



# National Health and Nutrition Examination Survey (NHANES)

## Physician Examination Procedures Manual



January 2007

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# 1. OVERVIEW OF THE NATIONAL HEALTH AND NUTRITION EXAMINATION SURVEY

This chapter provides a general history and description of the National Health and Nutrition Examination Survey (NHANES), and an overview of the tasks that staff perform during the survey.

## 1.1 History

The National Health Survey Act, passed in 1956, provided the legislation authorizing for a survey to provide current statistical data on the amount, distribution, and effects of illness and disability in the United States. NHANES was created to fulfill the purpose of this act. The NHANES 99 for 2004 was the eighth in a series of national examination studies conducted in the United States since 1960, but effective in 2005, NHANES has become a continuous field survey with year-round data collection.

To fulfill the purposes of this act, it was recognized that data collection would involve at least three sources: (1) direct interviews with Americans of all ages; (2) clinical tests, measurements, and physical examinations on sample persons; and (3) facilities where persons received medical care such as hospitals, clinics, and doctors' offices.

To comply with the 1956 act, the National Center for Health Statistics (NCHS), a branch of the U.S. Public Health Service in the U.S. Department of Health and Human Services, has conducted eight separate examination surveys to collect interview and physical examination data.

The first three of these national health examination surveys were conducted in the 1960s:

1. 1960-62—National Health Examination Survey I (NHES I);
2. 1963-65—National Health Examination Survey II (NHES II); and
3. 1966-70—National Health Examination Survey III (NHES III).

NHES I focused on selected chronic disease of adults aged 18-79. NHES II and NHES III focused on the growth and development of children. The NHES II sample included children aged 6-11,

while NHES III focused on youths aged 12-17. All three surveys had an approximate sample size of 7,500 individuals.

Beginning in 1970 a new emphasis was introduced. The study of nutrition and its relationship to health status gained importance as researchers began to discover links between dietary habits and disease. In response to this concern, under a directive from the Secretary of the Department of Health, Education and Welfare, the National Nutrition Surveillance System was instituted by NCHS. The purpose of this system was to measure the nutritional status of the U.S. population and changes over time. A special task force recommended that a continuing surveillance system include clinical observation and professional assessment as well as the recording of dietary intake patterns. Thus, the National Nutrition Surveillance System was combined with the National Health Examination Survey to form the National Health and Nutrition Examination Survey (NHANES). Five surveys of this type have been conducted since 1970:

1. 1971-75—National Health and Nutrition Examination Survey I (NHANES I);
2. 1976-80—National Health and Nutrition Examination Survey II (NHANES II);
3. 1982-84—Hispanic Health and Nutrition Examination Survey (HHANES);
4. 1988-94—National Health and Nutrition Examination Survey (NHANES III); and
5. 1999-05—National Health and Nutrition Examination Survey (NHANES 99).

NHANES I, the first cycle of the NHANES studies, was conducted between 1971 and 1975. This survey was based on a national sample of about 28,000 persons between the ages of 1-74. Extensive data on health and nutrition were collected by interview, physical examination, and a battery of clinical measurements and tests from all members of the sample.

NHANES II began in 1976 with the goal of interviewing and examining 28,000 persons between the ages of 6 months and 74 years. This survey was completed in 1980. To establish a baseline for assessing changes over time, data collection for NHANES II was made comparable to NHANES I. This means that in both surveys many of the same measurements were taken in the same way, on the same age segment of the U.S. population.

While the NHANES I and NHANES II studies provided extensive information about the health and nutritional status of the general U.S. population, comparable data were not available for many

of the ethnic groups within the United States. HHANES, conducted from 1982 to 1984, aimed at producing estimates of health and nutritional status for the three largest Hispanic subgroups in the United States—Mexican Americans, Cuban Americans, and Puerto Ricans—that were comparable to the estimates available for the general population. HHANES was similar in design to the previous HANES studies, interviewing and examining about 16,000 people in various regions across the country with large Hispanic populations.

NHANES III, conducted between 1988 and 1994, included about 40,000 people selected from households in 81 counties across the United States. As previously mentioned, the health status and characteristics of minority groups can be very different from that of nonminority groups. Thus, black Americans and Mexican Americans were selected in large proportions in NHANES III. Each of these groups comprised separately 30 percent of the sample. It was the first survey to include infants as young as 2 months of age and to include adults with no upper age limit. For the first time a home examination was developed for those persons who were unable or unwilling to come into the examination center but would agree to an abbreviated examination in their homes. To obtain reliable estimates, infants and young children (1-5 years) and older persons (60+ years) were sampled at a higher rate. NHANES III also placed an additional emphasis on the effects of the environment upon health. Data were gathered to measure the levels of pesticide exposure, the presence of certain trace elements in the blood, and the amounts of carbon monoxide present in the blood.

NHANES 99, conducted between 1999 and 2005, was the first of the series of surveys designed with the goal of becoming a continuous, annual survey. Each single year, and any combination of consecutive years of data collection, comprises a nationally representative sample of the U.S. population. This new design allows annual statistical estimates for broad groups and specific race-ethnicity groups as well as flexibility in the content of the questionnaires and exam components. New technologic innovations in computer-assisted interviewing and data processing result in rapid and accurate data collection, data processing, and publication of results.

The number of people examined in a 12-month period is about the same as in previous NHANES—about 5,000 a year from 15 different locations across the Nation. The data from the NHANES are used by government agencies, state and community organizations, private researchers, consumer groups, companies, and health care providers.

In addition to NHANES I, NHANES II, Hispanic HANES, and NHANES III, several other HANES projects have been underway since 1982. These projects have been a part of the HANES Epidemiological Follow-up Survey, a multiphase project that has been conducting follow-up interviews with the NHANES I survey population in order to provide a longitudinal picture of the health of the U.S. population.

## **1.2 Goals of the Survey**

NHANES 2005, the current version of the survey, was designed to continue the collection of information about the health and diet of people in the United States. These data are used to fulfill specific goals. The overall goals of NHANES 2005 are to:

- Estimate the number and percent of persons in the U.S. population and designated subgroups with selected diseases and risk factors;
- Monitor trends in the prevalence, awareness, treatment, and control of selected diseases;
- Monitor trends in risk behaviors and environmental exposures;
- Analyze risk factors for selected diseases;
- Study the relationship between diet, nutrition, and health;
- Explore emerging public health issues and new technologies; and
- Establish a national probability sample of genetic material for future genetic testing.

## **1.3 NHANES Data Accomplishments**

NHANES data have been used to influence policy and improve the health of the U.S. population in many ways since the survey series was established. For the past 40 years, the U.S. Public Health Service has been interviewing and examining tens of thousands of Americans. Currently, teams of doctors, nutritionists, and health technologists are conducting the National Health and Nutrition Examination Survey (NHANES) in communities across the United States. Information from the survey will be updated annually.

Some of the contributions of the NHANES data include:

- **Pediatric growth charts.** Developed by the National Health and Nutrition Examination Survey, the NHANES growth charts are found on the walls of pediatricians' offices and clinics not only across the United States, but also around the world. With new information on younger babies, the current charts have been expanded and improved.
- **Vitamins and minerals.** The earlier NHANES showed that low iron levels were a serious problem for many people, including women of childbearing age, preschool children, and the elderly. As a result, the government decided to fortify grain and cereal with iron to correct this deficiency. The surveys also showed the need for folate to eliminate another deficiency and prevent birth defects. Today, we have a wealth of information at our fingertips and, indeed, on our food labels to help us make better choices about our diets. Much of that information comes directly from the National Health and Nutrition Examination Survey.
- **Cholesterol levels.** The first survey in the 1960s led public health officials to sound the alarm about the link between high cholesterol levels and the risk of heart disease. When NHANES started testing, one-third of adults had high cholesterol. Today fewer than 1 in 5 adults have high cholesterol. Changes in diet and lifestyle, all built on information from the national survey, have sharply reduced our risk of dying from a heart attack. These strategies have also helped doctors find ways to better treat heart attack patients and speed their recovery.
- **Lead-free gasoline.** It was NHANES that gave the first clear-cut evidence that Americans had too much lead in their blood. This led Congress, the Environmental Protection Agency, and others to phase out the use of lead as an additive in gasoline, and the results have been remarkable. By the 1990s, NHANES found that only 4 percent of Americans had elevated lead in their blood, but it remains a problem for certain groups, especially poor children living in old houses, in cities where lead paint was once common. The survey helps public health agencies pinpoint where lead still remains a problem.

As the NHANES survey continues to collect and update health information, there are other ways in which the information will be of use, including:

- **Osteoporosis.** This condition, in which bones get weaker as people grow old, is blamed for many of the fractures among the elderly. The National Health and Nutrition Examination Survey measures bone density of participants.
- **Environmental smoke.** Recent NHANES data found that nearly 9 out of 10 nonsmoking Americans were exposed to smoke either at home or on the job.
- **Obesity.** Despite the public health gains in recent years, more Americans are overweight than ever before. Today, more than half of the adults in the U.S. are overweight, and the number of overweight children and teens has doubled in the past

decade. This has led public health experts to look for ways to improve both diet and fitness.

- **Changes in Food/Diet.** Today consumers can find a wide range of low fat and light foods in their grocery stores, from dinner entrees to snacks. As the food we eat changes, NHANES helps monitor whether these new foods and dietary changes actually are in the best interest of our health.
- **Immunizations.** The National Health and Nutrition Examination Survey has turned up important information about the extent of hepatitis B infections, and led to the recommendation that all infants and children be vaccinated against it. Though babies and children are the primary targets for immunizations, the survey also has alerted doctors to the importance of tetanus shots for older people.

#### **1.4 National Center for Health Statistics**

The Division of Health and Nutrition Examination Surveys (DHANES) is one of the survey divisions at the CDC's National Center for Health Statistics (NCHS).

DHANES is responsible for planning, operations, informatics, analysis, and reporting activities related to the family of health and nutrition examination surveys. These surveys range from the capstone cross-sectional National Health and Nutrition Examination Survey, to longitudinal studies, and more recent efforts with community-based studies. DHANES is comprised of more than 60 Federal employees who have training and expertise in diverse areas including public health, informatics, survey methodology, and statistics. The Federal staff are augmented by contractor staff working on- and offsite.

The Division consists of four branches and the Office of the Division Director. The DHANES Office of the Director coordinates the major activities in the Division. Each of the four branches consists of a multidisciplinary team with specific duties and responsibilities.

#### **1.5 Sample Selection**

A sample is defined as a representative part of a larger group. Since it is impossible to interview and examine everyone in the United States for NHANES, a representative sample is taken of the U.S. population. By studying a representative sample of the population, it is assumed that the findings would not have been too different had every person in the U.S. been studied. Because generalizations

about the population will be made, it is extremely important that the sample be selected in a way that accurately represents the whole population. Statisticians calculate the size of the sample needed and take into consideration the geographic distribution and demographic characteristics of the population, such as age, gender, race, and income.

An introductory letter is sent to each household in the sample. A few weeks after the letter goes out, interviewers visit each listed household and use carefully designed screening procedures to determine whether any residents are eligible for the survey. If eligible residents are present, the interviewer then proceeds to introduce the study, presents the Sample Person (SP) with a survey brochure, and obtains a signed consent for the household interview. The brochure contains detailed information on the survey, the household interview, and the Mobile Examination Center (MEC) examination.

A signed consent form must be obtained from each eligible individual before the household interview can be conducted. A refusal to sign the consent form is considered a refusal to participate in the survey. After the interview is completed, the interviewer then explains the MEC exam, obtains another signed consent form for the MEC exam, and contacts the field office to schedule a MEC appointment for the SP. All SPs aged 12 years and older must sign the Examination Consent forms to participate in the MEC examination. Parental consent is also required for SPs under 18 years of age. SPs aged 7-11 years old are asked to sign the Examination Assent form. An additional consent form is required for consent to future general research and genetics testing for both adults (ages 18+) and parents of children under 18 years. This consent form gives permission to store a small sample of blood and urine for future specimen testing and to collect a sample for genetics testing. A refusal to sign the MEC consent or assent form is considered a refusal to participate in the examination phase of the survey. Examinations will not be performed on sample persons who do not sign a consent form.

## **1.6 Field Organization for NHANES**

There are two levels of field organization for this study - the home office staff and the field staff.

- **Home Office Staff from Westat** – Project staff from Westat are responsible for overseeing the field teams and field work.

- **Field Office (FO) Staff** – For this survey, an office will be opened at every survey location (stand). Each field office will have a Study Manager (SM), Office Manager (OM), a Field Manager (FM), and one Assistant Office Manager (AOM).
  - The **Study Manager (SM)** is responsible for the overall management of operations at a stand.
  - The **Office Manager (OM)** is responsible for the stand office operations and is the main conduit for the flow of work and information between the MEC and the household interviewing staff. She or he will supervise one or more local office clerks hired to assist with office activities. The OM reports to the SM.
  - The **Field Manager (FM)** has primary responsibility for the supervision of the household interviewers. The FM also assists the SM and supervises the activities of the Assistant Office Managers. She or he will deal with administrative issues, ISIS problems, and preparations for the next stand.
  - The **Assistant Office Managers (AOMs)** are primarily responsible for data entry into the Integrated Survey Information System (ISIS), editing data collection materials, and verification of interviewer work. The AOMs report to the FM and also work closely with the OM.
- **Facilities Specialist (FES)**– One Facilities and Equipment Specialist will travel with each field office team and caravan to oversee the maintenance and operation of the trailers.
- **Household Interviewers** – These staff members are primarily responsible for identifying and enrolling the survey participants, conducting the household interviews, and appointing the study participants for the MEC exam. Specifically, household interviewers will locate occupied residential dwelling units, administer the Screener to select eligible sample persons, obtain signed consents to the household interview, conduct the interviews, set up examination appointments, obtain consents for the MEC exam, conduct field reminders for MEC appointments, and assist in rescheduling broken, cancelled, and no-show appointments.

Several times a week, household interviewers visit the field office and report to the field manager. During the course of the study, interviewers also interact on a daily basis with other field office staff and home office staff.

- **MEC Staff** – These health professionals conduct the health exams. The survey includes two exam teams. There are 16 individuals on each traveling team: 1 MEC manager, 1 MEC coordinator, 1 licensed physician, 3 medical technologists, 4 health technologists, 2 MEC interviewers, 2 dietary interviewers, and 1 phlebotomist. In addition, local assistants are recruited, trained, and employed at each stand to assist the exam staff.

The following section describes the steps that are always completed before the opening of a stand and provides an overview of the tasks that interviewers are expected to perform.

Steps completed prior to interviewing include:

1. Statisticians scientifically select certain segments in the sampling area. A segment is an area with definite boundaries, such as a city block or group of blocks containing a cluster of households.
2. Segments are listed by NHANES staff. Listing is the systematic recording on special forms of the address of every dwelling unit (DU) located within the segment. Commercial buildings and other structures not intended as living quarters are not listed.
3. A sample of dwelling units is selected from the listing forms. This sample is the group of addresses that interviewers visit in order to conduct interviews.
4. Immediately before data collection begins, an advance letter is sent to each dwelling unit with a mailing address. This letter briefly describes the study and informs the household that an interviewer will contact them in the near future.

Steps followed by the interviewers at a stand include:

1. Obtain assignment of sampled dwelling units to contact from the field manager.
2. Locate dwelling units using addresses on the Household Folders and listing/mapping materials in the Segment Folder.
3. Contact an adult who lives in the selected household (occupied residential dwelling unit) and administer the Screener using a laptop computer.
  - The Screener is an interview that lists all the individuals who live in the household, divides the household into families, and collects all the demographic characteristics necessary to immediately determine if there are persons in the household eligible for further interviewing.
  - All instructions necessary to determine eligibility and to select sample persons (SPs) are programmed in the CAPI Screener.
4. If all persons in a household are ineligible, no further work is done with the case. If eligible household members are identified, interviewers continue to conduct all the necessary tasks associated with the case.
5. In eligible households, obtain a signed interview consent form prior to completing the medical history and/or the family questionnaire.

6. Administer the appropriate medical history CAPI interview to eligible respondents. The questions asked depend on the age of the SP.
7. Administer the Family questionnaire to one adult family member from each eligible family in the household.
8. Schedule a MEC appointment for each SP, coordinating the MEC schedule and the SP schedule.
9. Obtain signed consent form(s) for each SP for the examination, confirm the examination appointment(s) with the field office, and give each SP an appointment slip.
10. If there is more than one eligible family in a household, repeat this process with each additional family.
11. Record the result of each contact or attempted contact with the household on the Call Record located in the Household Folder.

Interviewers also support the survey by conducting field reminders prior to MEC appointments and reschedule broken, cancelled, or no-show MEC appointments. When an interview has been completed, interviewers edit their work, carefully reviewing all forms for completeness and legibility. Interviewers report in person to the field manager at the stand office for regularly scheduled conferences, usually every other day. During these conferences, interviewers discuss completed cases, discuss problems with incomplete cases, receive new case assignments, and report time, expenses, and production.

To ensure the accuracy and completeness of the survey, all interviewer work is edited by the field office staff, and then validated by recontacting respondents. After this review, supervisors provide interviewers with feedback concerning the quality of the work.

## **1.7 Exams and Interviews in the Mobile Examination Center (MEC)**

Examinations and interviews are conducted in a mobile examination center (MEC), which is composed of four specially equipped trailers. Each trailer is approximately 48 feet long and 8 feet wide. The trailers are set up side-by-side and connected by enclosed passageways. During the main survey, detachable truck tractors drive the trailers from one geographic location to another.

Exhibit 1-1 shows a floor plan for the MEC. The interior of the MEC is designed specifically for this survey. For example, the trailers are divided into specialized rooms to assure the privacy of each study participant during exams and interviews. Many customized features have been incorporated including an audiometry room that uses a soundproof booth, a wheelchair lift, and a wheelchair-accessible bathroom available to assist participants with mobility problems. Exhibit 1-2 shows the locations of the various exams within the MEC.

### 1.7.1 Exam Sessions

The MEC operates 5 days a week and includes weekday, evening, and weekend sessions. Two 4-hour sessions are scheduled each day with approximately 10-12 SPs per session. During a stand, workweeks rotate to offer a variety of MEC appointments on weekday mornings, afternoons, and evenings, and every weekend.

Exhibit 1-1. Floor plan of the MEC

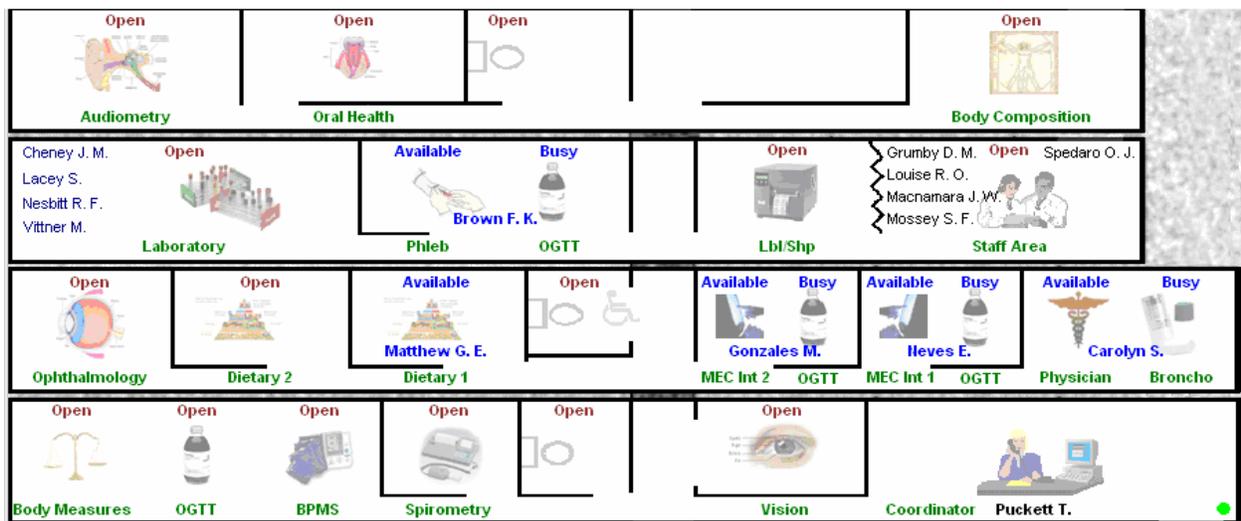


Exhibit 1-2. MEC exams and rooms

| Trailer   | Room   | Room Use  |
|-----------|--|---|
| Trailer 1 | Coordinator<br>Vision<br>Respiratory Health<br><br>OGTT<br>Anthropometry                                       | Welcoming and waiting area for SPs<br>Vision tests<br>Exhaled Nitric Oxide<br>Spirometry<br>Bronchodilator with repeat spirometry<br>Oral glucose tolerance Trutol administration<br>Body measurements      |
| Trailer 2 | Physician<br>MEC Interview 1<br>MEC Interview 2<br>Dietary Interview 1<br>Dietary Interview 2<br>Ophthalmology | Physician examination<br>Health interview/OGTT Trutol administration<br>Health interview/OGTT Trutol administration<br>Dietary interview<br>Dietary interview<br>Vision tests                               |
| Trailer 3 | Phlebotomy/OGTT<br><br>Laboratory<br>Label/shipping area<br>Staff area   | Drawing of blood samples<br>Oral glucose tolerance Trutol administration<br>Processing of biological samples<br>Lab area for labeling and shipping specimens<br>Staff area that houses main computer system |
| Trailer 4 | Bone Density (DXA)<br>Oral Health<br>Audiometry  | Bone Density scans<br>Dental examination<br>Hearing tests   |

**1.7.2 Exam Team Responsibilities**

There are 16 individuals on each exam team. In addition, a local assistant will be hired to assist the staff in managing examinee flow. The duties of the exam team members are summarized below:

- One MEC manager supervises the exam staff, oversees exam flow, and supports exam operations.
- One coordinator directs the flow of SPs through the MEC examination process. The coordinator manages all SP appointments, verifies that all components are completed for each SP, and exits SPs from the MEC.
- One physician conducts the medical examination and records results, reviews the results of the complete blood count and pregnancy test, and serves as the safety officer for the MEC.
- Two health (MEC) interviewers administer questionnaires for physical and mental health information.

- Two dietary interviewers administer the dietary questionnaire. The interviewers record a 24-hour dietary recall of the types and amounts of foods consumed by the SP in the last 24 hours.
- Four health technologists (some with radiologic technology and/or other health training) take and record body measurements, perform vision tests, conduct respiratory health exams and bone density (DXA) scans, administer hearing tests, and administer the Trutol solution for the glucose tolerance test.
- Three medical technologists conduct clinical laboratory tests on biological and environmental specimens, record the results of the tests, and prepare and ship specimens to various laboratories.
- One phlebotomist conducts the phlebotomy interview, administers the fasting questionnaire, and draws blood for laboratory tests and special studies like the volatile organic compound special study. The phlebotomist is also responsible for administering the Trutol and drawing a second blood sample for the GTT test. They are trained as a backup examiner for other MEC components like body measures and the physical activity monitor.

