National Health and Nutrition Examination Survey 2005–2006

Documentation, Codebook, and Frequencies

Glycohemoglobin

Laboratory

Survey Years:
2005 to 2006

SAS Transport File:
GHB_D.XPT

January 2008

NHANES 2005–2006 Data Documentation

Laboratory Assessment: Glycohemoglobin (GHB_d)

First Published: January 2008 **Last Revised:** N/A

Component Description

Diabetes mellitus will be assessed by measures of blood glycohemoglobin, fasting plasma glucose, 2-hour glucose (Oral Glucose Tolerance Test), serum insulin in participants aged 12 years and over.

Glycohemoglobin measures are available for a full sample. Measures of fasting plasma glucose, 2-hour glucose and serum insulin were measured in the morning examination session only.

Diabetes is a leading cause of disease and death in the United States. Eight million Americans are known to have diabetes, and an approximately equal number have undiagnosed diabetes. In 1993, nearly 18 percent of all deaths for persons over the age of 25 were among people with diabetes. The prevalence of diabetes and overweight (one of the major risk factors for diabetes) continue to increase. Substantial new efforts to prevent or control diabetes have begun, including the Diabetes Prevention Trial and the National Diabetes Education Program.

Diabetes testing provides population data to: 1) determine a national estimate of diabetes disease prevalence (diagnosed and undiagnosed), 2) identify the risk factors of diabetes disease; 3) permit a national cohort to be established for follow-up studies of this condition; and 4) provide critical information to clinicians and public health officials for the development of preventive care and community-based interventions.

Eligible Sample

Participants aged 12 years and older were tested.

Description of Laboratory Methodology

In this assay, the stable (SA1c) and labile (LA1c) A1c forms can be individually resolved on the chromatogram without manual pretreatment, allowing accurate measurement of the stable form of HbA1c. The analyzer dilutes the whole blood specimen with a hemolysis solution, and then injects a small volume of the treated specimen onto the HPLC analytical column. Separation is achieved by utilizing differences in ionic interactions between the cation exchange

group on the column resin surface and the hemoglobin components. The hemoglobin fractions (A1c, A1b, F, LA1c, SA1c, A0 and H-Var) are subsequently removed from the column material by step-wise elution using elution buffers each with a different salt concentration. The separated hemoglobin components pass through the photometer flow cell where the analyzer measures changes in absorbance at 415 nm. The analyzer integrates and reduces the raw data, and then calculates the relative percentages of each hemoglobin fraction. Analysis requires three minutes.

A detailed description of the laboratory method used can be found at NHANES web page in the Laboratory Procedures Manual.

Laboratory Quality Control and Monitoring

The NHANES quality control and quality assurance protocols (QA/QC) meet the 1988 Clinical Laboratory Improvement Act (CLIA) mandates. Detailed quality control and quality assurance instructions are discussed in the NHANES Laboratory/Medical Technologists Procedures Manual (LPM). Read the LABDOC file for detailed QA/QC protocols.

There were changes to the equipment and lab site from the previous 6 years. Glycohemoglobin measurements for NHANES 1999-2004 were performed by the Diabetes Diagnostic Laboratory at the University of Missouri-Columbia using Primus CLC330 and Primus CLC 385 (Primus Corporation, Kansas City, MO). Glycohemoglobin measurements for NHANES 2005-2006 were performed by the Diabetes Laboratory at the University of Minnesota using Tosoh A1c 2.2 Plus Glycohemoglobin Analyzer (Tosoh Medics, Inc., San Francisco, CA). Both assays use a High Performance Liquid Chromatography (HPLC) system.

Analytic Notes

Glycohemoglobin regression equation to compare 2005-2006 data to 2003-2004 data:

A crossover study was performed to compare the 2005-2006 Tosoh method to the 2003-2004 Primus method. A Deming regression analysis was done and the following regression was obtained:

Y(Primus) = 0.4892 + 0.9277X(Tosoh), n=207, r=0.980.

This regression may be used to trend the glycohemoglobin data.

NHANES 2005-2006 Survey Design:

The analysis of NHANES 2005-2006 laboratory data must be conducted with the key survey design and basic demographic variables. The NHANES 2005-2006 Household Questionnaire Data Files contain demographic data, health indicators, and other related information collected during household interviews. They also contain all survey design variables and sample weights for these age groups. The phlebotomy file includes auxiliary information such as the conditions precluding venipuncture. The household questionnaire and phlebotomy files may be linked to the laboratory data file using the unique survey participant identifier SEQN.

References

1. Tosoh A1c 2.2 Plus Operator's Manual, 1998. PN 990228 Version 1.2. Tosoh Medics, Inc., 347 South San Francisco, CA 94080.

2. Tosoh A1c 2.2 Plus Glycohemoglobin Assay Application Instruction Guide, 1998. PN 990233 Version 1.2. Tosoh Medics, Inc.

3. Trivelli LA, Ranney HM, Lai H-T. Hemoglobin components in patients with diabetes mellitus. NEJM 1971; 284(7):353.

4. Bunn HF, Gabbay KH, Gallop PM. The glycosylation of hemoglobin: relevance to diabetes mellitus. Science 1678; 200:21-7.

5. Cerami A, Koenig RJ. Hemoglobin a1c as a model for the development of sequelae of diabetes mellitus. TIBS 1978; Apr:73.

6. Steffes M, Cleary P, Goldstein D, et al. Hemoglobin A1c Measurements over Nearly Two Decades: Sustaining Comparable Values throughout the Diabetes Control and Complications Trial and the Epidemiology of Diabetes Interventions and Complications Study. Clin Chem 2005; 51:4.

NCHS Locator Fields

Title: Glycohemoglobin

Contact Number: 1-866-441-NCHS

Years of Content: 2005–2006

First Published: January 2008

Last Revised: N/A

Access Constraints: None

Use Constraints: None

Geographic Coverage: National

Subject: Glycohemoglobin, Diabetes

Record Source: NHANES 2005–2006

Survey Methodology: NHANES 2005–2006 is a stratified multistage probability sample of the civilian non-institutionalized population of the U.S.

Medium: NHANES Web site; SAS transport files

National Health and Nutrition Examination Survey
Codebook for Data Production (2005-2006)

Glycohemoglobin (GHB_D)
Person Level Data

January 2008

SEQN	Target
	B(12 Yrs. to 150 Yrs.)
Hard Edits	**SAS Label**
	Respondent sequence number
English Text: Respondent sequence number.	
English Instructions:	

LBXGH	Target
	B(12 Yrs. to 150 Yrs.)
Hard Edits	**SAS Label**
	Glycohemoglobin (%)
English Text: Glycohemoglobin (%)	
English Instructions:	

Code or Value	Description	Count	Cumulative	Skip to Item
3.8 to 15.6	Range of Values	6493	6493	
.	Missing	487	6980	