National Health and Nutrition Examination Survey

2017-March 2020 Data Documentation, Codebook, and Frequencies

Cytomegalovirus IgG & IgM Antibodies - Serum (P_CMV)

Data File: P_CMV.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.

Cytomegalovirus (CMV) is a herpes virus, which can be a serious pathogen in infants and adults. CMV usually does not cause significant disease in healthy individuals, but pregnant women can transmit CMV to their unborn babies, who are then at risk. Congenital CMV infection is a significant source of morbidity among children, causing a wide range of clinical outcomes including jaundice, hydrocephalia, hearing loss, ocular lesions, and even death. Currently, about one out of every 200 babies are born with congenital CMV infection each year.

In the United States, one in three children are already infected with CMV by age five. Young children with CMV infection shed the virus in high titers and are a major source of transmission to other susceptible children and adults, which is of special concern for pregnant women. For this reason, characterizing infection among children less than 6 years old is essential to expanding our understanding of important transmission exposures, mainly breastfeeding and close contact during childcare, and patterns of primary and recurrent infections. Such information would inform the development of prevention strategies to protect vulnerable populations, including pregnant women and their fetuses.

Additionally, young children have been identified as a potential target population for CMV vaccine development, recently ranked of highest priority by the Institute of Medicine. Describing the serological profile of children under the age of 6 would improve our understanding of immunity during early childhood and facilitate vaccine development.

Eligible Sample

All examined participants aged 1 to 5 years, in the NHANES 2017-March 2020 pre-pandemic sample, were eligible.

Description of Laboratory Methodology

CMV Immunoglobulin G (IgG) antibodies are detected by enzyme-linked fluorescent immunoassay (ELFA) in a semiquantitative-automated manner, using the VIDAS CMV method designed by Biomerieux. All NHANES specimen numbers were scanned by the barcode reader. The VIDAS instrument reads the specimen reactivity of each sample and assigns numeric values.

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

Laboratory Method Files

Cytomegalovirus (CMV) serology (IgG, IgM, and avidity) (February 2020)

Cytomegalovirus (CMV) serology Lab Procedure Manual (August 2021)

Laboratory Quality Assurance and Monitoring

Serum specimens were processed, stored, and shipped to the National Center for Infectious Diseases, Centers for Disease Control and Prevention, Atlanta, GA for analysis.

Detailed instructions on specimen collection and processing instructions are discussed in the NHANES 2017-2018 and 2019-2020 Laboratory Procedures Manuals (LPMs). Vials were stored under appropriate frozen (-30^{o}C) conditions until they were shipped to the National Center for Infectious Diseases 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 QC 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 and 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 2019-2020, approximately 71% of children aged 1-17 years who were examined in the MEC provided a blood specimen through phlebotomy, while 94% 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 details on the use of sample weights and 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 2017-March2020 Pre-pandemic 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 data file.

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

Detection Limits

Since this data is reported as qualitative data, the use of lower limit of detections (LLODs) isn't applicable.

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 - 5 YEARS

LBXIGG - Cytomegalovirus (CMV) IgG

Variable Name: LBXIGG

SAS Label: Cytomegalovirus (CMV) IgG

English Text: Cytomegalovirus (CMV) IgG

Target: Both males and females 1 YEARS - 5 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
1	positive	267	267	
2	negative	688	955	
3	indeterminate	2	957	
.	Missing	617	1574	

LBXIGM - Cytomegalovirus (CMV) IgM

Variable Name: LBXIGM

SAS Label: Cytomegalovirus (CMV) IgM

English Text: Cytomegalovirus (CMV) IgM

Target: Both males and females 1 YEARS - 5 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
1	positive	7	7	
2	negative	936	943	
3	indeterminate	14	957	
.	Missing	617	1574	

LBXIGGA - Cytomegalovirus (CMV) IgG avidity

Variable Name: LBXIGGA

SAS Label: Cytomegalovirus (CMV) IgG avidity

English Text: Cytomegalovirus (CMV) IgG avidity

Target: Both males and females 1 YEARS - 5 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
1	low	22	22	
2	high	231	253	
3	indeterminate	14	267	
.	Missing	1307	1574	