# National Health and Nutrition Examination Survey

## 2017-March 2020 Data Documentation, Codebook, and Frequencies

## Alpha-1-Acid Glycoprotein - Serum (Surplus) (P_SSAGP)

**Data File: P_SSAGP.xpt**

**First Published: June 2024**

**Last Revised: NA**

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## 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.

Alpha-1-acid glycoprotein (AGP; also called orosomucoid) is synthesized in the liver and structurally belongs to the lipocalin superfamily of secretory proteins, such as retinol-binding protein and α1-microglobulin. It is made up of a polypeptide chain having 5 carbohydrate chains N-glycosidically bonded to it (molar mass of 41,000 daltons).

AGP is a sensitive acute phase reactant and its concentration can increase by a factor of 3 within 24-48 hours when inflammation occurs. It can also be used to differentiate between acute phase reactions (elevated serum level) and estrogen effects (normal or decreased serum level); whereas, the serum level of other positive reactants, such as ceruloplasmin and haptoglobin, increases during such reactions. Moderate and isolated increases occur when glomerular filtration is inhibited in the early stages of uremia. The determination is used in the assessment of the activity of acute and recurring inflammations as well as of tumors with cell necrosis (Schmid, 1975).

## Eligible Sample

Examined participants aged 3-5 years and females aged 12-49 years were eligible.

## Description of Laboratory Methodology

The Tina-quant Roche AAGP2 assay is based on the principle of immunological agglutination. Anti-α1-acid glycoprotein antibodies react with antigen in the sample to form an antigen/antibody complex. Following agglutination, this is measured turbidimetrically (AAGP2 Tina-quant α1-Acid Glycoprotein Gen.2 [package insert]).

There were no changes to the lab method, lab equipment, or lab site for this component in the NHANES 2017-March 2020 cycle.

## Laboratory Quality Assurance and Monitoring

The laboratory and method were certified according to the Clinical Laboratory Improvement Amendment (1988) guidelines (Clinical Laboratory Improvement Amendment, 1988). Either in-house prepared serum quality control (QC) pools at three levels or Roche QC pools at two levels were analyzed in every run in duplicate and evaluated for validity against pre-established means and control limits by use of a multi-rule

quality control program (Caudill et. al., 2008).

Performance of QC pools during the study period:

| QC Pool | Analyte | n | Mean (g/L) | SD (g/L) | CV (%) | Difference to target (%) |
|---|---|---|---|---|---|---|
| LS17523_b | AGP | 24 | 0.517 | 0.02 | 4.5 | -0.81 |
| LS17523_c | AGP | 37 | 0.516 | 0.03 | 4.9 | 0.60 |
| MS17524_b | AGP | 24 | 0.954 | 0.03 | 3.3 | -0.56 |
| MS17524_c | AGP | 37 | 0.939 | 0.02 | 2.5 | 0.45 |
| HS17525_b | AGP | 24 | 2.064 | 0.03 | 1.5 | -0.63 |
| HS17525_c | AGP | 37 | 2.026 | 0.04 | 1.8 | -0.52 |
| PNP_50538700 | AGP | 12 | 0.681 | 0.03 | 4.0 | -0.87 |
| PPP_50539400 | AGP | 12 | 1.299 | 0.03 | 2.0 | -5.87 |
| PNP_59413100 | AGP | 26 | 0.668 | 0.03 | 4.0 | -4.57 |
| PPP_59413200 | AGP | 26 | 1.237 | 0.03 | 2.2 | -4.85 |

The method achieved satisfactory performance using the Institute for Reference Materials and Measurements (IRMM) lyophilized human serum reference material ERM-DA470k, which has a certified AGP value of 0.617 g/L as measured by various methods using ERM-D470 as calibrant. The mean recovery of AGP in ERM-DA470k spiked into CFAS protein material was 91.5% (1:2 dilution), 93.2% (1:4 dilution), and 91.3% (1:8 dilution) during 9 measurements performed between 2020 and 2023. When averaged across dilutions, the mean recovery by year was 96.6% (2020), 91.5% (2021), 87.7% (2022), and 95.6% (2023). This procedure was adopted to avoid matrix effects that were observed when the reference material was diluted with Roche diluent, saline, or water and showed significant under-recovery.

