National Health and Nutrition Examination Survey

2015-2016 Data Documentation, Codebook, and Frequencies

Complete Blood Count with 5-Part Differential - Whole Blood (CBC_I)

Data File: CBC_I.xpt

First Published: September 2017

Last Revised: NA

Component Description

The complete blood count (CBC) with 5-part differential counts red blood cells (RBCs), white blood cells (WBCs) and platelets; measures hemoglobin; estimates the red cells' volume and sorts the WBCs into subtypes. A CBC is a routine blood test used to evaluate your overall health and detect a wide range of disorders, including anemia, infection, and leukemia.

These data will be used to estimate deficiencies and toxicities of specific nutrients in the population and subgroups, to provide population reference data, and to estimate the contribution of diet, supplements, and other factors to whole blood levels of nutrients. Data will be used for research to further define nutrient requirements as well as optimal levels for disease prevention and health promotion.

Eligible Sample

Examined participants aged 1 year and over were eligible.

Description of Laboratory Methodology

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

Complete Blood Count with 5-Part Differential in Whole Blood (September 2017)

Laboratory Quality Assurance and Monitoring

Whole blood samples are analyzed on the NHANES MEC.

Detailed instructions on specimen collection and processing are discussed in the NHANES Laboratory Procedures Manual (LPM).

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 NHANES laboratories. In the MEC, the CBC results are measured in duplicate and averaged. The averaged results are reported to participant and released in this dataset.

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

All QC procedures recommended by the manufacturers were followed. Reported results for all assays meet NHANES quality control and quality assurance performance criteria for accuracy and precision, similar to the Westgard rules.

Data Processing and Editing

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

Five derived variables were created in this data file. The variables were created using the following formulas:

LBDLYMNO = LBXWBCSI * LBXLYPCT/100 (round to 1 decimal)
LBDMONO = LBXWBCSI * LBXMOPCT/100 (round to 1 decimal)
LBDNENO = LBXWBCSI * LBXNEPCT /100 (round to 1 decimal)
LBDEONO = LBXWBCSI * LBXEOPCT/100 (round to 1 decimal)
LBDBANO = LBXWBCSI * LBXBAPCT/100 (round to 1 decimal)

Analytic Notes

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

Demographic and Other Related Variables

The analysis of NHANES 2015-2016 laboratory data must be conducted using the appropriate survey design and demographic variables. The NHANES 2015-2016 Demographics File contains demographic data, health indicators, and other related information collected during household interviews as well as the sample design variables. The recommended procedure for variance estimation requires use of stratum and PSU variables (SDMVSTRA and SDMVPSU, respectively) in the demographic file.

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

The detection limits were constant for all of the analytes in the data set. None of the

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

Detection Limits

Variable Name	SAS Label	LLOD	ULOD	Range
LBXWBCSI	White blood cell count	0.050	400.000	x 10^3 cells/uL
LBXLYPCT	Lymphocyte percent	0.00	100.00	%
LBXMOPCT	Monocyte percent	0.00	100.00	%
LBXNEPCT	Segmented neutrophils percent	0.00	100.00	%
LBXEOPCT	Eosinophils percent	0.00	100.00	%
LBXBAPCT	Basophils percent	0.00	100.00	%
LBXRBCSI	Red blood cell count	0.005	8.5	x 10^6 cells/uL
LBXHGB	Hemoglobin	0.10	25.50	g/dL
LBXMCVSI	Mean cell volume	50.00	150.00	fL
LBXRDW	Red cell distribution width	10.00	40.00	%
LBXPLTSI	Platelet count	3.0	3000.0	x 10^3 cells/uL
LBXMPSI	Mean platelet volume	5.00	25.00	fL

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

- Westgard J.O., Barry P.L., Hunt M.R., Groth T. A multi-rule Shewhart chart for quality control in clinical chemistry. Clin Chem (1981) 27:493-501.

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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 1 YEARS - 150 YEARS

LBXWBCSI - White blood cell count (1000 cells/uL)

Variable Name: LBXWBCSI

SAS Label: White blood cell count (1000 cells/uL)

English Text: White blood cell count (1000 cells/uL)

Target: Both males and females 1 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
1.4 to 117.2	Range of Values	8117	8117	
.	Missing	1048	9165	

LBXLYPCT - Lymphocyte percent (%)

Variable Name: LBXLYPCT

SAS Label: Lymphocyte percent (%)

English Text: Lymphocyte percent (%)

Target: Both males and females 1 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
3.7 to 94.5	Range of Values	8116	8116	
.	Missing	1049	9165	

LBXMOPCT - Monocyte percent (%)

Variable Name: LBXMOPCT

SAS Label: Monocyte percent (%)

English Text: Monocyte percent (%)

Target: Both males and females 1 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
1.4 to 29.3	Range of Values	8116	8116	
.	Missing	1049	9165	

LBXNEPCT - Segmented neutrophils percent (%)

Variable Name: LBXNEPCT

SAS Label: Segmented neutrophils percent (%)

English Text: Segmented neutrophils percent (%)

