National Health and Nutrition Examination Survey

2015-2016 Data Documentation, Codebook, and Frequencies

Cholesterol - Low - Density Lipoprotein (LDL) & Triglycerides (TRIGLY_I)

Data File: TRIGLY_I.xpt

First Published: January 2019

Last Revised: NA

Component Description

The goals of this component are: 1) to monitor the prevalence and trends in major cardiovascular conditions, and overall risk factors in the U.S.; and 2) to evaluate prevention and treatment programs targeting cardiovascular disease in the U.S.

Blood lipid levels are the main elements of the cardiovascular disease laboratory in NHANES. Cardiovascular disease is the leading cause of death in the United States. The data will be used to monitor the status of hyperlipidemia, and the success of the National Cholesterol Education Program.

Eligible Sample

Participants aged 12 years and older who were examined in the morning session were eligible.

Description of Laboratory Methodology

This method is based on the work by Wahlefeld (Roche, 2014) using a lipoprotein lipase from microorganisms for the rapid and complete hydrolysis of triglycerides to glycerol followed by oxidation to dihydroxyacetone phosphate and hydrogen peroxide. The hydrogen peroxide produced then reacts with 4-aminophenazone and 4-chlorophenol under the catalytic action of peroxidase to form a red dyestuff (Trinder endpoint reaction). The color intensity of the red dyestuff formed is directly proportional to the triglyceride concentration and can be measured photometrically.

Triglycerides are fatty acid esters of glycerol that have three hydroxyl groups. Because they are insoluble in water, the triglycerides are transported with other more polar lipids. Elevated triglyceride measurements are associated with diabetes mellitus, pancreatitis, alcoholism, glycogen storage disease, hypothyroidism, nephrosis, pregnancy, use of oral contraceptives and gout. Triglyceride levels are decreased in hyperthyroidism, use of certain lipid-lowering drugs and malabsorption syndrome.

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

Triglycerides (January 2019)

Laboratory Quality Assurance and Monitoring

Serum samples were processed, stored, and shipped to University of Minnesota, Minneapolis, MN for analysis.

Detailed instructions on specimen collection and processing are discussed in the NHANES Laboratory Procedures Manual (LPM). Vials are stored under appropriate frozen (−30°C) conditions until they are shipped to University of Minnesota for testing.

The NHANES quality assurance and quality control protocols (QA/QC) 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 during "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 use of Westgard rules (Westgard, et al. 1981) 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 quarterly. The reports are reviewed for trends or shifts in the data. The laboratories are required to explain any identified areas of concern.

Data Processing and Editing

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

Three derived variables were created in this data file. The variables were created using the following formula:

LBDTRSI

The triglycerides value in mg/dL (LBXTR) was converted to mmol/L (LBDTRSI) by multiplying by 0.01129.

LBDLDL

Serum Low-Density Lipoprotein (LDL)-cholesterol levels were derived on study participants who were examined in the morning session only. The distribution of serum LDL-cholesterol should be estimated only on participants aged 12 and above who fasted at least 8.5 hours or more, but less than 24 hours in the morning session. LDL-cholesterol is calculated from measured values of total cholesterol, triglycerides, and HDL-cholesterol according to the Friedewald calculation:

[LDL-cholesterol] = [total cholesterol] − [HDL-cholesterol] − [triglycerides/5]

where all values are expressed in mg/dL. The calculation is valid for triglycerides less than or equal to 400 mg/dL.

LBDLDLSI

The LDL-cholesterol in mg/dL (LBDLDL) was converted to mmol/L (LBDLDLSI) by multiplying by 0.02586.

Analytic Notes

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

Subsample Weights

Triglycerides were measured in a fasting subsample of participants 12 years and older. Special sample weights are required to analyze these data properly. Specific sample weights for this subsample are included in this data file and should be used when analyzing these data.

Demographic and Other Related Variables

The analysis of NHANES laboratory data must be conducted using the appropriate survey

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

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

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

LBXTR and LBXLDL

Serum levels were measured for participants that were examined in the morning session only. The distribution of serum triglycerides should be estimated only on participants aged 12 and above who fasted at least 8.5 hours or more, but less than 24 hours.

The TRIGLY_I data file contains laboratory test results for triglycerides (LBXTR) using the reference analytic method. However, the NHANES Standard Biochemistry Profile (BIOPRO_I) also includes measurements of triglycerides (LBXSTR). The appropriate variable to use for the most accurate data analysis is **LBXTR** from the TRIGLY_I data file.

Detection Limits

The detection limits were constant for this analyte in the data set. The variable prefixed LBX (ex., LBXTR) provides the analytic result for that analyte.

The lower limit of detection (LLOD, in mg/dL) for triglycerides:

Variable Name	SAS Label	LLOD
LBXTR	Serum Triglycerides	9

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

- Roche Trig/GB reagent package insert. Version 2014-06, V8.0. Roche Diagnostics Inc., 9115 Hague Road Indianapolis, IN 46250-0457.

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

Codebook and Frequencies

SEQN - Respondent sequence number

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

WTSAF2YR - Fasting Subsample 2 Year MEC Weight

Variable Name: WTSAF2YR

SAS Label: Fasting Subsample 2 Year MEC Weight

English Text: Fasting Subsample 2 Year MEC Weight

Target: Both males and females 12 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
13612.331812 to 521632.18583	Range of Values	2743	2743	
0	No Lab Result	448	3191	
.	Missing	0	3191	

LBXTR - Triglyceride (mg/dL)

Variable Name: LBXTR

SAS Label: Triglyceride (mg/dL)

English Text: Triglyceride (mg/dL)

Target: Both males and females 12 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
14 to 2141	Range of Values	2723	2723	
.	Missing	468	3191	

LBDTRSI - Triglyceride (mmol/L)

Variable Name: LBDTRSI

SAS Label: Triglyceride (mmol/L)

English Text: Triglyceride (mmol/L)

Target: Both males and females 12 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0.158 to 24.172	Range of Values	2723	2723	
.	Missing	468	3191	

LBDLDL - LDL-cholesterol (mg/dL)

Variable Name: LBDLDL

SAS Label: LDL-cholesterol (mg/dL)

English Text: LDL-cholesterol (mg/dL)

English Instructions: LBDLDL = ROUND(LBXTC-(LBXHDD+LBXTR/5) for LBXTR less than or equal to 400 mg/dL, and missing for LBXTR greater than 400 mg/dL

Target: Both males and females 12 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
23 to 277	Range of Values	2699	2699	
.	Missing	492	3191	

LBDLDLSI - LDL-cholesterol (mmol/L)

Variable Name: LBDLDLSI

SAS Label: LDL-cholesterol (mmol/L)

English Text: LDL-cholesterol (mmol/L)

Target: Both males and females 12 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0.595 to 7.163	Range of Values	2699	2699	
.	Missing	492	3191	