Each staff member is part of a team of professional persons with specific assignments that must be completed in order to accomplish the overall objective of the survey. Each individual must be aware of and respect the job demands placed upon other staff members, maintain an attitude of tolerance and consideration for fellow members of the team, and willingly perform extra tasks that may be assigned to support other staff members in the performance of their duties. MEC staff members may be requested to perform tasks not directly related to their specific professional skills in order to implement the overall data collection plan.

### **1.7.3 Examination Components**

The full examination for an adult takes approximately 3½ hours, but the actual length depends on the SP's age. Some exams are done only on certain age groups so the exam profiles vary, even among adult SPs. The exam components are described briefly below and summarized in Exhibit 1-3.

Exhibit 1-3. Examination components

| Examination                     | Age group         |
|---------------------------------|-------------------|
| Audiometry                      | 12-19             |
| Bone Density (DXA)              | 8 +               |
| Body Measures                   | All ages          |
| Dietary Interview               | All ages          |
| Glucose Tolerance               | 12+               |
| Laboratory                      | 1+                |
| Urine Sample                    | 6+                |
| MEC (Health) Interview          | 8 +               |
| Ophthalmology                   | 40+               |
| Oral Health                     | 5+                |
| Phlebotomy                      | 1+                |
| Physician                       | All ages          |
| Blood Pressure                  | 8+                |
| Respiratory Health              | 6-79              |
| Spirometry                      |                   |
| Exhaled Nitric Oxide            |                   |
| Bronchodilation with spirometry | Limited subsample |
| Vision                          | 12+               |
| Volatile Organic Compounds      | 12+               |

- **Audiometry**

The goals of the hearing exam are to obtain normative data on the hearing status of the adolescent U.S. population and to evaluate certain covariates that may be related to hearing loss, such as noise exposure. The hearing component tests youth aged 12-19 years by performing pure tone air conduction audiometry and tympanometry. Because air conduction thresholds alone cannot detect middle ear disease, tympanometry is conducted to identify potentially medically-correctible conditions which may be contributing to hearing impairment.

- **Body Composition**

The DXA component will use dual energy x-ray absorptiometry to evaluate skeletal health on SP's aged 8 years and older. Two DXA scans, AP spine and femur, will be used to assess overall skeletal changes that often occur with age by measuring bone

mineral content (BMC) and bone mineral density (BMD). DXA measurements can also be used to provide information on early gender and ethnic changes in the rate of bone accretion and to determine the age when skeletal accretion ceases and when peak bone mass occurs.

- **Body Measures or Anthropometry**

All SPs will have body measurements taken. The exam will include height, weight, and other body measurements such as skinfold and arm girth. These measurements will be used to assess growth, obesity, and body fat distribution, and will provide information that can be used as a reference for later studies. Measurements of height and weight will allow for a revision of the child growth charts now in widespread use. Measuring body fat is important because it is associated with hypertension, adult diabetes, cardiovascular disease, gallstones, arthritis, and some forms of cancer. Furthermore, obesity and overweight can have an affect on the mental, physical, and social well-being of individuals.

- **Dietary Interview**

Dietary information has been collected in NHANES since the 1970s. Researchers and policymakers rely on NHANES data for detailed information about the foods and beverages that are consumed by the U.S. population. In addition to providing important national reference data on food and nutrient intakes that are obtained on all survey participants, the data help us to learn about food patterns of ethnic subgroups, the adequacy of diets consumed by young children and older persons, and the contribution of food to total nutrient intakes. Total nutrient intakes from food and dietary supplements can be computed by combining NHANES Dietary Recall data with the dietary interview supplement and antacid recall information. Many Federal agencies use NHANES data to evaluate Federal regulations in the areas of food fortification and human risk assessment analyses that are used to measure human exposure to contaminants that are found in food.

The goal of the dietary component is to estimate total intake of foods, food energy and nutrients, nonnutrient food components, and plain drinking water by the U.S. population; and assess dietary behaviors and the relationship of diet to health. Quantitative dietary intake data are obtained for all subjects by means of a 24-hour dietary recall interview using a computer-assisted dietary data entry system.

Two dietary interviews will be administered to all SPs. The primary dietary interview is administered in person in the MEC (the MEC In-person interview). At the end of the MEC dietary interview, the interviewers will schedule the SPs for a Phone Follow-up (PFU) 3-10 days later. The PFU is a follow-up dietary interview conducted by telephone by dietary interviewers from the home office. In addition, a second telephone interview about food and food shopping will be offered to SPs 1+ who complete the MEC dietary interview. This interview, called the Flexible Consumer Behavior Survey, is also conducted by the home office dietary interviewers.

- **Oral Glucose Tolerance Test (OGTT or GTT)**

The purpose of this test is to reassess the prevalence of diabetes and impaired glucose tolerance (IGT) in the U.S. population. Persons with impaired glucose tolerance (IGT) – 15.6 percent of the U.S. population – are at high risk for developing diabetes. Also, IGT is an important risk factor for a number of other adverse health conditions and mortality. IGT is defined on the basis of an abnormal oral glucose tolerance test (OGTT). Persons without diabetes but with an OGTT 2-hr value of 140-199 mg/dl are considered to have IGT. Recent national and international randomized controlled trials have shown that diabetes can be delayed or prevented among persons with IGT.

The GTT will allow estimation of the prevalence of IGT and, thus, prediabetes in the U.S. population, surveillance of trends in the prevalence and awareness of these conditions, study of the risk factors for IGT and prediabetes, and examination of IGT as a risk factor for health conditions and mortality. Timely data on IGT and prediabetes are particularly important as the Nation initiates efforts to prevent diabetes among persons with prediabetes. These data on IGT and prediabetes are critical to targeting, designing, and evaluating prevention efforts.

A fasting glucose blood test is performed on all participants 12 years and older who are examined in the morning session after a 9-hour fast. After the venipuncture, participants are asked to drink 75 milligrams of Trutol® and to have a second venipuncture 2 hours (plus or minus 15 minutes) after consuming the Trutol. The blood glucose level from the second venipuncture will be used to determine if an SP has IGT.

- **Laboratory**

The laboratory component includes the collection and processing of various biological and environmental specimens including blood for subjects 1 year and older, and urine for subjects 6 years and older. On-site pregnancy testing excludes pregnant women from other examination components such as DXA. Complete Blood Counts (CBCs) are also performed in the MEC laboratory. All other specimen testing is performed by Federal, private, and university-based laboratories under contract to NCHS.

Urine is collected from SPs age 6 and older to assess kidney function, measure levels of mercury, heavy metals, iodine and arsenic, and assess environmental exposures to pesticides such as organophosphates, phthalates, polyaeromatic hydrocarbons, phytoestrogens, and perchlorates.

- **MEC (Health) Interview**

SPs aged 8 and older will have a health interview in the MEC. Generally, the questions asked in the MEC are considered to be more sensitive than the questions asked in the household. The MEC environment is believed to be a more appropriate setting for the administration of these questions. All SPs will be asked questions in a face-to-face interview. In addition, persons who are 12-59 years old will be asked a series of more personal questions in complete privacy. The SP will listen to questions through a set of earphones and will enter responses by touching a computer screen.

Depending upon the age of the SP, the interview may consist of questions about tobacco, drug, and alcohol use, reproductive health (birth control practices, pregnancy and reproductive history, sexual activity), health behaviors (physical activity, weight history), kidney conditions and bowel health, current health status and mental health, and exposure to certain chemicals. Children 8-11 years will only be asked questions about weight history.

## ■ **Ophthalmology**

The ophthalmology component consists of two eye examinations completed on all SPs 40 years and above. SPs will be excluded if they have an eye infection, eye patches or blindness. The first exam is visual field testing using Frequency Doubling Technology (FDT) perimetry to test for visual field loss from glaucoma. The second exam is digital fundus photography using an ophthalmic digital imaging system to assess the presence of diabetic retinopathy, age-related macular degeneration, and other retinal diseases.

The leading causes of visual impairment in the United States are primarily age-related eye diseases including cataract, diabetic retinopathy, glaucoma, and age-related macular degeneration. More than 3.4 million Americans aged 40 years and older are either blind or are visually impaired. Glaucoma is the leading cause of irreversible blindness and a prevalent disease associated with aging. Although glaucoma can usually be controlled by early detection and treatment, half of people with glaucoma are not diagnosed, and glaucoma is still the number one blinding disease among African Americans.

Diabetic retinopathy is the leading cause of new blindness among adults aged 20-74 years. It can affect almost anyone with diabetes, and contribute both to individual and societal burden. Age related macular degeneration (ARMD) is the leading cause of visual impairment and blindness in the United States among people 65 years and older. The frequency of ARMD is expected to increase as the population lives longer.

## ■ **Oral Health**

SPs aged 5 and older will receive a simplified oral health exam conducted by health technologists trained to administer the screening assessments. All examinees will be checked for tooth loss, cavities, restorations, and sealants. SPs 25 years and older will also be asked some questions about denture use and will be assessed for dental function.

Oral and dental diseases affect many in the United States. Dental caries and tooth loss remain significant problems affecting the Nation's oral health. Although average dental caries rates for school-aged children have declined, nearly a half of all children still have caries. Additionally, more than 90 percent of adults in the United States have experienced caries. Dental sealants, an effective caries prevention measure, have been underutilized in the United States, with less than one-quarter of children aged 5-17 having them.

Over the past four decades, oral and dental health characteristics collected in national surveys supported by the Federal Government have been critical for monitoring health status, risk factors for disease, and access to preventive and treatment services. The 2005-06 NHANES oral health component will meet a critical need to continue monitoring trends in dental caries and tooth retention. More specifically, this NHANES will produce oral health data to monitor five oral health objectives in the Healthy People 2010 health promotion: dental caries experience, untreated dental decay, no permanent tooth loss, complete tooth loss, and dental sealants.

■ **Phlebotomy**

SPs aged 1 and older will have blood drawn. The amount drawn will depend on the person's age. It is important to draw blood from study participants for a number of reasons:

- Knowledge can be gained about how healthy a person is by measuring for various substances in his or her blood.
- Blood tests can provide early warnings of potential health problems, perhaps before physical signs appear. For example, a blood test for lead might indicate exposure to unsafe lead levels before an individual shows any physical signs of lead poisoning. Also, diabetes mellitus will be assessed by measures of plasma glucose, insulin, and glycohemoglobin in examinees ages 12 years and older. Diabetes is a large, growing, and costly public health problem in the United States and disproportionately affects racial and ethnic minorities. About 17 million Americans have diabetes and more than 1 million new cases of diabetes are diagnosed each year. Alarmingly, type 2 diabetes (formerly considered an adult disease) is now being diagnosed in children and adolescents and there has been a large increase in diagnosed diabetes among adults <40 years of age.
- Blood tests will also indicate the presence of STDs such as Chlamydia and gonorrhea, hepatitis, herpes, and HIV infection.
- Blood tests help in monitoring nutritional status, one of the key goals of NHANES. What researchers discover from this data can lead to health policy recommendations—the need for more vitamin fortification, for example.
- The blood testing also provides information about the levels of cholesterol and other blood lipids, another important study goal.

■ **Physician**

All SPs see the physician. The physician measures blood pressure and pulse of all participants over 8 years of age, explains to female SPs how the HPV examination will be completed and explains the meaning of the STD/HIV test results to eligible SPs. The physician explains how SPs receive the results of STD/HIV tests so that the results remain totally confidential to the SP. Beginning in 2007, the physician will screen participants who qualify for the bronchodilator with spirometry exam, obtain consent for, and administer the bronchodilator. The physician must be present on the

MEC before any exams can be conducted, and the physician is in charge of any medical emergency that occurs on the MEC.

- **Respiratory Health**

Beginning in 2007, respiratory health (RH) will be incorporated in the NHANES study. RH will be collected by means of an assessment of lung function testing, or spirometry, and a measurement of exhaled nitric oxide (ENO). The objective of collecting this data is to assess the prevalence of asthma and adult chronic obstructive pulmonary disease in the U.S. population. All SPs aged 6-79 years will be eligible to participate in the component. SP's will be excluded from the RH exam if they answer positively to any pre-exam safety exclusion questions.

RH has three subcomponents: (1) spirometry, (2) ENO measurements, and (3) repeat spirometry measurements after the administration of a bronchodilator. For the third subcomponent, a subset of SPs whose baseline spirometry results show lung function values below a certain threshold, and will be provided with an opportunity to repeat spirometry after inhaling a bronchodilator medication. The MEC physician will first evaluate the participant to determine if the participant meets the requirements for safe bronchodilator administration. The physician will then obtain written informed consent, and then instruct the SP in the administration of the bronchodilator, and then administer the medication. Results from repeat spirometry testing following the bronchodilator could potentially provide a more detailed picture of each individual's breathing problem, i.e., an indication of whether the person is likely to have asthma or chronic obstructive pulmonary disease.

ENO provides a noninvasive marker measure of airway inflammation, a factor in asthma and possibly other lung diseases. Evaluation of airway inflammation, a precursor of asthma symptoms, is important in the investigation of underlying disease. Currently, there are no U.S. population-based estimates of ENO baseline levels for normal subjects, or for those persons with asthma and chronic obstructive pulmonary disease.

- **Vision**

This examination consists of a near and distance vision acuity test, eyeglass prescription determination when appropriate, and an automated refraction measurement. It will be given to SPs aged 12 and older.

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 eye disease prevalence, in research program planning, and in developing and testing hypotheses about eye disease etiology.

Data collected more than 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.

■ **Volatile Organic Compounds/Perchlorate (VOC) Special Study**

The purpose of the VOC/Perchlorate study is to determine the prevalence of exposures to chemicals called Volatile Organic Compounds (VOCs) and Perchlorates. Volatile organic compounds are emitted as gases from certain solids or liquids. VOCs include a variety of chemicals, some of which may have short- and long-term adverse health effects. Concentrations of many VOCs are consistently higher indoors (up to ten times higher) than outdoors. VOCs are emitted by a wide array of products numbering in the thousands. Examples include paints and lacquers, paint strippers, cleaning supplies, pesticides, building materials and furnishings, office equipment such as copiers and printers, correction fluids and carbonless copy paper, graphics and craft materials including glues and adhesives, permanent markers, and photographic solutions.

Perchlorate is an oxidizer used in rocket fuel, explosives, and road flares, and it also occurs naturally in the atmosphere. Since the 1950s, unused amounts of the chemical have been dumped into unlined pits throughout the United States, where it has seeped into water supplies. The chemical is highly mobile and soluble in water, aiding its dispersion through the environment.

VOCs and Perchlorates are tested on a half-sample of participants over age 12; tap water from participants' homes are collected by the household interviewers, and in the MEC, blood is collected from the participant during phlebotomy.

#### **1.7.4 Sample Person Remuneration**

All examinees receive remuneration for the MEC visit as well as payment for transportation expenses. The MEC visit remuneration is age-related and may include an extra fasting incentive if the SP is eligible. SPs who complete the dietary phone interview and the Consumer Behavior Questionnaire also receive an incentive.

### **1.7.5 Report of Exam Findings**

Examinees receive the results of many of the tests and exams conducted in the MEC, though some results are used only for research and are not reported.

One report, a Preliminary Report of Findings, is produced on the day of the SP's examination and includes results that are immediately available and require no further evaluation or interpretation. Before the examinee's departure from the MEC, the coordinator prints a report that can include height, weight, complete blood count, blood pressure and heart rate, vision test results, and results from the oral health and audiometry examinations. The MEC physician reviews the blood pressure and complete blood count test results for abnormalities and discusses any problems with the SP (or his or her parent.) Approximately 12-16 weeks after the exam, NCHS mails the remainder of the examination results to the SP after appropriate clinical or quality reviews are completed. This Final Report of Findings will include all the results from the Preliminary Report of Findings and may include laboratory tests like liver and kidney function tests and lipids, bone density scan results, retinal image scan reports, and spirometry results. Seriously abnormal results are reported to the SP via telephone by NCHS before the remaining findings are mailed.

Certain tests, such as those for sexually transmitted diseases (Chlamydia, gonorrhea, herpes simplex, and human papillomavirus) and human immunodeficiency virus (HIV) are released only to the sample person using a specially devised procedure requiring a unique password.

To further assist sample persons, an in-house NCHS survey response team is available to answer calls from NHANES participants regarding the results from the Report of Finding System. The response team effort works both as a triage mechanism and a surveillance system. A receipt and control record is kept on all sample person inquiries. Also available at no cost to sample persons is an 800 toll-free telephone number that can be accessed during regular scheduled business hours. The response team members include a physician, a nurse with a doctorate degree, and other staff who are trained to answer specific questions.

Tests and procedures conducted in the MEC are not considered diagnostic exams and are not a substitute for an evaluation by a medical professional. No clinical treatments or health interventions of any type are performed in the MEC. If a health problem is discovered during the course of the MEC exam, the physician offers to contact the examinee's personal healthcare provider or recommend a local

physician or clinic for follow-up care. If a sample person is found to have a serious condition requiring immediate attention, the local rescue squad may be summoned or the SP will be advised to seek immediate medical treatment.

### **1.7.6 Dry Run Day**

At the beginning of the examination period, one-half day is devoted to calibrating instruments, practicing MEC procedures, and collecting biological specimens that serve as blind quality control samples. A dry run day is scheduled immediately before the first exam day of every stand to make sure that all equipment is operational, supplies are adequate, and the facility is working properly. All procedures in the dry run are completed as though the actual exam session was being conducted. The only difference is that the examinees are volunteers who are not part of the sample for the survey. Volunteers may include local residents, local officials, or field employees or guests of NCHS.

## **1.8 Integrated Survey Information System (ISIS)**

The Integrated Survey Information System (ISIS) is a computer-based infrastructure designed to support all survey operations including sample management, data collection, data editing, quality control, analysis, and delivery of NHANES data. With a collection of customized subsystems, the ISIS links the field office, mobile examination center, Westat home office, and NCHS during field operations. Each component in NHANES such as Dietary Interview has a computer application for direct data entry. Data collected in the Dietary Interview room of the mobile examination center is directly entered in the ISIS system computers. In addition, data from biomedical equipment such as the Dual Energy X-Ray Absorptiometry (DXA) scanner for body composition is directly downloaded to the ISIS system where it is displayed on the computer screen and stored in the system database.

## **1.9 Confidentiality and Professional Ethics**

All information regarding this study must be kept strictly confidential except as required by law. This includes location of survey sites. Since this study is being conducted under a contract with the National Center for Health Statistics, the privacy of all information collected is protected by two public

laws: Section 308(d) of the Public Health Service Act (42 U.S.C.242m) and the Privacy Act of 1974 (5 U.S.C. 552a).

Each person working on the study must be continuously aware of the responsibility to safeguard the rights of all the individuals participating in the study. Each participant should be treated courteously, not as a sample number. Never divulge names or any other information about study participants except to the research team. Refrain from any discussions about study participants, in or out of the MEC, which might be overheard by people not on the survey staff. All of the members of the research team are under the same legal, moral, and ethical obligations to protect the privacy of the SPs participating in the survey. No participant names will be included in any reports prepared about the survey and neither NCHS nor the contractor is allowed to release information that would identify study participants without the consent of the participants.

Cooperation from the public is essential to the success of survey research. A great deal of effort is expended in obtaining cooperation from many national, regional, state, and local officials and the general public. It is the responsibility of every field employee to build on the integrity of the survey to encourage continued access to study participants during current and future surveys. Professional conduct, both on and off the job, is extremely important.

Each staff member has a responsibility for promoting good public relations. The Public Health Service and the contractor will be judged by the actions of the staff both on and off duty; consequently staff must be discreet in speech and action. Personal appearance and behavior must be governed by these same considerations. Please be aware of the audience at all times and avoid statements or actions that could shed an unfavorable light on the survey.

Staff will be asked to sign a pledge of confidentiality before the survey begins. This pledge states that they are prohibited by law from disclosing any information while working on the survey to anyone except authorized staff of NCHS and the contractor, and that they agree to abide by the contractor's Assurance of Confidentiality.

## **2. OVERVIEW OF PHYSICIAN EXAMINATION**

### **2.1 The Role of the Physician in NHANES**

Physicians function as mobile examination center (MEC) team members with the primary function of collecting blood pressure, heart rate and pulse data, and counseling SPs regarding sexually transmitted disease (STD) and HIV testing. In the current NHANES, the physician's role has been expanded to include a subcomponent of the respiratory health study. In this component, the physician conducts pre-bronchodilator study safety exclusion evaluations, and administers bronchodilator medication to selected, eligible participants, after which repeat spirometry testing is administered. Physicians are also the primary care providers during medical emergencies. If there is a life threatening or medical emergency, the MEC physician provides immediate intervention and referral as needed. The MEC is not a medical treatment facility, hence, MEC physicians do not provide diagnoses or treatment of medical conditions.

Data obtained by physicians for the survey database include blood pressure (BP) measurements and heart rates (HR). These measurements are the data source for reporting the national standard for blood pressure and heart rate from the NHANES. The physicians discuss the STD testing done on the survey, as well as bacterial vaginosis (BV) with women 14-49 years old. The physicians instruct SPs about how to obtain their STD test results confidentially. When physicians determine that data obtained during the MEC examination indicate a medical referral, they refer SPs to health care providers in the local community.

Physician training focuses on BP and HR measurements, and decisionmaking for safety exclusion from bronchodilator medication administration testing. Clear and complete instruction for the physician aids standardized, accurate data collection across both MEC teams, and emphasizes the importance of following the protocol for the purpose of systematic, prioritized survey data collection.

### **2.2 Medical Policy Regarding the Examination**

The purpose of the NHANES study is to collect data on the health status of the United States population. It is important to emphasize that treatment is **not** within the role of the MEC physician, and

any clinical findings that are of concern to physicians are documented and included in community practitioner referrals. In most instances, the examining physician will not be licensed within the state in which the examinations are being conducted. The liability insurance obtained for Westat physicians does not cover any type of treatment procedure except for medical emergency stabilization while awaiting the arrival of local paramedics.

NHANES survey staff have neither control over, nor connection with, local health care systems. Any physician involvement beyond routine referral is ineffective and interferes with the purpose of the study. Referral of examinees is included in the MEC procedures for ethical reasons, although referral is not within the purpose of the study. Before SPs depart the MEC, they are provided with a report of the findings that become available while they are in the MEC. They are provided a final report of all findings approximately 3 months after their MEC examination. These are in the form of written reports and they are mailed to the SPs.

### **2.2.2 Presence in MEC during MEC Examinations**

Examinations do not occur in the MEC without the presence of a physician. Physicians report to the MEC at least 5 minutes before examinations are scheduled to begin. They leave the MEC only when all examination and interview protocol procedures have been completed and all SPs have left the MEC.

