

National Health and Nutrition Examination Survey 2003-2004

Documentation, Codebook, and Frequencies

MEC Laboratory Component: RBC
Folate, Serum Folate, and
Vitamin B12

Survey Years:
2003 to 2004

SAS Export File:
L06NB_C.XPT



First Published: June 2006
Last Revised: N/A

NHANES 2003–2004 Data Documentation

Laboratory Assessment: Lab 6 –RBC Folate, Serum Folate, and Vitamin B12

Years of Coverage: 2003–2004

First Published: June 2006

Last Revised: N/A

Component Description

RBC Folate, Serum Folate, and Vitamin B12

The objectives of this component are: 1) to provide data for monitoring secular trends in measures of nutritional status in the U.S. population; 2) to evaluate the effect of people's habits and behaviors such as physical activity and the use of alcohol, tobacco, and dietary supplements on people's nutritional status; and 3) to evaluate the effect of changes in nutrition and public health policies including welfare reform legislation, food fortification policy, and child nutrition programs on the nutritional status of the U.S. population. These data will be used to estimate deficiencies and toxicities of specific nutrients in the population and subgroups, to provide population reference data, and to estimate the contribution of diet, supplements, and other factors to serum levels of nutrients. Data will be used for research to further define nutrient requirements as well as optimal levels for disease prevention and health promotion.

Eligible Sample

RBC Folate, Serum Folate, and Vitamin B12

Participants aged 1 year and older who do not meet any of the exclusion criteria are eligible.

Description of Laboratory Methodology

RBC Folate, Serum Folate, and Vitamin B12

Both serum folate and vitamin B12 are measured by using the Bio-Rad Laboratories "Quantaphase II Folate/Vitamin B12" radioassay kit. The assay is performed by combining serum or a whole blood hemolysate sample with ¹²⁵I-folate and ⁵⁷Co-vitamin B12 in a solution containing dithiothreitol (DTT) and cyanide. The mixture is boiled to inactivate endogenous folate-binding proteins and to convert the various forms of vitamin B12 to cyanocobalamin. The reduced folate and its analogs are stabilized by DTT during the heating. The mixture is cooled and then combined with immobilized affinity-purified porcine intrinsic factor and folate-binding proteins. The addition of these substances adjusts and buffers the pH of the reaction mixture to 9.2. The reaction mixture is then incubated for 1 hour at room temperature.

During incubation, the endogenous and labeled folate and B12 compete

for the limited number of binding sites on the basis of their relative concentrations. The reaction mixtures are then centrifuged and decanted. Labeled and unlabeled folate and vitamin B12, binding to immobilized binding proteins, are concentrated in the bottom of the tube in the form of a pellet. The unbound folate and B12 in the supernatant are discarded, and the radioactivity associated with the pellet is counted. Standard curves are prepared by using the pre-calibrated folate/B12 standards in a human serum albumin base. The concentration of the folate and vitamin B12 in the participant's serum or folate in a participant's whole blood is calculated from the standard curve.

In the erythrocyte folate procedure, the sample is first diluted 1:11 with a solution of 1 g/dL ascorbic acid in water and either incubated for 90 min prior to assay or frozen immediately for later assay. The 90-min incubation or the freeze-thaw is necessary for hemolysis of the red blood cells; either allows the endogenous folate conjugates to hydrolyze the conjugated pterylpolyglutamates prior to assay. The sample is further diluted 1:2 with a protein diluent (human serum albumin), resulting in a matrix similar to that of the standards and serum samples.

There were no changes to the equipment or lab site from the previous 2 years.

A detailed description of the laboratory method used can be found on the NHANES website.

Laboratory Quality Control and Monitoring

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 Laboratory/Medical Technologists Procedures Manual (LPM). Read the LABDOC file for detailed QA/QC protocols.

A detailed description of the quality assurance and quality control procedures can be found on the NHANES website.

Data Processing and Editing

Serum specimens are processed, stored, and shipped to the Division of Environmental Health Laboratory Sciences, National Center for Environmental Health, Centers for Disease Control and Prevention for analysis.

