ICPSR 25501

National Health and Nutrition Examination Survey (NHANES), 1999-2000

United States Department of Health and Human Services. Centers for Disease Control and Prevention. National Center for Health Statistics

NCHS Questionnaire: Examination and Laboratory

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Dietary Interview

24-hour Dietary Recall Interview

Public Health Objectives:

Dietary factors are associated with 5 of the 10 leading causes of death in the U.S. population. NHANES is the cornerstone of the National Nutrition Monitoring and Related Research Program (NNMRRP). Policy makers and researchers require NHANES dietary data to assess the quality and adequacy of the U.S. diet in relation to health parameters, to evaluate the impact of program changes including welfare reform, legislation, food fortification policy, and child nutrition programs, and to identify target groups for public health education and awareness programs. Dietary practices and behaviors are used to evaluate the adoption of the *Dietary Guidelines for Americans* and *Five-a-Day Program* recommendations.

The objectives of the component are to estimate total intake of food energy (calories), nutrients, and non-nutrient food components from foods and beverages that were consumed during the 24-hour period (midnight to midnight) prior to the MEC examination. A short set of questions will be administered after the dietary recall interview to ascertain intake of plain, drinking water during the previous 24-hour time period, and frequency of fish and shellfish consumption during the past 30 days.

Staff:

Dietary interviewer

Protocol:

Methods:

- An in-person interview methodology will be used for all dietary interviews. The dietary interviewer will record the information reported by the respondent using a computer-assisted dietary interview software program that was developed for the survey. Instructions will be provided to the respondent orally in English and/or Spanish.
- Measurement aids and visuals including charts and drawings will be used by the respondent to quantify the foods and beverages that are reported.
- A short questionnaire will be administered after the dietary recall to obtain information on intake of plain drinking water and recent fish and shellfish consumption.
- The interviewers will perform data retrieval by telephone when the information provided by the respondent or a proxy is incomplete; the interviewers will obtain permission from the SP or proxy to conduct data retrieval.

Time Allotment:

- Depending on the number of foods reported in the dietary recall, the dietary interview length ranges from 15-30 minutes.
- A representative 10 percent (minimum) subsample will be asked to complete a second independent dietary recall interview either in-person or by telephone. If additional funds are available, second interviews will be obtained from 25 percent of the examined sample.

Health Measures:

Not applicable

Eligibility:

All survey participants are eligible for the dietary interview component. Translators may assist respondents when needed, and proxy reporting is permitted.

Exclusion Criteria:

The only circumstances that would lead to exclusion would be in instances when communication or cognitive difficulties make it impossible for the participant to provide the necessary information, and a proxy reporter is not available to complete the interview.

Justification for using vulnerable populations:

- Minors are included in this component because they are an important target population group.
 Dietary data are linked to other household interview and health component data and are used to track changes that occur in food and nutrient intakes over time.
- There is no reason to exclude mentally impaired or handicapped individuals because there is no contraindication.

Risks:

There is no risk associated with this component.

Report of Findings:

No findings are reported to respondents.

Mobile Exam Center Components Descriptions

The following pages describe the exam components as offered in the Mobile Examination Center.

Audiometry

Public Health Objectives:

Hearing loss severe enough to interfere with speech is experienced by approximately 8 percent of U.S. adults and 1 percent of children. Hearing loss at this level has consequences for quality of life, development in children, and other problems. Occupational surveys list noise as the first or second most prevalent work hazard worldwide. More than 8 million U.S. workers are exposed to average eight hour noise levels exceeding 85 dBA, and of this number 500,000 are estimated by the Occupational Safety and Health Administration (OSHA) to be exposed to 100 dBA or greater. The principal health consequence of excessive noise exposure is permanent hearing loss, and the economic consequences of hearing loss are great. Workers compensation is estimated by the Alliance of American Insurers to average \$80-\$100 million each year, with the number of claims increasing each year.

The hearing examination will achieve the following objectives: 1) to obtain normative data on the hearing status of the adult US population; and 2) to evaluate certain covariates that may be related to hearing loss, such as occupational exposure.

Staff:

Medical technician

Protocol:

Methods:

The hearing component for NHANES will test a half-sample of adults ages 20-69 using pure tone audiometry and tympanometry. Pure tone audiometry thresholds will be obtained in both ears at 500, 1000, 2000, 3000, 4000, 6000, and 8000 hz. To detect middle ear disease, tympanometry will be conducted to provide an estimate of tympanic membrane compliance. The otoscopic exam will examine the outer ear to identify abnormalities which may require alternate audiometric procedures or influence the results obtained.

Time Allotment:

• 16 minutes

Health Measures:

- Evaluation of hearing sensitivity
- Evaluation of the physiological function of the middle ear
- Physical examination of the outer ear

Eligibility:

Participants age 20-69

Exclusion Criteria:

• No precluding conditions for otoscopy, immittance, or audiometry

Justification for using vulnerable populations:

• There is no reason to exclude mentally impaired or handicapped individuals because there is no contraindication if they can understand exam instructions.

Risks:

There are no known risks with the hearing examination.

Report of findings:

• MEC

Level 1: None

Level 2: MEC physician evaluates all participants with the following findings and refers as appropriate:

- Otoscopy impacted cerumen, drainage, blood in ear canal, foreign body in ear canal
- Tympanometry- Measures of pressure, compliance and volume consistent with blocked ear canal, fluid, or perforated eardrum

Level 3: Classification of hearing ability based on pure-tone audiometry

Text as is appears in MEC report:

The softest sounds you are able to hear are called hearing thresholds. Your thresholds at different frequencies (pitches) are reported in the table below. The lower pitched sounds are towards the left of the table and the higher pitched sounds are toward the right. Values of 25 dB or less are considered normal hearing.

Hearing Levels by Ear and Frequency (Air Conduction)

Frequency (Hz)

| | 500 | 1000 | 2000 | 3000 | 4000 | 6000 | 8000 |
|-----------|-----|------|------|------|------|------|------|
| Right Ear | 999 | 999 | 999 | 999 | 999 | 999 | 999 |
| Left Ear | 999 | 999 | 999 | 999 | 999 | 999 | 999 |

Thresholds reported in dB HL

- Provide interpretation of hearing test for right ear and left ear (see Attachment 32).
- Provide recommendation if any threshold in either ear exceeds 25 dB HL as follows:

The audiometry test can identify a hearing problem but can not determine the cause of hearing loss. We recommend that you see a doctor regarding your hearing loss if you have not already done so.

Balance and Vestibular Testing

Public Health Objectives:

Balance disorders, disequilibrium and dizziness from vestibular disturbance constitute a major public health problem. Primary disorders of balance and dizziness are often hidden by their acute and serious consequences, such as falls; motor vehicle accidents; and on the job injuries. Subtle dysfunction of the vestibular system may underlie difficulties in learning, writing, and reading, and affects an individual's ability to perform the most routine activities. These problems may not only interfere with most activities of everyday life but may prevent employment and limit personal independence. Tremendous health care resources are committed to the medical, surgical, and physical rehabilitative therapy of patients with balance disorders.

Disequilibrium may be responsible and is certainly related to many of the fractures caused by falling, including 200,000 hip fractures, that occur annually in Americans over the age of 65. Data from the National Institute on Aging indicate that combined medical and surgical costs for care of individuals with hip fractures exceed \$8 billion per year. Accurate prevalence data on vestibular function is critical to improve the diagnosis and treatment of balance disorders.

The specific objectives of this component are: 1) to obtain accurate prevalence data on disorders of balance and vestibular function; 2) to examine the relationship between balance disorders and other covariates, such as certain medical conditions and health status; and 3) to characterize normal and disordered balance and spatial orientation.

Staff:

Health technician trained in modified Romberg test

Protocol:

Methods:

The balance function component of NHANES will be performed on a half-sample of adults ages 40-69 using the standard Romberg test as a measure of postural sway. This test is performed on normal and compliant support surfaces in a corner of a room in the MEC with a chair placed behind the participant. The subject is instructed to maintain standing balance without shoes for 15 seconds under each of four conditions that reduce or eliminate input from the sensory avenues of vision and/or proprioception: normal support surface with eyes open; normal support surface with eyes closed; compliant support surface with eyes open; and, compliant support surface with eyes closed. This test is a pass/fail examination, with failure defined as having occurred if the subject begins to fall within 15 seconds. Increased sway without indication of falling is not considered abnormal. The medical technician stands immediately to the side of the participant prepared to stabilize the participant by use of the safety belt.

Time Allotment:

6 to 7 minutes

Health Measures:

Identification of balance disordered individuals

Eligibility:

Participants aged 40-69 who do not meet exclusion criteria

Exclusion Criteria:

Participants who are unable to stand

Justification for using vulnerable populations:

There is no reason to exclude mentally impaired or handicapped individuals because there is no contraindication if they can understand exam instructions.

Risks:

Minimal risk of falling

Report of findings:

None

Body Composition - Bioelectrical Impedance Analysis (BIA)

Public Health Objectives:

Evaluation of body composition will: 1) provide nationally representative data on body composition (lean and fat tissue), overall and for age, gender, and racial/ethnic groups; 2) provide estimates of the prevalence of obesity, as distinct from overweight; 3) provide data to study the association between body composition and other health conditions and risk factors, such as cardiovascular disease, diabetes, hypertension, and activity and dietary patterns; and 4) provide nationally representative data from a simple measurement (BIA) to develop equations to estimate body composition as measured by a more expensive and complicated measurement (dual-energy x-ray absorptiometry). BIA was successfully introduced into NHANES III (1988-94).

Staff:

Health technician (MEC).

Protocol:

Methods:

The sample person lies on his/her back and electrodes are placed on the wrists and ankles. A low-level alternating current (< 1 mA) is delivered and impedance through the body fluids is measured using the BIA equipment.

Time Allotment:

3 minutes.

Health Measures:

Resistance, reactance, impedance (all in ohms), and phase angle (degrees) are determined at 50 distinct frequencies between 5KHz and 1MHz. Prediction equations can use these values to estimate extra- and intra-cellular water content, and by further estimation, lean tissue and adipose tissue. However, these outcomes will not calculated because of lack of consensus on the appropriate equations.

Eligibility:

Sample persons aged 8-49 years who do not meet any of the exclusion criteria.

Exclusion Criteria:

- Any amputations other than fingers or toes
- Artificial joint or any orthopedic hardware
- Pacemaker or automatic defibrillator
- History of radiographic contrast material (barium) use in past 72 hours
- Coronary stents or metal suture material.

Justification for using vulnerable populations:

- Minors are included in the body composition assessment to develop simple measures of body composition for this age group.
- Mentally impaired individuals will not be excluded from body composition because there is no contraindication.

Risks:

- Minimal risk.
- There is no shock and the current is not perceptible. The BIA procedure is safe because of the following three factors: 1) no adverse event has been reported in the course of thousands of individuals undergoing measurement, 2) the test frequencies (5KHz 1MHz) are unlikely to stimulate electrically excitable tissues, such as nerves or cardiac muscle, and 3) the relatively small test current is less than the threshold of perception.
- Although there has been no risk or contraindication reported, experts in the field recommend that measurements *not* be performed on people with implanted defibrillators, pacemakers, stents, metal suture material in the heart or great vessels, metal pins, or artificial joints.

Report of findings:

Because there is no consensus on appropriate prediction equations for all populations, no outcomes that are meaningful to participants will be obtained. Therefore, no findings will be reported to the participant.

Body Composition - Dual-energy X-ray Absorptiometry (DXA)

Public Health Objectives:

Evaluation of body composition will: 1) provide nationally representative data on body composition (bone, lean, and fat tissue), overall and for age, gender, and racial/ethnic groups; 2) provide estimates of the prevalence of obesity, as distinct from overweight; 3) provide estimates of low bone density/osteoporosis; 4) provide data to study the association between body composition and other health conditions and risk factors, such as cardiovascular disease, diabetes, hypertension, and activity and dietary patterns; and 5) provide nationally representative data from a sophisticated instrument (DXA) to allow development of equations to estimate lean and fat composition from a simple measurement (BIA).

Information on bone, lean, and fat content is obtained by DXA. The importance of lean and fat tissue in relation to obesity and chronic disease has been addressed in the section on BIA. Therefore, this section focuses on the bone measure aspect of DXA.

It has been estimated that the annual cost of osteoporosis is about \$10 billion. The magnitude of this problem is likely to increase dramatically over the next few decades as the population ages. The risk of hip fractures (the most costly fractures in terms of morbidity, mortality and health care costs) begins to increase exponentially after age 65. Important pieces of data are not currently available about the changes in bone mass in the population, especially in minority populations. There are no data on total body bone measures from a nationally representative sample. Measures of total body bone mineral content or density will allow researchers to gain insights into age, sex, and racial/ethnic differences in the skeleton relative to other measures of body composition such as total muscle and fat mass, as well as behavioral factors such as diet and activity.

