention, the origin of each variable is clear, and there is no chance of overlaying similar variables across multiple components. Variables range in length from three to eight characters. The first two variable characters represent the topic (e.g., analyte, questionnaire instrument, examination component) and are listed below alphabetically by topic. For questionnaires administered in the household, the remainder of the variable name following the first two characters indicates the question section and number. For example, data for the response to the Household Adult Questionnaire question B1 are contained in the variable HAB1. For most laboratory and examination variables, as well as some other variables, a "P" in the third position refers to "primary" and the remainder of the variable name is a brief description of the item. For instance, in the Laboratory Data File, information on the length of time the person fasted before the first blood draw is contained in the variable PHPFAST. The variable PHPFAST was derived as follows: characters 1-2 (PH) refer to "phlebotomy," character 3 (P) refers to "primary," characters 4-8 (FAST) refer to an abbreviation for "fasting."

CODE	TOPIC
AT	Alanine aminotransferase (from biochemistry profile)
AM	Albumin (from biochemistry profile)
AP	Alkaline phosphatase (from biochemistry profile)
AL	Allergy skin test
AC	Alpha carotene
AN	Anisocytosis
TM	Antimicrosomal antibodies
TA	Antithyroglobulin antibodies
AA	Apolipoprotein (AI)
AB	Apolipoprotein (B)
AS	Aspartate aminotransferase (from biochemistry profile)
LA	Atypical lymphocyte
AU	Audiometry
BA	Band
BO	Basophil
BS	Basophilic stippling
BC	Beta carotene

CODE	TOPIC
BX	Beta cryptoxanthin
BL	Blast
BU	Blood urea nitrogen (BUN) (from biochemistry profile)
BM	Body measurements
BD	Bone densitometry
C1	C-peptide (first venipuncture)
C2	C-peptide (second venipuncture)
CR	C-reactive protein
UD	Cadmium
CN	Central nervous system function evaluation
CL	Chloride (from biochemistry profile)
CO	Cotinine
CE	Creatinine (serum)(from biochemistry profile)
UR	Creatinine (urine)
DM	Demographic
DE	Dental examination
MQ	Diagnostic interview schedule
DR	Dietary recall (total nutrient intakes)
EO	Eosinophil
EP	Erythrocyte protoporphyrin
FR	Ferritin
FB	Fibrinogen
RB	Folate (RBC)
FO	Folate (serum)
FH	Follicle stimulating hormone (FSH)
FP	Fundus photography
GG	Gamma glutamyl transferase (GGT) (from biochemistry profile)
GU	Gallbladder ultrasonography
GB	Globulin (from biochemistry profile)
G1	Glucose (first venipuncture)
G2	Glucose (second venipuncture)
SG	Glucose (from biochemistry profile)
GH	Glycated hemoglobin
GR	Granulocyte
C3	HCO ₃ (Bicarbonate)(from biochemistry profile)
HD	HDL cholesterol
HP	Helicobacter pylori antibody
HT	Hematocrit
HG	Hemoglobin
AH	Hepatitis A antibody (HAV)
HB	Hepatitis B core antibody (anti-HBc)
SS	Hepatitis B surface antibody (anti-HBs)
SA	Hepatitis B surface antigen (HBsAg)
HC	Hepatitis C antibody (HCV)
DH	Hepatitis D antibody (HDV)
H1	Herpes 1 antibody
H2	Herpes 2 antibody
HX	Home examination (general)
HO	Homocysteine
HF	Household family questionnaire
HA	Household adult questionnaire

CODE	TOPIC
HQ	Household questionnaire variables (composite)
HS	Household screener questionnaire
HY	Household youth questionnaire
HZ	Hypochromia
I1	Insulin (first venipuncture)
I2	Insulin (second venipuncture)
UI	Iodine (urine)
FE	Iron
SF	Iron (from biochemistry profile)
LD	Lactate dehydrogenase (from biochemistry profile)
L1	Latex antibody
LC	LDL cholesterol (calculated)
PB	Lead
LP	Lipoprotein (a)
LH	Luteinizing hormone
LU	Lutein/zeaxanthin
LY	Lycopene
LM	Lymphocyte
MR	Macrocyte
MC	Mean cell hemoglobin (MCH)
MH	Mean cell hemoglobin concentration (MCHC)
MV	Mean cell volume (MCV)
PV	Mean platelet volume
MA	MEC adult questionnaire
MX	MEC examination (general)
FF	Dietary food frequency (ages 12-16 years)
MP	MEC proxy questionnaire
MY	MEC youth questionnaire
ME	Metamyelocyte
MI	Microcyte
MO	Monocyte
MN	Mononuclear cell
ML	Myelocyte
IC	Normalized calcium (derived from ionized calcium)
OS	Osmolality (from biochemistry profile)
PH	Phlebotomy data collected in MEC (e.g., questions)
PS	Phosphorus (from biochemistry profile)
PF	Physical function evaluation
PE	Physician's examination
PL	Platelet
DW	Platelet distribution width
PK	Poikilocytosis
PO	Polychromatophilia
SK	Potassium (from biochemistry profile)
PR	Promyelocyte
RC	Red blood cell count (RBC)
RW	Red cell distribution width (RDW)
RE	Retinyl esters
RF	Rheumatoid factor antibody
RU	Rubella antibody
WT	Sample weights