### **2.2.3 Response to Medical Emergencies**

If an examinee becomes ill or disabled during the examination session, the physician renders only the level of care necessary to keep the examinee out of immediate danger. Arrangements are made to transport SPs to an appropriate medical facility. An ambulance is called if a potentially life threatening condition develops, or if indicated for any SP. Further details about medical emergencies are included in Chapter 6.

## **2.2.4 Maintenance of Emergency Equipment and Supplies**

Physicians maintain emergency equipment and supplies for use in the MEC. They inventory supplies, restock supplies as needed, and ensure that all emergency equipment, medications, and supplies are current and in proper working order. Emergency procedures and supplies are described in detail in Chapter 6.

## **2.3 Physician Examination**

The physician examination is described in detail in Chapter 4, Physician Protocol. The bronchodilator subcomponent of respiratory health administered by the physician is presented in the Bronchodilator Procedures Manual under separate cover. The physician examination consists of measuring blood pressure and heart rate or pulse depending on the age of the SP. In addition, the physician discusses the implications of STD testing, and provides guidance for female SPs aged 14-59 who are asked to self-collect a vaginal swab to test for Human Papillomavirus (HPV). The physician instructs the SP in these procedures. The physician exam also includes a set of exclusionary questions for those SPs who consent to have their blood tested for prostate specific antigen (PSA). The blood to test the antigen is drawn during the venipuncture, which could occur either before or after the SP sees the physician for the physician exam. In either case, the physician asks a set of questions that would exclude the SP from the PSA testing if the SP answers “yes” to any one of the questions. If the SP does not agree to have his blood tested for PSA, then the physician codes the PSA section of the exam as a refusal, and the laboratory removes the PSA blood sample from the specimens.

### **2.3.1 Measurement of Blood Pressure and Pulse**

Physicians count heart rates on all SPs through 4 years of age. Radial pulse is counted on SPs from 5 years of age through age 7, and blood pressure and pulse is measured on all SPs 8 years of age and older. The specific protocol used for blood pressure measurements is described in Chapter 4, Physician Protocol.

### **2.3.2 Counseling for STD and HIV**

All SPs who are 14-17 years of age are tested for Chlamydia, gonorrhea, and herpes type 2; SPs who are aged 18-39 are tested for Chlamydia, gonorrhea, herpes type 2, syphilis, and HIV; and SPs aged 40-49 are tested for herpes type 2, syphilis, and HIV. Female SPs who are aged 14-59 are also tested for human papillomavirus (HPV). Physicians counsel SPs about the survey specific STD and HPV testing and tell them how to get their test results. The specific protocol used for STD/HIV and HPV counseling is described in Chapter 4, Physician Protocol.

### **2.3.4 Referrals**

Physicians are responsible for monitoring out of range data values as defined by the component protocols. If data values exceed predefined limits, the ISIS system flags these data for review. Physicians are responsible for discussing out of range values with SPs and making referrals to outside physicians if necessary. Physicians' procedures for managing referrals are described in Chapter 5.

## **2.4 Maintenance of Physician's Examination Room**

Physicians are individually responsible for the maintenance of the physician's examination room and all equipment and supplies required for their examination. At the beginning of a stand physicians inventory the required supplies and equipment. They prepare the examination room by opening and setting up all supplies and equipment needed for the physician examination. They determine that adequate supply levels are available and that all equipment is in proper working order. At the end of each examination session, physicians clean and properly store all equipment and restock supplies as needed. At the end of each stand, physicians inventory equipment and supplies and then pack up the equipment and supplies. Details about equipment maintenance and supplies are included in Chapter 3, Equipment and Supplies.

### **3. EQUIPMENT AND SUPPLIES**

#### **3.1 Description of Equipment**

Equipment is selected that meets the requirements for obtaining the required data and creates the best opportunity for minimal data collection error. All equipment is regularly subjected to quality control checks. Equipment required for blood pressure and heart rate measurement is a stethoscope, and an inflation system including an arm blood pressure cuff and a manometer. A stopwatch is used for standardizing time between individual BP measurements. Quality control procedures for physician equipment are described in detail in Chapter 8, Physician Equipment Quality Control.

#### **3.2 Sphygmomanometer**

The inflation system consists of a latex inflation bag, a Calibrated<sup>®</sup> V-Lok<sup>®</sup> cuff, a Latex Inflation Bulb, and an Air-Flo<sup>®</sup> Control Valve. The pressure gauge is a Baumanometer<sup>®</sup> calibrated mercury true gravity wall model.

##### **3.2.1 The Baumanometer<sup>®</sup> Calibrated Manometer**

Upon receipt from the factory, these manometers are precisely calibrated to true gravity, and are guaranteed by the manufacturer to remain scientifically accurate. Regular inspection is necessary to eliminate extraneous conditions that could cause the blood pressure measurement to be erroneously read. The mercury-gravity manometer consists of a calibrated cartridge glass tube that is optically clear, easy to clean, and abrasion resistant. The mercury reservoir at the bottom of the tube communicates with a compression cuff through a rubber tube. When air pressure is exerted on the mercury in the reservoir by pumping the pressure bulb, the mercury in the glass tube rises and indicates how much pressure the cuff applies against the artery. The measurement markings on the glass tubes are ceramic lines; they are fused to the surface of the glass, and cannot be removed with chemicals, solvents, or even by abrasion.

The manometer is connected to the wall for ease of accurate visualization while the physician is seated next to the SP. The physician inspects the manometer before each blood pressure

measurement. The mercury meniscus shape is examined and if the shape of the mercury meniscus (top of the column of mercury) is not a smooth, well-defined curve, the equipment is replaced. If the mercury does not rise easily in the tube, or if the mercury column bounces noticeably as the valve is closed, the equipment is replaced as the atmospheric pressure within the tube is likely altered rendering the manometer inaccurate. The physicians never attempt to repair the equipment. The level of the mercury in the calibrated glass tube is expected to be at the zero line when the manometer is on a level surface with the inflation system disconnected. If the level of the mercury is above or below the zero line, there may be too much mercury in the reservoir, a mercury leak, or dirt in the mercury or in the calibrated glass tube. To correct this, the physician takes the manometer off the wall, tips the manometer gently to the right, and then to the erect position. If the meniscus of the mercury column does not return to zero, the equipment is replaced.

### **3.2.2 Calibrated<sup>®</sup> V-Lok<sup>®</sup> Cuff**

The Calibrated<sup>®</sup> V-Lok<sup>®</sup> compression cuff is made of urethane-coated Dacron, an unyielding material that exerts an even pressure on the inflatable bladder inside the cuff. The compression cuffs have Velcro fasteners that adhere to them to keep the cuff in position when placed on the arm. The physicians measure the circumference of the arm and the correct cuff size is precisely determined according to the measured arm size. The size of the arm, not the SP's age, determines the cuff to be used. The size of the cuff and the bladder used influences the accuracy of the blood pressure readings. If the cuff is too narrow, the observed blood pressure is overestimated (higher than it really is), and if it is too wide, the reading may be underestimated (lower than it really is). The four cuff sizes used are child, adult, large arm, and thigh. The cuff sizes are discussed in detail in Chapter 4, Physician Protocol.

The function of the pressure bulb is to create pressure in the system to allow inflation of the bladder. The pressure control valve controls the rate at which the system is deflated. The cuffs, pressure bulb, control bulb, manometer, and manometer tubing are checked each day before use for cracks, tears, and air leaks.

### **3.2.3 Littman™ Cardioscope III Stethoscope**

The stethoscopes used for listening to Korotkoff sounds are Littman™ Cardioscope III for adults and Littman™ Classic II pediatric for children. These stethoscopes are of the very highest acoustical quality. They have a bell and diaphragm chestpiece, and an acoustical *rating by the manufacturer* of 9 on a scale of 1-10, with a rating of 10 having the best acoustical attributes. The construction uses a single lumen rubber tubing connection between the eartubes and the chestpiece. The eartubes can be adjusted to fit the particular user at an anatomically correct angle, and the plastic ear covers come in different sizes allowing the user to match the best ear canal size to achieve an acoustically sealed ear fit. All parts of the stethoscope can be cleaned for use between SPs. The bell of the stethoscope is used to auscultate the Korotkoff sounds for blood pressure measurements. The techniques for obtaining blood pressure data are described in detail in Chapter 4, Physician Protocol.

### **3.3 Maintenance of Equipment**

Physicians maintain all equipment used in their component. The following sections specifically state the requirements that physicians follow to check equipment and maintain equipment used for the physician examination.

#### **3.3.1 Mercury Sphygmomanometer**

The mercury manometer is calibrated when it is manufactured; recalibration is unnecessary. However, regular inspection is necessary to eliminate conditions that could cause the blood pressure measurement to be read as erroneously high or low. Physicians must adhere to the following instructions related to BP equipment maintenance.

Check the shape of the meniscus (top of the column of mercury)—it should be a smooth, well-defined curve. If the shape of the mercury meniscus is not a smooth, well-defined curve, replace the equipment. This is caused by dirt in the mercury or the glass tube. Check that the mercury rises easily in the tubing and that the mercury column does not bounce noticeably when the valve is closed. If the mercury does not rise easily in the tube, or if the mercury column bounces noticeably as the valve is closed, replace the equipment as this indicates alteration of the atmospheric pressure within the tube.

Disconnect the inflation system from the blood pressure (BP) cuff and check that the meniscus of the mercury in the glass manometer tube is zero. The level of the mercury in the calibrated glass tube should always be at the zero line when the manometer is on a level surface with the inflation system disconnected. If the level of the mercury is above or below the zero line, there may be too much mercury in the reservoir, a mercury leak, dirt in the mercury, or in the calibrated glass tube. Move the manometer gently from side to side. If the top of the mercury column does not return to zero when returned to the upright position, replace the equipment.

Check for cracks in the glass tube. Check the cap at the top of the calibrated glass tube to make sure it is securely in place. Check the cuff, pressure bulb, and tubing for cracks or tears. Check the pressure control valve for sticks or leaks. Use the following procedure to check for air leaks:

- Connect the inflation system and wrap it around the calibration cylinder;
- Inflate to 250 mm Hg;
- Open valve and deflate to 200 mm Hg and close valve; and
- Wait for 10 seconds; if mercury column drops more than 10 mm Hg, there is an air leak in the system.

Never attempt to repair the equipment yourself. Contact the MEC manager to have equipment sent for repair or replacement. The manometer will be sent to Baum for repair or replacement. Chapter 8, Physician Equipment Quality Control, provides specific daily, weekly, and stand equipment quality control procedures.

Contact for repair or replacement of manometer:

W. A. Baum Co. Inc.  
Copiague, New York 11726  
Phone: 516-226-3940  
Fax: 516-226-3969

### **3.3.2 Littman Stethoscope**

Check the stethoscope for cracks in the rubber and for tight earpiece attachment. Check that the head of the stethoscope is securely attached to the rubber tubing. Check that the head can be easily

rotated so that either the bell or the diaphragm can be accessed. The bell head is always used to auscultate the Korotkoff sounds for BP measurement. Chapter 8 provides specific daily, weekly, and stand equipment quality control procedures.

### **3.3.3 Blood Pressure Cuffs**

Check the inflation cuff for cleanliness, and wipe between each use with disinfectant wipes. Check the inflation cuff as an integral component of the inflation system. Chapter 8 provides specific daily, weekly, and stand equipment quality control procedures.

### **3.4 Mercury Spills or Leaks**

A mercury manometer is used to measure blood pressures. The mercury is encased in a glass tube, and unless exposed to the atmosphere, is harmless. Mercury is a metallic substance that gives off a toxic vapor when exposed to the atmosphere. Temperature, ventilation, and sunlight affect the level of the vapor's concentration. Mercury vapors will permeate the skin surface and are poisonous when inhaled. Check the cap at the top of the calibrated glass tubing. If it is not securely closed, the mercury could leak out. Loss of air and mercury will occur if the glass tube is broken. Care should be taken in handling the manometer to prevent this. If the tube appears cracked, check for any spilled mercury and replace the equipment if necessary.

#### **3.4.1 Required Procedure for Handling Spilled or Leaking Mercury**

The following procedure is required for handling spilled or leaking mercury:

- Contact the MEC manager immediately to report the incident and receive instructions. The Mercury Spill Kit contains all the materials needed for clean up.
- The MEC manager will determine what action should be taken. If necessary, the local hazardous materials contact may be called to report such spills. The local hazardous materials agency may want to make a followup visit to the facility to check for levels of mercury in the exposed area.
- Do not touch the mercury with bare hands or attempt to vacuum or clean up the spill.

- The procedures for cleaning up the mercury are different depending on the surface where the spill is detected.
- If the spill is small the following procedure may be used.
  - Leakage or spillage on a hard surface (e.g., hard floor, table, etc.):
    1. Get the Mercury Spill Kit from the physician's exam room.
    2. Put on the green protective gloves.
    3. Use the mercury (Hg Absorb) sponge.
    4. Remove the sponge from the plastic zip-closable bag.
    5. Dampen the sponge with water.
    6. Wipe the area contaminated with mercury. Do this slowly to allow for complete absorption of all free mercury. The chemical layer (Hg Absorb powder) on the sponge will absorb the mercury droplets.
    7. After finishing with the Hg Absorb sponge, place it back into its plastic zip-closable bag.
    8. Place the manometer case and mercury sponge into separate plastic bags and secure with tape. Return to the MEC manager.
    9. Complete a Mercury Spill Report Form.
    10. Obtain replacement equipment.
  - Leakage and/or spillage on a soft or absorbent surface (e.g., rug, etc.):
    1. Get the Mercury Spill Kit from the physician's exam room.
    2. Put on the green protective gloves.
    3. Turn off heat or air conditioning to avoid spreading vapors to other rooms in the MEC.
    4. Open a window if possible to ensure adequate ventilation to the outside for the room where the spill occurred.
    5. Use the mercury (Hg Absorb) sponge, if possible. See directions above.
    6. Wet the MERCSORB<sup>®</sup> powder with water. Mercury will react with powder, forming a metal/mercury amalgam.

7. Wipe or sweep wetted powder over all cracks and hard to reach locations for maximum pickup.
8. Pick up amalgam by sponging or by using the small sweep and dustpan provided in the Mercury Spill Kit.
9. Complete a Mercury Spill Report Form.
10. Obtain replacement equipment.

## **4. PHYSICIAN PROTOCOL**

### **4.1 General Overview**

Physicians collect the SPs blood pressure, heart rate, and pulse measurements for the survey. The protocol for these measurements is described in detail in Section 4.2 of this chapter. As noted in Chapter 2, physicians also perform the bronchodilator administration subcomponent of respiratory health described under separate cover. The physician examination does, however, exclude SPs from the bronchodilator component based on blood pressure, and pulse findings. The physician may ask “Shared Exclusion” questions, which are asked by the first person to examine the SP. The purpose of having questions that are shared between examiners is to minimize examination time by excluding questions from any component that have already been asked in another examination component. This process saves time in each component and prevents replication of questions for SPs. These questions are asked to determine whether SPs should be included or excluded from bone density scanning. Physicians are the designated MEC examiners who discuss sexually transmitted diseases, human papillomavirus, and human immunodeficiency virus testing with SPs. The SP examination profile differs by age groups. MEC physicians are the designated examiners to discuss pregnancy results with SPs who are less than 17 years of age. Physicians also review examination data results to determine the need for referrals. The referral procedure, including referral for pregnancy, is described in detail in Chapter 5, Referrals.

### **4.2 Blood Pressure, Heart Rate, and Pulse Measurements**

Physicians count heart rates on all SPs through 4 years of age. Radial pulse is counted on SPs from 5 through 7 years of age and blood pressure and pulse are measured on all SPs 8 years of age and older. Physicians record the survey blood pressure measurements. The protocol for blood pressure measurement follows procedures developed by the American Heart Association. Physicians and backup physicians are certified in blood pressure measurement through a training program provided by SHARED Care, Inc, that includes didactic information, video practice listening to and recording Korotkoff sounds, and practice listening to blood pressures of volunteers with a certified instructor. Certification is achieved when physicians meet all requirements of the training program. Recertification is accomplished quarterly.

#### **4.2.1 SPs Included for Blood Pressure, Heart Rate, and Pulse Measurements**

Heart rates are measured on all children up to and including 4 years of age. Radial (brachial if necessary) pulses are measured on SPs 5 years of age and older. Blood pressures are measured on all SPs 8 years of age and older.

#### **4.2.2 SPs Excluded from Blood Pressure, Heart Rate, and Pulse Measurements**

SPs are excluded from blood pressure measurement if they have any condition that could potentially cause them harm or discomfort or would prevent accurate blood pressure measurement. Specifically, BP measurements are not done when both arms have a rash, gauze/adhesive dressings, casts, are withered, puffy, have tubes, open sores, hematomas, wounds, arteriovenous (AV) shunt, or any other intravenous access device. Also, women who have had an axillary nodal biopsy or resection, or a unilateral radical mastectomy do not have their blood pressure measured in the affected arm. If there is a condition with both arms, the blood pressure is not taken.

Some conditions that may affect BP are noted, but these conditions do not exclude SPs from BP measurement. SPs are asked if they have had any food, coffee, cigarettes, or alcohol in the past 30 minutes. Although intake of coffee and cigarettes could affect blood pressure, this information is not used to exclude SPs from blood pressure measurement. There are no protocol specific reasons for excluding SPs from heart rate or pulse measurement.

#### **4.2.3 Procedures for Measuring Blood Pressures, Heart Rates, and Pulses**

These are the instructional procedures for physicians to follow when measuring BPs, heart rate, and pulse. Physicians are taught during training to follow these protocol specific procedures exactly when measuring blood pressures, listening to heart rates, and counting pulses.

#### 4.2.3.1 Selecting the Arm for BP Measurement

Pulse and blood pressure are measured in the right arm unless specific known or self-reported conditions prohibit the use of the right arm. If the measurements cannot be taken in the right arm, the left arm is used. Use of the right or left arm is noted during ISIS data entry.

#### 4.2.3.2 Position SP for Blood Pressure Measurements

Ask the SP to sit all the way to the back of the chair so that the spine is straight. Instruct the SP to rest quietly for 5 minutes prior to blood pressure measurement. The arm and back should be supported and the legs should be uncrossed with both feet flat on the floor. The arm should be bared and unrestricted by clothing with the palm of the hand turned upward and the elbow slightly flexed. The arm should be positioned so that the midpoint of the upper arm is at the level of the heart. The location of the heart is the junction of the fourth intercostal space and the lower left sternal border. The mercury manometer should be positioned at the eye level of the examiner so the mercury meniscus can be easily read without parallax. Small or short SPs may need the chair position raised or lowered to correctly position for the BP measurement. If necessary, place SP's feet on a foot stool to correctly stabilize the feet. Very tall SPs may need to place their arm on an arm rest or pillow to bring their upper arm to the correct position.

#### 4.2.3.3 Locating the Pulse Points

**Locating the Radial Pulse:** Position SP with the right palm upward. Palpate the radial pulse on the flexor surface of the wrist, laterally, with the pads of the index and middle fingers.

**Locating the Brachial Pulse:** Position SP with the right palm turned upward and the arm slightly bent at the elbow. Palpate the brachial pulse in the groove between the bicep and tricep muscles above the elbow with the pads of the index and middle fingers. Using an eyeliner pencil, mark the spot where the pulse is most strongly palpated. **The center of the cuff bladder is placed at this point.**

**Locating the Brachial Pulse at the Antecubital Space:** The brachial pulse is traced from the bicep and tricep space until palpated in the medial aspect of the antecubital fossa. Mark the spot using

the eyeliner pencil. This is the point where the bell of the stethoscope is placed to listen for the BP. If the pulse cannot be felt in the arm, check the radial pulse. If no radial or brachial pulse is palpable on the right arm, use the left arm unless contraindicated. If a radial pulse is apparent, whether or not the brachial pulse can be felt, the blood pressure measurement should be attempted.

#### 4.2.3.4 Cuff Size and Application

The first step to obtain an accurate BP is to use an accurate cuff *bladder size*. The length and width of the cuff's bladder should encircle at least 80 percent of the length of the arm, and 40 percent of the width of an adult's arm. The length and width of the cuff should encircle 100 percent of the arm in children less than 13 years old. The index lines found on most BP cuffs are **not used to guide cuff application in this study**. **Arm length and circumference measurement** are specified in detail in the *NHANES Anthropometry Procedures Manual*. The appropriate size cuff is determined as outlined below.

- Using a centimeter tape, determine the midpoint of the upper arm by measuring the length of the arm between the acromium and olecranon process (between the shoulder and elbow).\*
- Mark the midpoint of this measurement with a cosmetic pencil.\*
- Measure the circumference of the bare upper arm at the midpoint. \*
- Find the arm circumference under column 4 in Table 4-1, Arm circumference and acceptable cuff size.
- Use the cuff size from column 1 associated with the arm circumference in column 4. (Example: If the arm circumference at midpoint is 36 cm, use the large adult cuff.)
- Position the *rubber bladder* over the brachial artery at least 1" *above the crease of the elbow*. For long thin arms, the cuff should be placed in the middle of the arm. Place the marker on the inner part of the cuff directly over the brachial artery.
- Wrap the cuff in a circular manner taking care not to wrap the cuff in a spiral direction so that any part overlaps with another part.
- Check the fit of the cuff to ensure that it is secure but not tight.

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\* These measurement instructions are available in more detail in the *NHANES Anthropometry Procedures Manual*.

Table 4-1. Arm circumference and acceptable cuff size

| Cuff size   | Bladder width (cm) | Bladder length (cm) | Arm circumference <sup>1</sup> |
|-------------|--------------------|---------------------|--------------------------------|
| Child       | 9                  | 17                  | 17-21.9                        |
| Adult       | 12                 | 22                  | 22-29.9                        |
| Large adult | 15                 | 32                  | 30-37.9                        |
| Adult thigh | 18                 | 35                  | 38-47.9                        |

<sup>1</sup> Adapted from Human Blood Pressure Determination by Sphygmometry, American Heart Association.

#### 4.2.3.5 Determine the Maximum Inflation Level (MIL)

- Determine the maximum inflation level (MIL) after the SP has been seated and resting quietly for approximately 3 minutes.
- The MIL or palpatory method provides an approximation of the systolic blood pressure to determine the highest level to which the cuff should be inflated when the actual measurement is made. The MIL is determined as follows:
  - Locate the radial pulse in the right arm (Section 4.2.3.3).
  - Inflate the cuff quickly to a pressure of 70 – 80 mm Hg. Then inflate the cuff in increments of 10 mm Hg until the radial pulse is no longer palpable (palpated systolic). Continue inflating the cuff in increments of 10 mm Hg to a final measure that is 30 mm Hg above the pressure where the pulse was last palpated. This number is the MIL. Note this measurement for recording.
  - Rapidly deflate the cuff, confirm the return of the pulse, and disconnect the tubing.
  - If you were unable to obtain the MIL, wait 1 minute and repeat the process.
  - Enter the MIL in the *MIL Field* in the ISIS system.

