NHANES 1999-2000 Public Release Dataset- September 2003

Laboratory 10AM – Glucose, Insulin, and C-peptide

Description

Glucose, Insulin, and C-peptide
Diabetes mellitus will be assessed by measures of plasma glucose, insulin, and c-peptide in participants aged 12 years and over 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 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.

Information on the prevalence of diabetes disease, especially in its early stages, and associated risk factors will be used to help develop early intervention and prevention programs for the disabling consequences of this condition. Specifically, the diabetes disease examination will provide population data to: 1) determine a national estimate of diabetes disease prevalence (diagnosed and undiagnosed), including those at high risk for the late complications of the disease (i.e., ulceration and amputation); 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 who do not meet any of the exclusion criteria.

Data Collection Methods

Blood specimens are processed, stored, and shipped to the University of Missouri-Columbia for analysis.

Examination Protocol

Detailed specimen collection and processing instructions are discussed in the NHANES Laboratory/Medical Technologists Procedures Manual (LPM). Vials are stored under appropriate frozen (- 20 degrees Centigrade) conditions until they are shipped to University of Missouri-Columbia for testing.

Analytic Methodology

Glucose

The enzyme hexokinase (HK) catalyzes the reaction between glucose and adenosine triphosphate (ATP) to form glucose-6-phosphate (G-6-P) and adenosine diphosphate (ADP). In the presence of nicotinamide adenine dinucleotide (NAD), G-6-P is oxidized by the enzyme glucose-6-phosphate dehydrogenase (G-6-PD) to 6-phosphogluconate and reduced nicotinamide adenine dinucleotide (NADH). The increase in NADH concentration is directly proportional to the glucose concentration and can be measured spectrophotometrically at 340 nm.

Insulin

Insulin radioimmunoassay (RIA) is a double-antibody batch method. Insulin in the specimen competes with a fixed amount of ^{125}I-labelled insulin for the binding sites of the specific insulin antibodies. Adding a second antibody, centrifuging, and decanting separate bound and free insulin. The radioactivity in the pellet is then measured. The radioactivity is inversely proportional to the quantity of insulin in the specimen.

C-peptide

C-peptide radioimmunoassay (RIA) is a competitive assay where ^{125}I-labelled C-peptide competes with C-peptide in the specimen for antibody sites. Adding a second PEG-accelerated double antibody separates bound and free C-peptide. The antibody-bound fraction is precipitated and counted. The radioactivity is inversely proportional to the quantity of insulin in the specimen.

Analytic Notes

LBXGLU and LBXGLUSI: Plasma glucose; LBXCPSI: C-peptide; LBXIN and LBXINSI: Insulin

The Diabetes Diagnostic Laboratory at the University of Missouri, Columbia measure plasma glucose, serum c-peptide and insulin on participants aged 12 years and older.

Measures of plasma glucose, insulin, and c-peptide are assessed in participants aged 12 years and over in the morning examination session only.

The Laboratory 10 Data File which contains laboratory test results for glucose (LBXGLU) is measured using the reference analytic method. However, the lab 18 biochemistry profiles also included measurements of this analyte. These serum glucose values(LBXSGL) reported in this first data release should not be used to determine

undiagnosed diabetes or prediabetes. Instead, plasma glucose values (LBXGLU) should be used based on the reference analytic method of this analyte.

Sample Weights
Use the full sample morning fasting sample weight (WTSAM2YR) and the jackknife replicate morning fasting sample weights (WTSAM01-WTSAM52) for glucose, insulin, and C-peptide.

The full sample weights are used to estimate means, percentages, medians and other percentiles and regression coefficients.

The 52 jackknife replicate weights are used to estimate standard errors of these statistics.

Special Notes for this Dataset

The analysis of NHANES 1999-2000 laboratory data must be conducted with the key survey design and basic demographic variables. The NHANES 1999-2000 Household Questionnaire Data Files contain demographic data, health indicators, and other related information collected during household interviews. The Household Questionnaire Data Files also contain all survey design variables and sample weights required to analyze these data. The Phlebotomy Examination file includes auxiliary information on duration of fasting, the time of day of the venipuncture, and the conditions precluding venipuncture. The Household Questionnaire and Phlebotomy Exam files may be linked to the laboratory data file using the unique survey participant identifier SEQN.