NHANES is the only nationally representative survey that can shed light on when peak bone mass is attained and the degree of total body bone loss with age. Childhood and adolescence are the periods to target for intervention strategies in osteoporosis. Measurement in younger individuals will provide insight into early racial/ethnic differences in the rate of bone accretion. This information is vital to all aspects of treatment and prevention of this disease and is particularly critical to government funding of related research, medical screening, treatment, and reimbursement programs.

Staff:

Health Technician (MEC)

Protocol:

Methods:

Dual-energy X-ray absorptiometry delivers a small amount of radiation through a scanning arm while the participant lies in the supine position.

Time Allotment:

Scan time is 3 minutes; 10 minutes are allowed for the procedure.

Health Measures:

Values are obtained for the total body and for each arm, each leg, the trunk and head. Bone measures may also be obtained for pelvis, left and right ribs, thoracic and lumbar spine.

- Total body tissue (gm)
- Bone mineral content (gm)
- Bone area (cm₂)
- Bone mineral density (gm/cm₂)
- Fat content (gm)
- Lean mass (gm)
- Lean mass plus bone mineral content (gm)
- Percent fat (%)

Eligibility:

Sample persons aged 8 years and older who do not meet any of the exclusion criteria.

Exclusion Criteria:

- Any amputations other than fingers or toes
- Pregnancy

Risks:

- Artificial joint or any orthopedic hardware
- Pacemaker or automatic defibrillator
- History of radiographic contrast material (barium) use in past 72 hours
- Coronary stents or metal suture material.

Minimal risk. The total radiation dose is extremely low, 0.01 to 0.04 mrem, which is within the range of background radiation and considerably less than conventional X-rays. A chest X-ray, for example, delivers a radiation dose of 40 mrem.

Justification for using vulnerable populations:

- Males under 18 are included in the DXA assessment to obtain information on critical periods for bone accretion.
- Pregnant women will be excluded from DXA because of the radiation exposure, however minimal.
- Mentally impaired individuals will not be excluded from body composition because there is no contraindication.

Report of findings:

- MEC None
- NCHS
- Level 1: None
- Level 2: DXA grader will fax any abnormal pathology to DHES physician (e.g., abnormal densities, fracture). Physician will call participant and send report when appropriate.
- Level 3: Total bone mineral density (BMD) and interpretation using the T-score from analyzed whole body scan, and % total body fat. Males will be analyzed as if they were females because the reference group includes only females.

Text as it appears in final report:

The whole body DXA scan provides two pieces of health information; the first is your percent body fat and the second is your bone density.

The body composition analysis showed that your total body fat is %

The percentage of body fat varies considerably among normal people. < If age < 17 print statement A; else print statement B>

Statement A. For boys between the ages of 6 and 16, percent body fat normally ranges from about 5% to 26%. (note: norms for girls tbd)

Statement B. For adults, the percentages reach up to 30% for men and 35% for women in middle age.

IF SP is \$ 20 years of age:

The bone density measurement can help identify persons who may be at greater risk for fracture because they have weaker bones. In general, a lower bone density means that the bone is weaker. However, not all men or women with low bone density will have fractures.

The results from your whole body scan show that your bone density is ______g/cm₂, and your T-score is ____. Compared with young adults, your bone density is <*insert statement*>.

If examinees T-score is \$ -1.0 insert normal

If examinees T-score is less than -1.0 but greater than -2.5 insert low

If examinees T-score is # -2.5 very low

<If T-score is #-2.5 print the following:> Most people develop low bone density over many years and you should not be alarmed. We do recommend that you discuss these results with your doctor in the near future. Your doctor may wish to do another bone density test of your spine or hip, since fractures due to osteoporosis often occur at these sites.

<*If T-score is* > -2.5 *print the following:*> The whole body scan is used for research only. This type of scan gives information on the bone density of your skeleton. The fragility of your spine or hip are best evaluated by DXA scans of those specific areas.

Else if SP is < 20 *years of age:*

This is the first time that bone density in young people is being measured in a national survey. We are using this information to learn about bone formation in your age group. We will not be able to give you results about your bone density until we know what typical bone density is in your age group. Your participation is helping us determine this.

Body Measurements - Anthropometry

Public Health Objectives:

Evaluation of body measurements (anthropometry) will: 1) provide nationally representative data on selected body measures, overall and for age, gender, and racial/ethnic groups; 2) provide estimates of the prevalence of overweight; 3) provide data to study the association between body measures and body composition, other health conditions and risk factors, such as cardiovascular disease, diabetes, hypertension, and activity and dietary patterns; and 4) monitor growth and development in children.

Overweight and obesity are important nutrition-related public health problems. The recent increase in overweight prevalence among all sex, age, and racial-ethnic groups has been called an epidemic. NHANES is unique in collecting nationally representative measured data on body measures and composition. Body measures data from NHANES are used to provide representative reference data, set health objectives, and monitor trends. Anthropometry data have been collected with comparable methods since the first National Health Examination Survey (1960-62).

Staff:

Health technician (MEC): (second person needed for young children)

Protocol:

Methods:

- Weight: the participant will stand on a digital scale that is connected to the ISIS system.
- Stature and recumbent length: measured with an electronic stadiometer that is connected to the ISIS system.
- Other lengths and circumferences: measured with a metal tape.
- Skinfolds: measured with a skinfold caliper.

Time Allotment:

Range 4-5 minutes.

Health Measures:

| | Birth+ | 2mo+ | 2yr+ | 4yr+ | 8yr+ |
|----------------------|--------|--------------|------|------|------|
| Head Circumference | Y | Y (through 6 | | | |
| | | months) | | | |
| Weight | Y | Y | Y | Y | Y |
| Upper Leg Length | | | | | Y |
| Maximal calf | | | | | Y |
| circumference | | | | | |
| Recumbent Length | Y | Y | Y | | |
| Standing Height | | | Y | Y | Y |
| Upper Arm Length | | Y | Y | Y | Y |
| Arm Circumference | | Y | Y | Y | Y |
| Waist Circumference | | | Y | Y | Y |
| Thigh Circumference | | | | | Y |
| Triceps Skinfold | | Y | Y | Y | Y |
| Subscapular Skinfold | | Y | Y | Y | Y |

Eligibility:

All sample persons. See Health Measures table for age-eligibility.

Exclusion Criteria:

None

Justification for using vulnerable populations:

- Minors are included in this component because they are an important target population group. Body
 composition findings are linked to other household interview and health component data and are used to
 track changes that occur in health over time.
- There is no reason to exclude mentally impaired or handicapped individuals because there is no contraindication if they can understand exam instructions.

Risks:

None

Report of findings:

MEC:

Level 1: None Level 2: None

Level 3: Height and weight

For non-pregnant persons 20 years and over, text in MEC report is as follows:

For a person of your height, your weight is _____

Body mass index Statement

< 19.00 below the range of a healthy weight, and you may be underweight.
 \$ 25.00 above the range of a healthy weight, and you may be overweight.
 19.00-24.99 within the range of a healthy weight.

Cardiovascular Fitness

Public Health Objectives:

Low levels of physical activity and physical fitness are surely the most important public health problem on which we have such limited data. Reports on population attributable risk place inactivity in the same general category as tobacco use and unhealthful diet as problems, yet the amount of data from nationally representative samples on smoking and diet is several orders of magnitude greater that the data on physical activity, and there are no data on physical fitness on a nationally representative population of U.S. adults.

Evaluation of cardiovascular fitness will: 1) provide nationally representative data on cardiovascular fitness; 2) estimate the prevalence of persons at risk due to poor physical fitness; and 3) provide data to study the association between cardiovascular fitness and other health conditions and risk factors, such as obesity, cardiovascular disease, diabetes, hypertension, and activity and dietary patterns.

Staff:

Health technician (MEC) and physician

Protocol:

Methods:

The protocol is a submaximal exercise test. The exam consists of a 2 minute warm up, two 3 minute exercise periods, and a 3 minute recovery period. The grade and speed of the treadmill during exercise are determined by: 1) the participant's physical activity readiness determined by responses to the household interview, 2) age, and 3) BMI. During the first stage of the exercise period, the participant should attain approximately 55-65% of age-predicted maximal heart rate (APMHR). During the second stage, the participant should attain approximately 70-80% APMHR.

Time Allotment:

22 minutes

Health Measures:

Pre-test heart rate and blood pressures will be captured and stored by ISIS. Additionally, at the end of warm-up, each exercise stage, and each minute of recovery, the ISIS will capture:

- Heart rate (bpm)
- Systolic blood pressure (mm Hg)
- Diastolic blood pressure (mm Hg)
- Treadmill speed and grade (mph, %)

From the exercise heart rate and treadmill settings, maximal work capacity will be predicted. Predicted maximal work capacity is the measure of fitness obtained.

Eligibility:

Sample persons aged 12-49 years who do not meet any of the exclusion criteria

Exclusion Criteria:

All persons not excluded by household questionnaire will be evaluated by the MEC physician for eligibility for the CV fitness component. Physician will follow the protocol for medical exclusion based on responses to safety exclusion questions, pulse and blood pressure.

Exclusions based on household interview and/or other components:

- Any amputations of legs and feet other than toes
- Self reported weight > 350 pounds, exclude
- Pacemaker or automatic defibrillator
- Pregnancy greater than 12 weeks

Exclusions based on household interview

Medical Conditions and Health Status (COO) (if 1, 7, or 9 exclude)

- COQ.160b Congestive heart failure COQ.160c Coronary heart disease
- COO.160d Angina pectoris
- COQ.160e Myocardial infarction
- COQ.160f Stroke
- COQ.160 Emphysema
 - Physical Functioning (PFQ) (if 3, 4, 7, or 9, exclude)
- PFQ.060b Difficulty walking for a quarter mile (2-3 blocks)
- PFQ.060c Difficulty walking up 10 steps without resting

| | • PFQ.060h | Walking from one room to another on the same level |
|---------|---|--|
| | PFQ060I | Standing up from an armless straight chair |
| | (if 1,7, or 9, excl | |
| | • PFQ.090 | Use of a device such as a cane or wheelchair |
| | | 2,16, 97, 99 exclude) |
| | • PFQ.067 | 2=Back or Neck Problem |
| | | 5=Depression/Anxiety/Emotional Problem 6=Developmental Problems (Cerebral Palsy) |
| | | 7=Diabetes |
| | | 10=Heart Problem |
| | | 12=Lung/Breathing Problem |
| | | 16=Stroke Problem |
| | Diabetes (DIQ) | (if 1,7, or 9, exclude) |
| | • DIQ.080 | Retinopathy |
| | Cardiovascular (| CAQ)- (if 1, 7, or 9) |
| | • CAQ.030 | Stop when walking at own pace on the level |
| | • CAQ.040 | SOB after walking 100 yards or few minutes on the level |
| | • CAQ.050 | PND |
| | • CAQ.060 | PND relieved by sitting on side of bed |
| | • CAQ.070 | Orthopnea |
| | | lth (RSQ) - (if 55 {code for 12 or more attacks], 77, or 99 exclude) |
| | RSQ.080RSQ.110 | Wheezing in past 12 months (if 1,7,or 9, exclude) |
| | • RSQ.110 Vision (VSQ) - | Wheezing that limits speech (last 12 months) |
| | • VSQ.020 | Blind (if 1,7, or 9, exclude) |
| | • VSQ.030 | Very poor eyesight (if 1,7, or 9, exclude) |
| | ~ | ations will be available in SP History in Physician's Exam. Physician will check |
| | | ude based on medication on the Exclusion list below. (See questions 9- |
| Cardiov | vaccular Safety and Exclusi | on Questions (Asked in Physician's Exam): |
| Cardiov | | sclude unless otherwise indicated) |
| 1. | | ed in the past 3 months? (See exclusion list below) |
| 2. | | doctor ever said you should not participate in sports or other activities because of |
| | a health condition? | |
| 3. | Has a doctor ever said yo recommended by a doctor | u have a heart condition and that you should only do physical activity r? |
| 4. | (20-49 years only) Do yo | u feel pain in your chest when you do physical activity? |
| 5. | | past month, have you had chest pain when you were not doing physical activity? medical doctor about your chest pain? Did the doctor tell you that the chest pain |
| 6. | • | because of dizziness? (Probe: Is this an isolated incident or does it occur on a |
| 7. | , | usness? (Probes: Did this occur as a result of illness or was it unexplained? Is |
| , · | | r does it occur on a regular basis? |
| 8. | | int problem that could be made worse by walking? (Probe: Do you think you |
| | can do the test without in | |
| 9. | | any prescription medications? (yes go to 10, no go to 15) |
| 10. | Are you currently taking 14) | any prescription medications for your blood pressure? (yes go to 11, no go to |
| 11. | What is the name of this i | medication? |
| | (If medication is on list, e | exclude. If not on list, go to 12. |
| 12. | Are you taking any other exclude.) | medication for your blood pressure? (Yes, go to 13/ No go to 14./Don't Know, |
| 13. | | medication? |
| | | exclude. If not on list, go to 14.) |

- 14. Are you currently taking prescription medications for the following conditions:
 - · heart condition Yes/No/Don't Know (If Yes or Don't Know, exclude)
 - · prescription eye drops for glaucoma (If Yes or Don't Know, exclude)
- 15. Do you know of any other reason why you should not do a treadmill test?