#### 4.2.3.6 Heart Rate Measurements for SPs through Age 4

For all SPs through the age of 4 years, only the heart rate is recorded. Count the heart rate by listening to the heart at approximately the 4th intercostal space, midclavicular line. Use the bell device of the pediatric stethoscope.

- Remove all clothing over the left chest wall.
- The heart rate should be recorded after the child rests for 4 minutes.

- If the SP is extremely active or crying, allow an additional maximum of 2 minutes for the child to become quiet before counting the heart rate.
- If the child can sit in a chair without an adult, have the child sit quietly in the chair until the heart rate is counted.
- If the child needs to be held, ask the adult who accompanies the child to hold the child in an upright position, without “squeezing” any portion of the body, especially the abdomen.
- Count the rate for 30 seconds and record the rate in the ISIS **Heart Rate Field**.
- Note regularity and record in the ISIS **Regular Field**.

#### 4.2.3.7 Pulse Measurements for All SPs Aged 5 Through 7

For all SPs 5 through 7 years of age, only the radial pulse rate is recorded.

- The pulse may be taken after the SP has been seated and resting quietly for approximately 4 minutes.
- With the elbow and forearm resting comfortably on a table and the palm of the hand turned upward, find the radial pulse and count for 30 seconds.
- The number of beats in 30 seconds is recorded.
- The **rhythm field** is defaulted to “Regular.” If there is an irregular rhythm, click on the radio button indicating regular, and check the box to specify “Irregular.”
  - If the SP is between the ages 12 through 49, the system will enable a space to enter the number of irregular beats that occurred in 60 seconds.
  - Count the pulse again for 60 seconds and record the number of missed beats during that period. Enter this number in the appropriate box. If there are 4 or more missed beats in 60 seconds, the system will block the SP from the cardiovascular fitness component.

#### 4.2.3.8 Seated Blood Pressure Readings

Both blood pressure and pulse are taken and recorded on SPs 8 years of age and older. Three consecutive blood pressure readings are obtained, using the same arm. If a blood pressure measurement is interrupted or you are unable to get one or more of the readings, a fourth attempt may be made. Wait at

least 30 seconds between readings. Open the thumb valve completely and disconnect the manometer tubing from the cuff between each reading to reduce the pressure in the cuff to zero.

#### **4.2.3.9 Procedure**

- The following procedures are used for seated blood pressure readings:
  - Place earpieces of the stethoscope into the ear canals, angled forward to fit snugly.
  - Confirm that the stethoscope head is in the low-frequency (bell) position. The bell is recommended because it may be better suited to hear the low frequency Korotkoff sounds. Position the bell of the stethoscope over the brachial artery and hold it firmly in place, making sure that the head makes contact with the skin around its entire circumference. If possible, avoid allowing the cuff, tubing, or bell to come in contact with each other.
  - Position the bell of the stethoscope over the brachial artery pulsation just above and medial to the antecubital fossa, where marked during the procedure to find the pulse.
  - Rapidly and steadily, inflate the cuff to the MIL.
  - When the MIL is reached, open the thumb valve and smoothly deflate the cuff at a constant rate near 2-mm Hg per second (one mark per second) while concurrently listening for Korotkoff sounds.
  - Keep the center of the manometer at eye level.
  - Watch the top of the mercury column (meniscus) as the pressure in the bladder falls and note the level of the manometer pressure when the first repetitive sounds are heard (phase I) and when they disappear (phase V).
  - Continue steady deflation at 2 mm Hg per second for at least another 10 mm Hg past where the last sounds were heard.
  - Rapidly deflate the cuff and disconnect the manometer tubing between measurements to ensure the cuff deflates completely to zero.
  - Enter Karotkoff Phase I (the level of the pressure on the manometer at the first appearance of repetitive sounds) as the systolic blood pressure reading.
  - Enter Karotkoff Phase V (the point at which the last muffled sound is heard) as the diastolic blood pressure reading.

- If phase I or phase V occurs between the millimeter marks on the glass column, round upward to the nearest digit.
- Wait for at least 30 seconds between readings, with the SP continuing to rest quietly, and without talking to the SP.
- Take a second set of measurements and enter the systolic and diastolic pressures in the system.
- Disconnect the manometer tubing and wait 30 seconds between readings with the SP resting quietly.
- Take the third measurement and record the systolic and diastolic pressures in the system.
- The system will automatically calculate the average based on predetermined guidelines.
- If enhancement techniques were needed, enter this in the system for that reading.
- If you are unable to get a blood pressure reading for some reason, deflate the cuff and enter this in the system as “Could Not Obtain.”
- Four measurements can be attempted if necessary. Wait 30 seconds and proceed with the fourth measurement.

#### **4.2.3.10 Averaging Rules for Determining Mean Blood Pressure**

- ISIS calculates the blood pressure average using the following protocol:
  - If only one blood pressure reading was obtained, that reading is the average.
  - If there is more than one blood pressure reading, the first reading is always excluded from the average.
  - If only two blood pressure readings were obtained, the second blood pressure reading is the average.
  - If all diastolic readings were zero, then the average would be zero.
    - Exception: If there is one diastolic reading of zero and one (or more) with a number above zero, the diastolic reading with zero is not used to calculate the diastolic average.
  - If two out of three are zero, the one diastolic reading that is not zero is used to calculate the diastolic average.

#### 4.2.3.11 Procedures to Enhance the Brachial Pulse Sounds

- If you are having difficulty hearing the blood pressure sounds, two methods can be used to increase the intensity and loudness of the sounds:
  - Inflate the cuff, and then have the subject open and close his or her fist several times. Blood pressure is then determined in the usual manner.
- When an enhancement method is used to measure BP, check “**Enhancement**” field on the data entry screen for that measurement.

#### 4.2.3.12 Additional Blood Pressure Measurement Guidelines

- If a BP measurement was interrupted, use the following guidelines:
  - The maximum number of cuff inflations for each SP is five, counting all MIL attempts and blood pressure attempts. The rationale for this is twofold: to minimize the discomfort to the SP of frequent cuff inflations and to accomplish data collection for this measurement within the time allowed.
  - If the blood pressure sounds are not heard during the first measurement, review your technique, check stethoscope position for loose connections or tubing kinks, and maintain a quiet environment. Relocate the brachial pulse and apply the bell headpiece directly over the pulse point. See the procedures in the above section for enhancing the Korotkoff sounds at the brachial pulse. Check enhancement techniques in the box on the Blood Pressure screen.
  - If the difference between the MIL and the 1st systolic measurement is less than 10 mm Hg or greater than 50 mm Hg, the system will prompt the examiner to obtain a new MIL. In this case, return to the first screen, do another estimate of the MIL, and record the new MIL in the system. The first and second BP measures are then obtained in the usual manner. Due to the limit of five inflations, the third BP measure (and the subsequent 4th measurement) should be marked as “Could not Obtain.”

#### 4.2.3.13 Hard Edit Limits for Blood Pressure

A hard edit is a limit imposed by the system that prevents data entry above or below the specified instrument or measurable limits. When entries are recorded that are outside these limits, the system displays a message that the value is out of range and sends a “popup message” asking that the



- Diastolic BP minimum and maximum ages 50+ 50 to 106 mm Hg
- Pulse minimum and maximum all ages, males and females 40 to 190 beats/minute

### **4.3 Sexually Transmitted Diseases (STD), Human Immunodeficiency Virus (HIV), and Human Papillomavirus (HPV)**

SPs who consent have blood drawn for STD and HIV testing. Female SPs who consent to self-collect vaginal swabs have the swabs tested for human papillomavirus (HPV). The specific tests are determined by age categories:

- All SPs aged 14-17 Chlamydia, gonorrhea and herpes type 2
- All SPs aged 18-39 Chlamydia, gonorrhea, herpes type 2, HIV and syphilis
- All SPs aged 40-49 Herpes type 2, HIV and syphilis
- Female SPs aged 14-59 Human papillomavirus (HPV)

SPs consent to these tests during the household interview, but may change their mind prior to the examination. Some SPs agree during the home interview, but decide not to be tested when they arrive at the MEC. Other SPs do not agree to be tested during the home interview, but change their mind and want to be tested when they arrive for the examination. In either case, the examiner is responsive to the decision of the SP. The physicians' role in STD, HIV, and HPV testing is to discuss these tests with SPs. The objective of the physician's STD and HIV pretest discussion is to educate eligible participants about the STD, HIV, and HPV testing and to explain the mechanism for getting their personal test results. The confidential nature of the test result reports is explained.

#### **4.3.1 Guidelines Affecting STD, HIV, and HPV Test Result Reporting**

Two guidelines affect the confidential reporting of STD, HIV, and HPV test results to participants in NHANES. First, NHANES is not subject to state laws that require reporting STD results to state health departments. Second, adolescents in the United States can consent to the confidential diagnosis and treatment of STDs. Medical care for these conditions can be provided to adolescents without parental consent or knowledge. Therefore, there is no legal obligation to disclose findings to

anyone other than the participant (CDC, 1993 *Sexually Transmitted Diseases Treatment Guideline*, MMWR 42 RR-14).

STD, HIV, and HPV test results are confidential and are **not disclosed to anyone**, including the participant's doctor, insurer, family or friends, except at the SP's specific request, and **only** after the SP properly provides the password selected during the examination. Everyone working with the NHANES signs a legal document making them subject to the Privacy Act, the Public Health Service, and other laws.

Because of the medical, social, and emotional consequences of positive STD, HIV, or HPV tests, disclosure of results are always handled in a sensitive, respectful, and confidential manner. SPs can only obtain their results when they call the toll-free telephone number provided to them during the examination. STD, HIV, and HPV results are the only NHANES SP health examination results that are provided verbally. All other findings from the health examination are reported to persons in a written report that is mailed to them. The methods for reporting results of these tests differ slightly for adolescents and adults. These methods are described in the following sections.

#### **4.3.1.1 Procedures for Reporting STD, HIV, and HPV Results**

During the physician's examination, eligible participants are informed about the STD, HIV, and HPV tests conducted during the MEC examination. To assure that these results are only provided to the SP for whom the results are specified, SPs are asked to provide their own password. Physicians record the password in the ISIS at the time of the physician component examination. Physicians inform participants that they must call a toll-free number in order to get their individual results. SPs use their personally selected password to confirm their identity when they call for their results. The physician encourages SPs to keep their password to themselves and not share the information with anyone. Physicians also encourage SPs to call for their results after the designated date. This self-initiated request for test results is the most foolproof method of ensuring that test results will go only to the tested individual. All SPs receive a reminder notice (Exhibit 4-1, Reminder form to get STD and HIV results) that includes the toll-free number, the date after which the results will be available, and their password.

Adult participants (aged 18 and older) receive their reminder notice from the coordinator as they leave the MEC. The reminder notice is in an envelope that is handed directly to the SP.

Minors (SPs 14-17 years of age) receive the same reminder notice, but instead of receiving it at checkout from the coordinator, the physician personally places the form in a sealed envelope marked with a number that was previously placed on the SP's examination gown. (When SPs change into an examination gown at the beginning of the session, they are given a numbered basket in which to store clothing. The assistant coordinator marks the number of the basket on their gown for subsequent identification). The physician gives the envelope to the assistant coordinator who places it in the SP's numbered basket. The physician reminds the SP to retrieve the envelope from the basket when changing clothes to leave the MEC.

Exhibit 4-1. Reminder form to get STD, HIV, and HPV results

|  |  |
|--|--|
| <b><u>National Health and Nutrition Examination Survey</u></b><br><b>STD AND HIV CALLBACK REMINDER</b> |  |
| <b>How to get results for sexually transmitted diseases and HIV</b>                                    |  |
| Call toll free:  | <b>1-888-301-2360</b>                                  |
| When:  | <b>anytime after 8/3/1999</b>                          |
| Hours:   | <b>Monday – Friday, 8:30 am – 6:00 pm Eastern Time</b> |
| When calling for results, you will need to provide the following information:                          |  |
| Sample Number:   | 955543   |
| Password:  | Picture  |
| We will only give results to the person tested.  |  |

Participants who do **not** call for their report are sent a letter reminding them to call the toll-free number to receive their special test results. If they do not call the survey, staff from NCHS will contact them by phone and tell them their results, whether positive or negative. If a health problem is identified, the participant is informed and referred for treatment in their area.

#### **4.3.2 Informing SPs of STD, HIV, and HPV Results**

SPs call the National Center for Health Statistics personnel for STD, HIV, and HPV reports. When SPs call to obtain their test results, they provide their password. Test results are not provided unless the caller correctly states the password. Under no circumstances are STD test results put in writing with a respondent's name, address, or any other personal identifiers. Test results are only communicated by telephone specifically and solely to the SP.

#### **4.4 Vaginal Swab**

Women within the ages of 14-59 are being asked to self-collect a vaginal swab for human papillomavirus (HPV) testing. The swab is self-collected by the women in the privacy of the bathroom after receiving instructions from the physician. The next sections instruct the physician in the vaginal swab protocol.

##### **4.4.1 Instructing the SP for Vaginal Swab**

The physician will explain the HPV assessment after discussing the tests for sexually transmitted diseases and HIV, and obtaining participant's password. The following is the suggested physician script.

##### **Instructions**

“Additionally we ask all girls and women your age to participate in a test for human papillomavirus. You may not have heard about these conditions. Human papillomavirus is sexually transmitted and many women who are infected do not have any symptoms. Here is some additional information about these diseases. You will find a sheet like this in your packet when you leave. [Show Reproductive Health/Sexually Transmitted Diseases Chart.]

We will test for HPV using vaginal fluid. I will explain how to collect a vaginal specimen yourself. Here is a kit that contains one vaginal swab, smaller than a tampon. You will do this in the

bathroom where you will have complete privacy. I recommend that you wash your hands before starting and after completing the collection. Also, because you will be inserting a swab into your vagina, you may want to undress partially before starting. Once you are ready to begin, first twist the top off the clear soft plastic tube. Do not discard the top. Place the top on a clean surface. Remove the swab from the plastic tube. Hold the stick at the end and do not touch the foam part of the swab. Hold the lips of the vagina open with one hand. Insert the swab fully into the vagina (like a tampon) with your other hand. Turn the foam swab against the walls of your vagina as you count to ‘ten.’ Carefully remove the swab without touching the skin or hair outside of the vagina. Place the swab into the soft plastic tube and replace the cover onto the tube. When you are done, you can give the tube to the staff person who will be waiting outside the bathroom. There are written instructions in English and Spanish inside the package if you need a reference.”

Instructions for women in the third trimester of pregnancy vary in that the SP is instructed to insert the swab halfway into the vaginal area by holding the swab at about halfway from the end of the swab.

“Do you have any questions about this test?”

“How do you feel about taking part in this test?”

(If participant indicates she is uncomfortable, you can probe “you seem unsure about doing this, what are you thinking about?” Remember the participant has the right to refuse this test. If the participant refuses this test, explain, “This will not affect your participation in the rest of the study.”) If the participant agrees to the test, explain:

“Like the blood and urine tests that are being done, these results are very private, and we will give these results only to you. We will not put the results in the report that is mailed to your home. We will give you a toll-free number to call in 4 weeks, and results will be reported only after you provide the password which you gave me a few minutes ago <*password provided during STD/HIV pre-test counseling*>.”

Persons 18-59:

“When you leave, you will have a piece of paper in your packet with a toll-free number, the dates to call, and the password you just gave me. Please be sure to call for your STD and HPV test results during those dates.”

Youth under 18 years:

“Here is a piece of paper with a toll-free number, the dates to call, and the password you just gave me. Please be sure to call for your STD and HPV results during those dates.”

## **4.5 Prostate Specific Antigen Testing**

Men who are 40 years of age and older are asked to have their blood tested for prostate specific antigen. The physician explains why this test is important, and reviews when the results will be received and what they mean. It is important that the physician fully explain that for PSA, a positive test does not mean that the SP has cancer, or that a negative result does not mean that the SP does not have cancer. The suggested script for the physician to use to gain agreement for PSA testing follows.

### **4.5.1 Physician Script for PSA**

“I would like to provide you with some information on the blood test for prostate specific antigen, or PSA. This test is commonly used by doctors along with a digital rectal exam for early detection of prostate cancer. Prostate cancer is a major public health problem among men, especially those with increasing age and in certain racial/ethnic groups. This testing will help us to do national-level planning to control this problem.

We will not do a rectal examination, but would like to test your blood for PSA to help us determine what the levels or concentrations are in men in the United States. Before we proceed, here are some facts you should know:

The PSA test measures a protein produced by the prostate gland. When prostate cancer is present, the PSA tends to rise. It is important to note that an elevated PSA does not necessarily mean cancer is present. Other problems such as prostate enlargement or an infection of the prostate may cause the PSA test result to be high.

Another fact to consider is that a normal PSA test does not guarantee that prostate cancer is not present. Certain medications and supplements are also known to affect the PSA test value.

You will receive the result of your PSA test in the Final Report of Findings sent to your home 12-16 weeks after the exam. If your PSA level is high, you will receive a letter from the survey program about your PSA level in approximately 3 weeks. You should discuss your PSA results with your doctor. If you have an elevated PSA test, your doctor or health care provider will want to do other tests to see whether prostate cancer is present or not present.

Are you willing to have your blood tested for PSA?”

If the SP answers “Yes,” then ask the exclusion questions referred to below. If any one question is answered “Yes,” explain to the SP that the test cannot be accurately done, and explain why. If the SP does not want to have the PSA test done, mark the section as “Not done, refused.” This will block the lab from shipping blood for PSA.

#### **4.5.2 Introduction to Exclusion Questions**

“Some medical procedures and prostate conditions will result in a high PSA. Because the survey is interested in learning about normal levels of PSA in the population, participants will be excluded if they have a condition or recent procedure that may affect the PSA result. Moreover, if you have had some of these conditions or procedures, a PSA test may not be useful to detect if you currently have prostate cancer. I am now going to ask you some questions about your prostate health.”

##### **Ask the Questions in the ISIS Application Related to These Topics:**

- Digital rectal exam in the past week;
- Prostate biopsy in the past month;
- Cystoscopy in the past month;
- History of prostate cancer;
- History of prostate surgery, including prostatic enlargement;
- History of radiation treatment for prostate cancer; and
- History of medication for prostate cancer.

#### **4.6 Data Entry Screens**

The following sections instruct physicians about how to carry out the data entry for the physician component. The ISIS screens are displayed as a visual reference.

#### 4.6.1 Child Heart Rate, Pulse

Heart rate (0-4 years of age) or pulse (5-7 years of age) is counted for 30 seconds and the number of beats in a 30-second period is entered in the heart rate field. The system calculates this rate and displays the number of beats in 60 seconds on the screen. The 60-second heart rates are stored in the database.

Exhibit 4-2. Child heart rate/pulse

Physician Exam: Stand:601 Session:601550 03/03/1999 08:30 am - 12:30 pm

SP ID: 767675 Name: Garbowski, Whitney Age: 3 years Gender: Female Date: 02/13/1999 Time: 07:15 PM

Heart Rate

Heart Rate

30 sec. heart rate: 60 sec. heart rate:

30 x 2 = 60

Regular  Could not obtain

Irregular

1 of 2

End of Section Close Exam Finish

- Enter the 30-second heart rate or pulse in the field. The system calculates the 60-second heart rate and displays it in the **60-second heart rate field**.
- When taking the heart rate and pulse, note whether it is regular or irregular. The default is regular. If the heart rate is irregular, click the **irregular field option** box.

Exhibit 4-3. Child heart rate: Required data entry

Physician Exam: Stand:601 Session:601550 03/03/1999 08:30 am - 12:30 pm

SP ID: 767675 Name: Garbowski, Whitney Age: 3 years Gender: Female Date: 02/13/1999 Time: 07:25 PM

Heart Rate

Heart Rate

30 sec. heart rate: 60 sec. heart rate:

x 2 =

Regular  Could not obtain

Irregular

Physician

Please, enter heart rate or check Could not Obtain

OK

1 of 2

End of Section Close Exam Finish

- If the next button is pressed before the heart rate is entered, a message is displayed: “Please enter heart rate or check Could not Obtain.”
- Click OK to this message and enter the number of beats in the **30-sec. heart rate** field.
- Click the Next arrow button to advance to the Component Status screen.

Exhibit 4-4. Component status for child heart rate/pulse

Physician Exam: Stand:601 Session:601550 03/03/1999 08:30 am - 12:30 pm

SP ID: 767675 Name: Garbowski, Whitney Age: 3 years Gender: Female Date: 02/13/1999 Time: 07:25 PM

**Heart Rate Status**

Status

Complete

Partial

Not Done

Comments

Other text

2 of 2

End of Section Close Exam Finish

- If the heart rate was entered, the component status defaults to “complete.”
- If the heart rate was not done, the status defaults to “partial.”
- Select an appropriate comment from the drop-down list.
- Select the Finish button to close the examination.

## 4.6.2 Blood Pressure Data Entry

Exhibit 4-5. Default blood pressure screen

Physician: Stand:505 Session:505070 12/30/1999 08:30 am - 12:30 pm

SP ID: 535881 Name: SMITH, SAMMY Age: 20 years Gender: Male Date: 07/06/2000 Time: 05:20 PM

### Blood Pressure

**Meal**

Have you had any of the following in the past 30 minutes? (check all that applies)

food  
 alcohol  
 coffee  
 cigarettes

**Arm/Cuff**

Arm selected:  Right  Left  Could not obtain Cuff size: [dropdown]

**Timer, min.**

1 2 3 4 5

**Pulse/MIL**

30 sec pulse: 60 sec pulse:

x 2 =

Regular  
 Irregular

Pulse type: Radial [dropdown]

Maximum inflation level:  mm Hg

Could not obtain

1 of 3

End of Section Close Exam Finish

- A timer on the right side of the screen starts a 5-minute count when this screen is opened. The timer is used to help determine when the pulse, MIL, and blood pressure measurements are to be made.
- Determine if the SP has had food, alcohol, coffee, or cigarettes in the last 30 minutes. Check all that apply. Answering “Yes” does not exclude SPs from any of the physician’s examination.
- The pulse should not be taken until the SP has been resting quietly for **at least 3** minutes. The SP should be seated quietly during this time to allow the heart rate and blood pressure measurements to stabilize to a standard resting state.
- The MIL should not be taken until the SP has been resting quietly for **at least 4** minutes.
- The blood pressure should not be taken until the SP has been resting for **at least 5** minutes.
- The default for “Arm/cuff” is the right arm. If the left arm is used, click on left.
- If “Could not Obtain” is selected, the cuff size, MIL, and blood pressure fields are disabled.