CODE	TOPIC
SE	Selenium
SI	Sickle cell
NA	Sodium (from biochemistry profile)
SH	Spherocyte
SP	Spirometry
SD	Survey design
TT	Target cell
TE	Tetanus
TH	Thyroid Stimulating Hormone (TSH)
T4	Thyroxine
TB	Total bilirubin (from biochemistry profile)
CA	Total calcium
SC	Total calcium (from biochemistry profile)
TC	Total cholesterol
CH	Total cholesterol (from biochemistry profile)
TI	Total iron binding capacity (TIBC)
TP	Total protein (from biochemistry profile)
TX	Toxic granulation
TO	Toxoplasmosis antibody
PX	Transferrin saturation
TG	Triglycerides
TR	Triglycerides (from biochemistry profile)
TY	Tympanometry
UA	Uric acid (from biochemistry profile)
UB	Urinary albumin
VU	Vacuolated cells
VR	Varicella antibody
VA	Vitamin A
VB	Vitamin B12
VC	Vitamin C
VD	Vitamin D
VE	Vitamin E
WC	White blood cell count (WBC)
WW	WISC/WRAT cognitive test

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NHANES III Priority Toxicant Reference Range Study Data File General Information

Introduction

This document describes the data file for the Priority Toxicant Reference Range Study conducted as part of NHANES III to assess the levels of common pesticides and volatile organic compounds (VOCs) in a sample of the U.S. household population. Two groups of compounds were measured: selected VOCs at the low parts-per-trillion levels in whole blood and selected pesticides or their metabolites at the low parts-per-billion levels in urine. The data file for this study consists of three parts: 1) questionnaire data, 2) blood VOC data, and 3) urine pesticide metabolite data.

The documentation pertaining specifically to the Priority Toxicant Reference Range Study Data File is divided into three main sections. The first section, "General Information," describes the contents of the data file. The second section, "Data File Index," includes a brief description of all the variables on the data set, shows the data item name and its position in the data set. The third section, "Item Descriptions, Codes, Counts, and Notes" is a codebook for the dataset. It provides for each item a description, the data item name, a value range, a frequency count for each value, notes by variable and an appendix.

This data file may be linked to other NHANES III publicly released data files through use of the unique survey participant identifier (SEQN).

Description of Priority Toxicant Reference Range Study

The Priority Toxicant Reference Range Study was conducted among a non-statistical subsample of NHANES III participants in the medical examination who were 20-59 years old. Volunteers for this study were asked to provide an additional 20 ml of blood and to answer a brief self-administered questionnaire on use of and exposure to various chemical products. Urine from specimens collected in the medical examination was also used for this study. The sample size for this study is 1338. A urine specimen was not available to measure levels of pesticide metabolites for 360 persons in

this sample. The blood sample was not available for 320 persons in the sample. This subsample only includes people for whom there was either a blood or a urine specimen available.

No formal statistical sampling procedures were used to recruit volunteers for this study. Because the sample for this study is not statistically based, sample weights cannot be used in analyses of these data. As a result of this, estimates obtained from analyses of these data cannot be weighted. Therefore, representative estimates for the U.S. population cannot be calculated.

For specimen collection and processing procedures and examiner training and control, please see the description in General Information of Laboratory Data File Documentation, which can be found on CD-ROM, series 11, No. 1A (/LAB/LAB.DOC).

Laboratory Methods

The Division of Environmental Health Laboratory Sciences, National Center for Environmental Health, CDC conducted the laboratory analyses for this study. The methodology for measuring blood levels of VOCs is described in:

Ashley DL, Bonin MA, Cardinali FL, McCraw JM, Holler JS, Needham LL, Patterson DG, Jr. Determining volatile organic compounds in human blood from a large sample population using purge and trap gas chromatography/mass spectrometry. Anal Chem 1992;64:1021-9.

The laboratory methodology for measuring urinary levels of pesticide metabolites is described in:

Hill RH, Shealy DB, Head SL, Williams CC, Bailey SL, Gregg M, Baker SE, Needham LL. Determination of pesticide metabolites in human urine using isotope dilution technique and tandem mass spectrometry. J Analyt Toxicol 1995;19:323-9.

Data Preparation and Processing

For laboratory tests with a lower detection limit, results below this limit were replaced with a value equal to the lower detection limit divided by the square root of two. Appendix 1 documents the detection limit for each laboratory analyte in this data file.

Some blood level VOC laboratory measures were defined as above the standard range for that test. These results may have lower quantitative validity than values found within the standard range. However, in all cases, additional laboratory testing showed that standard curves continued to be linear to at least an order of magnitude higher than the highest measured value. This data file contains a flag variable for each VOC analyte to indicate those values that are outside the standard ranges (OSR).

Blood measures of volatile organic compounds were not obtained for 320 of the volunteers in this study. For these participants, fields for all blood measures are left blank. In other cases, blood specimens were available but results were not obtained for specific analytes. These are identified by 8-fills in a data item indicating a value that is blank but applicable.

For urine measures of pesticide metabolites, urine specimens were not available for 360 of the volunteers in this study. For these participants, fields for all urine measures are left blank. In other cases a urine specimen was available but no result was obtained and the field is identified with an 8-fill as described above.

For questionnaire data, there were three parts (A, B, C) for each of 12 questions regarding exposure to various chemicals and household products. For each exposure, Part A states "In the last 3 days: today or yesterday or the day before yesterday, have you either breathed or had on your skin, any of the following?" Part B states "During these 3 days: Altogether, have you either breathed fumes from this product or had it on your skin 30 minutes or less or more than 30 minutes?" Part C states "Check here if this happened while you were working at your job?"

For any one exposure, if Part A is coded as "no" or "don't know", then Parts B and C are blank (data are missing, but applicable). If Part A is coded as 8 (blank, but applicable), codes for Parts B and C are also coded as 8.