Question 1: List of reasons for exclusion based on hospitalization from ACSM Guidelines, 5th edition, page 42.

- · A recent significant change in the resting ECG suggesting infarction or other acute cardiac event.
- · Recent complicated myocardial infarction
- · Unstable angina
- · Uncontrolled ventricular arrhythmia
- · Uncontrolled atrial arrhythmia that comprimises cardiac function
- · Third degree AV heart block
- · Acute congestive heart failure
- · Severe aortic stenosis
- · Suspected or known dissecting aneurysm
- · Active or suspected myocarditis or pericarditis
- · Thrombophlebitis or intracardiac thrombi
- · Recent systemic or pulmonary embolus
- · Acute infections
- · Significant emotional distress (psychosis)
- · Moderate valvular heart disease
- · Known electrolye abnormalities
- · Fixed rate pacemaker
- · Frequent or complex ventricular ectopy
- · Ventricular aneurysm
- · Uncontrolled metabolic disease (diabetes, thyrotoxicosis, myxedema, etc)
- · Chronic infections disease (mononucleosis, hepatitis, AIDS)
- · Neuromuscular, musculoskeletal, or rheumatoid disorders that are
- · exacerbated by exercise
- · Complicated pregnancy (N.B. this is an exception to the ASCM guidelines the guidelines also include advanced pregnancy)

Questions 9-14: Exclusion Medication List

Antianginal Agents

Calcium Channel-Blockers Bepridil (Vascor) Diltiazem (Cardizem) Verapamil (Calan, Isoptin)

Anti Arrhythmics

Amiodarone (Cordarone)

Bretylium (Bretylol)

Disopyramide (Norpace)

Encainide (Enkaid)

Ethmozine (Moricizine)

Flecanide (Tambocor)

Lidocaine (Xylocaine, Xylocard)

Mexiletine (Mexitil)

Procainamide (Pronestyl, Procan SR)

Propafenone

Sotalol (Betapace)

Tocainide (Tonocard)

Quinidine (Quinidex, Quinaglute)

Beta Blockers

Acebutolol (Sectral)

Atenolol (Tenormin)

Betaxolol (Kerlone)

Bisoprolol (Zebeta)

Cartelol (Cartrol)

Labetalol (Normodyne)

Metoprolol tartrate (Lopressor)

Nadolol (Corgard)

Pindolol (Visken)

Propranolol (Inderal)

Timolol (Blocardren)

Eye Drops

Betoptic Eyedrops

Timoptic Eyedrops

Nitrates and Nitroglycerin

Isosorbide dinitrate (Isordil, Diltrate)

Nitroglycerin (Nitrostat, Nitrolingual spray)

Nitroglycerin ointment (Nitrol ointment)

Nitroglycerin patches (Transderm Nitro, Nitro-Dur II, Nitrodisc)

Isosorbide mononitrate (Ismo, Monoket)

Pentaerythritol tetranitrate (Cardilate)

Digitalis

Digoxin (Lanoxin)

Physician exam exclusions: If participants resting pulse rate is > 100 bpm or systolic blood pressure > 180 mm Hg.

Criteria for stopping during the fitness protocol:

- Onset of angina or angina-like symptoms
- Significant drop (20mmHg) in SBP or a failure of the SBP to rise with an increase in exercise intensity
- Excessive rise in BP: SBP > 260 mmHg or DBP > 115 mmHg
- Signs of poor perfusion: lightheadedness, confusion, ataxia, pallor, cyanosis, nausea, or cold and clammy skin
- Failure of heart rate to increase with increased exercise intensity
- Subject requests to stop
- Physical or verbal manifestations of severe fatigue
- Unusual or severe shortness of breath
- Leg pains or cramps
- Failure of the testing equipment
- Severe headache
- Visual disturbances
- %HRmax >90% and SP appears/feels exhausted
- Unable to complete test without holding on to the handrail

Justification for using vulnerable populations:

- Minors are included in the cardiovascular fitness assessment to obtain information on fitness among adolescents.
- Pregnant women will be excluded from fitness testing because physiologic changes with pregnancy affect heart rate, and therefore the interpretation of the data. The exclusion also considers safety.
 - Mentally impaired individuals will be excluded from the treadmill test.

Risks:

There is much experience across the country to suggest that submaximal testing in a healthy population

poses minimal health risk. Persons with any conditions that may increase risk of adverse outcome on the treadmill will be excluded. Risk associated with this test in a screened population include fatigue, muscle soreness, exercise-induced asthma, and chest tightness.

The Cooper Institute for Aerobic Research and Stanford University have conducted tens of thousands of submaximal tests similar to what is proposed in NHANES. These tests were conducted in community survey centers and work-site health promotion programs. They were done after screening and determination of eligibility by a nurse or exercise technician with no physician supervision, other than supervising training and monitoring for quality control. There have been no complications from these tests. No one even missed 30 minutes of work due to delay caused by some incident related to the exercise test. This accumulated experience also points to the low risk associated with submaximal exercise testing in an apparently healthy population. There is also no problem associated with conducting the exercise test after venipuncture. That is the procedure followed in most exercise laboratories including the Cooper Clinic and Stanford surveys since exercise changes hemoconcentration and provides inaccurate readings for lipids etc.

Report of findings:

MEC:

- Level 1: MEC Physician notified if participant has acute chest pain, acute respiratory distress or signs of hemodynamic instability. If the participant is deemed medically unstable, emergency medical procedures will be instituted.
- Level 2: If the MEC Physician determines that a condition discovered during fitness testing requires follow-up by a community physician, a referral will be made.
- Level 3: Grade, speed, test duration, and general fitness classification relative to same sex and age group based on estimated maximum work capacity (V02 max).

Text in MEC report is as follows:

Your fitness test was done on a treadmill. The test consisted of a warm-up, two exercise periods (stage 1 and stage 2), and a recovery period. The table below shows your test results.

| Stage | Required | Your | Your Heart |
|----------|---------------|------|------------|
| | Time | Time | Rate |
| Warmup | 2 min | | |
| Stage 1 | 3 min | | |
| Stage 2 | 3 min | | |
| Recovery | $2-3 \min(s)$ | | |

During this exercise your maximum incline on the treadmill was ____%, and your maximum speed was___mph. Compared with other people of your age and sex, your cardiovascular fitness level is _____. (Superior, excellent, good, fair, poor, very poor).

Dermatology Examination

Public Health Objective:

One in three Americans has a skin condition serious enough to require medical attention. However, there are major gaps in knowledge about the frequency, impact, etiology, and prevention of most skin diseases.

A review of current literature shows that psoriasis affects health-related quality of life (HRQOL) in ways similar to other major medical conditions. The impact on HRQOL can be seen in physical, emotional, and social measures. Studies of disability caused by psoriasis indicate that the levels of disability for those with the condition are greater than for those of healthy controls. There is also an association between psoriasis, stress, and depression.

Hand dermatitis is the most common occupational skin disease, as well as a common cause of occupational disability. Acute eczematous dermatitis is one of the few skin diseases that, according to the Americans with Disabilities Act of 1990, may still be used as a reason for exclusion from employment. The estimated cost associated with this condition is greater than \$300 million dollars a year.

Fitzpatrick skin type is a method of classifying individuals based on their response to sun exposure in terms of tanning or burning (photosensitivity). Individuals' susceptibility to different skin diseases is known to vary by skin type. In addition, skin type has been used to help determine starting doses for phototherapy and to assess the possibility of cutaneous side-effects of certain dermatologic treatments. Under the Americans with Disabilities Act of 1990, photosensitivity is an allowable exclusion criterion for outdoor workers. Currently, the distribution of skin type across the U.S. population is unknown. Knowing more about the U.S distribution of skin type will be helpful in developing more accurate measures of risk factors for various skin diseases. It may also be important to the development of better national health education campaigns regarding sun protective behavior.

Staff:

Health technician

Equipment:

Kodak DCS760 digital camera with 50mm lens.

Protocol:

The exam consists of four digital images taken by a health technician (with a Kodak DCS760 digital camera with 50mm lens) as follows:

Picture A: "BACK with ELBOWS"



- a. Subject is positioned facing the mirror in the body measure room.
- b. Back of gown is opened and clipped to expose Subject's back.
- c. Sticky rule is placed on Subject's back.
- d. Camera is in horizontal position.
- e. Arms are rotated out to square up the elbows.
- f. Hands are not critical in this shot.
- g. Top of shot at Subject's neck (no head).
- h. Camera focus indicator is on Subject's spine.

Picture B: "INNER ARM"



- a. Subject's gown is closed and they are instructed to turn around and face the camera.
- b. Subject extends the left arm to the left side, with palm up.
- c. Top of shot is Subject's neck (no head).

Picture C: "FRONT OF LEGS with HANDS"



- a. Subject is instructed to face the camera.
- b. Subject places hands on lower abdomen, with fingers extended, for tops of hands
- c. Bottom of shot is Subject's booties.
- d. Camera focus indicator is on front of Subject's gown.

Picture D. "BACK OF LEGS with PALMS"



- a. Subject is instructed to turn and face the door.
- b. Subject places hands behind back on lower hips, with palms flattened and fingers spread.
- c. Bottom of shot is Subject's booties.
- d. Camera focus indicator is on back of Subject's gown.

Eligibility:

Sample persons aged 20–59 years who do not meet any of the exclusion criteria.

Exclusion Criteria:

A person who is unable to stand unassisted would not receive this examination.

There are no other safety exclusions for this component.

Justification for using vulnerable populations:

Mentally impaired individuals will not be excluded from the dermatology exam because there are no contraindications. However, guardians will receive the report of findings and facilitate any referral if necessary.

Risks:

None.

Special precautions:

A chaperone will be made available should the SP request one.

Report of findings:

MEC: None

NCHS Level 1: Moles or lesions suspicious of melanoma or other malignancies. Report faxed directly from NIH dermatologist to DHES medical officer. Officer will call SP

with findings in addition to sending report.

Level 2: Presence of eczematous dermatitis or other clinically relevant skin condition will be reported by letter to sample person.

Level 3: None

Lower Extremity Disease

Public Health Objective:

Lower extremity disease is disabling and costly among the elderly and persons with diabetes. The major manifestations of lower extremity disease are peripheral vascular disease and peripheral neuropathy. Late-stage complications are chronic ulcers, gangrene, and amputation. Lower extremity disease is associated with increased susceptibility to falls. Few population-based studies have been conducted and no national examination data exist on lower extremity disease and its risk factors. The Health Resources and Services Administration has launched a major initiative called the Lower Extremity Amputation Prevention Program, and would benefit from population-based data to help monitor this effort.

Information on the prevalence of lower extremity 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 lower extremity disease examination will provide population data to: 1) determine a national estimate of lower extremity 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 lower extremity 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.

Staff:

Health technician (MEC)

Protocol:

Methods:

- Peripheral vascular disease is assessed by the ratio between systolic blood pressure in the lower legs to that in the arm. Systolic pressure will be measured in one arm (brachial vessel, right arm if accessible) and both ankles (posterior tibial vessels). Each pressure will be measured twice in SP's age 40-59, while each will be measured only once for SP's 60 and above to reduce the time for this component in that age group.
- The feet will be examined for the presence of amputations, lesions, and bunions.
- Peripheral neuropathy is assessed by ability to feel slight pressure applied with a standard monofilament to the bottom of the foot at 3 sites. If an incorrect answer is given at any site, the test will be repeated at that site up to a total of three times.

Time Allotment:

15-18 minutes depending on age of examinee

Health Measures:

Peripheral vascular disease - systolic blood pressures (mm Hg):

- Brachial
- Right Posterior Tibial
- Left Posterior Tibial

Calculated means and ratios

Foot abnormalities - presence or absence of:

- Amputations (entire foot, partial foot, great toe, other toes)
- Lesions or bandages
- Bunions

Peripheral neuropathy - correct response, incorrect response, or inability to detect monofilament pressure on each foot at:

- Metatarsal Head 1
- Metatarsal Head 5
- Halux

Eligibility:

Sample persons aged 40 years and older who do not meet any of the exclusion criteria.

Exclusion Criteria:

- Bilateral above the knee or below the knee amputations
- Rash or open wound on both arms that would interfere with accurate measurement or would cause discomfort to the participant, exclude from the peripheral vascular disease measures.

 Venous stasis ulceration or other pathology that precludes placing a blood pressure cuff around the right OR left ankle (e.g., open wounds, small gauze/adhesive dressings, casts, puffiness) –

measurements will not be made on the affected ankle. If both ankles are affected, person is excluded from peripheral vascular disease component.

Justification for using vulnerable populations:

- Minors are not included in the lower extremity disease assessment because of extremely low prevalence of abnormalities at younger ages.
- Pregnant women will be included because the effect of any hemodynamic changes will affect both brachial and lower vessels equivalently. However, a woman in later pregnancy may not be able to lay on her back comfortably for the test and would be excluded for this reason.
- Mentally impaired individuals will not be excluded from the exam because there
 is no contraindication.