#### Exhibit 4-6. Blood pressure cuff size

Physician: Stand:505 Session:505070 12/30/1999 08:30 am - 12:30 pm

SP ID: 535881 Name: SMITH, SAMMY Age: 20 years Gender: Male Date: 07/06/2000 Time: 05:20 PM

### Blood Pressure

**Meal**  
Have you had any of the following in the past 30 minutes? (check all that applies)

- food
- alcohol
- coffee
- cigarettes

**Arm/Cuff**  
Arm selected:  Right  Left  Could not obtain Cuff size:

**Timer, min.**  
1 2 3 4 5

**Pulse/MIL**  
30 sec pulse: 60 sec pulse:  
48 x 2 = 96  Regular  Irregular  
Pulse type:

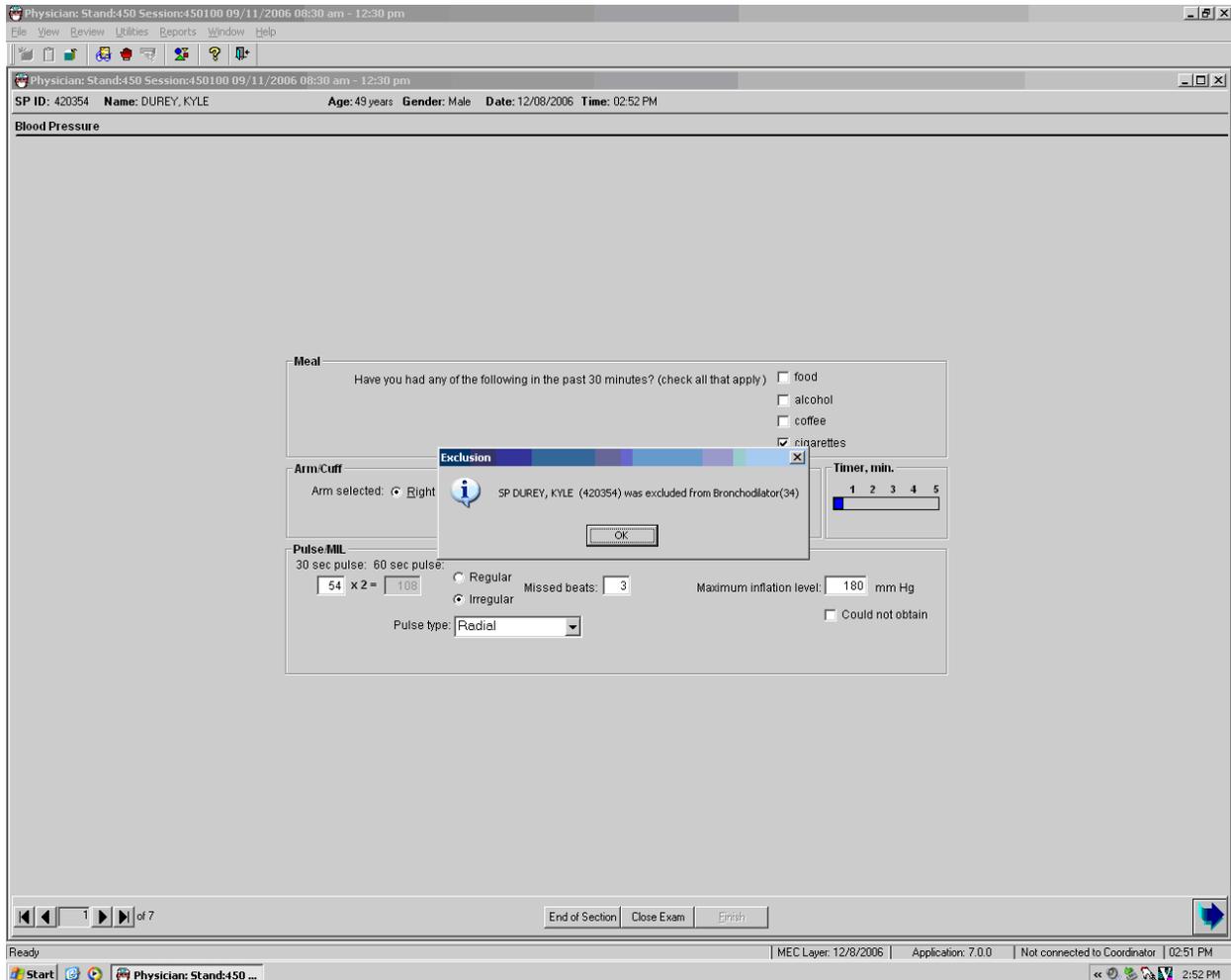
Diastolic level: 178 mm Hg  Could not obtain

1 of 3 End of Section Close Exam Finish

- Check which arm is being used for the BP. The default is the right arm.
- Select cuff size from the drop-down menu. The sizes of cuffs are child, adult, large adult, and adult thigh.
- If the cuff size is not selected before the Next button is pressed, a message is displayed with a reminder to select cuff size.
- The default site for taking the pulse is radial. If the radial pulse is not palpable, try the brachial. If a brachial pulse is obtained, select and record brachial from the drop-down menu of the “Pulse Type” field.
- Enter the 30-second pulse in the “30-sec pulse” field. The system will automatically calculate the 60-second heart rate and display it on the screen.
- Note whether the heart rate was regular or irregular. If the heart rate was irregular, click the box indicating irregular.
- The default pulse type is radial. If the pulse type was brachial, use the drop-down menu to change the pulse type to brachial.

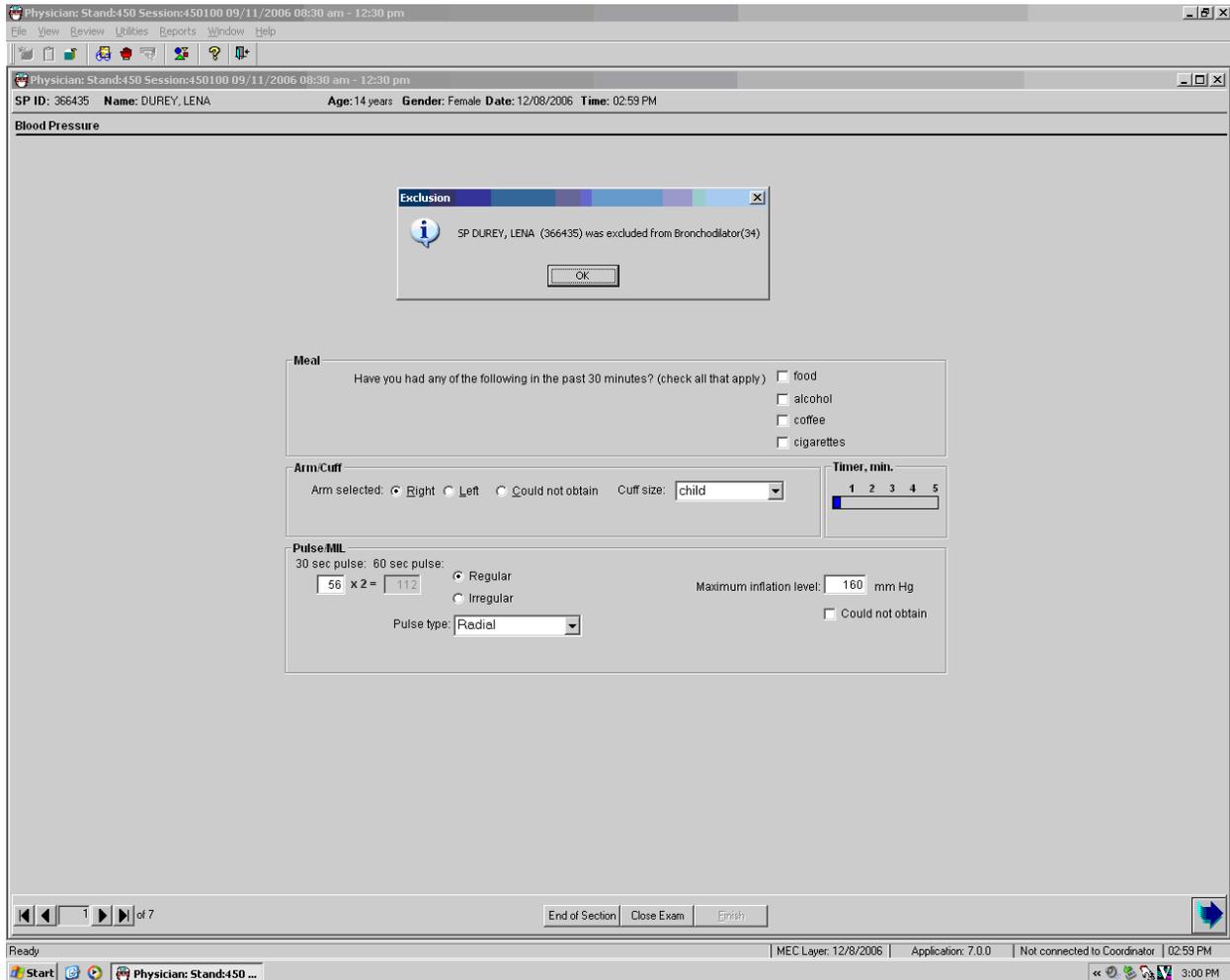
## 4.6.3 Exclusion from Bronchodilator Based on Pulse and Irregular Beats

Exhibit 4-7. Irregular rhythm exclusion from Bronchodilator



- If the pulse is irregular, SPs are excluded from the bronchodilator subcomponent. A message is displayed: “SP [name] was excluded from Bronchodilator.” Click OK to this message.
- The SP is excluded from the Bronchodilator safety exclusion questions and the subcomponent.

## Exhibit 4-8. Heart rate exclusion from Bronchodilator



- If the pulse is greater than the rates for specified age ranges, SPs are excluded from the Bronchodilator subcomponent. A message is displayed: “The SP was excluded from Bronchodilator.” Click OK to this message.
- The SP is excluded from the Bronchodilator safety exclusion questions and from the Bronchodilator subcomponent.

Exhibit 4-9. Required pulse entry

Physician: Stand:505 Session:505070 12/30/1999 08:30 am - 12:30 pm  
SP ID: 535881 Name: SMITH, SAMMY Age: 20 years Gender: Male Date: 07/06/2000 Time: 05:20 PM

**Blood Pressure**

**Meal**  
Have you had any of the following in the past 30 minutes? (check all that applies)  food  
 alcohol  
 coffee  
 cigarettes

**Arm/Cuff**  
Arm selected:  Right  Left  Could not obtain Cuff size: adult  
Timer, min. 1 2 3 4 5

**Pulse/MIL**  
30 sec pulse: 60 sec pulse:  
x 2 = 0  Regular  Irregular  
Pulse type: Radial  
Level: 178 mm Hg  
 Could not obtain

Physician  
Please, enter Pulse or check Could not Obtain  
OK

1 of 3 End of Section Close Exam Finish

- If the physician tries to exit from this screen before recording the pulse measurement, a system message is displayed: “Please, enter Pulse or check Could not Obtain.”
- Click OK to this message and record the 30-sec pulse in the “30-sec pulse” field.

Exhibit 4-10. Out of range maximum inflation level

The screenshot shows a medical software interface for a blood pressure measurement. At the top, the window title is "Physician: Stand:505 Session:505070 12/30/1999 08:30 am - 12:30 pm". Below this, patient information is displayed: "SP ID: 535881 Name: SMITH, SAMMY Age: 20 years Gender: Male Date: 07/06/2000 Time: 05:20 PM".

The main section is titled "Blood Pressure". It contains several sub-sections:

- Meal:** A question asks "Have you had any of the following in the past 30 minutes? (check all that applies)". There are four checkboxes: "food" (checked), "alcohol" (checked), "coffee" (checked), and "cigarettes" (unchecked).
- Arm/Cuff:** "Arm selected:" with radio buttons for "Right" (selected) and "Left".
- Pulse/ML:** "30 sec pulse: 60 sec pulse:" with input fields showing "46" and "92". There are radio buttons for "Regul:" (selected) and "Irregular". A dropdown menu for "Pulse type:" is set to "Radial".
- Maximum inflation level:** A text input field contains "304" mm Hg. There is a checkbox for "Could not obtain" which is unchecked.
- Timer, min.:** A progress bar with a scale from 1 to 5 minutes.

An error dialog box titled "Physician" is overlaid on the screen. It contains a red "X" icon and the text: "The value you have entered is out of range. Please reenter your reading." with an "OK" button.

At the bottom of the interface, there are navigation buttons: "End of Section", "Close Exam", and "Finish". A status bar at the very bottom shows "1 of 3" and a mouse cursor icon.

- Get the maximum inflation level (MIL) and enter this in the “Maximum inflation level” data entry field. If a number greater than 300 is entered a message is displayed: “The value you entered is out of range. Please reenter your reading.” The mercury manometer does not register numbers greater than 300.

Exhibit 4-11. MIL data entry required

The screenshot shows a medical software interface for blood pressure entry. At the top, a status bar displays: Physician: Stand:505 Session:505070 12/30/1999 08:30 am - 12:30 pm. Below this, patient information is shown: SP ID: 535881 Name: SMITH, SAMMY Age: 20 years Gender: Male Date: 07/06/2000 Time: 05:20 PM. The main section is titled 'Blood Pressure' and contains several sub-sections: 'Meal' with a question 'Have you had any of the following in the past 30 minutes? (check all that applies)' and checkboxes for food, alcohol, coffee, and cigarettes; 'Arm/Cuff' with radio buttons for 'Right' and 'Left'; 'Pulse/MIL' with input fields for '30 sec pulse' (46) and '60 sec pulse' (92), radio buttons for 'Regular' and 'Irregular', a 'Pulse type' dropdown menu set to 'Radial', and a 'Maximum inflation level' field. A 'Timer, min.' section shows a progress bar from 1 to 5. A 'Physician' dialog box is overlaid in the center, featuring a red 'X' icon and the text 'Please, enter MIL or check Could not Obtain' with an 'OK' button. At the bottom, there are navigation buttons: 'End of Section', 'Close Exam', 'Finish', and a blue arrow button. A status bar at the very bottom shows '1 of 3' and navigation icons.

- If the Next button is entered before the MIL is entered, the system will display a message: “Please enter MIL or check “Could not Obtain.” If “Could not Obtain” is selected for MIL, an attempt should be made to get a blood pressure measurement.

## 4.6.4 Blood Pressure Measurement Screens

Exhibit 4-12. Default blood pressure data entry screen

Physician: Stand:250 Session:250160 10/22/2003 08:30 am - 12:30 pm

File View Review Utilities Reports Window Help

Physician: Stand:250 Session:250160 10/22/2003 08:30 am - 12:30 pm

SP ID: 681463 Name: S, W Age: 25 years Gender: Female Date: 06/14/2004 Time: 04:23 PM

Blood Pressure Readings - 1

BP Screen Number 1.

Reading 1

Systolic:  mm Hg Diastolic:  mm Hg  Enhancement used  Could not obtain

Maximum inflation level:  mm Hg

End of Section Close Exam Eirish

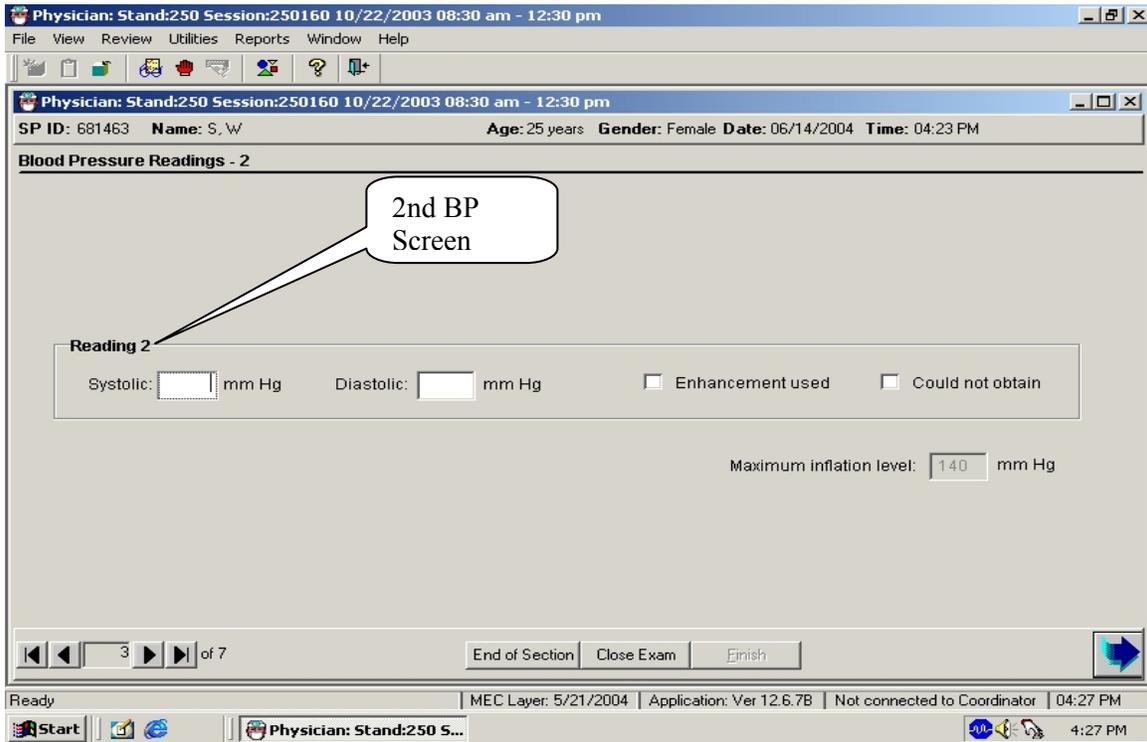
Advance for next BP Measurement

Ready MEC Layer: 5/21/2004 Application: Ver 12.6.7B Not connected to Coordinator 04:26 PM

Start Physician: Stand:250 S... 4:26 PM

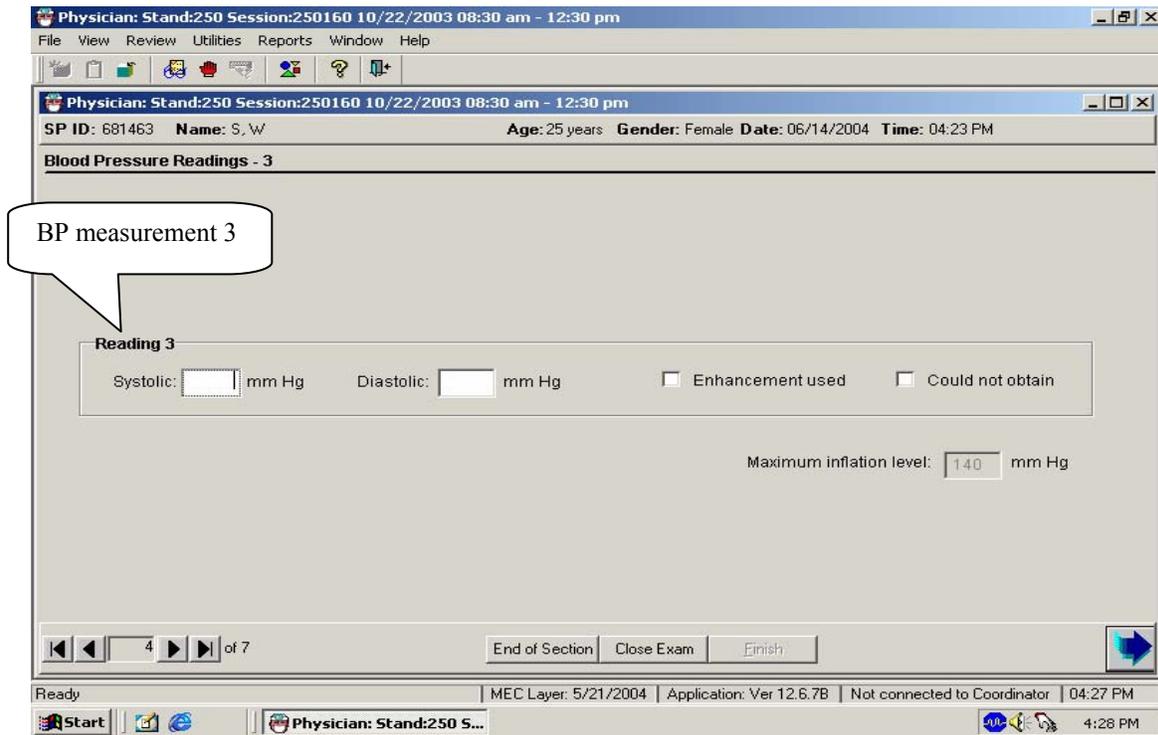
- Blood pressures are measured 3 times with a 30-second pause between each successive measurement.
- If you are unable to get a blood pressure measurement, check “Could not Obtain” for that measurement.
- If the blood pressure is difficult to hear, enhancement methods may, and should, be used. See Section 4.2.3.11 for a description of these methods. If the enhancements are used, click on the “Enhancement” button for that measurement.
- **Each BP measurement is recorded on a new screen. Advance the screen after each successive BP measurement. Do not go back to review previous BPs before taking the next measurement.**

Exhibit 4-13. Blood Pressure Readings screen 2



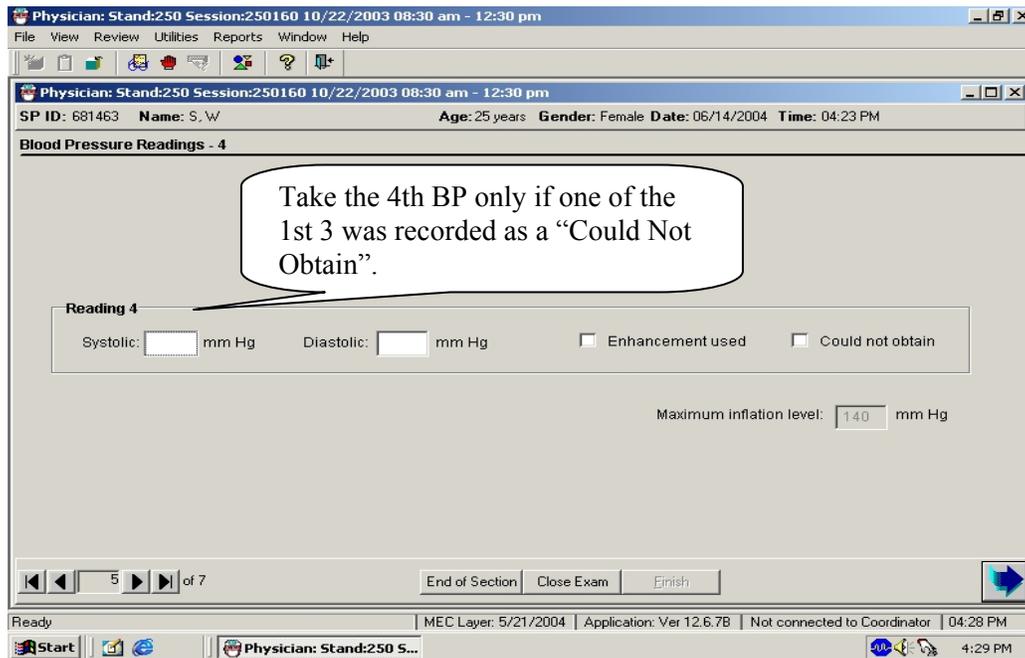
- Take the second BP using the same techniques as BP 1.
- Record the 2nd BP, and advance the screen.