NHANES III Priority Toxicant Reference Range Study Index

Description	Variable Name	Positions
GENERAL INFORMATION		
Respondent identification number	SEQN	1-5
CHEMICAL EXPOSURE QUESTIONNAIRE		
Diesel fuel or kerosene - exposure?	VOPQ1A	6
Diesel fuel or kerosene - 30 minutes?	VOPQ1B	7
Diesel fuel or kerosene - at work?	VOPQ1C	8
Gasoline - exposure?	VOPQ2A	9
Gasoline - 30 minutes?	VOPQ2B	10
Gasoline - at work?	VOPQ2C	11
Paint thinner, etc. - exposure?	VOPQ3A	12
Paint thinner, etc. - 30 minutes?	VOPQ3B	13
Paint thinner, etc. - at work?	VOPQ3C	14
Varnish, lacquer, etc. - exposure?	VOPQ4A	15
Varnish, lacquer, etc. - 30 minutes?	VOPQ4B	16
Varnish, lacquer, etc. - at work?	VOPQ4C	17
Bug or insect spray - exposure?	VOPQ5A	18
Bug or insect spray - 30 minutes?	VOPQ5B	19
Bug or insect spray - at work?	VOPQ5C	20
Weed killer - exposure?	VOPQ6A	21
Weed killer - 30 minutes?	VOPQ6B	22
Weed killer - at work?	VOPQ6C	23
Solid toilet bowl deodorants - exposure?	VOPQ7A	24
Solid toilet bowl deodrnts - 30 minutes?	VOPQ7B	25
Solid toilet bowl deodorants - at work?	VOPQ7C	26
Air freshener/room deod - exposure?	VOPQ8A	27
Air freshener/room deod - 30 minutes?	VOPQ8B	28
Air freshener/room deod - at work?	VOPQ8C	29
Moth balls or cystals - exposure?	VOPQ9A	30
Moth balls or crystals - 30 minutes?	VOPQ9B	31
Moth balls or crystals - at work?	VOPQ9C	32
Pressure treated wood - exposure?	VOPQ10A	33
Pressure treated wood - 30 minutes?	VOPQ10B	34
Pressure treated wood - at work?	VOPQ10C	35
Fingernail polish/rmvr - exposure?	VOPQ11A	36
Fingernail polish/rmvr - 30 minutes?	VOPQ11B	37

NHANES III Priority Toxicant Reference Range Study Index

Description	Variable Name	Positions
Fingernail polish/rmvr - at work?	VOPQ11C	38
Drycleaning fl/spot rmvr - exposure?	VOPQ12A	39
Drycleaning fl/spot rmvr - 30 minutes?	VOPQ12B	40
Drycleaning fl/spot rmvr - at work?	VOPQ12C	41
Eaten seafood/fish in last 48 hours?	VOPQ13	42
Drink any red wine in last 48 hours?	VOPQ14	43
WHOLE BLOOD VOCS		
1,1,1-Trichloroethane conc. (ug/L)	VOPLV01	44-49
1,1,2,2-Tetrachloroethane conc. (ug/L)	VOPLV02	50-54
1,1,2-Trichloroethane conc. (ug/L)	VOPLV03	55-59
1,1-Dichloroethane concentration (ug/L)	VOPLV04	60-64
1,1-Dichloroethene concentration (ug/L)	VOPLV05	65-69
1,2-Dichlorobenzene concentration (ug/L)	VOPLV06	70-74
1,2-Dichloroethane concentration (ug/L)	VOPLV07	75-79
1,2-Dichloropropane concentration (ug/L)	VOPLV08	80-84
1,3-Dichlorobenzene concentration (ug/L)	VOPLV09	85-89
1,4-Dichlorobenzene concentration (ug/L)	VOPLV10	90-95
2-Butanone concentration (ug/L)	VOPLV11	96-101
Acetone concentration (ug/L)	VOPLV12	102-107
Benzene concentration (ug/L)	VOPLV13	108-112
Bromodichloromethane conc. (ug/L)	VOPLV14	113-117
Bromoform concentration (ug/L)	VOPLV15	118-122
Carbon tetrachloride conc. (ug/L)	VOPLV16	123-127
Chlorobenzene concentration (ug/L)	VOPLV17	128-132
Chloroform concentration (ug/L)	VOPLV18	133-137
cis-1,2-Dichloroethene conc. (ug/L)	VOPLV19	138-142
Dibromochloromethane conc. (ug/L)	VOPLV20	143-147
Dibromomethane concentration (ug/L)	VOPLV22	148-152
Ethylbenzene concentration (ug/L)	VOPLV23	153-157
m-/p-Xylene concentration (ug/L)	VOPLV24	158-163
Methylene chloride concentration (ug/L)	VOPLV25	164-168
o-Xylene concentration (ug/L)	VOPLV26	169-173
Styrene concentration (ug/L)	VOPLV27	174-178
Tetrachloroethene concentration (ug/L)	VOPLV28	179-184
Toluene concentration (ug/L)	VOPLV29	185-189
trans-1,2-Dichloroethene conc. (ug/L)	VOPLV30	190-194