Detailed specimen collection and processing instructions are discussed in the NHANES LPM. Vials are stored under appropriate frozen (-20°C)

conditions until they are shipped to National Center for Environmental Health for testing.

This file contains no top coding.

Three derived variables were created in this data file. The formula for their derivation is as follows:

The vitamin B12 in pg/mL was converted to pmol/L by multiplying by 0.738.

The serum folate in ng/mL was converted to nmol/L by multiplying by 2.265.

The RBC folate in ng/mL RBC was converted to nmol/L RBC by multiplying by 2.265.

Detailed instructions on specimen collection and processing can be found on the NHANES website.

Analytic Notes The analysis of NHANES 2003–2004 laboratory data must be conducted with the key survey design and basic demographic variables. The NHANES 2003–2004 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.

References N/A

Locator Fields

Title: RBC Folate, Serum Folate, and Vitamin B12

Contact Number: 1-866-441-NCHS

Years of Content: 2003–2004

First Published: June 2006

Revised: N/A

Access Constraints: None

Use Constraints: None

Geographic Coverage: National

Subject: RBC Folate, Serum Folate, and Vitamin B12

Record Source: NHANES 2003–2004

Survey Methodology: NHANES 2003–2004 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 (2003-2004)**

**RBC Folate, Serum Folate, and Vitamin B12
(L06NB_C)**

Person Level Data

First Published: June 2006

Last Revised: N/A



SEQN	Target
	B(1 Yrs. to 150 Yrs.)
Hard Edits	SAS Label
	Respondent sequence number
English Text: Respondent sequence number.	
English Instructions:	

LBXRBF	Target			
	B(1 Yrs. to 150 Yrs.)			
Hard Edits	SAS Label			
	Folate, RBC (ng/mL RBC)			
English Text: Folate, RBC (ng/mL RBC)				
English Instructions:				
Code or Value	Description	Count	Cumulative	Skip to Item
18 to 1901	Range of Values	8296	8296	
.	Missing	883	9179	

LBDRBFSI	Target			
	B(1 Yrs. to 150 Yrs.)			
Hard Edits	SAS Label			
	Folate, RBC (nmol/L RBC)			
English Text: Folate, RBC (nmol/L RBC)				
English Instructions:				
Code or Value	Description	Count	Cumulative	Skip to Item
40.8 to 4305.8	Range of Values	8296	8296	
.	Missing	883	9179	

LBXB12	Target			
	B(1 Yrs. to 150 Yrs.)			
Hard Edits	SAS Label			
	Vitamin B12, serum (pg/mL)			
English Text: Vitamin B12, serum (pg/mL)				
English Instructions:				
Code or Value	Description	Count	Cumulative	Skip to Item
34 to 34254	Range of Values	8267	8267	
.	Missing	912	9179	

LBDB12SI	Target			
	B(1 Yrs. to 150 Yrs.)			
Hard Edits	SAS Label			
	Vitamin B12, serum (pmol/L)			
English Text: Vitamin B12, serum (pmol/L)				
English Instructions:				
Code or Value	Description	Count	Cumulative	Skip to Item
25.09 to 25279.45	Range of Values	8267	8267	
.	Missing	912	9179	

LBXFOL	Target			
	B(1 Yrs. to 150 Yrs.)			
Hard Edits	SAS Label			
	Folate, serum (ng/mL)			
English Text: Folate, serum (ng/mL)				
English Instructions:				
Code or Value	Description	Count	Cumulative	Skip to Item
2 to 689	Range of Values	8268	8268	
.	Missing	911	9179	

LBDFOLSI	Target			
	B(1 Yrs. to 150 Yrs.)			
Hard Edits	SAS Label			
	Folate, serum (nmol/L)			
English Text: Folate, serum (nmol/L)				
English Instructions:				
Code or Value	Description	Count	Cumulative	Skip to Item
4.5 to 1560.6	Range of Values	8268	8268	
.	Missing	911	9179	