Risks: None Report of findings

MEC

Peripheral vascular disease - Ankle/arm pressure ratios

Level 1: None Level 2: <0.5 Level 3: 0.5-<0.9

Text in MEC report is as follows:

The circulation in your legs was examined by comparing the blood pressure in your arm with the blood pressure in your ankles. The result is reported below as an index, which is called the ankle brachial pressure index. Typically the index is around 1.

| Right ankle brachial pressure index |
|-------------------------------------|
| Left ankle brachial pressure |
| index |

Part A. The blood pressure in <your right ankle, **both your ankles>** showed you have ______blood

flow to <your right leg, **both legs>** Part B., and the blood pressure in your left ankle, showed you have

_____ blood flow to your left leg.

Programming specifications:

ABPI Statement >0.9 normal 0.5-0.9 decreased

< 0.5 severely decreased

Programming check - if both right and left have the same statement (normal, decreased, severely decreased) print the bolded version of part A and do not print part B.

Peripheral neuropathy

Level 1: None

Level 2: One or more insensate sites (inability to determine response

or an incorrect response for one or more of the three sites on

each foot in

at least two of three repetitions of the test will be a cause for

referral)

Level 3: None

Text in MEC report is as follows:

This sensory examination tested your ability to feel a filament pressed on the bottoms of your feet. We tested three places on each foot. Part A. The examination showed that you have______ sensation in <your right foot, **both feet>**, Part B. and sensation in your left foot.

If one or more of the three areas (metatarsal head 1, 5, or halux) is/are incorrect, then print decreased. Else print normal

Either of the following define a correct response for a site:

- First response is correct
- First response is incorrect (or unable to determine), but second and third responses are correct

The following defines an incorrect response for a site:

• First response is incorrect (or unable to determine) and second or third responses are incorrect (or unable to determine)

Programming check - if both right and left have the same statement (normal, decreased) print the bolded version of part A. and do not print part B.

Observation of abnormalities

Level 1: Gangrene or acute vascular occlusion requiring immediate treatment

Level 2: Purulent or draining wounds, other gangrene, cellulitis or other

infection

Level 3: None

Oral health

Public Health Objectives:

NHANES is critical for monitoring oral health status, risk factors for disease, and access to preventive and treatment services. This component will address public health significance in areas of surveillance, prevention, treatment, health promotion/disease prevention, health policy, evaluation of Federal health programs, standardization of new methods and health and nutrition status of minorities and underserved populations.

Oral health data from NHANES will be used for:

- Assessing the prevalence of major oral health diseases and conditions including caries, periodontal disease, trauma, dry mouth, oral pain, and fluorosis effectiveness of fluoride based on the recommendations from a PHS report on the risks and benefits of fluoride and a recent NIDR sponsored conference
- Prevalence of mutations in cells from oral cavity
- Assessing prevention and treatment efforts
- Evaluating specific public health programs/new policies and initiatives
- Targeting minority/underserved populations for monitoring of health status
- Evaluating Healthy People 2000 and 2010 objectives related to oral health
- Assessing prevalence of antibodies and other indicators of oral health status in saliva

Staff:

Dentist

Protocol:

Methods:

The exam consists largely of visual inspection of surfaces, gums, and soft tissues. Examinations
for coronal and root caries are conducted with dental explorer and mirror. The exams for
gingival bleeding, periodontal pockets and gum recession are done with a periodontal probe.
For the saliva collection, the participant engages in stimulated salivation into a container for a
two minute period.

Time Allotment:

Depending on age, 4-11 minutes.

Health Measures and Eligibility:

The following oral health subcomponents for the examination component and the age groups of interest in parentheses are:

- Dental sealant assessment (2 to 34 years of age)
- Tooth count (2 years and older)
- Coronal caries (2 years and older)
- Orofacial traumatic injuries (6 to 29 years of age)
- Dental fluorosis assessment -- full mouth (6 to 49 years of age)
- Orofacial and other pain assessment (6 to 69 years of age)
- Gingival bleeding (12 to 49 years of age)
- Periodontal pockets, recession, loss of attachment (18 years and older)
- Root caries (18 years and older)
- Saliva flow rate (40 years and older)

Exclusion Criteria:

Asked of sample persons 12+ only, positive responses to the following screening questions exclude persons from the periodontal or root caries examination:

- Has a doctor or dentist ever told you that you must take antibiotics (e.g. penicillin) before you
 get a dental check up or care?
- Do you have a heart problem (specifically congenital heart murmurs, heart valve problems, congenital heart disease, or bacterial endocarditis)?
- Do you have rheumatic fever?
- Kidney disease requiring renal dialysis?
- Hemophilia?
- Pacemaker or artificial material in your heart veins or arteries?
- A hip bone or joint replacement?

Justification for using vulnerable populations:

- Minors are included in this component because they are an important target population group.
 Oral health findings are linked to other household interview and health component data and are used to track changes that occur in health over time.
- There is no reason to exclude mentally impaired or handicapped individuals because there is no contraindication.

Risks:

Minimal risks. These include possible discomfort, bleeding, and potential dislodging of already loose restorative material. There will be no exposure to radiation (no x-rays), hazardous material (no use of mercury) and no use of anesthetic agents.

Special precautions:

If the respondent reports a latex allergy, the dentist will wear vinyl gloves.

Report of Findings:

MEC:

- Level 1: Oral lesions requiring emergent attention -(e.g., abscess, oral cancer). Dentist will generate a referral letter for participant to take to oral health care provider.
- Level 2: Oral pathology requiring follow-up (e.g., severe periodontal disease or caries). Dentist will generate a referral letter for participant to take to oral health care provider.
- Level 3: Dentist will indicate participant should see dentist at his/her earliest convenience.
- Level 4: Dentist will refer participant to continue with routine dental visits.

Text as it appears in MEC report:

The dental examination of the National Health and Nutrition Examination Survey is not, and is not intended to be, a substitute for the examination usually given to persons seeking care from their own dentists.

Neither a dental history nor x-rays are taken, and therefore the findings are solely the result of what can be seen at the time of the examination.

The examining dentist recommends that you **Statement A** < part B > because of the following conditions:

Statement B

Statement A

- 1. see a dentist immediately
- 2. see your dentist within the next 2 weeks
- 3. see your dentist at the earliest convenience
- 4. continue your regular routine care

Statement B

- 1. decayed teeth
- 2. gum problems/disease
- 3. oral hygiene
- 4. clinical impression of a soft tissue condition
- 5. some other findings (See referral letter) Attachment 33
- 6. no significant findings

Physical Activity Monitor (PAM) Component

Public Health Objectives:

The primary objective of the component is to assess intensity and duration of physical activity levels of U.S. children and adults. *The U.S. Surgeon General's Report on Physical Activity and Health* reported that more than 60 percent of Americans do not engage in regular physical activity and that 25 percent do not engage in any activity. The report reaffirmed the importance of regular moderate or vigorous-intensity activity. Until now, it has been difficult to assess actual physical activity levels in freeliving populations because the cost and complexity of performing the monitoring tasks required to obtain this information were prohibitive. Physical activity data on children, particularly children in the 6-11 year age group are lacking. Proxy information on physical activity levels among youth are not useful because children spend large amounts of time away from home and they also engage in sporadic periods of activity that are difficult to document, let alone quantify. Activity monitors provide a reliable, objective, and accurate method to assess the intensity and duration of physical activity levels in children and adults.

Staff:

A trained health or medical technician initializes the activity monitors in the mobile examination center (MEC).

Protocol:

Examined persons are asked to wear the monitor for 7 days during normal waking hours. The monitors are not waterproof and must be removed prior to swimming or bathing. The monitor is worn on a flexible waist belt and can be removed easily. After 7 days of wear, participants return the monitor by mail in a postage-paid envelope. Respondents receive \$40 remuneration for returning their monitors.

Eligibility:

Ambulatory subjects 6 years of age and over are asked to wear activity monitors.

Time Requirement:

It takes approximately three (3) minutes to explain the component, initialize the monitor to record information, and fit the monitor belt on each subject.

Device:

The ActiGraph (formerly MTI/CSA) Model 7164 accelerometer manufactured by ActiGraph, Ft. Walton Beach, FL is used. Devices are calibrated prior to use in the study. The device is worn on an elastic waist belt over the right hip (underneath clothing).

Report of findings:

There is no report of findings for this component.

Physician's Exam

Public Health Objectives:

High blood pressure is a marker for the chronic condition hypertension, which is a major risk factor for premature cardiovascular, cerebrovascular, renovascular and other vascular diseases. Standardized blood pressure measurements will be used to monitor prevalence of hypertension.

Staff:

Licensed physician

Protocol:

Methods:

- Pulse: the examining physician will determine a 30 second resting pulse rate.
- Blood pressure: three systolic/diastolic BP measurements will be taken following a strict protocol.
- Cardiovascular exclusion screening questions will be asked by physician (see Cardiovascular Fitness)
- Pre-test counseling for STD/HIV testing. Physician will discuss the STD/HIV testing and assure the confidentiality of information collected. Physician will explain to the participants how they are to get their test results and will ask them to provide a password which will be used at the time of reporting results. Physician will answer any questions the participants may have about the STD or HIV testing. Attachment 34 is a brochure with information about STDs to be used by the physician.

Time Allotment:

Depends on age of sample person. Range 2-13 minutes.

Health Measures:

Blood pressure

- Pulse (bpm)
- Systolic blood pressure (mmHg)
 - Diastolic blood pressure (mmHg)

Eligibility:

Sample persons who do not meet the exclusion criteria

Pulse: 2 months and older Blood pressure: 8 years and older Cardiovascular fitness screening: 12-49 years STD/HIV counseling: 14-49 years of age

Exclusion Criteria:

- Blood pressure presence of the following on both arms: rashes, gauze dressings, casts, edema, paralysis, tubes, open sores or wounds, withered arms, a-v shunts, or if blood has been drawn from arm within last week.
- Blood pressure cuff too small to fit on arm

Justification for using vulnerable populations:

- Minors are included in the pulse and blood pressure assessment because of the relevance and impact of high blood pressure in this age group.
- Mentally impaired individuals will not be excluded from the physician's exam because there is no contraindication; however the person's guardian will receive the report of findings and facilitate any referral if necessary.

Risks:

Minimal risk. Transient discomfort during blood pressure measurement.

Special precautions:

None.

Report of findings:

MEC

Pulse and Blood Pressure - Adult

Level 1: Systolic BP >= 210 and/or diastolic BP >= 120; Pulse > 140 bpm

Level 2: 140 < Systolic BP < 210 and/or 90 <= diastolic BP < 120

Level 3: Systolic < 140 and diastolic < 90.

Text in MEC report is as follows:

| | | Optimal | Normal | Acceptable |
|--------------|-----------------|---------|--------|------------|
| Systolic bp | <value></value> | < 120 | < 130 | <140 |
| Diastolic bp | <value></value> | < 80 | < 85 | < 90 |
| | | | | |

Resting pulse rate (all ages) <value>

Your blood pressure today is insert statement from table below

| Systolic | Diastolic | Statement |
|----------|-----------|--|
| < 130 | < 85 | within the normal range |
| 130-139 | 85-90 | normal but at the high end of the normal range |
| 140-159 | 90-99 | mildly high |
| 160-179 | 100-109 | moderately high |
| 180-209 | 110-119 | very high |
| >210 | >120 | severely high |

From the Sixth Report of the Joint National Committee on Detection, Evaluation, and Treatment of High Blood Pressure

Children's BP levels reported as normal, high normal, high, and very high based on criteria established by the following manuscript: National High Blood Pressure Education Program Working Group on Hypertension Control in Children and Adolescents. Update on the 1987 Task Force Report on High Blood Pressure in Children and Adolescents: A Working Group Report from the National High Blood Pressure Education Program. Pediatrics. 1996;11:649-658.

• NCHS

STD/HIV - Toll free phone line for participant to call for results

Level 1: None

Level 2: Positive results for chlamydia, gonorrhea, Herpes type 2 or HIV. Participants will be

counseled by health educator and referred for care. List of STD/HIV treatment sites will be obtained in advance for each stand and be made available for participants

Level 3: Negative results for chlamydia, gonorrhea, Herpes type 2 and HIV.

Vision

Public Health Objectives:

Eye diseases cause suffering, disability and loss of productivity for millions of people in the United States. In economic terms, eye disease and blindness are estimated to cost the U.S. in excess of \$22 billion each year. No high-quality, up-to-date information exists on the prevalence of visual impairment and the major causes of visual impairment in the general population. These data are needed in planning health services, in monitoring changes in disease prevalence, in research program planning, in developing and testing hypotheses about eye disease etiology.