NHANES III Priority Toxicant Reference Range Study Index

Description	Variable Name	Positions
Trichloroethene concentration (ug/L)	VOPLV31	195-199
1,1,1-Trichloroethane OSR flag	VOPOSR01	200
1,1,2,2-Tetrachloroethane OSR flag	VOPOSR02	201
1,1,2-Trichloroethane OSR flag	VOPOSR03	202
1,1-Dichloroethane OSR flag	VOPOSR04	203
1,1-Dichloroethene OSR flag	VOPOSR05	204
1,2-Dichlorobenzene OSR flag	VOPOSR06	205
1,2-Dichloroethane OSR flag	VOPOSR07	206
1,2-Dichloropropane OSR flag	VOPOSR08	207
1,3-Dichlorobenzene OSR flag	VOPOSR09	208
1,4-Dichlorobenzene OSR flag	VOPOSR10	209
2-Butanone OSR flag	VOPOSR11	210
Acetone OSR flag	VOPOSR12	211
Benzene OSR flag	VOPOSR13	212
Bromodichloromethane OSR flag	VOPOSR14	213
Bromoform OSR flag	VOPOSR15	214
Carbon tetrachloride OSR flag	VOPOSR16	215
Chlorobenzene OSR flag	VOPOSR17	216
Chloroform OSR flag	VOPOSR18	217
cis-1,2-Dichloroethene OSR flag	VOPOSR19	218
Dibromochloromethane OSR flag	VOPOSR20	219
Dibromomethane OSR flag	VOPOSR22	220
Ethylbenzene OSR flag	VOPOSR23	221
m-/p-Xylene OSR flag	VOPOSR24	222
Methylene chloride OSR flag	VOPOSR25	223
o-Xylene OSR flag	VOPOSR26	224
Styrene OSR flag	VOPOSR27	225
Tetrachloroethene OSR flag	VOPOSR28	226
Toluene OSR flag	VOPOSR29	227
trans-1,2-Dichloroethene OSR flag	VOPOSR30	228
Trichloroethene OSR flag	VOPOSR31	229
URINARY PHENOLS		
Urinary creatinine (mg/dL)	URP	230-234
Carbofuranphenol concentration	UVPCFP	235-241

NHANES III Priority Toxicant Reference Range Study Index

Description	Variable Name	Positions
2-Isopropoxyphenol concentration	UVP1PP	242-248
Pentachlorophenol concentration	UVP2CP	249-255
1-Naphthol concentration	UVP1N	256-263
2-Naphthol concentration	UVP2N	264-270
2,4-Dichlorophenoxyacetic-acid conc.	UVP24D	271-277
2,4-Dichlorophenol concentration	UVP24DP	278-285
2,4,5-Trichlorophenol concentration	UVP245T	286-292
2,4,6-Trichlorophenol concentration	UVP246T	293-299
2,5-Dichlorophenol concentration	UVP25DC	300-308
3,5,6-trichloro-2-pyridinol conc.	UVP356T	309-315
4-Nitrophenol concentration	UVP4NP	316-322

NHANES III Priority Toxicant Reference Range Study

 CHEMICAL EXPOSURE QUESTIONNAIRE

Positions SAS name	Counts	Item description and code	Notes
9 VOPQ2A		In the last 3 days: today or yesterday or the day before yesterday, have you either breathed fumes from gasoline or had it on your skin?	
	380	1 Yes	
	921	2 No	
	23	8 Blank but applicable	
	14	9 Don't know	
10 VOPQ2B		During these 3 days: altogether, have you either breathed fumes from gasoline or had it on your skin?	
	330	1 30 minutes or less	
	50	2 More than 30 minutes	
	23	8 Blank but applicable	
	935	Blank	
11 VOPQ2C		Check here if you either breathed fumes from gasoline or had it on your skin while you were working at your job?	
	72	1 Yes	
	308	2 No	
	23	8 Blank but applicable	
	935	Blank	
12 VOPQ3A		In the last 3 days: today or yesterday or the day before yesterday, have you either breathed fumes from paint thinner, brush cleaner, or furniture stripper or had it on your skin?	
	80	1 Yes	
	1234	2 No	
	20	8 Blank but applicable	
	4	9 Don't know	

NHANES III Priority Toxicant Reference Range Study

 CHEMICAL EXPOSURE QUESTIONNAIRE

Positions SAS name	Counts	Item description and code	Notes
13 VOPQ3B		During these 3 days: altogether, have you either breathed fumes from paint thinner, brush cleaner, or furniture stripper or had it on your skin?	
	47	1 30 minutes or less	
	33	2 More than 30 minutes	
	20	8 Blank but applicable	
	1238	Blank	
14 VOPQ3C		Check here if you either breathed fumes from paint thinner, brush cleaner, or furniture stripper or had it on your skin while you were working at your job?	
	38	1 Yes	
	42	2 No	
	20	8 Blank but applicable	
	1238	Blank	
15 VOPQ4A		In the last 3 days: today or yesterday or the day before yesterday, have you either breathed fumes from varnish, lacquer, wood stain, or wet paint or had it on your skin?	
	96	1 Yes	
	1223	2 No	
	18	8 Blank but applicable	
	1	9 Don't know	
16 VOPQ4B		During these 3 days: altogether, have you either breathed fumes from varnish, lacquer, wood stain, or wet paint or had it on your skin?	
	40	1 30 minutes or less	
	56	2 More than 30 minutes	
	18	8 Blank but applicable	
	1224	Blank	

NHANES III Priority Toxicant Reference Range Study

 CHEMICAL EXPOSURE QUESTIONNAIRE

Positions SAS name	Counts	Item description and code	Notes
17 VOPQ4C		Check here if you either breathed fumes from varnish, lacquer, wood stain, or wet paint or had it on your skin while you were working at your job?	
	42	1 Yes	
	54	2 No	
	18	8 Blank but applicable	
	1224	Blank	
18 VOPQ5A		In the last 3 days: today or yesterday or the day before yesterday, have you either breathed fumes from bug or insect spray or had it on your skin?	
	116	1 Yes	
	1196	2 No	
	18	8 Blank but applicable	
	8	9 Don't know	
19 VOPQ5B		During these 3 days: altogether, have you either breathed fumes from bug or insect spray or had it on your skin?	
	92	1 30 minutes or less	
	24	2 More than 30 minutes	
	18	8 Blank but applicable	
	1204	Blank	
20 VOPQ5C		Check here if you either breathed fumes from bug or insect spray or had it on your skin while you were working at your job?	
	15	1 Yes	
	101	2 No	
	18	8 Blank but applicable	
	1204	Blank	