The current project did not use pristine (never thawed) samples, because the laboratory showed that multiple freeze/thawing cycles do not cause a noticeable loss of AGP; and AGP can be assessed in residual serum as long as the specimens have been stored frozen at -70C.

## Data Processing and Editing

Data were received after all the laboratory testing was complete. The data were not edited for extreme values.

## 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 surplus specimens 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 Overviews 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. Additionally, availability of

specimens for surplus projects is lower than for other laboratory tests performed on NHANES participants. The specimen availability can also vary by age or other population characteristics. 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 Tutorialfor details on the use of sample weights and analytic issues.

**Subsample Weights**

The analytes included in this dataset were measured in a participants aged 3-5 years and females aged 12-49 years. Special sample weights are required to analyze these data properly. Specific sample weights for this subsample, WTSSAGPP, are included in this data file and should be used when analyzing these data. The sample weights created for this file used the examination sample weight, i.e., WTMECPRP, as the base weight. The base weight was adjusted for additional nonresponse to these lab tests and re-poststratified to the population total using sex, age, and race/Hispanic origin. Participants who were part of the eligible population but who did not provide a serum specimen, or did not have sufficient volume of biospecimens, or who did not give consent for their specimens to be used for future research are included in the file, but they have a sample weight assigned “0” in their records.

**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 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**

The detection limits were constant for all of the analytes in the data set. No results were below the lower limit of detection. The lower limit of detection (LLOD in g/L) for SSAGP:

| Variable Name | Analyte Name | LLOD |
|---|---|---|
| SSAGP | Alpha-1-Acid Glycoprotein (g/L) | 0.1 |

## References


- AAGP2 Tina-quant α1-Acid Glycoprotein Gen.2 [package insert]. Indianapolis, IN. Roche Diagnostics. 2014-11, V 9.0.
- Caudill S.P., Schleicher R.L., Pirkle J.L. Multi-rule quality control for the age-related eye disease study. Stat. Med. (2008) 27(20):4094-4106.
- Clinical Laboratory Improvement Amendment. Pub. L. 100-578. 1988. (Oct. 31, 1988).
- Schmid K. α1-Acid glycoprotein. In: Putnam FW, ed. *The Plasma Proteins, 2nd ed.* New York, NY: Academic Press; 1975:183-228.

## 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 3 YEARS - 5 YEARS |
| **Target:** | Females only 12 YEARS - 49 YEARS |

# WTSSAGPP - Surplus specimen AGP weights prepandemic

**Variable Name:** WTSSAGPP

**SAS Label:** Surplus specimen AGP weights prepandemic

**English Text:** Surplus specimen AGP weights pre-pandemic

**Target:** Both males and females 3 YEARS - 5 YEARS

**Target:** Females only 12 YEARS - 49 YEARS

| Code or Value | Value Description | Count | Cumulative | Skip to Item |
|---|---|---|---|---|
| 0 to 297408.07273 | Range of Values | 3823 | 3823 | |
| . | Missing | 0 | 3823 | |

# SSAGP - Alpha-1-Acid Glycoprotein (g/L)

**Variable Name:** SSAGP

**SAS Label:** Alpha-1-Acid Glycoprotein (g/L)

**English Text:** Alpha-1-Acid Glycoprotein (g/L)

**Target:** Both males and females 3 YEARS - 5 YEARS

**Target:** Females only 12 YEARS - 49 YEARS

| Code or Value | Value Description | Count | Cumulative | Skip to Item |
|---|---|---|---|---|
| 0.23 to 2.07 | Range of Values | 2717 | 2717 | |
| . | Missing | 1106 | 3823 | |