Data collected over 20 years ago in the NHANES I (self-reported history questions and full vision examination with dilation) continue to be the only source of national prevalence data on eye disease and visual acuity impairment and there are no data on visual field impairment. Changes in disease definitions, population demographics, diagnostic capabilities, and treatments for eye diseases make it important to obtain new national data about eye disease. The absence of such data has forced researchers to use blindness registry data that are almost 25 years old. These studies select mostly white populations or non-nationally representative populations.

The ophthalmic data from NHANES will be used to: 1) measure the prevalence of visual acuity impairment in the U.S. population (visual acuity worse than 20/40), by cause; 2) measure the distribution of refractive error in the U.S. population; 3) evaluate screening strategies for visual impairment and eye disease; and 4) evaluate functional impairment related to vision.

Staff:

Health technician (MEC)

Protocol:

Methods:

Best corrective vision

Visual acuity is measured with an autorefractor. The examinee puts his/her chin on the chin rest and focuses on a chart with numbers and letters in the autorefractor screen. Examinee is then asked to sequentially read the largest to smallest possible line on a built-in chart in the autorefractor. The technician isolates the smallest line read by the examinee with 1 error. With the examinee's eye focused on the line, the autorefractor quickly takes three repeated measurements, which is also known as objective refraction. These three auto-retinoscopy measurements, their average, and other measurements from the objective refraction are saved in a database. If required, these readings are further fine tuned to obtain best visual acuity based on objective refraction readings. Data from completed examinations are transferred to the ISIS and saved in a database.

Current Prescription

The Lensmeter reads the current prescription of the eyeglass. This data is transferred to the autorefractor and later saved in the ISIS database to compare the current correction with the best corrective vision obtained from the auto-refractor.

Near visual acuity

For the near visual acuity, older examinees are asked to read five lines of numbers and letters written on the near acuity card at the comfortable distance and this distance is measured and saved in the ISIS database.

Time Allotment:

Depends on age and vision of sample person. Range 7-8 minutes.

Health Measures:

The ophthalmic data from NHANES will be used to: 1) measure the prevalence of visual acuity impairment in the U.S. population (visual acuity worse than 20/40), by cause; 2) measure the distribution of refractive error in the U.S. population; 3) evaluate screening strategies for visual impairment and eye disease; and 4) evaluate functional impairment related to vision.

Eligibility:

All sample persons aged 12+ years will have the refraction exam for the best corrective vision. Visual acuity assessment using the near card will be performed only on persons 50 years and over.

Exclusion Criteria:

Any evidence of injury (eye patch or bandage) or severe infection (i.e., purulent discharge with redness in eye) in both eyes.

Justification for using vulnerable populations:

- In recent years, myopia has been rapidly increasing in the U.S., especially among young adults and impaired vision is a major cause of motor vehicle accidents among older persons.
- Minors are included in this component because they are an important target population group.
 Visual acuity will be linked to other household interview and health component data and are used to monitor trends for impairment.
 - Mentally impaired individuals will be tested if they can follow instructions.

Risks:

None. No mydriadic or anesthetic agents will be used

Report of Findings:

• MEC:

Level 1: None

Level 2: None

Level 3: Visual acuity with recommendation

Text in MEC report is as follows:

We have done a quick check of your vision today. Our exam is not as precise as an eye exam done by an eye doctor. These values may differ from a vision exam you may have by an ophthalmologist, optometrist or optician

For vision 20/25 or better in both eyes with their current correction (either no correction, distance glasses and/or contact lenses):

Your distance vision is 20/_ in your right eye and 20/_ in your left eye with _____. This is a good level of vision. You should continue your usual schedule of periodic examinations by your eye doctor.

For vision worse than 20/25 in either eye with their current correction (either no correction, distance glasses and/or contact lenses):

Your distance vision is 20/__ in your right eye and 20/__ in your left eye with _____. This level of vision is not as good as most people's. If you were not already aware of this, you should see an eye doctor to see if he/she can improve your vision. Your eye doctor can also provide you with a full eye examination.

Blood and Urine Collection

Venipuncture

Public Health Objectives:

Venipuncture is performed to obtain laboratory results that provide prevalence estimates of disease, risk factors for exam components, and baseline information on health and nutritional status of the population.

Staff:

Certified Phlebotomist

Protocol:

Methods:

Blood is drawn from the examinee's arm. In the laboratory the blood is processed, stored and shipped to various laboratories for analysis. The complete blood count (CBC) results are reported in the MEC and all other results are reported from NCHS to the participant. The volume of blood drawn by age follows.

- 1-2 years, 9 ml (0.3 ounces), 0.6 tablespoons
- 3-5 years, 22 ml (0.7 ounces), 1.5 tablespoons
- 6-11 years, 38 ml (1.2 ounces), 2.5 tablespoons
- 12+ 89-92 ml (3.0 ounces), 6.0 tablespoons

Time Allotment:

Depending on age of participant. Range 5-10 minutes

Health Measures:

Laboratory test results.

Eligibility:

Sample persons aged 1 year and older who do not meet any of the exclusion criteria

Exclusion Criteria:

- Hemophiliacs
- Participants who received chemotherapy within last 4 weeks
- The presence of the following on both arms: rashes, gauze dressings, casts, edema, paralysis, tubes, open sores or wounds, withered arms or limbs missing, damaged, sclerosed or occluded veins, allergies to cleansing reagents, burned or scarred tissue, shunt or IV.

Justification for using vulnerable populations:

- Minors are included in this component because they are an important target population group.
 Laboratory data are linked to other household interview and health component data and are used to track changes that occur in health over time.
- There is no reason to exclude mentally impaired or handicapped individuals because there is no contraindication.

Risks:

The following are known risks associated with venipuncture:

- Hematoma
- Swelling, tenderness and inflammation at the site
- Persistent bleeding
- Vasovagal response dizziness, sweating, coldness of skin, numbness and tingling of hands and feet, nausea, vomiting, possible visual disturbance, syncope and injury fall from fainting.
- Rare adverse effects:

Thrombosis of the vein due to trauma

Infection which results in thrombophlebitis

Special precautions:

- Sterile equipment issued with all sample persons.
- Physician on call in case an adverse affect occurs.

Report of Findings:

Reported in the MEC:

Complete Blood Count (CBC)

Reported from NCHS:

Other laboratory results

Urine Collection

Public Health Objectives:

Urine is collected to obtain laboratory results that provide prevalence estimates of disease, risk factors for exam components, and baseline information on health and nutritional status of the population.

Staff:

MEC Coordinator

Protocol:

Methods:

Urine is collected from individuals ages 6 years and above.

Time Allotment:

2 minutes

Health Measures:

Laboratory test results.

Eligibility:

Sample persons aged 6 years and above.

Exclusion Criteria:

None

Justification for using vulnerable populations:

- Minors are included in this component because they are an important target population group.
 Laboratory data are linked to other household interview and health component data and are used to track changes that occur in health over time.
- There is no reason to exclude mentally impaired or handicapped individuals because there is no contraindication.

Risks:

None

Special precautions:

None

Report of Findings:

Reported in the MEC:

Pregnancy Test

Reported from NCHS:

Other laboratory results

Bone Markers

Laboratory Measures:

Bone alkaline phosphatase and Urinary NTX

Public Health Objectives:

Evaluation of bone mineral status will utilize measures of total bone mineral content and bone mineral density two markers of bone turnover: Bone alkaline phosphatase, a formative marker in serum and NTX, a resorptive marker in urine.

It has been estimated that the annual cost of osteoporosis is about \$10 billion. The magnitude of this problem is likely to increase dramatically over the next few decades as the population ages. The risk of hip fractures (the most costly fractures in terms of morbidity, mortality and health care costs) begins to increase exponentially after age 65.

Important pieces of data are not currently available about the changes in bone mass in the population, especially in minority populations. There are no data on total body bone measures from a nationally representative sample. Measures of total body bone mineral content or density will allow researchers to gain insights into age, sex, and racial/ethnic differences in the skeleton relative to other measures of body composition such as total muscle and fat mass, as well as behavioral factors such as diet and activity.

Childhood and adolescence are the periods to target for intervention strategies in osteoporosis. Measurement in younger individuals will provide insight into early racial/ethnic differences in the rate of bone accretion. Furthermore, correlation of DXA measures with bone markers over age can provide information about the utility of these markers as surrogates for bone density or content when seeking age of peak bone mass or indicators of high or low bone turnover. This information is crucial to understanding when the best and most effective dietary intervention can be implemented to maximize peak bone mass.

NHANES is the only nationally representative survey that can shed light on when peak bone mass is attained and the degree of total body bone loss with age. This information is vital to all aspects of treatment and prevention of this disease and is particularly critical to government funding of related research, medical screening, treatment, and reimbursement programs.

Data on bone status and its relationship to age among racial ethnic groups can be used to target osteoporosis prevention programs to the most important age groups. The data from the DXA scans and the bone marker studies will also provide important reference distributions and allow studies of the association between bone status, diet, activity, and other body composition measures.

Health Measures, Eligibility, Report of Findings:

| Health Measure | Eligibility | Volume Required | Report of Findings Level | | |
|---------------------------|--------------|-----------------|-----------------------------|---|---|
| | υ, | 1 | 1 | 2 | 3 |
| Bone alkaline phosphatase | 10 and older | 500 uL | | | |
| Urinary NTX | 10 and older | 2 mL | | | |

Diabetes Profile

Laboratory Measures:

Glucose, Insulin, C-peptide and Glycohemoglobin

Public Health Objectives:

Diabetes mellitus will be assessed by measures of plasma glucose, insulin, c-peptide and glycohemoglobin in examinees ages 12 years and over.

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.

Health Measures, Eligibility, Report of Findings:

| ures, Engionity, Report of I | mumgs. | | | | | |
|------------------------------|--------------|-----------------|--------------------|---|---|--|
| | | | Report of Findings | | | |
| Health Measure | Eligibility | Volume Required | Level | | | |
| | | | 1 | 2 | 3 | |
| Glucose | 12 and older | 1 mL | | ~ | ~ | |
| Insulin/C-peptide | 12 and older | 1 mL | | | | |
| Glycohemoglobin | 12 and older | 400 uL | | V | ~ | |

Infectious Disease Profile

Laboratory Measures:

Cryptosporidium, Helicobacter pylori, Hepatitis viruses

Public Health Objectives:

Cryptosporidium

Cryptosporidium is an important cause of outbreaks of waterborne disease in the United States. In 1993, two outbreaks of cryptosporidiosis occurred in large metropolitan areas (Milwaukee and Las Vegas/Clark County) and were associated with deaths among immunocompromised persons. While these waterborne outbreaks are increasingly being recognized, it is unclear how much endemic waterborne cryptosporidiosis occurs due to low level contamination of drinking water. To provide an estimate of exposure to this organism, the prevalence of antibodies to Cryptosporidium will be measured in NHANES participants age 6-49 years. This estimate will support a CDC/EPA response to a Congressional mandate to evaluate the burden of waterborne disease in the United States.

Helicobacter pylori

This organism has been shown to be the causative agent in chronic-active gastritis, and evidence has almost completely satisfied Koch's postulates for this organisms' pathogenicity in primary duodenal ulcers. More recent evidence has suggested that chronic *H. pylori* infection as well as early age of *H. pylori*-acquisition is a critical precursor to gastric carcinoma. Although an explosion of research has occurred over the past decade, many fundamental questions remain to be answered. These questions must be addressed in a carefully considered manner that combines systematic, demographic epidemiology with the knowledge of *H. pylori* positivity or negativity. Furthermore, at-risk cohorts should be particularly examined to address unresolved controversies regarding route of transmission, environmental risk factors (i.e., food or water), inheritability or familial tendencies for infection susceptibility, factors leading to carcinogenesis, the demographics of susceptibility in very young children, and possible growth disturbances caused by *H. pylori* infection. Because NHANES will have numerous data on environmental exposures, these data can be analyzed to add information on potential route of transmission for this organism.

Hepatitis viruses

Viruses that primarily infect the liver constitute a major public health problem because of the morbidity and mortality associated with the acute and chronic consequences of these infections. New immunization strategies have been developed to eliminate transmission of hepatitis B and hepatitis A viruses in the United States. Because of the high rate of asymptomatic infection with both viruses, NHANES will provide the best means for determining the age-specific effectiveness of immunization strategies to prevent these infections. In addition, NHANES provides the means to better define the epidemiology of hepatitis viruses that were recently characterized, such as hepatitis C, E and G virus along with D and possibly F. In NHANES testing for markers of infection with the hepatitis viruses will be used to determine secular trends in infection rates across most age and racial/ethnic groups, and will provide a national picture of the epidemiologic determinants of these infections.

Health Measures, Eligibility, Report of Findings:

| Health Measure | lealth Measure Eligibility | | Report of Findings Level | | |
|---------------------|----------------------------|--------|-----------------------------|---|---|
| | | - | 1 | 2 | 3 |
| Cryptosporidium | 6-49 | 500 uL | | | |
| Helicobacter pylori | 3 and older | 200 uL | | | |
| Hepatitis viruses | 2-5 (anti-HBs),6+ | 1 mL | | / | |

Markers of Immunization Status

Laboratory Measures:

Measles, rubella, varicella.