NHANES III Priority Toxicant Reference Range Study

 CHEMICAL EXPOSURE QUESTIONNAIRE

Positions SAS name	Counts	Item description and code	Notes
21 VOPQ6A		In the last 3 days: today or yesterday or the day before yesterday, have you either breathed fumes from weed killer or had it on your skin?	
	27	1 Yes	
	1284	2 No	
	21	8 Blank but applicable	
	6	9 Don't know	
22 VOPQ6B		During these 3 days: altogether, have you either breathed fumes from weed killer or had it on your skin?	
	16	1 30 minutes or less	
	11	2 More than 30 minutes	
	21	8 Blank but applicable	
	1290	Blank	
23 VOPQ6C		Check here if you either breathed fumes from weed killer or had it on your skin while you were working at your job?	
	8	1 Yes	
	19	2 No	
	21	8 Blank but applicable	
	1290	Blank	
24 VOPQ7A		In the last 3 days: today or yesterday or the day before yesterday, have you either breathed fumes from solid toilet bowl deodorants or had it on your skin?	
	129	1 Yes	
	1179	2 No	
	24	8 Blank but applicable	
	6	9 Don't know	

NHANES III Priority Toxicant Reference Range Study

 CHEMICAL EXPOSURE QUESTIONNAIRE

Positions SAS name	Counts	Item description and code	Notes
25 VOPQ7B		During these 3 days: altogether, have you either breathed fumes from solid toilet bowl deodorants or had it on your skin?	
	111	1 30 minutes or less	
	18	2 More than 30 minutes	
	24	8 Blank but applicable	
	1185	Blank	
26 VOPQ7C		Check here if you either breathed fumes from solid toilet bowl deodorants or had it on your skin while you were working at your job?	
	22	1 Yes	
	107	2 No	
	24	8 Blank but applicable	
	1185	Blank	
27 VOPQ8A		In the last 3 days: today or yesterday or the day before yesterday, have you either breathed fumes from air freshener/room deodorizer or had it on your skin?	
	453	1 Yes	
	854	2 No	
	18	8 Blank but applicable	
	13	9 Don't know	
28 VOPQ8B		During these 3 days: altogether, have you either breathed fumes from air freshener/room deodorizer or had it on your skin?	
	349	1 30 minutes or less	
	104	2 More than 30 minutes	
	18	8 Blank but applicable	
	867	Blank	

NHANES III Priority Toxicant Reference Range Study

 CHEMICAL EXPOSURE QUESTIONNAIRE

Positions SAS name	Counts	Item description and code	Notes
29 VOPQ8C		Check here if you either breathed fumes from air freshener/room deodorizer or had it on your skin while you were working at your job?	
	47	1 Yes	
	406	2 No	
	18	8 Blank but applicable	
	867	Blank	
30 VOPQ9A		In the last 3 days: today or yesterday or the day before yesterday, have you either breathed fumes from moth balls or crystals or had it on your skin?	
	46	1 Yes	
	1264	2 No	
	23	8 Blank but applicable	
	5	9 Don't know	
31 VOPQ9B		During these 3 days: altogether, have you either breathed fumes from moth balls or crystals or had it on your skin?	
	33	1 30 minutes or less	
	13	2 More than 30 minutes	
	23	8 Blank but applicable	
	1269	Blank	
32 VOPQ9C		Check here if you either breathed fumes from moth balls or crystals or had it on your skin while you were working at your job?	
	2	1 Yes	
	44	2 No	
	23	8 Blank but applicable	
	1269	Blank	

NHANES III Priority Toxicant Reference Range Study

 CHEMICAL EXPOSURE QUESTIONNAIRE

Positions SAS name	Counts	Item description and code	Notes
33 VOPQ10A		In the last 3 days: today or yesterday or the day before yesterday, have you either breathed fumes from pressure treated lumber/wood products or had it on your skin?	
	77	1 Yes	
	1227	2 No	
	22	8 Blank but applicable	
	12	9 Don't know	
34 VOPQ10B		During these 3 days: altogether, have you either breathed fumes from pressure treated lumber/wood products or had it on your skin?	
	52	1 30 minutes or less	
	25	2 More than 30 minutes	
	22	8 Blank but applicable	
	1239	Blank	
35 VOPQ10C		Check here if you either breathed fumes from pressure treated lumber/wood products or had it on your skin while you were working at your job?	
	26	1 Yes	
	51	2 No	
	22	8 Blank but applicable	
	1239	Blank	

NHANES III Priority Toxicant Reference Range Study

 CHEMICAL EXPOSURE QUESTIONNAIRE

Positions SAS name	Counts	Item description and code	Notes
36 VOPQ11A		In the last 3 days: today or yesterday or the day before yesterday, have you either breathed fumes from fingernail polish or fingernail polish remover or had it on your skin?	
	216	1 Yes	
	1099	2 No	
	18	8 Blank but applicable	
	5	9 Don't know	
37 VOPQ11B		During these 3 days: altogether, have you either breathed fumes from fingernail polish or fingernail polish remover or had it on your skin?	
	169	1 30 minutes or less	
	47	2 More than 30 minutes	
	18	8 Blank but applicable	
	1104	Blank	
38 VOPQ11C		Check here if you either breathed fumes from fingernail polish or fingernail polish remover or had it on your skin while you were working at your job?	
	10	1 Yes	
	206	2 No	
	18	8 Blank but applicable	
	1104	Blank	

