National Health and Nutrition Examination Survey

2017-March 2020 Data Documentation, Codebook, and Frequencies

High-Sensitivity C-Reactive Protein (P_HSCRP)

Data File: P_HSCRP.xpt

First Published: August 2021

Last Revised: NA

Component Description

The NHANES program suspended field operations in March 2020 due to the coronavirus disease 2019 (COVID-19) pandemic. As a result, data collection for the NHANES 2019-2020 cycle was not completed and the collected data are not nationally representative. Therefore, data collected from 2019 to March 2020 were combined with data from the NHANES 2017-2018 cycle to form a nationally representative sample of NHANES 2017-March 2020 pre-pandemic data. These data are available to the public. Please refer to the Analytic Notes section for more details on the use of the data.

C-reactive protein (CRP) is an acute phase protein synthesized in the liver. It is involved in the activation of complement, enhancement of phagocytosis, and detoxification of substances released from damaged tissue. It is one of the most sensitive, though nonspecific, indicators of inflammation. CRP levels may rise within six hours of an inflammatory stimulus. Measurement of CRP concentrations by this highly sensitive method is performed primarily to ascertain the level of cardiovascular disease risk in individuals who have no existing inflammatory conditions. Increases in CRP concentration are non-specific and should be used in conjunction with traditional clinical laboratory evaluation of acute coronary syndromes.

Eligible Sample

All examined participants aged 1 year and older, in the NHANES 2017-March 2020 pre-pandemic sample, were eligible.

Description of Laboratory Methodology

This is a two-reagent, immunoturbidimetric system. The specimen is first combined with a Tris buffer, then incubated. The second reagent (latex particles coated with mouse anti-human CRP antibodies) is then added. In the presence of circulating CRP the latex particles aggregate, forming immune complexes. These complexes cause an increase in light scattering that is proportional to the CRP concentration. The light absorbance resulting from this light scatter is read against a stored CRP standard curve. The concentration of CRP is determined from this line. Turbidity is measured at a primary wavelength of 546 nm (secondary wavelength 800 nm).

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

Laboratory Method Files

HS-CRP Laboratory Procedure Manual (February 2020)

HS-CRP Laboratory Procedure Manual (August 2021)

Laboratory Quality Assurance and Monitoring

Serum specimens are processed, stored, and shipped to the University of Minnesota – Advanced Research Diagnostics Laboratory (ARDL), Minneapolis, MN for analysis.

Detailed instructions on specimen collection and processing are discussed in the NHANES 2017-2018 and 2019-2020 Laboratory Procedures Manuals (LPMs). Vials were stored under appropriate frozen (–30°C)

conditions until they were shipped to the University of Minnesota for testing.

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

Mobile Examination Centers (MECs)

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

Analytical Laboratories

NHANES uses several methods to monitor the quality of the analyses performed by the contract laboratories. In the MEC, these methods include performing blind split samples collected 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 testing NHANES specimens. Progress reports containing any problems encountered during shipping or receipt of specimens, summary statistics for each control pool, QC graphs, instrument calibration, reagents, and any special considerations are submitted to NCHS quarterly. The reports are reviewed for trends or shifts in the data. The laboratories are required to explain any identified areas of concern.

Data Processing and Editing

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

Analytic Notes

The COVID-19 pandemic required suspension of NHANES 2019-2020 field operations in March 2020 after data were collected in 18 of the 30 survey locations in the 2019-2020 sample. Data collection was cancelled for the remaining 12 locations. Because the collected data from 18 locations were not nationally representative, these data were combined with data from the previous cycle (2017-2018) to create a 2017-March 2020 pre-pandemic data file. A special weighting process was applied to the 2017-March 2020 pre-pandemic data file. The resulting sample weights in the present file should be used to calculate estimates from the combined cycles. These sample weights are not appropriate for independent analyses of the 2019-2020 data and will not yield nationally representative results for either the 2017-2018 data alone or the 2019-March 2020 data alone. Please refer to the NHANES website for additional information for the NHANES 2017-March 2020 pre-pandemic data, and for the previous 2017-2018 public use data file with specific weights for that 2-year cycle.

Refer to the 2017-2018 and 2019-2020 Laboratory Data Overview documents for general information on NHANES laboratory data.

There are over 800 laboratory tests performed on NHANES participants. However, not all participants provided biospecimens or enough volume for all the tests to be performed. The specimen availability can also vary by age or other population characteristics. For example, in 2017 - March 2020, approximately 76% of children aged 1-17 years who were examined in the MEC provided a blood specimen through phlebotomy, while 95% of examined adults age 18 and older provided a blood specimen. Analysts should evaluate the extent of missing data in the dataset related to the outcome of interest as well as any predictor variables used in the analyses to determine whether additional re-weighting for item non-response is necessary.

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

Demographic and Other Related Variables

The analysis of NHANES laboratory data must be conducted using the appropriate survey design and demographic variables. The NHANES 2017-March 2020 Pre-pandemic DemographicsFile contains demographic data, health indicators, and other related information collected during household interviews as well as the sample design variables. The recommended procedure for variance estimation requires use of stratum and PSU variables (SDMVSTRA and SDMVPSU, respectively) in the demographic data file.

The 2017-March 2020 Pre-pandemic Fasting Questionnaire File includes auxiliary information, such as fasting status, length of fast and the time of venipuncture.

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

Detection Limits

The detection limit was constant for the analyte in the data set. Two variables are provided for this analyte. The variable name ending in “LC” (ex., LBDHRPLC) indicates whether the result was below the limit of detection: the value “0” means that the result was at or above the limit of detection, “1” indicates that the result was below the limit of detection. For the analyte with analytic results below the lower limit of detection (LBDHRPLC=1), an imputed fill value was placed in the analyte results field. This value is the lower limit of detection divided by square root of 2 (LLOD/sqrt [2]). The variable prefixed LBX (ex., LBXHSCRP) provides the analytic result for that analyte.

The lower limit of detection (LLOD, in mg/L) for High-Sensitivity C-Reactive Protein:

Variable Name	Analyte Description	LLOD
LBXHSCRP	High Sensitivity C-Reactive Protein (mg/L)	0.15

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.

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

LBXHSCRP - HS C-Reactive Protein (mg/L)

Variable Name: LBXHSCRP

SAS Label: HS C-Reactive Protein (mg/L)

English Text: High-Sensitivity C-Reactive Protein (hs-CRP) (mg/L)

Target: Both males and females 1 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0.11 to 246.86	Range of Values	11614	11614	
.	Missing	2158	13772	

LBDHRPLC - HS C-Reactive Protein Comment Code

Variable Name: LBDHRPLC

SAS Label: HS C-Reactive Protein Comment Code

English Text: High-Sensitivity C-Reactive Protein (hs-CRP) Comment Code

Target: Both males and females 1 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0	At or above detection limit	11216	11216	
1	Below lower detection limit	398	11614	
.	Missing	2158	13772	