Public Health Objectives:

Measles

Measles is a highly infectious disease which was targeted for elimination in the United States by the year 1996. The elimination strategy called for vaccination of all susceptible persons at age 12-15 months and at 4-11 years. NHANES will assess age-specific population immunity, taking into account vaccinees who never develop antibodies, persons who may lose immunity over time, and persons who are immune from natural disease. The U.S. measles elimination goal for 1996 came at a time when measles elimination was being considered as an achievable goal world-wide by the World Health Organization. If success can be demonstrated in the U.S. as well as other countries in the hemisphere, world-wide efforts to eliminate measles will be encouraged. The benefit from a study of measles seroprevalence will be to document age-specific immunity that is found following measles elimination efforts and to help judge the levels of immunity that are needed to eliminate measles.

Rubella

Congenital rubella syndrome (CRS) is the term used to describe the serious birth defects that occur among infants born to women infected with rubella while pregnant. A single rubella vaccination, usually given as measlesmumps-rubella (MMR) vaccine, is thought to confer lifelong immunity. Widespread use of the vaccine has resulted in near elimination of CRS in the United States. In recent years, an increasing proportion of rubella cases have been reported among adults, and outbreaks have occurred among persons of Hispanic ethnicity. Population-based rubella seroprevalence studies would provide valuable information about specific groups that lack rubella immunity and therefore could be targeted for immunization. Therefore serologic testing of NHANES participants will be conducted to document the level of immunity to rubella by race and ethnicity and allow comparison data from NHANES III.

Varicella

In March 1995, a vaccine for prevention of varicella (chicken pox) was licensed for use in persons 1 year of age and older. Wide use of the vaccine may change the epidemiology of the disease with a shift in incidence to older persons who are at higher risk than are younger persons for more severe disease and complications. Older persons may have severe complications such as encephalitis and/or death if they develop varicella. Additionally, pregnant women can pass on varicella if they develop it in the last weeks of gestation with severe life-threatening consequences to the newborn. NHANES provides a unique opportunity to assess changes in the seroprevalence of immunity to varicella after introduction of the vaccine. Demographic data on immune and susceptible persons will help target vaccination programs toward groups at risk for disease.

| | | | rt of Fi | ndings | |
|----------------|-------------|-----------------|----------|--------|---|
| Health Measure | Eligibility | Volume Required | | Level | _ |
| | | | 1 | 2 | 3 |
| Measles | 6-49 | 100 uL | | | |
| Rubella | 6-49 | 200 uL | | | |
| Varicella | 6-49 | 100 uL | | | |

Miscellaneous Laboratory Assays

Laboratory Measures:

C-reactive protein, Fibrinogen, Latex allergy, Standard Biochemical Profile includes Alanine Aminotransferase (ALT), Albumin, Alkaline Phosphatase (ALP), Aspartate Aminotransferase (AST), Bicarbonate (HCO₃), Blood Urea Nitrogen (BUN), Calcium, Cholesterol, Creatinine, Gamma Glutamyltransaminase (γ-GT), Glucose, Iron, Lactate Dehydrogenase (LDH), Phosphorus, Sodium, Potassium, and Chloride, Total Bilirubin, Total Protein, Triglycerides, and Uric Acid.

Public Health Objectives:

C-reactive protein

C-reactive protein is considered to be one of the best measures of the acute phase response to an infectious disease or other cause of tissue damage and inflamation. It is used to correct the iron status measures which are affected by inflammation. It can also be used to measure the body's response to inflammation from chronic conditions, such as arthritis, and environmental exposures to agents such as tobacco smoke.

Fibrinogen

Fibrinogen is an essential blood clotting factor and is also involved in a range of other functions, including platelet aggregation and smooth muscle proliferation. A growing body of evidence has identified fibrinogen as an important risk factor for cardiovascular disease, the major cause of death in the U.S. The objective of including this measure is to provide data on laboratory, clinical, and socio-demographic correlates of fibrinogen levels. Of particular importance in NHANES, the data will be used to study the relationship between fibrinogen levels and clinically measured lower extremity arterial blood flow as assessed by the Ankle-Brachial Index in the Lower Extremity Disease component.

Latex allergy

Since the late 1980's, the number of reports of hypersensitivity reactions to natural rubber latex has risen dramatically, occurring concomitantly with the increased demand for and use of latex products that resulted from the introduction of guidelines to prevent the transmission of blood borne pathogens (e.g., hepatitis B, HIV). The emergence of latex allergy now represents a significant public health problem. Serologic screening for latex-specific IgE in NHANES will provide an estimate of the prevalence of latex sensitization, enable determination of secular trends in the emergence of this problem and help delineate demographic factors (e.g., age, occupation) for the development of latex sensitization. Data collected during the survey will be used to identify other at-risk groups and to formulate strategies/guidelines for the prevention of latex sensitization and, ultimately, life-threatening hypersensitivity reactions.

Standard biochemical profile

This battery of measurements are used in the diagnosis and treatment of certain liver, heart, and kidney diseases, acid-base imbalance in the respiratory and metabolic systems, other diseases involving lipid metabolism and various endocrine disorders as well as other metabolic or nutritional disorders.

- Alanine Aminotransferase (ALT)
 Alanine aminotransferase measurements are used in the diagnosis and treatment of certain liver diseases (e.g., viral hepatitis and cirrhosis) and heart diseases. Elevated levels of the transaminases can indicate myocardial infarction, hepatic disease, muscular dystrophy, or organ damage. Serum elevations of ALT activity are rarely observed except in parenchymal liver disease, since ALT is a more liver-specific enzyme than asparate aminotransferase (AST).
- Albumin
 Albumin measurements are used in the diagnosis and treatment of numerous diseases primarily involving the liver or kidneys.
- c. Alkaline Phosphatase (ALP)
 Increased ALP activity is associated with two groups of diseases: those affecting liver function and those involving osteoblastic activity in the bones. In hepatic disease, an increase in ALP activity is generally accepted as an indication of biliary obstruction. An increase in serum phosphatase activity is associated with primary hyperparathyroidism, secondary hyperparathyroidism owing to chronic renal disease, rickets, and osteitis deformans juvenilia due to vitamin D deficiency and malabsorption or renal tubular dystrophies. Increased levels of ALP are also associated with Von Recklinghausen's disease with bone involvement and

malignant infiltrations of bone. Low levels are associated with hyperthyroidism, and with the rare condition of idiopathic hypophosphatasia associated with rickets and the excretion of excess phosphatidyl ethanolamine in the urine.

d. Aspartate Aminotransferase (AST)

AST measurements are used in the diagnosis and treatment of certain types of liver and heart disease. Elevated levels of the transaminases can signal myocardial infarction, hepatic disease, muscular dystrophy, or organ damage.

e. Bicarbonate (HCO₃)

Together with pH determination, bicarbonate measurements are used in the diagnosis and treatment of numerous potentially serious disorders associated with acid-base imbalance in the respiratory and metabolic systems.

f. Blood Urea Nitrogen (BUN)

BUN measurements are used in the diagnosis of certain renal and metabolic diseases. The determination of serum urea nitrogen is the most widely used test for the evaluation of kidney function. The test is frequently requested in conjunction with the serum creatinine test for the differential diagnosis of prerenal, renal, and postrenal uremia. High BUN levels are associated with impaired renal function, increased protein catabolism, nephritis, intestinal obstruction, urinary obstruction, metallic poisoning, cardiac failure, peritonitis, dehydration, malignancy, pneumonia, surgical shock, Addison's disease, and uremia. Low BUN levels are associated with amyloidosis, acute liver disease, pregnancy, and nephrosis. Normal variations are observed according to a person's age and sex, the time of day, and diet, particularly protein intake .

g. Calcium

Elevated total serum calcium levels are associated with idiopathic hypercalcemia, vitamin D intoxication, hyperparathyroidism, sarcoidosis, pneumocystic carinii pneumonia and blue diaper syndrome. Low calcium levels are associated with hypoparathyroidism, pseudohypoparathyroidism, chronic renal failure, rickets, infantile tetany, and steroid therapy.

h. Cholesterol

An elevated cholesterol level is associated with diabetes, nephrosis, hypothyroidism, biliary obstruction, and those rare cases of idiopathic hypercholesterolemia and hyperlipidemia; low levels are associated with hyperthyroidism, hepatitis, and sometimes severe anemia or infection.

i. Creatinine

Creatinine measurement serves as a test for normal glomerular filtration. Elevated levels are associated with acute and chronic renal insufficiency and urinary tract obstruction. Levels below 0.6 mg/dL are of no significance.

j. Gamma Glutamyltransaminase (γ-GT)

 γ -GT measurement is principally used to diagnose and monitor hepatobiliary disease. It is currently the most sensitive enzymatic indicator of liver disease, with normal values rarely found in the presence of hepatic disease. It is also used as a sensitive screening test for occult alcoholism. Elevated levels are found in patients who chronically take drugs such as phenobarbital and phenytoin.

k. Glucose

Glucose measurements are used in the diagnosis and treatment of pancreatic islet cell carcinoma and of carbohydrate metabolism disorders, including diabetes mellitus, neonatal hypoglycemia, and idiopathic hypoglycemia.

l. Iron

Iron (non-heme) measurements are used in the diagnosis and treatment of diseases such as iron deficiency anemia, chronic renal disease, and hemochromatosis (a disease associated with widespread deposit in the tissues of two iron-containing pigments, hemosiderin and hemofuscin, and characterized by pigmentation of the skin).

m. Lactate Dehydrogenase (LDH)

LDH measurements are used in the diagnosis and treatment of liver diseases such as acute viral hepatitis, cirrhosis, and metastatic carcinoma of the liver; cardiac diseases such as myocardial infarction; and tumors of the lungs or kidneys.

n. Phosphorus

There is a reciprocal relationship between serum calcium and inorganic phosphorus. Any increase in the level of inorganic phosphorus causes a decrease in the calcium level by a mechanism not clearly understood. Hyperphosphatemia is associated with vitamin D hypervitaminosis, hypoparathyroidism, and renal failure. Hypophosphatemia is associated with rickets, hyperparathyroidism, and Fanconi syndrome. Measurements of inorganic phosphorus are used in the diagnosis and treatment of various disorders, including parathyroid gland and kidney diseases and vitamin D imbalance.

o. Sodium, Potassium, and Chloride

Hyponatremia (low serum sodium level) is associated with a variety of conditions, including severe polyuria, metabolic acidosis, Addison's disease, diarrhea, and renal tubular disease. Hypernatremia (increased serum sodium level) is associated with Cushing's syndrome, severe dehydration due to primary water loss, certain types of brain injury, diabetic coma after therapy with insulin, and excess treatment with sodium salts.

Hypokalemia (low serum potassium level) is associated with body potassium deficiency, excessive potassium loss caused by prolonged diarrhea or prolonged periods of vomiting and increased secretion of mineralocorticosteroids. Hyperkalemia (increased serum potassium level) is associated with oliguria, anuria, and urinary obstruction.

Low serum chloride values are associated with salt-losing nephritis, Addisonian crisis, prolonged vomiting, and metabolic acidosis caused by excessive production or diminished excretion of acids. High serum chloride values are associated with dehydration and conditions causing decreased renal blood flow, such as congestive heart failure.

- p. Total Bilirubin
 - Elevated levels are associated with hemolytic jaundice, paroxysmal hemoglobinuria, pernicious anemia, polycythemia, icterus neonatorum, internal hemorrhage, acute hemolytic anemia, malaria, and septicemia. Low bilirubin levels are associated with aplastic anemia, and certain types of secondary anemia resulting from toxic therapy for carcinoma and chronic nephritis .
- q. Total Protein Total protein measurements are used in the diagnosis and treatment of a variety of diseases involving the liver, kidney, or bone marrow, as well as other metabolic or nutritional disorders.
- Triglycerides
 Triglyceride measurements are used in the diagnosis of diabetes mellitus, nephrosis, liver obstruction, and other diseases involving lipid metabolism and various endocrine disorders and in the treatment of patients with these diseases .
- s. Uric Acid
 Uric acid measurements are used in the diagnosis and treatment of numerous renal and
 metabolic disorders, including renal failure, gout, leukemia, psoriasis, starvation or other
 wasting conditions and in the treatment of patients receiving cytotoxic drugs.

| ures, Engionity | y, Report of Fir | iumgs. | | | | |
|-----------------|------------------|--------------|-----------------|-------|------------------------|-------------|
| Health I | Measure | Eligibility | Volume Required | Repor | t of Fir Level 2 | ndings 3 |
| C-reactiv | e protein | 3 and older | 300 uL | | | |
| Fibrii | nogen | 40 and older | 1 uL | | | |
| Latex | allergy | 12-59 | 500 uL | | | |
| | ALT | | | | / | / |
| | AST | | | | ~ | ~ |
| | Albumin | | | | ~ | ~ |
| | Alkaline | | | | | ~ |
| | Phosphatase | | | | | |
| | Bicarbonate | | | | ~ | ~ |
| | BUN | | | | ~ | ~ |
| | Calcium | | | | ~ | ~ |
| | Cholesterol | | | | | * |
| | Creatinine | | | | ~ | ~ |
| | GGT | | | | | ~ |
| Biochemistry | Glucose | 12 and older | 1 mL | | | * |
| profile | Iron | | | | | * |
| | LDH | | | | | ~ |
| | Phosphorus | | | | ~ | ~ |
| | Sodium | | | | ~ | ~ |
| | Potassium | | | | ~ | ~ |
| | Chloride | | | | ~ | ~ |
| | Total | | | | ~ | ~ |
| | Bilirubin | | | | | |
| | Total Protein | | | | ~ | ~ |
| | Triglycerides | | | | | * |
| | Uric Acid | | | | V | V |

^{*} Value reported from different assay

Kidney Disease Profile

Laboratory Measures:

Serum creatinine, blood urea nitrogen and diabetic status, urinary albumin and creatinine

Public Health Objectives:

The purpose of the kidney and urologic diseases portion of the NHANES is to determine prevalence of specific nephrologic and urologic conditions in the population; to determine the association between health conditions such as diabetes and hypertension and the development of kidney and urologic diseases; to monitor trends in the prevalence of these diseases and their risk factors over time. These data will be used to assist in planning for initiatives and other programs for the prevention and treatment of nephrologic and urologic diseases.