NHANES III Priority Toxicant Reference Range Study

 CHEMICAL EXPOSURE QUESTIONNAIRE

Positions SAS name	Counts	Item description and code	Notes
39 VOPQ12A		In the last 3 days: today or yesterday or the day before yesterday, have you either breathed fumes from drycleaning fluid or spot remover or had it on your skin?	
	54	1 Yes	
	1253	2 No	
	22	8 Blank but applicable	
	9	9 Don't know	
40 VOPQ12B		During these 3 days: altogether, have you either breathed fumes from drycleaning fluid or spot remover or had it on your skin?	
	45	1 30 minutes or less	
	9	2 More than 30 minutes	
	22	8 Blank but applicable	
	1262	Blank	
41 VOPQ12C		Check here if you either breathed fumes from drycleaning fluid or spot remover or had it on your skin while you were working at your job?	
	7	1 Yes	
	47	2 No	
	22	8 Blank but applicable	
	1262	Blank	
42 VOPQ13		Have you eaten seafood or any fish (including tuna) in the last 48 hours?	
	324	1 Yes	
	983	2 No	
	31	8 Blank but applicable	

NHANES III Priority Toxicant Reference Range Study

 CHEMICAL EXPOSURE QUESTIONNAIRE

Positions SAS name	Counts	Item description and code	Notes
43 VOPQ14		Did you drink any red wine in the last 48 hours?	
	44	1 Yes	
	1261	2 No	
	33	8 Blank but applicable	

NHANES III Priority Toxicant Reference Range Study

 WHOLE BLOOD VOCS

Positions SAS name	Counts	Item description and code	Notes
44-49 VOPLV01		1,1,1-Trichloroethane concentration (ug/L)	
	132	00.061 Below limit of detection	
	414	00.086-13.897	
	472	888888 Blank but applicable	
	320	Blank	
50-54 VOPLV02		1,1,2,2-Tetrachloroethane concentration (ug/L)	
	967	0.006 Below limit of detection	
	4	0.012-0.016	
	47	88888 Blank but applicable	
	320	Blank	
55-59 VOPLV03		1,1,2-Trichloroethane concentration (ug/L)	
	969	0.011 Below limit of detection	
	1	0.027	
	48	88888 Blank but applicable	
	320	Blank	
60-64 VOPLV04		1,1-Dichloroethane concentration (ug/L)	
	917	0.006 Below limit of detection	
	38	0.009-0.034	
	63	88888 Blank but applicable	
	320	Blank	
65-69 VOPLV05		1,1-Dichloroethene concentration (ug/L)	
	931	0.013 Below limit of detection	
	20	0.018-0.058	
	67	88888 Blank but applicable	
	320	Blank	

NHANES III Priority Toxicant Reference Range Study

WHOLE BLOOD VOCS			

Positions		Item description	
SAS name	Counts	and code	Notes

70-74		1,2-Dichlorobenzene concentration (ug/L)	
VOPLV06	727	0.031 Below limit of detection	
	291	88888 Blank but applicable	
	320	Blank	
75-79		1,2-Dichloroethane concentration (ug/L)	
VOPLV07	956	0.008 Below limit of detection	
	4	0.014-0.026	
	58	88888 Blank but applicable	
	320	Blank	
80-84		1,2-Dichloropropane concentration (ug/L)	
VOPLV08	870	0.006 Below limit of detection	
	12	0.008-0.026	
	136	88888 Blank but applicable	
	320	Blank	
85-89		1,3-Dichlorobenzene concentration (ug/L)	
VOPLV09	892	0.013 Below limit of detection	
	28	0.019-00.04	
	98	88888 Blank but applicable	
	320	Blank	
90-95		1,4-Dichlorobenzene concentration (ug/L)	
VOPLV10	40	00.052 Below limit of detection	
	875	00.074-51.889	
	103	888888 Blank but applicable	
	320	Blank	
96-101		2-Butanone concentration (ug/L)	
VOPLV11	970	00.539-87.853	
	48	888888 Blank but applicable	
	320	Blank	

NHANES III Priority Toxicant Reference Range Study

 WHOLE BLOOD VOCS

Positions SAS name	Counts	Item description and code	Notes
102-107 VOPLV12	911	Acetone concentration (ug/L) 000345-080306	
	107	888888 Blank but applicable	
	320	Blank	
108-112 VOPLV13	125	Benzene concentration (ug/L) 0.021 Below limit of detection	
	671	00.03-01.88	
	222	88888 Blank but applicable	
	320	Blank	
113-117 VOPLV14	809	Bromodichloromethane concentration (ug/L) 0.006 Below limit of detection	
	128	0.009-0.225	
	81	88888 Blank but applicable	
	320	Blank	
118-122 VOPLV15	533	Bromoform concentration (ug/L) 0.019 Below limit of detection	
	46	0.027-0.412	
	439	88888 Blank but applicable	
	320	Blank	
123-127 VOPLV16	915	Carbon tetrachloride concentration (ug/L) 0.013 Below limit of detection	
	20	00.02-0.056	
	83	88888 Blank but applicable	
	320	Blank	
128-132 VOPLV17	720	Chlorobenzene concentration (ug/L) 0.005 Below limit of detection	
	181	0.007-0.092	
	117	88888 Blank but applicable	
	320	Blank	

NHANES III Priority Toxicant Reference Range Study

 WHOLE BLOOD VOCS

Positions SAS name	Counts	Item description and code	Notes
133-137 VOPLV18	397	Chloroform concentration (ug/L) 0.015 Below limit of detection	
	479	0.021-4.627	
	142	88888 Blank but applicable	
	320	Blank	
138-142 VOPLV19	926	cis-1,2-Dichloroethene concentration (ug/L) 0.009 Below limit of detection	
	5	0.014-0.023	
	87	88888 Blank but applicable	
	320	Blank	
143-147 VOPLV20	811	Dibromochloromethane concentration (ug/L) 0.009 Below limit of detection	
	108	0.013-0.088	
	99	88888 Blank but applicable	
	320	Blank	
148-152 VOPLV22	607	Dibromomethane concentration (ug/L) 0.031 Below limit of detection	
	1	0.053	
	410	88888 Blank but applicable	
	320	Blank	
153-157 VOPLV23	36	Ethylbenzene concentration (ug/L) 0.014 Below limit of detection	
	570	00.02-3.731	
	412	88888 Blank but applicable	
	320	Blank	
158-163 VOPLV24	391	m-/p-Xylene concentration (ug/L) 00.023 Below limit of detection	
	627	00.033-33.057	
	320	Blank	