Exhibit 4-14. Blood Pressure Readings screen 3



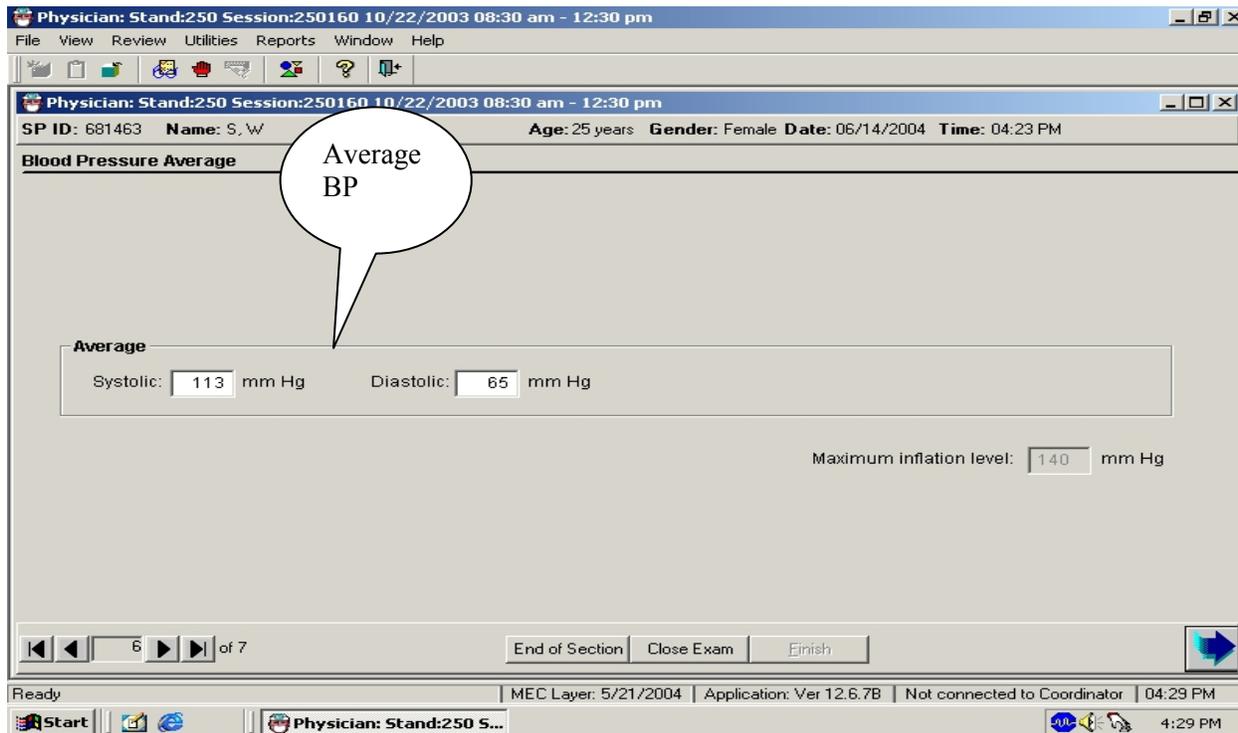
- Take the third BP using the same techniques as BPs 1 and 2.
- Record the 2nd BP, and advance the screen.

Exhibit 4-15. Blood Pressure Readings screen 4



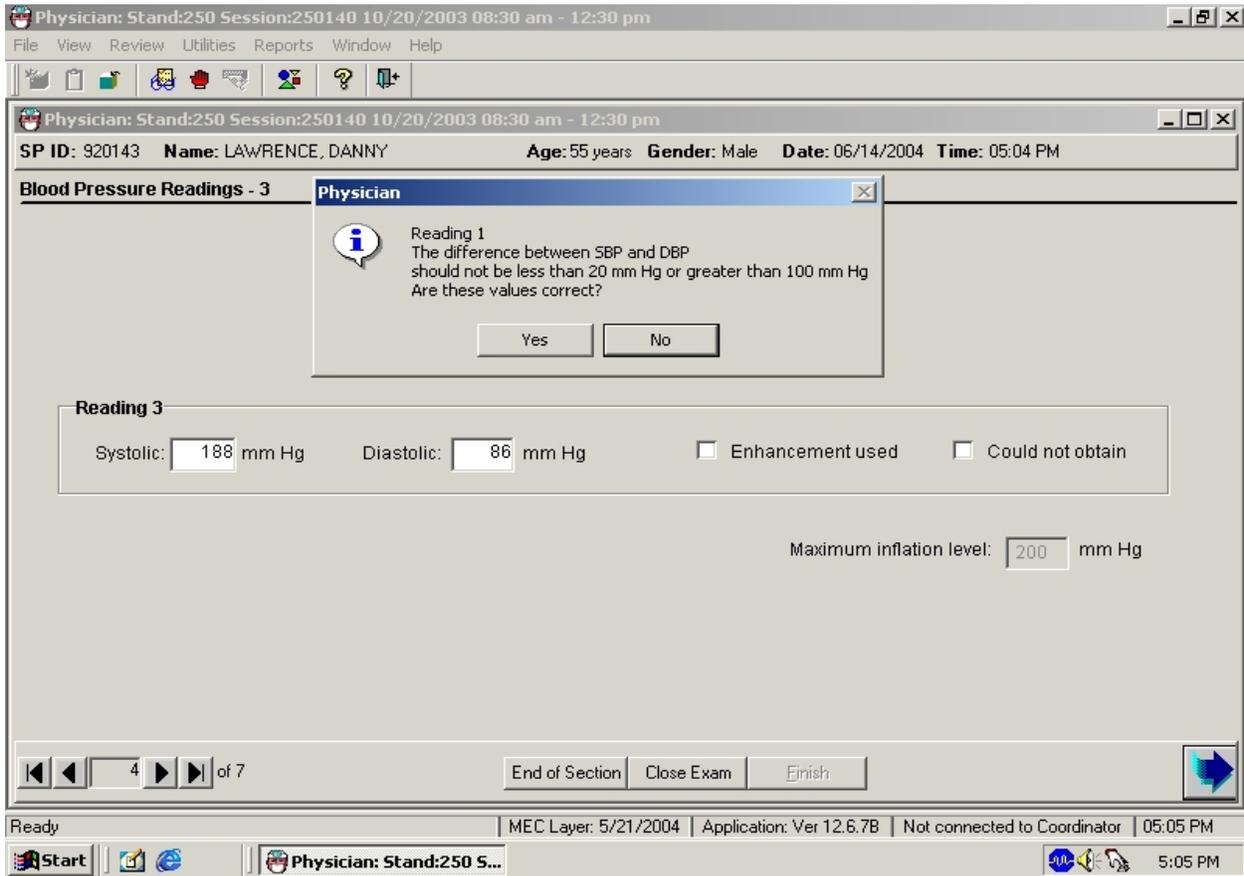
- If any of the first three measurements are checked as “Could not Obtain,” the BP section of the application will open up another field to allow a fourth measurement.
- Take the fourth measurement and record the results.
- The maximum number of times the cuff should be inflated for blood pressure measurements is five including all MIL measurements.
- The increment of the mercury manometer markings are in 2-millimeter intervals. All end digit BP measurements should be recorded as even numbered digits. If an odd number is entered as the end digit for either the systolic or diastolic measurement, a message is displayed: “**Number must be even!**”
- Click OK to this message. Reenter the correct measurement and continue with data entry or measurement.
- If the systolic BP entered is greater than the MIL, a message is displayed: “SBP should be less than MIL. Please, redo your MIL.”
- Redo the MIL and record. The maximum number of times the cuff can be inflated is five.

Exhibit 4-16. Averaging systolic blood pressure



- There must be a MIL recorded for every SP.
- Ideally, every SP has three blood pressure measurements recorded.
- When three systolic blood pressure readings are recorded, the systolic average is calculated by the system as the average of the **last two systolic measurements**.
- When only one systolic blood pressure reading can be obtained, the one systolic reading is calculated by the system as the average.
- When only two systolic blood pressure readings can be obtained, the first systolic reading is discarded and the second systolic blood pressure measurement is calculated by the system as the systolic average.
- If all diastolic readings are zero, the average diastolic BP is calculated by the system as zero (0).
- If there is one diastolic reading of zero and one or more readings with a diastolic above zero (0), the system uses only the nonzero diastolic readings to calculate the average diastolic BP.
- If two out of three diastolic readings are zero (0), the system uses the one nonzero diastolic reading to calculate the average diastolic BP.
- When the average BP appears, tell the SP his or her BP.

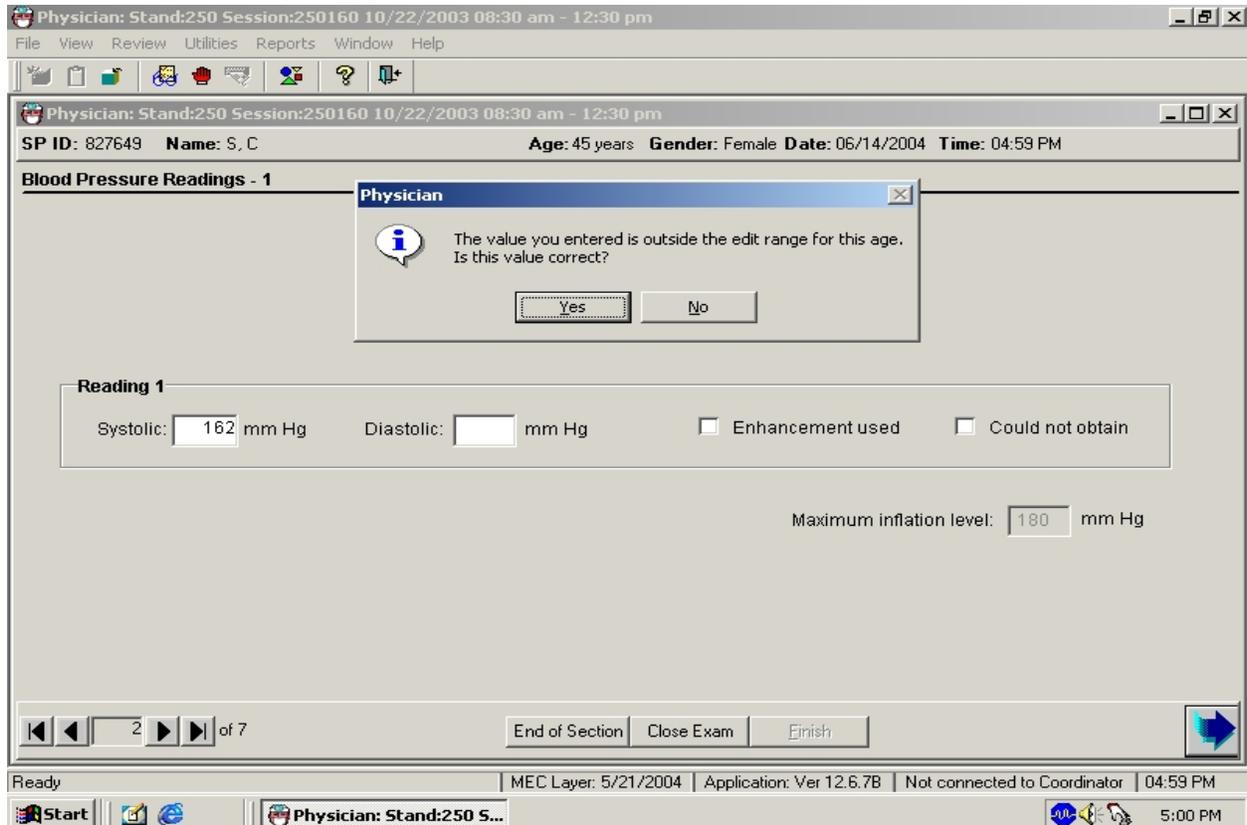
Exhibit 4-17. Edit allowable systolic and diastolic blood pressure



- If the systolic and diastolic BP are less than 20 mm Hg or more than 100 mm Hg, the application edits asks for verification of accuracy.
- If the measurements are correct, click “Yes.”
- If the measures are incorrect, click “No,” and reenter the measurements.

## 4.6.5 Blood Pressure Edit Limits

Exhibit 4-18. Edit range limits for blood pressure



- If a systolic or diastolic value is outside the edit range for that SP, (age specific) the system displays a message: “The value you entered is outside the range for this age. Is this value correct?”
- If the value entered is correct, click “Yes,” and proceed with the data entry.
- If the response is not correct, click on “No” and reenter the value, then proceed with the examination.

## 4.6.6 Blood Pressure Component Status and Comments

Exhibit 4-19. Comments in blood pressure component

Physician: Stand:250 Session:250160 10/22/2003 08:30 am - 12:30 pm

File View Review Utilities Reports Window Help

Physician: Stand:250 Session:250160 10/22/2003 08:30 am - 12:30 pm

SP ID: 681463 Name: S, W Age: 25 years Gender: Female Date: 06/14/2004 Time: 04:23 PM

**Blood Pressure Status**

Status

Complete  
 Partial  
 Not Done

Comments [dropdown menu]

Other text [text input field]

7 of 7 End of Section Close Exam Finish

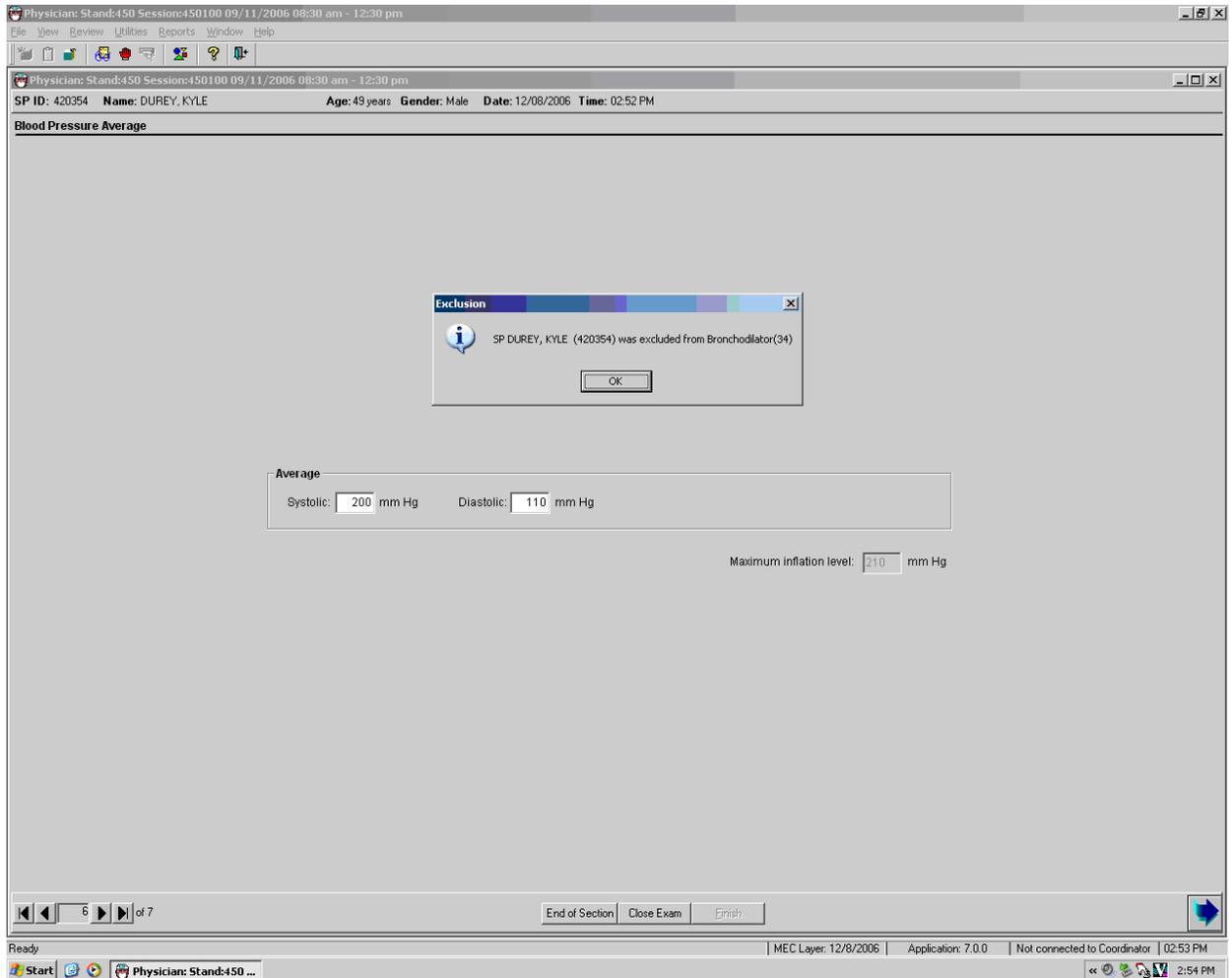
Ready MEC Layer: 5/21/2004 Application: Ver 12.6.7B Not connected to Coordinator 04:30 PM

- If all the measurements were entered, the system sets the default last screen for the component status to “Complete.”
- If one or more of the measurements were not recorded, the system sets the component status to “Partial.”
- If the Component Status is partial, select the appropriate comment from the drop-down menu.
- The comments in the menu are:
  - Safety exclusion: SP is excluded due to a situation that may cause him or her harm or discomfort such as applying or inflating a cuff on an arm with visible edema, lesions, or other conditions.
  - SP refusal: SP refuses all or part of the examination.
  - No time: SP is unable to complete the examination due to time restrictions.

- Physical limitation: SP has a physical limitation that prevents examination completion.
- Communication problem: Physician is unable to communicate instructions for the examination adequately.
- Equipment failure: There is a malfunction of the equipment.
- SP ill/emergency: SP became ill while in the middle of the examination.
- Interrupted: Session was interrupted due to natural phenomena or other event.
- Poor cuff fit: If cuff does not fit properly, the blood pressure measurements should not be taken.
- Other, specific: If none of the standard comments apply, select “Other” and specify the reason for the status in the open text field.

#### 4.6.7 Exclusion from Bronchodilator Based on Blood Pressure

Exhibit 4-20. Blood pressure exclusion from Bronchodilator



- If the systolic BP exceeds specific age criteria, the SP is excluded from the Bronchodilator subcomponent and from the safety exclusion questions in the physician's examination.
- A message is displayed: "SP [name] was excluded from Bronchodilator."
- Click "OK."

#### **4.6.8 Shared Exclusion Questions**

If the shared exclusion questions were answered during the household interview, the answers appear in the fields. The fields are disabled for the physician examination, as well as any other component where the questions are relevant. The responses given during the household interview or during any component cannot be changed after the answer is recorded and the screen advanced. If the shared exclusion questions were not answered during the household interview, they are enabled and are asked during the MEC examination in the first examination where shared exclusions are asked. Each question is asked only once, even when the question is relevant for more than one component. Some examinations do not require all the shared exclusions to be asked. In this situation, there may be some questions answered in one examination and then disabled in the remaining examinations. Shared exclusion questions are component specific. Answers provided during previous components appear on the screen for the next examiner to see, but the field for data entry is disabled. Only shared exclusion questions relevant to the component that have not been answered are enabled.

## Exhibit 4-21. Shared Exclusion Questions Females aged 12 to 49

The screenshot displays a software window titled "Physician: Stand:450 Session:450100 09/11/2006 08:30 am - 12:30 pm". The window contains a menu bar (File, View, Review, Utilities, Reports, Window, Help) and a toolbar. Below the menu bar, the patient information is displayed: "SP ID: 798037 Name: DUREY, KATE Age: 18 years Gender: Female Date: 12/08/2006 Time: 02:56 PM". The main content area is titled "Shared Exclusion Questions" and contains two questions:

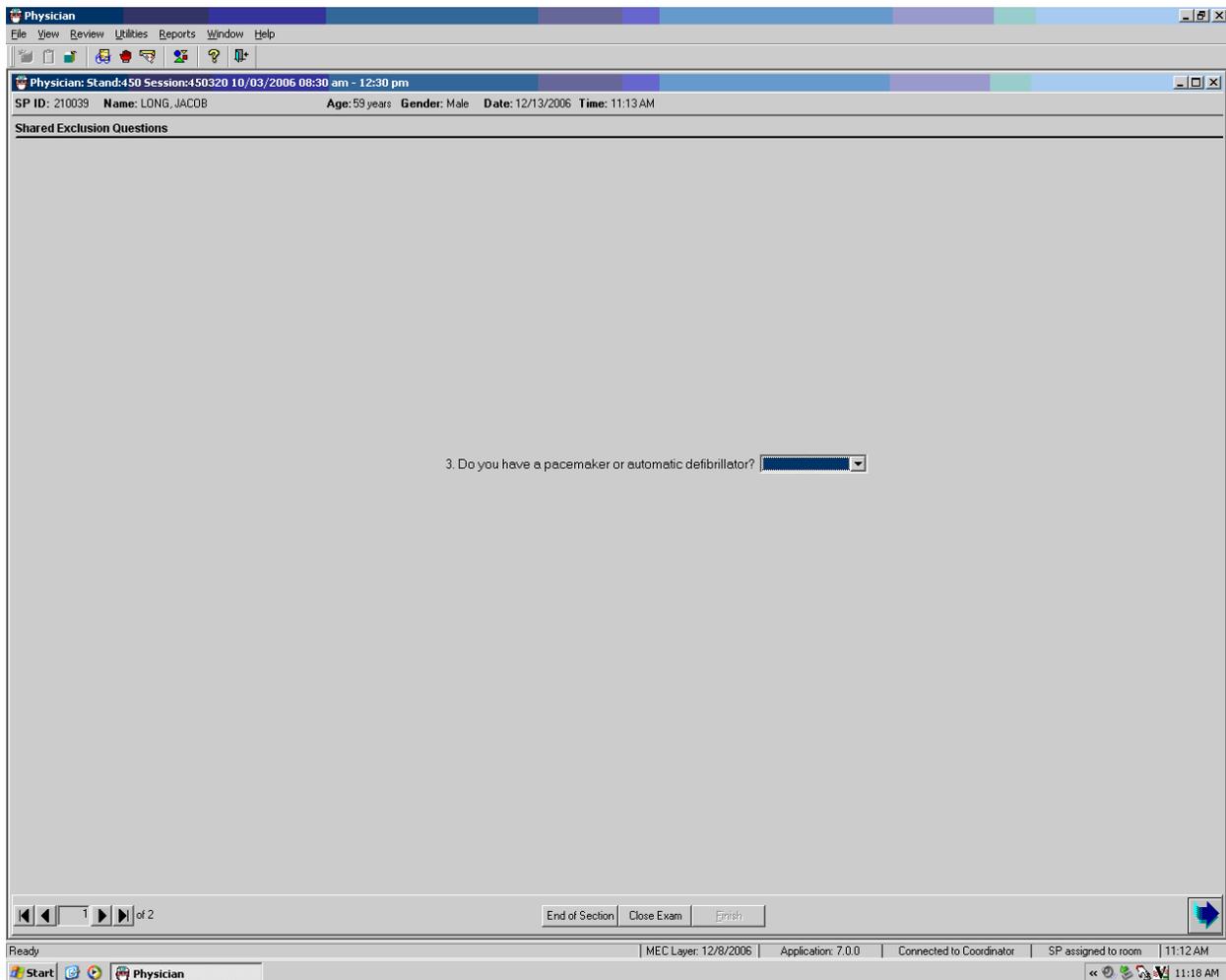
3. Do you have a pacemaker or automatic defibrillator?