Blood specimens will be used to obtain measures of serum creatinine, blood urea nitrogen and diabetic status; urinary albumin and creatinine will be measured. Self-reported information on chronic analgesic use and incontinence will be collected.

The incidence of end stage kidney failure is increasing rapidly in the U.S. in adults of all age groups which implies that the prevalence of progressive renal impairment is also increasing. However, little information is known about the prevalence of chronic renal impairment on a national level. Urologic disease, including urinary incontinence affect a large proportion of the population. Little nationally representative data on the prevalence and risk factors associated with these conditions are available.

| Health | Measure | Eligibility | Volume Required | Repor | t of Fir Level | dings |
|--------|-----------------------|--------------|-----------------|-------|-------------------|-------|
| | | , | 1 | 1 | 2 | 3 |
| | e/blood urea rogen | 12 and older | 1 mL | | > | > |
| | albumin and atinine | 6 and older | 2 mL | | | |

Hormone Profile

Laboratory Measures:

Follicle stimulating hormone (FSH), Luteinizing hormone (LH), Thyroid stimulating hormone (TSH), thyroxin (T4), pregnancy test.

Public Health Objectives:

- Follicle stimulating hormone, luteinizing hormone
- Serum FSH and LH levels and questionnaire data on menstrual history will be used to classify
 women according to menopausal status. This information and data on exogenous hormone use
 are important for evaluating women's risk for certain health conditions such as cardiovascular
 disease and osteoporosis (see reproductive health questionnaire section).
- Thyroid stimulating hormone, thyroxine
- Serum TSH and T4 levels will be used to assess thyroid function and will provide populationbased reference information on these hormone levels. Thyroid function will be examined in relation to measures of exposure to endocrine disrupting substances, which are hypothesized to effect thyroid function (see laboratory protocol for environmental exposure assessments).
- Pregnancy test
- Information on current pregnancy status will be used to exclude participants from the DXA
 examination and for interpretation of current nutritional status and body measures.

| <u> </u> | . 6 | | | | | |
|-----------------------|------------------|-----------------|---|-------------------|-------------|--|
| II. 141 M | H M M | | | Report of Finding | | |
| Health Measure | Eligibility | Volume Required | | Level | | |
| | | | 1 | 2 | 3 | |
| Serum: FSH/LH | 35-60 females | 0.5 mL | | | > | |
| Serum: TSH/T4 | 12+ (1/3 sample) | 1 mL | | > | > | |
| Urine: Pregnancy Test | 18 – 59 females | 1 mL | | | 1 | |

Nutritional Biochemistries and Hematologies

Laboratory Measures:

Complete blood count

Erythrocyte protoporphyrin

Serum folate

RBC folate

Serum iron & TIBC

Serum ferritin

Serum vitamin A

Serum vitamin E

Serum carotenoids

Plasma homocysteine

Serum vitamin B₁₂

Public Health Objectives:

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.

| | | | Repo | rt of Fii | ndings |
|-------------------------------|-------------|-----------------|------|-----------|----------|
| Health Measure | Eligibility | Volume Required | | Level | |
| | | | 1 | 2 | 3 |
| Complete blood count | 1 and older | 300 uL | | / | / |
| Erythrocyte protoporphyrin | 1 and older | 400 uL | | | / |
| Serum folate | 3 and older | 1 mL | | / | / |
| RBC folate | 3 and older | 100 uL | | / | / |
| Serum iron & TIBC | 1 and older | 1.25 mL | | | / |
| Serum ferritin | 1 and older | 1.25 mL | | / | / |
| Transferrin saturation | 1 and older | 1.25 mL | | / | / |
| Serum vitamin A | 3 and older | 400 uL | | / | / |
| Serum vitamin E | 3 and older | 400 uL | | | |
| Serum carotenoids | 3 and older | 400 uL | | | |
| Retinyl esters | 3 and older | 400 uL | | | |
| Plasma homocysteine | 3 and older | 1 mL | | | |
| Selenium | 3 and older | 1 mL | | | |
| Methyl malonic acid | 3 and older | 1 mL | | | |
| Serum vitamin B ₁₂ | 3 and older | 1 mL | | / | / |

Sexually Transmitted Disease Profile

Laboratory Measures:

Chlamydia trachomatis, Neisseria gonorrhoeae, Herpes simplex 1 and 2, HIV

Public Health Objectives:

Chlamydia trachomatis and Neisseria gonorrhoeae (Urine Test)

Sexually transmitted infections caused by Chlamydia trachomatis and Neisseria gonorrhoeae may lead to pelvic inflammatory disease, ectopic pregnancy, infertility, and chronic pelvic pain in women. They may also increase the risk of HIV transmission in women. Pregnant women may transmit infection to their newborn causing serious medical complications. At the present the prevalence of chlamydial and gonococcal infection in the general population of the United States is unknown. NHANES offers an opportunity to assess the prevalence of chlamydial and gonococcal infection in the general population and to monitor trends in prevalence as prevention programs are established and expanded.

Herpes simplex 1 and 2 (Blood Test)

Sera from NHANES subjects ages 14-49 will be tested for antibody to Herpes simplex 1 and 2 (HSV-1/2) to continue to monitor the prevalence of HSV-1/2 infection in the U.S. HSV-1 is a common chronic infection that is associated with lower socioeconomic status. HSV-2 is an index of sexually transmitted infections. In addition, questions about those sexual behaviors that are risk factors for sexually transmitted infections and that are the focus of major national HIV and sexually transmitted diseases risk reduction efforts will be included. The joint availability of sexually transmitted infection and risk factor data in a national sample on a periodic basis is a unique and invaluable resource for evaluation of national HIV/STD risk reduction efforts and for risk-based modeling of the frequency and trends of sexually transmitted infections.

HSV-2 infections are rarely life threatening, but morbidity due to recurrent genital ulcerations is substantial. Just as important, HSV-2 infection is the best current marker of sexual behavior risk factors leading to sexually transmitted infections, generally, because: (a) HSV-2 infections are common and, thus, HSV-2 rates are a sensitive measure of sexually transmitted infection risk factors; (b) HSV-2 infection is almost always a result of sexual transmission and, thus, a specific measure of sexually transmitted infection; (c) HSV-2 infections are not curable and, thus, HSV-2 risk is not influenced by health care seeking factors; and (d) sensitive, specific, and relatively inexpensive tests for HSV-2 antibody are available. HSV-2 is a very important index of the success of large national efforts, motivated by the acquired immunodeficiency epidemic, to reduce risky sexual behaviors.

HIV antibody (Blood or Urine Test)

The estimated prevalence of human immunodeficiency virus (HIV) infection in the United States population is an important measure of the extent of the medical and financial burden the nation faces due to this virus. NHANES III data on HIV infection during 1988-94 will serve as a baseline for monitoring the changes in the epidemic over time in the general population of the United States. In addition to HIV testing in NHANES, whole blood samples will be collected and stored for future CD4 testing once the HIV status of the sample is known. This will allow CDC to determine the distribution of CD4 cells in a random sample of HIV positive individuals. NHANES is now the only national survey collecting blood on a population based sample, therefore it will be a key element in future estimates. If the participant refuses phlebotomy but does not refuse the HIV test urine will be tested for HIV antibody.

| | | | Repor | t of Fir | ndings |
|-------------------------|-------------|-----------------|-------|----------|--------|
| Health Measure | Eligibility | Volume Required | | Level | |
| | | | 1 | 2 | 3 |
| Chlamydia trachomatis/ | 14-39 | 4 mL | | * | ~ |
| Neisseria gonorrhoeae | | | | | |
| Herpes 1 and 2 antibody | 14-49 | 500 uL | | * | / |
| HIV antibody | 18-49 | 500 uL | | * | ~ |

^{*} Persons with positive STD or HIV findings will be referred for counseling and treatment.

Justification for using vulnerable populations:

- Teenagers are included because they are at increasing risk for STD's. A pilot study in NHANES III demonstrated an increased prevalence chlamydial infection starting at age 14 years (whites 4%, blacks 12% Mexican Americans 6%).
- Mentally impaired persons will be excluded from the STD profile due to NCHS' inability to
 provide adequate support and counseling to this group with the test result.

Tobacco Use

Laboratory Measures:

Serum Cotinine

Public Health Objectives:

Tobacco use (primarily cigarette smoking) has been associated with acute and chronic lung cancer, asthma, increased incidence of respiratory illness, and cardiovascular disease among nonsmokers including pregnant women, fetuses and children. Data from NHANES III showed that almost 90% of non-tobacco users are exposed to environmental tobacco smoke.

The specific aims of the component are: 1) to measure the prevalence and extent of tobacco use from biochemical indicators (cotinine) and self-report; 2) to estimate the extent of exposure to environmental tobacco smoke (ETS), and determine trends in exposure to ETS; and 3) to describe the relationship between tobacco use (and/or ETS) and chronic health conditions (e.g., respiratory and cardiovascular diseases) and other biochemical measurements .

Staff:

MEC Interviewer, Certified Phlebotomist

Protocol:

Methods:

- The tobacco component for NHANES will include questionnaire items on current and past use of cigarettes, pipes, cigars and smokeless tobacco. Exposure to ETS at home and at work and in-utero ETS exposure among children will also be obtained. In addition, use of nicotine replacement products (e.g., gum and patch) will be collected using questionnaires.
- Nicotine exposure will be assessed for examinees 3 years of age and older through the measurement of serum cotinine, a metabolite of nicotine.

Time Allotment:

- Part of a 10 minute venipuncture
- Part of a 15-20 minute interview

| | | | Report of Findings | | | |
|----------------|--------------|-----------------|--------------------|-------|---|--|
| Health Measure | Eligibility | Volume Required | | Level | | |
| | | | 1 | 2 | 3 | |
| Cotinine | 3-11 | 1.5 mL | | | | |
| | 12 and older | 2 mL | | | | |

Blood lipids

Laboratory Measures:

Total Cholesterol, HDL- Cholesterol, LDL-Cholesterol, Triglycerides

Public Health Objectives:

The goals of this component are: 1) to monitor the prevalence and trends in major cardiovascular conditions and risk factors in the U.S.; 2) to establish baseline national data for the ankle-brachial (ankle-arm) pressure index; and 3) to evaluate prevention and treatment programs targeting cardiovascular disease in the U.S.

The main element of the cardiovascular disease laboratory component in NHANES is blood lipid levels. Cardiovascular disease is the leading cause of death in the United States. An estimated 4.8 million Americans have congestive heart failure. Increasing prevalence, hospitalizations, and deaths have made congestive heart failure a major chronic condition in the United States.

The data will be used to: 1) monitor the status of hypertension prevalence, awareness, treatment and control and the success of the National HBP Education Program; 2) monitor the status of hyperlipidemia and the success of the National Cholesterol Education Program; 3) estimate the prevalence of congestive heart failure and compare to the baseline data from the NHANES I; and 4) establish baseline national data on peripheral vascular disease as indicated by the ankle-brachial pressure index.

| | | | Repo | ort of Findings | |
|-------------------|-------------|-----------------|------|-----------------|---|
| Health Measure | Eligibility | Volume Required | | Level | |
| | | _ | 1 | 2 | 3 |
| Total cholesterol | 3 and older | +++ | | / | ~ |
| HDL-Cholesterol | 3 and older | +++ | | | ~ |
| LDL-Cholesterol | 3 and older | calculated | | | ~ |
| Triglycerides | 3 and older | +++ | | V | ~ |

⁺⁺⁺ For all four assays 200 uL used for children 3-5 years and 2ml used for persons 6 years and older

Environmental Health Profile

Laboratory Measures:

Blood lead; blood cadmium; blood mercury; serum persistent pesticides; serum noncoplanar polychlorinated biphenyls (PCBs); serum dioxins, furans, and coplanar PCBs; serum and urine levels of phytoestrogens; urine levels of non-persistent pesticides and metabolites; urine heavy metals; urine phthalates; urine polyaromatic hyrdrocarbons.