NHANES III Priority Toxicant Reference Range Study

 WHOLE BLOOD VOCS

Positions SAS name	Counts	Item description and code	Notes
164-168 VOPLV25	585	Methylene chloride concentration (ug/L) 0.063 Below limit of detection	
	19	0.091-1.622	
	414	88888 Blank but applicable	
	320	Blank	
169-173 VOPLV26	25	o-Xylene concentration (ug/L) 0.028 Below limit of detection	
	603	0.041-3.487	
	390	88888 Blank but applicable	
	320	Blank	
174-178 VOPLV27	78	Styrene concentration (ug/L) 0.013 Below limit of detection	
	546	0.019-4.006	
	394	88888 Blank but applicable	
	320	Blank	
179-184 VOPLV28	145	Tetrachloroethene concentration (ug/L) 00.021 Below limit of detection	
	421	000.03-12.225	
	452	888888 Blank but applicable	
	320	Blank	
185-189 VOPLV29	4	Toluene concentration (ug/L) 0.065 Below limit of detection	
	571	0.094-6.767	
	443	88888 Blank but applicable	
	320	Blank	
190-194 VOPLV30	921	trans-1,2-Dichloroethene concentration (ug/L) 00.01 Below limit of detection	
	15	0.014-0.038	
	82	88888 Blank but applicable	
	320	Blank	

NHANES III Priority Toxicant Reference Range Study

 WHOLE BLOOD VOCS

Positions SAS name	Counts	Item description and code	Notes
195-199 VOPLV31	567 78 373 320	Trichloroethene concentration (ug/L) 0.007 Below limit of detection 00.01-2.678 88888 Blank but applicable Blank	
200 VOPOSR01	7 1331	1,1,1-Trichloroethane OSR flag 1 Yes Blank	See note
201 VOPOSR02	1338	1,1,2,2-Tetrachloroethane OSR flag Blank	See note
202 VOPOSR03	1338	1,1,2-Trichloroethane OSR flag Blank	See note
203 VOPOSR04	1338	1,1-Dichloroethane OSR flag Blank	See note
204 VOPOSR05	1338	1,1-Dichloroethene OSR flag Blank	See note
205 VOPOSR06	1338	1,2-Dichlorobenzene OSR flag Blank	See note
206 VOPOSR07	1338	1,2-Dichloroethane OSR flag Blank	See note
207 VOPOSR08	1338	1,2-Dichloropropane OSR flag Blank	See note
208 VOPOSR09	1338	1,3-Dichlorobenzene OSR flag Blank	See note

NHANES III Priority Toxicant Reference Range Study

 WHOLE BLOOD VOCS

Positions SAS name	Counts	Item description and code	Notes
209 VOPOSR10	61 1277	1,4-Dichlorobenzene OSR flag 1 Yes Blank	See note
210 VOPOSR11	23 1315	2-Butanone OSR flag 1 Yes Blank	See note
211 VOPOSR12	110 1228	Acetone OSR flag 1 Yes Blank	See note
212 VOPOSR13	1338	Benzene OSR flag Blank	See note
213 VOPOSR14	1338	Bromodichloromethane OSR flag Blank	See note
214 VOPOSR15	1338	Bromoform OSR flag Blank	See note
215 VOPOSR16	1338	Carbon tetrachloride OSR flag Blank	See note
216 VOPOSR17	1338	Chlorobenzene OSR flag Blank	See note
217 VOPOSR18	1 1337	Chloroform OSR flag 1 Yes Blank	See note
218 VOPOSR19	1338	cis-1,2-Dichloroethene OSR flag Blank	See note
219 VOPOSR20	1338	Dibromochloromethane OSR flag Blank	See note

NHANES III Priority Toxicant Reference Range Study

 WHOLE BLOOD VOCS

Positions SAS name	Counts	Item description and code	Notes
220 VOPOSR22	1338	Dibromomethane OSR flag Blank	See note
221 VOPOSR23	1 1337	Ethylbenzene OSR flag 1 Yes Blank	See note
222 VOPOSR24	2 1336	m-/p-Xylene OSR flag 1 Yes Blank	See note
223 VOPOSR25	1338	Methylene chloride OSR flag Blank	See note
224 VOPOSR26	1338	o-Xylene OSR flag Blank	See note
225 VOPOSR27	2 1336	Styrene OSR flag 1 Yes Blank	See note
226 VOPOSR28	3 1335	Tetrachloroethene OSR flag 1 Yes Blank	See note
227 VOPOSR29	5 1333	Toluene OSR flag 1 Yes Blank	See note
228 VOPOSR30	1338	trans-1,2-Dichloroethene OSR flag Blank	See note
229 VOPOSR31	3 1335	Trichloroethene OSR flag 1 Yes Blank	See note

NHANES III Priority Toxicant Reference Range Study

URINARY PHENOLS

Positions		Item description	
SAS name	Counts	and code	Notes
230-234		Urinary creatinine (mg/dL)	
URP	1	007.9 Below level of detection	
	977	011.3-583.7	
	360	Blank	