4a. Are you currently pregnant?

At the bottom of the window, there is a navigation bar with buttons for "End of Section", "Close Exam", and "Finish", along with a "1 of 2" indicator and a blue arrow icon. The Windows taskbar at the bottom shows the system tray with the time "2:57 PM" and the status "Not connected to Coordinator".

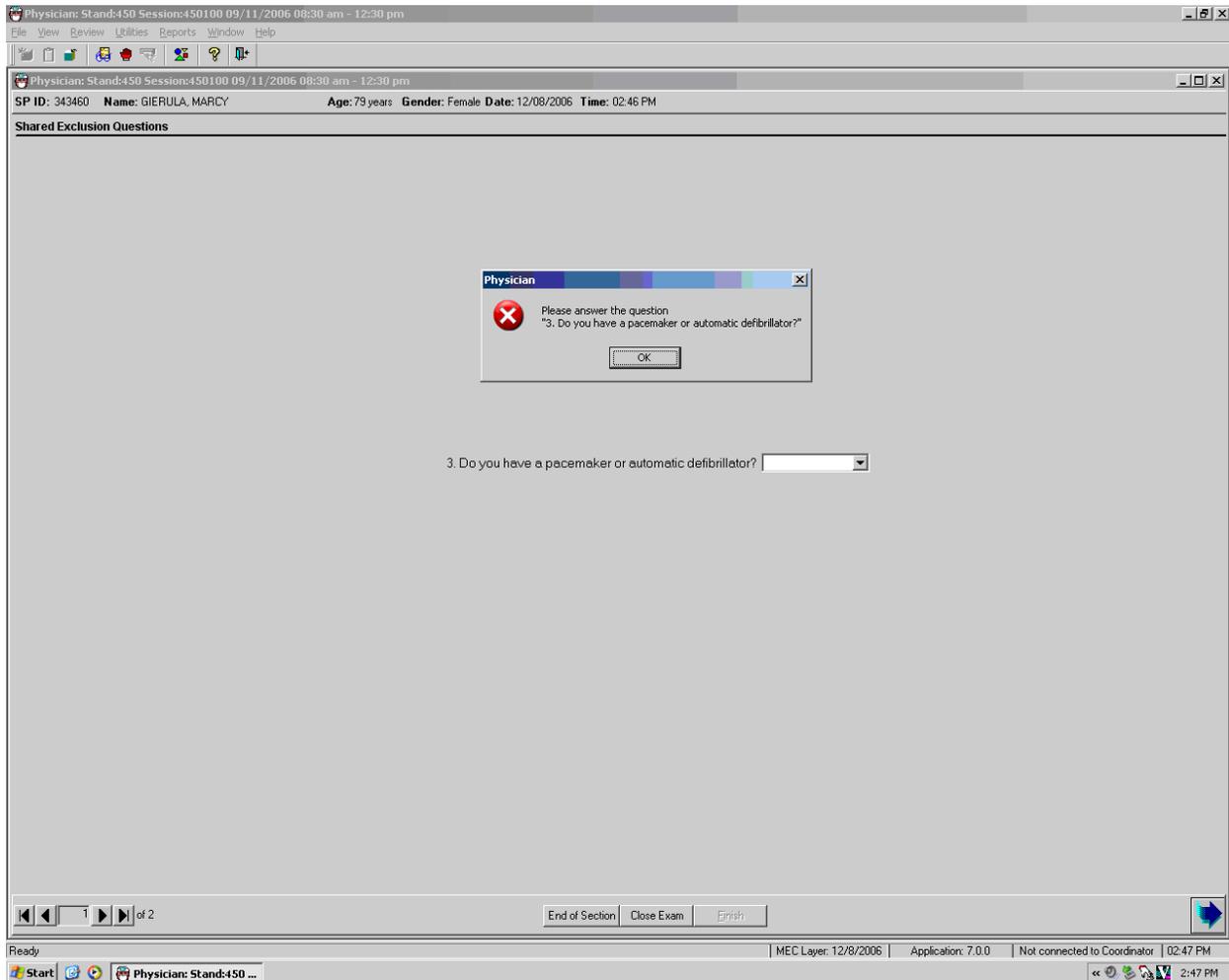
- If the SP is female, there are shared exclusion questions on self-reported pregnancy.
- If the shared exclusion questions are answered in the household examination, the questions will appear answered and disabled. These responses cannot be changed in the MEC.
- If the responses excluded the SP from Bronchodilator, the SP would not be sent to the Bronchodilator subcomponent.

## Exhibit 4-22. Shared Exclusion Questions: Pacemaker/Automatic Defibrillator



- This is the only Shared Exclusion question for SPs who are male, and females who are not of childbearing age.
- If the response to the above question is “Yes,” the SP is excluded from the Bronchodilator subcomponent.

## Exhibit 4-23. Shared Exclusion Questions: Required data entry



- If the Next button is pressed to go to the next screen, a message is displayed: “Please answer the question.” The specific question that was not answered will also be part of this message.
- Click “OK” to this message and answer the question, then go to the next screen.

Exhibit 4-24. Component completion status for shared exclusions

The screenshot shows a software window titled "Physician Exam: Stand:601 Session:601480 02/24/1999 08:30 am - 12:30 pm". Below the title bar, a status bar displays "SP ID: 305781 Name: Washington, George Age: 43 years Gender: Male Date: 02/13/1999 Time: 07:54 PM". The main content area is titled "Shared Exclusion Status" and contains a form with the following elements:

- A "Status" section with three radio buttons: "Complete" (selected), "Partial", and "Not Done".
- A "Comments" section with a text input field and a dropdown arrow.
- An "Other text" section with a text input field.

At the bottom of the window, there is a navigation bar with left and right arrow buttons, a page indicator "2 of 2", and three buttons: "End of Section", "Close Exam", and "Finish". A blue arrow icon is located in the bottom right corner.

- If all the shared exclusion questions are answered, the component status for shared exclusions defaults to “Complete.”
- If all questions were not answered, the status defaults to partial. The examination is closed with the “Close Examination” button.
- If the SP was excluded by any of the shared exclusion questions, the system displays a series of messages to indicate the other components that are blocked for this SP.
- The SP is excluded from DXA if the response to the question on pacemaker or defibrillator is “Yes.”
- The SP is excluded from DXA if the weight is greater than 300 pounds.

#### 4.6.9 STD and HIV Discussion of Tests and Obtaining Results

Exhibit 4-25. STD Tests for SPs 14-17 years old

Physician: Stand:505 Session:505110 01/03/2000 08:30 am - 12:30 pm

SP ID: 292199 Name: MAYNES, KAREN Age: 17 years Gender: Female Date: 07/07/2000 Time: 11:36 AM

**STD Tests**

**STD (Sexually Transmitted Disease) Overview**

- ◆ Discuss Chlamydia and Gonorrhea
- ◆ Discuss Herpes Type 2

**Reporting of Results**

Results kept completely confidential and reported only to you

Please call our toll free number in 1 month

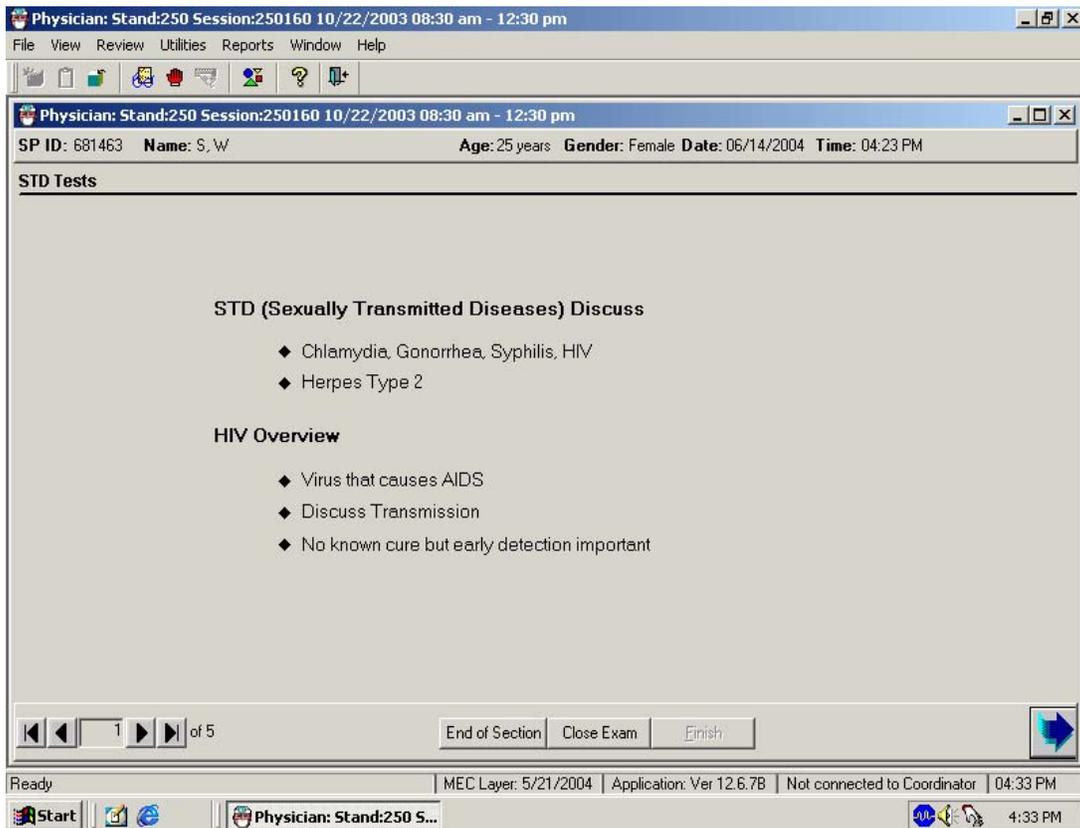
Password:

Here is a sheet with your password, the toll free number, and the times to call.

1 of 2 | End of Section | Close Exam | Finish

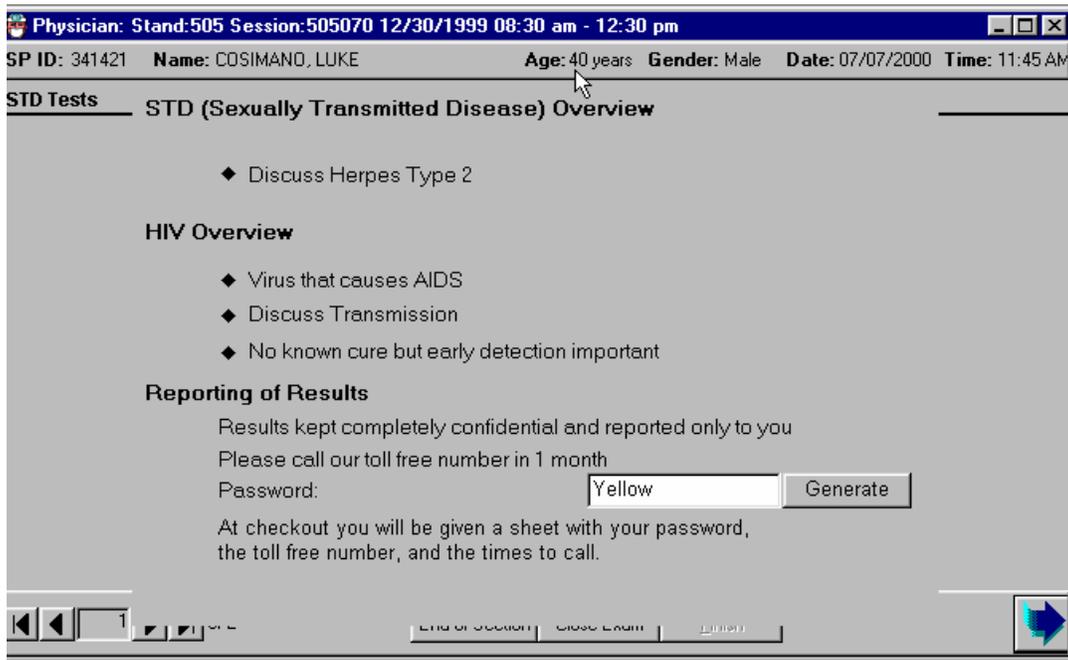
- If the SP is 14-17 years of age, the physician discusses the method for the SP to receive STD results.
- The physician asks the SP to give a password to use when calling to get his or her test results. If the SP cannot think of a password, the physician will give the SP a password by clicking on “Generate.” The system will generate a password and display it in the password field.
- Other SP information on minors is given to the parents at the time of checkout from the MEC. Due to the sensitive and confidential nature of STD results, the information reports for 14- to 17-year-olds are printed in the physician’s room. These test results are given only to the SP.
- Click on the “Print” button to print the information form for the SP. After discussing the mechanism for obtaining test results, put the STD and HIV information form in a sealed envelope.
- On the envelope, write the number on the SP’s examination gown (the number corresponding to the number on the basket containing the SP’s clothes). Put the envelope in your mailbox or give it directly to the assistant coordinator, who will put the envelope in the basket corresponding to the number on the envelope.

Exhibit 4-26. STD and HIV for SPs 18-39 years old



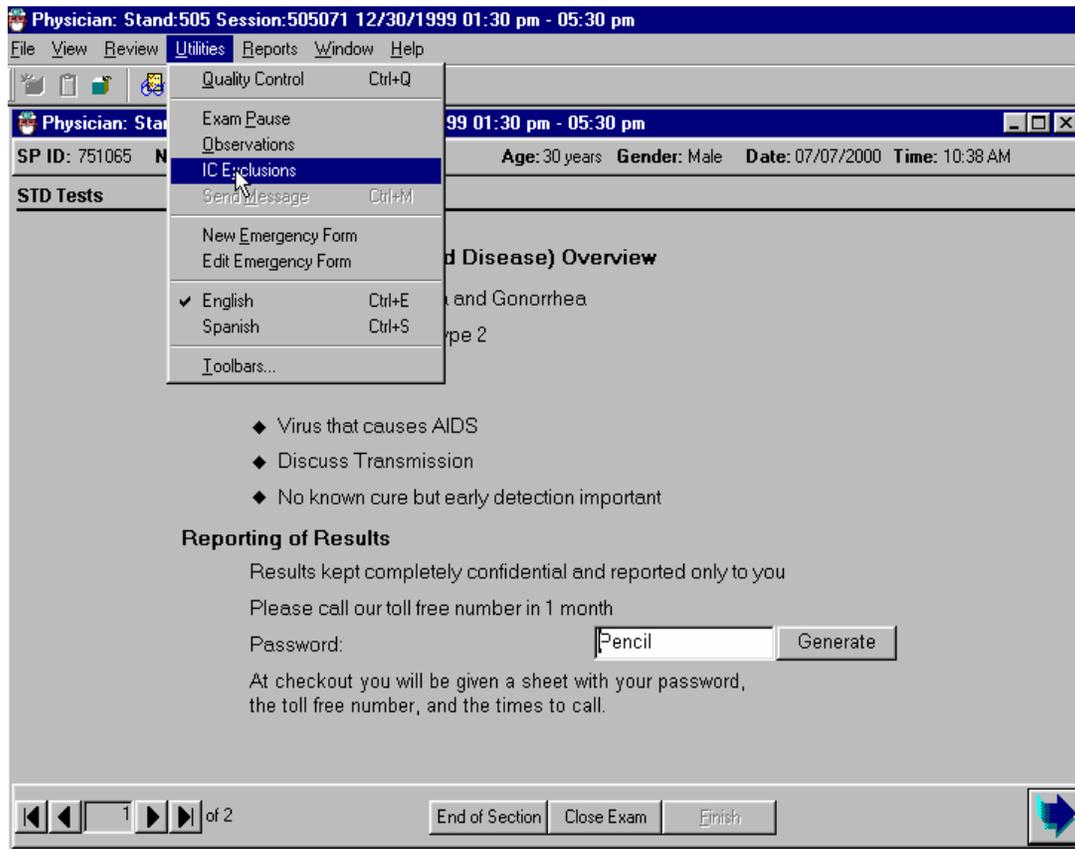
- If the SP is 18-39 years of age, the physician discusses the method for the SP to receive results for STD and HIV.
- The physician asks the SP to give a password to use when calling to get the test results.
- If the SP cannot think of a password, the physician will give the SP a password by clicking on "Generate."
- The system generates a password and displays it in the password field.
- The SP is given a printout during MEC checkout with the information needed to call for test results. The information printout form is printed at the coordinator station and placed with the SP's information packet.

Exhibit 4-27. STD and HIV for SPs 40-49 years old



- If the SP is 40-49 years of age, the physician discusses the method for the SP to receive STD and HIV results.
- The physician asks the SP to give a password to use when calling to get test results.
- If the SP cannot think of a password, the physician will give the SP a password by clicking on "Generate."
- The system generates a password and displays it in the password field.
- The SP is given a printout at the time of MEC checkout with the information needed to call for test results. This information printout is printed at the coordinator station and placed with the SP's information packet.

Exhibit 4-28. Utilities menu for informed consent exclusions



- SPs may refuse the STD and/or the HIV tests. They may do this at the household interview or in the phlebotomy room.
- They may also mention this to the physician and the SP can be excluded for STD and or HIV during the physician’s examination.
- If the SP mentions that they want to refuse these tests, the physician advances to the “Utilities” menu from the toolbar and selects “IC Exclusions” (Informed Consent exclusions).

Exhibit 4-29. STD and HIV – Informed consent exclusions

| IC Item         | Exclude SP from Test                 |                                     |
|-----------------|--------------------------------------|-------------------------------------|
| HIV             | <input checked="" type="radio"/> Yes | <input type="radio"/> No            |
| STD             | <input checked="" type="radio"/> Yes | <input type="radio"/> No            |
| Genetic Testing | <input type="radio"/> Yes            | <input checked="" type="radio"/> No |
| Future Studies  | <input type="radio"/> Yes            | <input checked="" type="radio"/> No |

OK Cancel

- Check HIV and/or STD to exclude the SP from these tests. This sends a message to the phlebotomy and laboratory examination component to exclude the SP from these tests.
- If the SP had previously agreed to these tests and later decided to refuse these test after discussion with the physician, the specimens can be still be excluded. Check one or both examinations as appropriate. This sends a message to the lab to discard the specimens.
- The SP could refuse these tests initially and later change his or her mind after talking with the physician or phlebotomist. In this situation, the informed consent exclusion should be unchecked. This will remove the exclusion for these tests in the laboratory.

Exhibit 4-30. SP refusal for STD and HIV testing

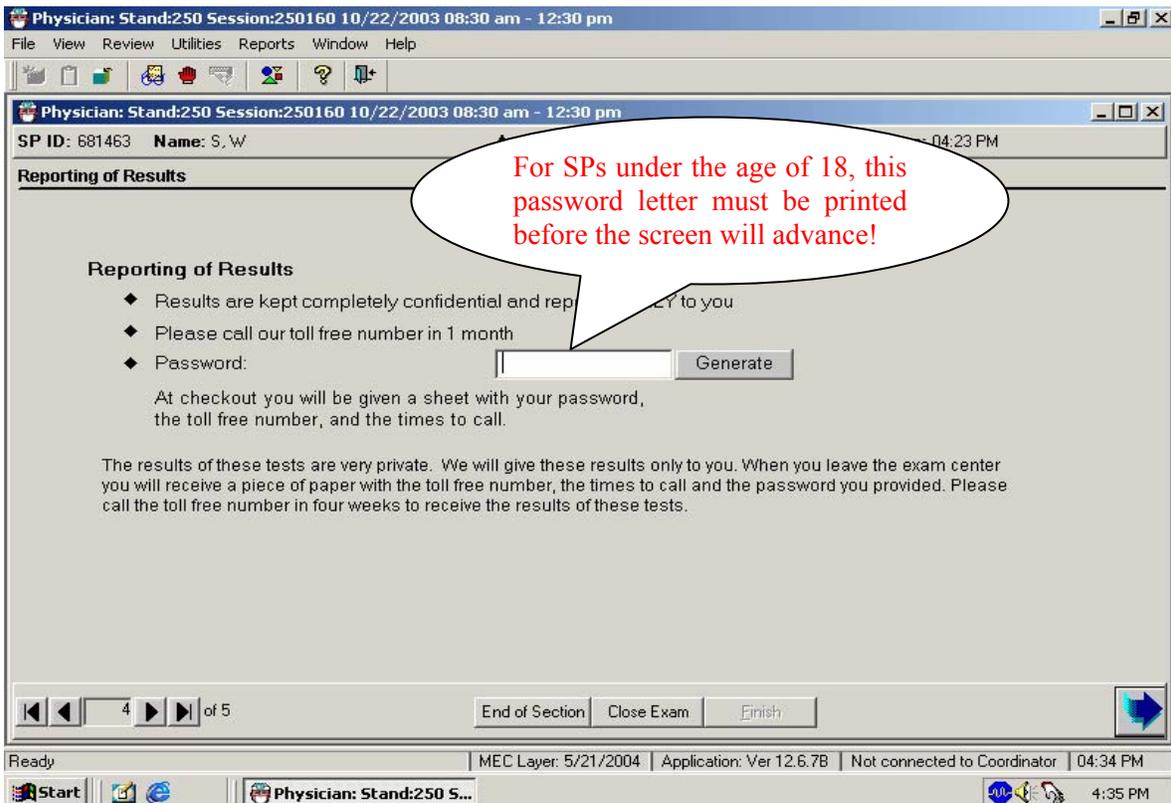
The screenshot shows a software window titled "Physician: Stand:505 Session:505071 12/30/1999 01:30 pm - 05:30 pm". The header bar contains patient information: "SP ID: 751065 Name: TERMANA, SISCO Age: 30 years Gender: Male Date: 07/07/2000 Time: 10:38 AM". The main content area is titled "STD Tests" and contains three sections:

- STD (Sexually Transmitted Disease) Overview**: A box containing the text "Participant has refused STD Testing".
- HIV Overview**: A box containing the text "Participant has refused HIV Testing".
- Reporting of Results**: Text stating "Results kept completely confidential and reported only to you", "Please call our toll free number in 1 month", and "Password:" followed by an input field and a "Generate" button. Below this, it says "At checkout you will be given a sheet with your password, the toll free number, and the times to call."