Target: Both males and females 1 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
3.6 to 93.2	Range of Values	8116	8116	
.	Missing	1049	9165	

LBXEOPCT - Eosinophils percent (%)

Variable Name: LBXEOPCT

SAS Label: Eosinophils percent (%)

English Text: Eosinophils percent (%)

Target: Both males and females 1 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0 to 32.2	Range of Values	8116	8116	
.	Missing	1049	9165	

LBXBAPCT - Basophils percent (%)

Variable Name: LBXBAPCT

SAS Label: Basophils percent (%)

English Text: Basophils percent (%)

Target: Both males and females 1 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0.1 to 4	Range of Values	8116	8116	
.	Missing	1049	9165	

LBDLYMNO - Lymphocyte number (1000 cells/uL)

Variable Name: LBDLYMNO

SAS Label: Lymphocyte number (1000 cells/uL)

English Text: Lymphocyte number (1000 cells/uL)

Target: Both males and females 1 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0.2 to 110.8	Range of Values	8116	8116	
.	Missing	1049	9165	

LBDMONO - Monocyte number (1000 cells/uL)

Variable Name: LBDMONO

SAS Label: Monocyte number (1000 cells/uL)

English Text: Monocyte number (1000 cells/uL)

Target: Both males and females 1 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0.1 to 2.6	Range of Values	8116	8116	
.	Missing	1049	9165	

LBDNENO - Segmented neutrophils num (1000 cell/uL)

Variable Name: LBDNENO

SAS Label: Segmented neutrophils num (1000 cell/uL)

English Text: Segmented neutrophils number (1000 cell/uL)

Target: Both males and females 1 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0.3 to 19.4	Range of Values	8116	8116	
.	Missing	1049	9165	

LBDEONO - Eosinophils number (1000 cells/uL)

Variable Name: LBDEONO

SAS Label: Eosinophils number (1000 cells/uL)

English Text: Eosinophils number (1000 cells/uL)

Target: Both males and females 1 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0 to 4.5	Range of Values	8116	8116	
.	Missing	1049	9165	

LBDBANO - Basophils number (1000 cells/uL)

Variable Name: LBDBANO

SAS Label: Basophils number (1000 cells/uL)

English Text: Basophils number (1000 cells/uL)

Target: Both males and females 1 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0 to 0.3	Range of Values	8116	8116	
.	Missing	1049	9165	

LBXRBCSI - Red blood cell count (million cells/uL)

Variable Name: LBXRBCSI

SAS Label: Red blood cell count (million cells/uL)

English Text: Red blood cell count (million cells/uL)

Target: Both males and females 1 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
2.52 to 7.9	Range of Values	8117	8117	
.	Missing	1048	9165	

LBXHGB - Hemoglobin (g/dL)

Variable Name: LBXHGB

SAS Label: Hemoglobin (g/dL)

English Text: Hemoglobin (g/dL)

Target: Both males and females 1 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
6.2 to 19.2	Range of Values	8117	8117	
.	Missing	1048	9165	

LBXHCT - Hematocrit (%)

Variable Name: LBXHCT

SAS Label: Hematocrit (%)

English Text: Hematocrit (%)

Target: Both males and females 1 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
21.8 to 59.1	Range of Values	8117	8117	
.	Missing	1048	9165	

LBXMCVSI - Mean cell volume (fL)

Variable Name: LBXMCVSI

SAS Label: Mean cell volume (fL)

English Text: Mean cell volume (fL)

Target: Both males and females 1 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
50.8 to 115.6	Range of Values	8117	8117	
.	Missing	1048	9165	

LBXMCHSI - Mean Cell Hgb Conc. (g/dL)

Variable Name: LBXMCHSI

SAS Label: Mean Cell Hgb Conc. (g/dL)

English Text: Mean Cell Hemoglobin Concentration (g/dL)

Target: Both males and females 1 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
13.8 to 38.5	Range of Values	8117	8117	
.	Missing	1048	9165	

LBXMCH - Mean cell hemoglobin (pg)

Variable Name: LBXMCH

SAS Label: Mean cell hemoglobin (pg)

English Text: Mean cell hemoglobin (pg)

Target: Both males and females 1 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
.	Missing	9165	9165	

LBXRDW - Red cell distribution width (%)

Variable Name: LBXRDW

SAS Label: Red cell distribution width (%)

English Text: Red cell distribution width (%)

Target: Both males and females 1 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
11.5 to 26.4	Range of Values	8117	8117	
.	Missing	1048	9165	

LBXPLTSI - Platelet count (1000 cells/uL)

Variable Name: LBXPLTSI

SAS Label: Platelet count (1000 cells/uL)

English Text: Platelet count (1000 cells/uL)

Target: Both males and females 1 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
14 to 777	Range of Values	8117	8117	
.	Missing	1048	9165	

LBXMPSI - Mean platelet volume (fL)

Variable Name: LBXMPSI

SAS Label: Mean platelet volume (fL)

English Text: Mean platelet volume (fL)

Target: Both males and females 1 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
5.6 to 15.1	Range of Values	8117	8117	
.	Missing	1048	9165	