NHANES III Priority Toxicant Reference Range Study

URINARY PHENOLS

Positions SAS name	Counts	Item description and code	Notes
235-241 UVPCFP	957	Carbofuranphenol concentration (ug/L) 00.7071 Below limit of detection	
	16	001.172-13.6946	
	5	8888888 Blank but applicable	
	360	Blank	
242-248 UVPIPP	901	2-Isopropoxyphenol concentration (ug/L) 00.7071 Below limit of detection	
	74	01.0373-10.2148	
	3	8888888 Blank but applicable	
	360	Blank	
249-255 UVPPCP	349	Pentachlorophenol concentration (ug/L) 00.7071 Below limit of detection	
	582	01.0088-55.2999	
	47	8888888 Blank but applicable	
	360	Blank	
256-263 UVP1N	131	1-Naphthol concentration (ug/L) 000.7071 Below limit of detection	
	832	001.0068-2498.899	
	15	88888888 Blank but applicable	
	360	Blank	
264-270 UVP2N	185	2-Naphthol concentration (ug/L) 00.7071 Below limit of detection	
	772	01.0001-87.5753	
	21	8888888 Blank but applicable	
	360	Blank	
271-277 UVP24D	825	2,4-Dichlorophenoxyacetic-acid concentration (ug/L) 00.7071 Below limit of detection	
	138	01.0018-36.8847	
	15	8888888 Blank but applicable	
	360	Blank	

NHANES III Priority Toxicant Reference Range Study

URINARY PHENOLS

Positions SAS name	Counts	Item description and code	Notes
278-285 UVP24DP	346	2,4-Dichlorophenol concentration (ug/L) 000.7071 Below limit of detection	
	622	001.0138-450.9854	
	10	88888888 Blank but applicable	
	360	Blank	
286-292 UVP245T	715	2,4,5-Trichlorophenol concentration (ug/L) 00.7071 Below limit of detection	
	200	001.003-025.321	
	63	88888888 Blank but applicable	
	360	Blank	
293-299 UVP246T	823	2,4,6-Trichlorophenol concentration (ug/L) 01.4142 Below limit of detection	
	100	02.0197-85.5436	
	55	88888888 Blank but applicable	
	360	Blank	
300-308 UVP25DC	16	2,5-Dichlorophenol concentration (ug/L) 0000.7071 Below limit of detection	
	946	00001.287-08717.988	
	16	8888888888 Blank but applicable	
	360	Blank	
309-315 UVP356T	175	3,5,6-Trichloro-2-pyridinol concentration (ug/L) 00.7071 Below limit of detection	
	798	01.0017-77.4046	
	5	88888888 Blank but applicable	
	360	Blank	

NHANES III Priority Toxicant Reference Range Study

 URINARY PHENOLS

Positions		Item description	
SAS name	Counts	and code	Notes
316-322		4-Nitrophenol concentration (ug/L)	
UVP4NP	565	00.7071	Below limit of detection
	389	001.004-63.1502	
	24	8888888	Blank but applicable
	360	Blank	

NOTES

VOPOSR.. Variable is a flag that indicates if value in VOPLV.. is outside the standard range. Value is "1" if value is outside the standard range and blank if not. See Introduction.

Appendix 1.

Blood Volatile Organic Compounds and Detection Limits

Variable name	Analyte	Detection limit (DL) (ug/L)	DL / SQRT(2)
VOPLV01	1,1,1-Trichloroethane	0.086	0.061
VOPLV02	1,1,2,2-Tetrachloroethane	0.008	0.006
VOPLV03	1,1,2-Trichloroethane	0.016	0.011
VOPLV04	1,1-Dichloroethane	0.009	0.006
VOPLV05	1,1-Dichloroethene	0.018	0.013
VOPLV06	1,2-Dichlorobenzene	0.044	0.031
VOPLV07	1,2-Dichloroethane	0.012	0.008
VOPLV08	1,2-Dichloropropane	0.008	0.006
VOPLV09	1,3-Dichlorobenzene	0.019	0.013
VOPLV10	1,4-Dichlorobenzene	0.073	0.052
VOPLV11	2-Butanone	0.50	0.035
VOPLV12	Acetone	200	141
VOPLV13	Benzene	0.030	0.021
VOPLV14	Bromodichloromethane	0.009	0.006
VOPLV15	Bromoform	0.027	0.019
VOPLV16	Carbon Tetrachloride	0.019	0.013
VOPLV17	Chlorobenzene	0.007	0.005
VOPLV18	Chloroform	0.021	0.015
VOPLV19	cis-1,2-Dichloroethene	0.013	0.009
VOPLV20	Dibromochloromethane	0.013	0.009
VOPLV22	Dibromomethane	0.044	0.031
VOPLV23	Ethylbenzene	0.020	0.014
VOPLV24	m-/p-Xylene	0.033	0.023
VOPLV25	Methylene chloride	0.089	0.063
VOPLV26	o-Xylene	0.040	0.028
VOPLV27	Styrene	0.019	0.013
VOPLV28	Tetrachloroethene	0.030	0.021
VOPLV29	Toluene	0.092	0.065
VOPLV30	trans-1,2-Dichloroethene	0.014	0.010
VOPLV31	Trichloroethene	0.010	0.007

Urine Pesticide Metabolites and Detection Limits

Variable name	Analyte	Detection limit (DL) (ug/L)	DL / SQRT(2)
UVP1N	1-Naphthol	1	0.7071
UVP245T	2,4,5-Trichlorophenol	1	0.7071
UVP24DP	2,4-Dichlorophenol	1	0.7071
UVP25DC	2,5-Dichlorophenol	1	0.7071
UVP356T	3,5,6-Trichloro-2-pyridinol	1	0.7071
UVPCFP	Carbofuranphenol	1	0.7071
UVPIPP	2-Isopropoxyphenol	1	0.7071
UVP246T	2,4,6-Trichlorophenol	2	1.4142
UVP24D	2,4-Dichlorophenoxyacetic acid	1	0.7071
UVP4NP	4-Nitrophenol	1	0.7071
UVP2N	2-Naphthol	1	0.7071
UVPPCP	Pentachlorophenol	1	0.7071