Public health objective:

Lead

Lead is a known environmental toxin that has been shown to deleteriously affect the nervous, hematopoietic, endocrine, renal and reproductive systems. In young children, lead exposure is a particular hazard because children more readily absorb lead than do adults, and children's developing nervous systems also make them more susceptible to the effects of lead. The primary sources of exposure for children are lead-laden paint chips and dust as a result of deteriorating lead-based paint. The risk for lead exposure is disproportionately higher for children who are poor, non-Hispanic black, living in large metropolitan areas, or living in older housing. Among adults, the most common high exposure sources are occupational.

Blood lead levels measured in previous NHANES programs have been the cornerstone of lead exposure surveillance in the U.S. The data have been used to document the burden of and dramatic decline of elevated blood lead levels; to promote the reduction of lead use; and to help to redefine national lead poisoning prevention guidelines, standards and abatement activities.

Mercury

Uncertainties exist regarding levels of exposure to methyl mercury from fish consumption and potential health effects resulting from this exposure. Past estimates of exposure to methyl mercury has been obtained from results of food consumption surveys and measures of methyl mercury in fish. Measures of a biomarker of exposure are needed for improved exposure assessments. Both blood and hair mercury levels will be assessed in two subpopulations particularly vulnerable to the health effects from mercury exposure: children 1-5 years old and women of child bearing age. Women of childbearing age will also haave a urine mercury test. Blood measures of total and inorganic mercury will be important for evaluation of exposure from exposure to mercury in interior latex paints.

Persistent organochlorines (persistent pesticides, PCBs, dioxins)

Organochlorines are diverse, synthetic chemicals that are persistent in the environment and tend to bioaccumulate. Most of these chemicals are banned in the U.S. Assessment of exposure to persistent organochlorines in a representative samples of the U.S. population is needed to determine current prevalence and level of exposure and the potential for human health threat from exposure to these chemicals.

Non-persistent pesticides

Pesticide residues and their metabolites in human tissues and fluids can be indicative of pesticide exposure and the total body burden of these pesticides. Little information is available concerning residential or household exposures to pesticides among the general population. Sufficient data do exist, however, from surveys or other focused research efforts to suggest that household exposure to certain common pesticides can be extensive and might be of significant public health concern. Pesticides of particular concern are: chlorpyrifos, 2,4-D, diazinon, permethrin, ortho-phenyl phenol, methyl parathion, and organophosphate pesticides.

Heavy metals

Trace metals have been associated with adverse health effects in occupational studies or laboratory studies, but have not been monitored in general population groups. Information on levels of exposure to these compounds is essential to determine the need for regulatory mechanisms to reduce the levels of hazardous pollutants to which

the general population is exposed and to establish population-based reference intervals for several potentially toxic metals.

Phthalates

Phthalate acid esters (phthalates) are used extensively as plasticizers in a wide range of applications such as children's toys, food packaging, and medical supplies. Because some of these compounds are known to be estrogenic and have been associated with a host of health problems in rats, such as cancers and teratogenicity, governments in Europe and Japan have become increasingly concerned about levels in food packaging materials and children's toys. Biomeasures of phthalates in humans is necessary to evaluate potential human health threats from exposure to these chemicals.

Polyaromatic Hydrocarbons (PAHs)

PAHs constitute a group of chemicals which are formed during the imcomplete combustion of coal, oil and gas, garbage, and other organic substances. These compounds require metabolic activation prior to their interactions with cellular macromolecules. PAHs are ubiquitous, thus exposure to them is widespread. In general, people are exposed to mixtures of PAHs, the sources of which include vehicle exhausts, asphalt roads, coal, coal tar, wild fires, agricultural burning, charbroiled foods, and hazardous waste sites. Altough most of the data regarding the carcinogenicity of these compounds comes from rats and mice, epidemiologic studies have shown increased mortality due to lung and bladder cancer in humans exposed to coke-oven emissions, roofing-tar emmissions, and cigarette smoke. PAHs enter the body quickly and easily by all routes of exposure and are readily and predominantly metabolized to hydroxylated metabolites as well as glucuronide metabolites. These metabolites are excellent indicators of exposure to the parent PAHs. While background level ranges of PAHs in air and water are known, the equivalent metabolite background levels in humans are not known. Because of increased epidemiologic data relating PAH exposure to cancer incidence, biomonitoring PAH metabolites in humans is very important.

Phytoestrogens

Many different plants produce compounds, called phytoestrogens, that mimic or interact with estrogen. The major classes of phytoestrogens are lignans (present in flaxseed, carrots, berries,and grapes) and isoflavones (present in soybeans and other legumes). Biomeasures of phytoestrogens are necessary to establish reference ranges for these compounds and to evaluate their potential effects on human health.

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|---------------|----------------------------------|-------------|---|-------|-------------------|-------|
| | | | | Repor | t of Fin Level | dings |
| | Health measure | Eligibility | Volume required | 1 | 2 | 3 |
| Blood | Lead/Cadmium | 1 and older | 0.2 mL (1-5 years) 0.5 mL (6+ years) | | / | |

| Blood Urine | Mercury | 1-5 women 16-49 | 0.5 mL | / | |
|----------------|---|--------------------|--------|----------|--|
| Serum | Persistent pesticides* Alpha Chlordane Aldrin Beta-hexachloro- cyclohexane cis-Nonachlor Dieldrin Endrin Gamma Chlordane Gamma-Hexachloro- cyclohexane Hexachlorobenzene Heptachlor Epoxide Lindane Mirex Nitrobenzene o,p'-DDD o,p'-DDE o,p'-DDT Oxychlordane p,p'-DDD p,p'-DDE p,p'-DDT trans-Nonachlor | 12+ (1/3 sample) | 4 mL | | |

| Serum | Noncoplanar PCBs* PCB 19 PCB 28 PCB 44 PCB 49 PCB 52 PCB 56 PCB 60 PCB 66 PCB 74 PCB 87 PCB 99 PCB 101 PCB 105 PCB 110 PCB 118 PCB 128 PCB 138 PCB 146 PCB 149 PCB 151 PCB 153 PCB 156 PCB 157 PCB 156 PCB 157 PCB 158 PCB 167 PCB 170 PCB 172 PCB 170 PCB 170 PCB 172 PCB 180 PCB 183 PCB 180 PCB 183 PCB 187 PCB 189 PCB 191 PCB 193 PCB 193 PCB 194 PCB 195 PCB 196 PCB 201 PCB 203 PCB 206 PCB 209 Total Polychlorinated Biphenyls (sum of all) | 12+ (1/3 sample) | test conducted on same aliquot used for persistent pesticides. | | |
|-------|---|------------------|--|--|--|

| Serum | Dioxins, Furans, | 12+ (1/3 sample) | 4 mL | | |
|--------|--|------------------|----------------|--|--|
| | Coplanar PCBs* 2,3,7,8-Tetrachloro- | (| | | |
| | dibenzo-p-dioxin (tcdd) | | | | |
| | 1,2,3,7,8-Pentachloro- | | | | |
| | dibenzo-p-dioxin (pncdd) 1,2,3,4,7,8-Hexachloro- | | | | |
| | dibenzo-p-dioxin (hxcdd) | | | | |
| | 1,2,3,6,7,8-Hexachloro- | | | | |
| | dibenzo-p-dioxin (hxcdd) 1,2,3,7,8,9-Hexachloro- | | | | |
| | dibenzo-p-dioxin (hxcdd) | | | | |
| | 1,2,3,4,6,7,8-Heptachloro- | | | | |
| | dibenzo-p-dioxin (hpcdd) 1,2,3,4,6,7,9-Heptachloro- | | | | |
| | dibenzo-p-dioxin (hpcdd) | | | | |
| | 1,2,3,4,6,7,8,9-Octachloro- | | | | |
| | dibenzo-p-dioxin (ocdd) 2,3,7,8,-Tetrachloro- | | | | |
| | dibenzofuran (tcdf) | | | | |
| | 1,2,3,7,8-Pentachloro- | | | | |
| | dibenzofuran (pncdf) 2,3,4,7,8-Pentachloro- | | | | |
| | dibenzofuran (pncdf) | | | | |
| | 1,2,3,4,7,8-Hexachloro- dibenzofuran (hcxdf) | | | | |
| | 1,2,3,6,7,8-Hexachloro- | | | | |
| | dibenzofuran (hxcdf) | | | | |
| | 1,2,3,7,8,9-Hexachloro- dibenzofuran (hxcdf) | | | | |
| | 2,3,4,6,7,8,-Hexchloro- | | | | |
| | dibenzofuran (hxcdf) | | | | |
| | 1,2,3,4,6,7,8-Heptachloro- dibenzofuran (hpcdf) | | | | |
| | 1,2,3,4,7,8,9-Heptachloro- | | | | |
| | dibenzofuran (Hpcdf) | | | | |
| | 1,2,3,4,6,7,8,9-Octachloro- dibenzofuran (ocdf) | | | | |
| | 3,3',4,4',5-Pentachloro- | | | | |
| | biphenyl (pncb) | | | | |
| | 3,3',4,4'-Tetrachloro- biphenyl (tcb) | | | | |
| | 3,3',4,4',5-Tetrachloro- | | | | |
| | biphenyl (tcb) | | | | |
| | 3,3',4,4',5,5'-Hexachloro- biphenyl (hxcb) | | | | |
| Serum, | Phytoestrogens* | serum: | serum: 4 mL | | |
| Urine | Coumestrol | 12+ (1/3 sample) | | | |
| | Daidzein Enterodiol | urine: | urine: 3 mL | | |
| | Enterodioi | 6+ (1/3 sample) | ullile. S IIIL | | |
| | Equol | | | | |
| | Genistein Matairesinol | | | | |
| | o-Desmethylangolensin (O- | | | | |
| | DMA) | | | | |
| | | | | | |

| | | <u> </u> | | | |
|-------|--|---------------------------------------|-------|--|--|
| Urine | non-persistent pesticides* 1-Naphthol 2,4,5-T 2,4,5-Tricholorphenol 2,4-D 2,4-Dichlorophenol 2,5-Dichlorophenol 2-Isopropoxyphenol 2-Naphthol 3,5,6-Trichloropyridinol 3,4-Dichloroaniline 3-Phenoxy benzoic acid Alachlor mercapturate Atrazine mercapturate Carbofuranphenol DEET Dicamba Glyphosate Malathion di-acid Metolachlor mercapturate Oxypyrimidine Paranitrophenol Pentachlorophenol o-Phenyl phenol | 6-11 (1/2 sample) 12+ (1/4 sample) | 10 mL | | |
| Urine | organophosphate pesticide screen* Dimethylphosphate Diethylphosphate Dimethylthiophosphate Diethylthiophosphate Dimethyldithiophosphate Dimethyldithiophosphate | 6-11 (1/2 sample) 12+ (1/4 sample) | 10 mL | | |
| Urine | Heavy Metals* Antimony Barium Beryllium Cesium Chromium Cobalt Iodine Lead Manganese Mercury (total) Molybdenum Platinum Thallium Thorium Tin Tungsten Uranium | 6+ (1/3 sample) | 10 mL | | |

| Urine | Pthalates* Bisphenol A Mono-(2-ethyl)-hexyl phthalate Mono-benzyl phthalate Mono-cyclohexyl phthalate Mono-ethyl phthalate Mono-isodecyl phthalate Mono-isononyl phthalate Mono-n-butyl phthalate Mono-n-butyl phthalate Mono-n-octyl phthalate Nonyl-phenol | 6+ (1/3 sample) | 3 mL | | |
|-------|--|-----------------|------|--|--|
| Urine | Polyaromatic hydrocarbons* 1-Hydroxy-aniline 1-Hydroxy-benzo[b] fluoranthene 1-Hydroxy-chrysene 1-Hydroxy-naphthalene 1-Hydroxy-pyrene 2-Hydroxy-aniline 2-Hydroxy-naphthalene 2-Hydroxy-benz[a] anthracene 3-Hydroxy-benzo[a] pyrene 3-Hydroxy-benzo[a] pyrene 3-Hydroxy-benzo[b] fluoranthene 3-Hydroxy-fluorene 3-Hydroxy-phenanthrene Hydroxy-benzo[a] fluoranthene Hydroxy-benzo[a] fluoranthene Hydroxy-benzo[a] fluoranthene Hydroxy-benzo[a] fluoranthene Hydroxy-benzo[g,h] perylene Hydroxy-benzo[j] fluoranthene Hydroxy-benzo[k] fluoranthene Hydroxy-fluoranthene Hydroxy-fluoranthene Hydroxy-fluoranthene Hydroxy-indeno[1,2,3-cd] pyrene Hydroxy-perylene | 6+ (1/3 sample) | 3 mL | | |

^{*}See Appendix 30, Strategy for Reporting Environmental Analytes