The bottom of the window features navigation controls: a set of arrows and a "1 of 2" indicator, buttons for "End of Section", "Close Exam", and "Finish", and a blue arrow icon.

- If the SP refused to have STD and HIV testing either during the consent process or in the phlebotomy room, the screen in the physician’s examination appears with a message over each section that was refused: “Participant has refused STD and HIV testing.”
- If the SP refuses the testing, it is not necessary to discuss the mechanism for getting results.
- It is not necessary to have the SP select a password.
- Select the “Next” button to go to the component status.

Exhibit 4-31. Password entry requirement for STD and HIV



- If a password is not entered, a message is displayed: "Please enter the Password."
- Click "OK" to this message.
- Generate a password if one is needed.
- Select the "Next" button to go to the next screen.

Exhibit 4-32. STD and HIV test completion status

The screenshot shows a window titled "Physician: Stand:505 Session:505071 12/30/1999 01:30 pm - 05:30 pm". Below the title bar, there is a header with patient information: "SP ID: 751065 Name: TERMANA, SISCO Age: 30 years Gender: Male Date: 07/07/2000 Time: 10:38 AM". The main area is titled "STD Tests Status" and contains a form with the following elements:

- A "Status" section with three radio buttons: "Complete" (selected), "Partial", and "Not Done".
- A "Comments" section with a text input field and a dropdown arrow.
- An "Other text" section with a text input field.

At the bottom of the window, there is a navigation bar with the following elements:

- Navigation icons: back, forward, and a page indicator showing "2 of 2".
- Buttons: "End of Section", "Close Exam", and "Finish".
- A right-pointing arrow icon.

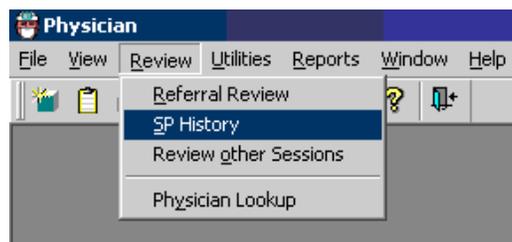
- The STD and HIV test completion status defaults to “Complete.”
- Select “Finish” to close the examination.

## 4.7 The Physician Examination

### 4.7.1 Reviewing SP History

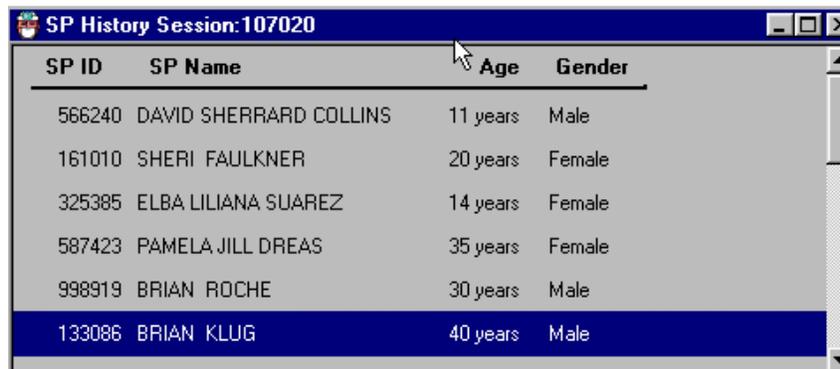
Medical conditions for all SPs in the session can be reviewed in the physician's examination under "SP History."

Exhibit 4-33. Review menu to select SP History



- To access "SP History," select "Review" from the toolbar and then choose "SP History."
- The "SP History" box is displayed.

Exhibit 4-34. SP History selections

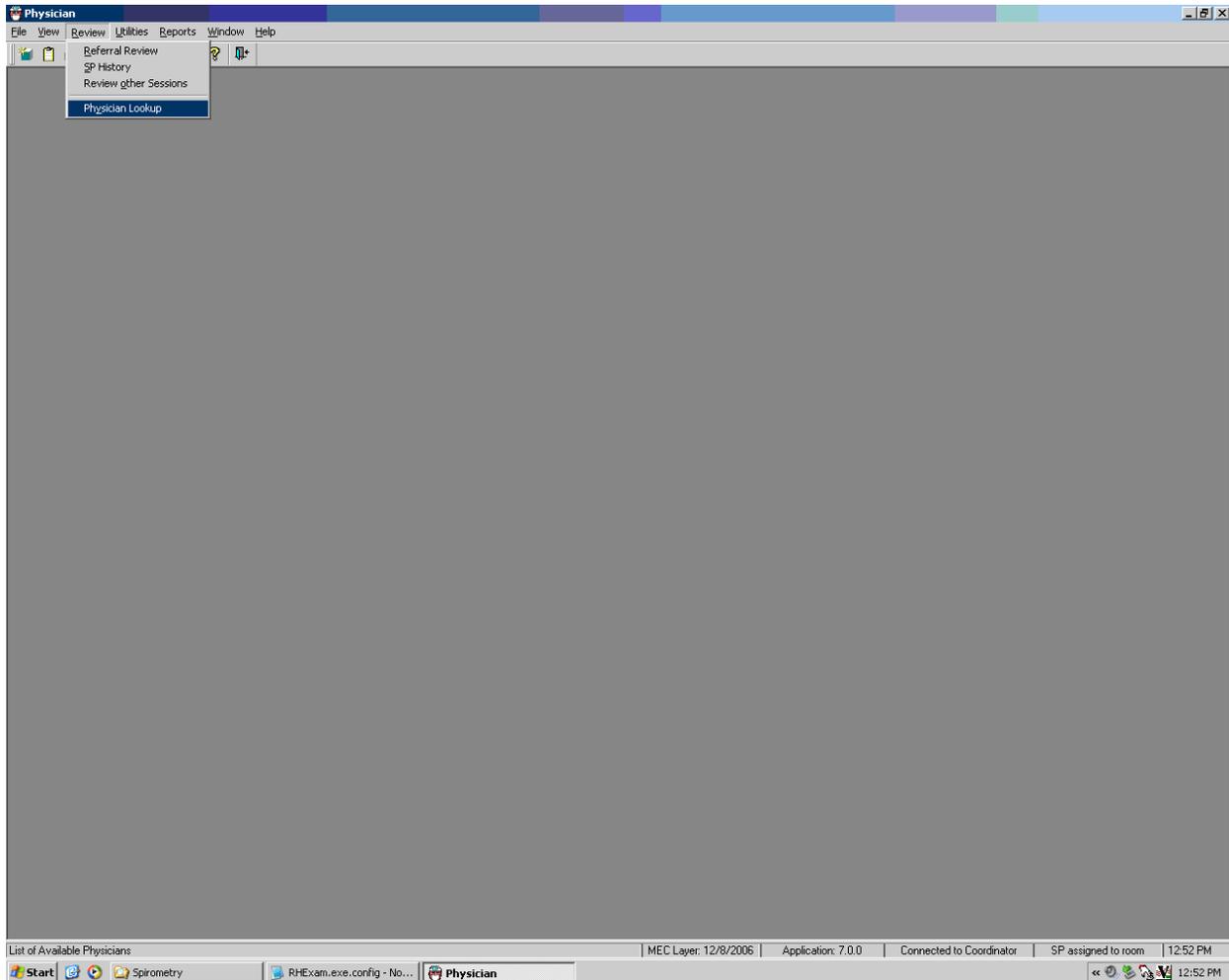
A screenshot of a software application window titled "SP History Session: 107020". The window displays a table with four columns: "SP ID", "SP Name", "Age", and "Gender". The table contains six rows of data. The last row, "133086 BRIAN KLUG 40 years Male", is highlighted in blue. A mouse cursor is pointing at the "Age" column header.

| SP ID  | SP Name                | Age      | Gender |
|--------|------------------------|----------|--------|
| 566240 | DAVID SHERRARD COLLINS | 11 years | Male   |
| 161010 | SHERI FAULKNER         | 20 years | Female |
| 325385 | ELBA LILIANA SUAREZ    | 14 years | Female |
| 587423 | PAMELA JILL DREAS      | 35 years | Female |
| 998919 | BRIAN ROCHE            | 30 years | Male   |
| 133086 | BRIAN KLUG             | 40 years | Male   |

- A list of all SPs in the session is displayed in the "SP History" box.
- Each SP's ID number, name, age, and gender is displayed.
- Highlight the name of the SP to view the medical conditions, medications, and self-reported pregnancy history.

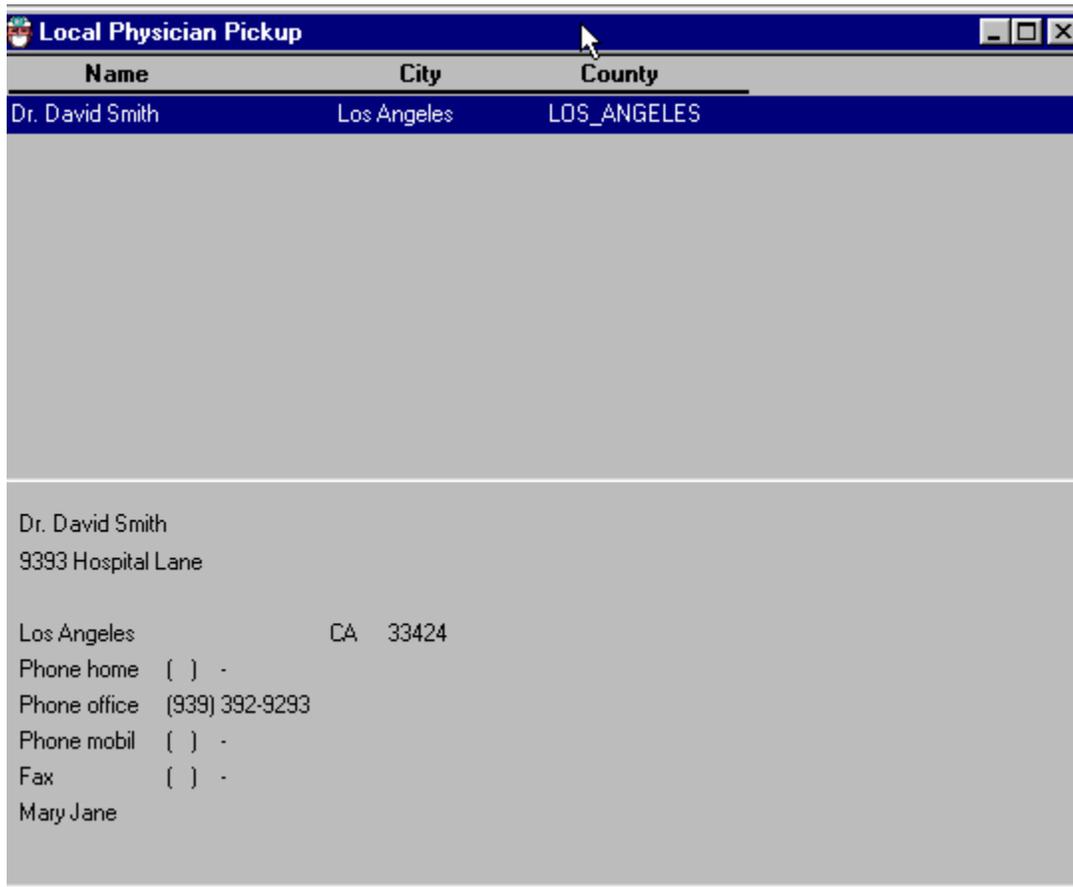
## 4.7.2 Physician Lookup Table

Exhibit 4-35. Review menu for physician referral “lookup”



- Each stand is provided with a list of physicians and/or clinics who have agreed to see SPs on referral if the SP doesn't have a health care provider.
- Select "Review" from the toolbar to access the list of physicians and clinics. Choose "Physician Lookup" from the menu.

Exhibit 4-36. Physician/clinic “Pickup” box



- The “Physician Pickup” box is displayed. Highlight the name of a physician or clinic.
- The complete address and phone numbers are listed in the lower part of the box.

### 4.7.3 Pausing an Examination

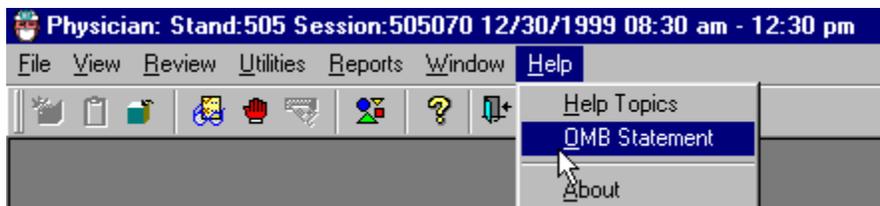
Exhibit 4-37. Pause an examination



- There may be situations where the physician is needed in another room in the MEC. If this occurs during an examination, select the icon with the red hand (the Pause icon).
- Clicking this icon pauses the examination in the physician's room. The timer for the examination stops.
- The Pause icon acts as a toggle and the timer will not start again until the Pause icon is clicked again.
- Examination pause may also be accessed from selecting "Utilities" from the Toolbar and then selecting "Examination Pause" from the menu.

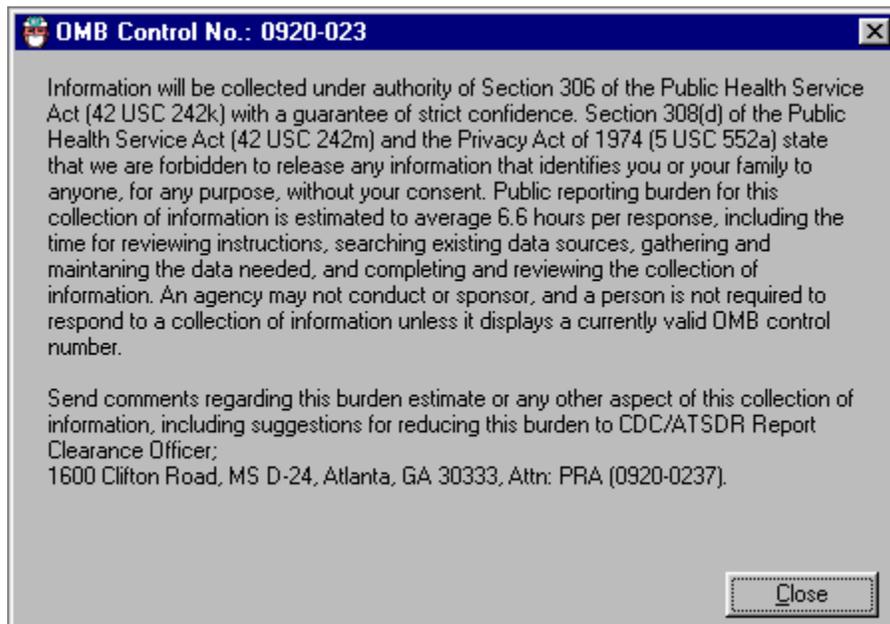
### OMB Statement

Exhibit 4-38. Menu to select OMB statement



- The OMB statement is found under the Help menu on the toolbar. Choose "Help," and then select OMB statement from the menu.

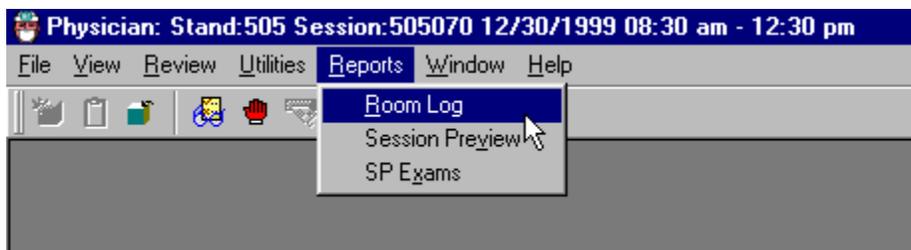
Exhibit 4-39. OMB statement



- The OMB statement is displayed. Click on “Close” to close this box.

#### 4.7.4 Room Log

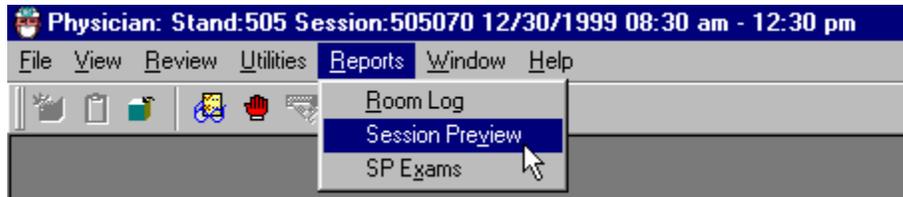
Exhibit 4-40. Menu for selecting room log



- The room log displays a list of the SPs who are eligible for this examination. All SPs are eligible for the physician’s examination. The SP examination status report displays all SPs in the session along with the status and status comment.
- Choose “Reports” from the toolbar and select “Room Log.”

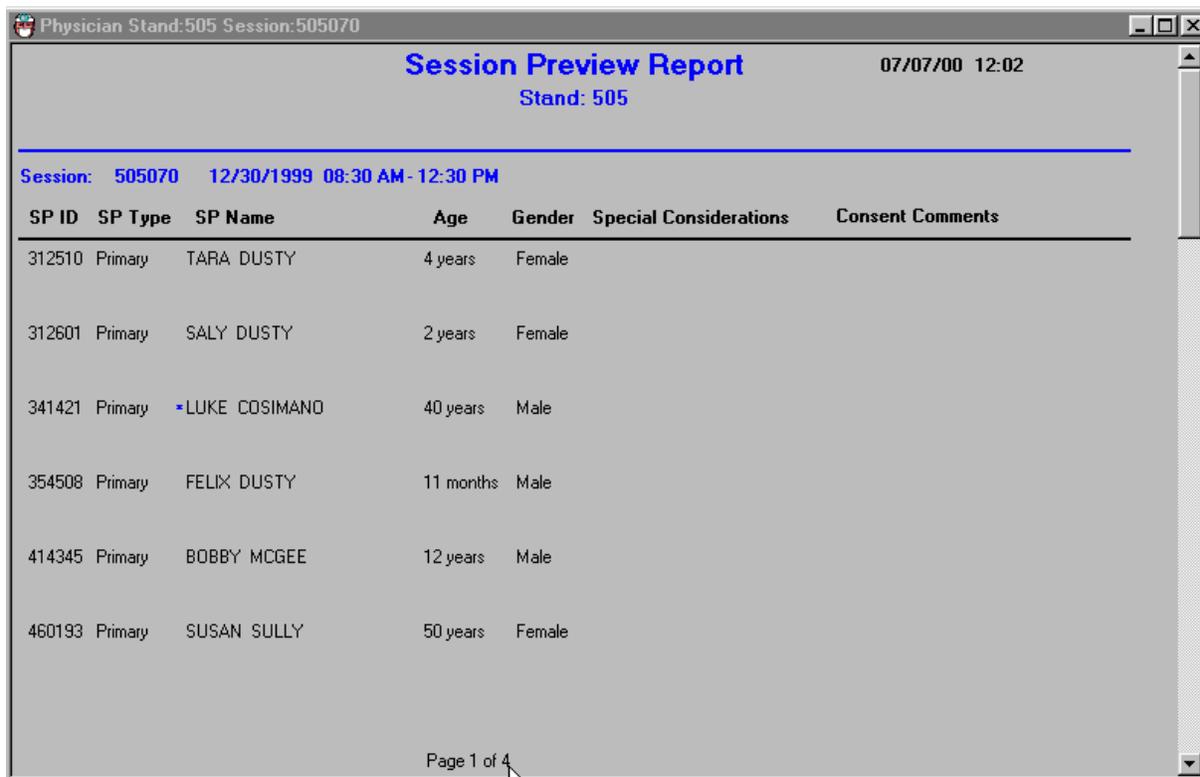
## 4.7.5 Session Preview

Exhibit 4-41. Session preview



- To preview a list of SPs in the current session, select “Reports” from the toolbar.
- Select “Session Preview.”

Exhibit 4-42. Session Preview Report

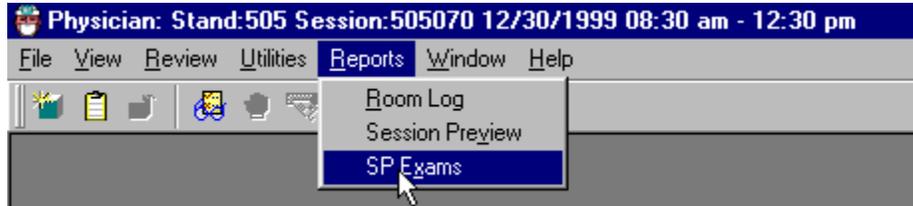
A screenshot of a software window titled "Session Preview Report". The window header shows "Physician Stand:505 Session:505070" and "07/07/00 12:02". Below the header, it says "Stand: 505" and "Session: 505070 12/30/1999 08:30 AM - 12:30 PM". The main content is a table with the following columns: "SP ID", "SP Type", "SP Name", "Age", "Gender", "Special Considerations", and "Consent Comments". The table lists six SPs. At the bottom, it says "Page 1 of 4".

| SP ID  | SP Type | SP Name       | Age       | Gender | Special Considerations | Consent Comments |
|--------|---------|---------------|-----------|--------|------------------------|------------------|
| 312510 | Primary | TARA DUSTY    | 4 years   | Female |                        |                  |
| 312601 | Primary | SALY DUSTY    | 2 years   | Female |                        |                  |
| 341421 | Primary | LUKE COSIMANO | 40 years  | Male   |                        |                  |
| 354508 | Primary | FELIX DUSTY   | 11 months | Male   |                        |                  |
| 414345 | Primary | BOBBY MCGEE   | 12 years  | Male   |                        |                  |
| 460193 | Primary | SUSAN SULLY   | 50 years  | Female |                        |                  |

- The “Session Preview Report” displays a list of SPs in the current session.
- The ID, SP Type, SP Name, Age, Gender, Special Considerations, and Consent Comments are displayed.
- This report provides information about special needs or consideration for each SP, such as wheelchair used for mobility, disabilities, and consent issues.

## 4.7.6 SP Examinations

Exhibit 4-43. SP examination



- To preview the status of the SP examinations in the current session, select “Reports” from the toolbar.
- Select “SP Exams” from the menu.

## Exhibit 4-44. SP Examination Status Report

**SP Exam Status Report**  
Stand: 450

12/11/06 14:40

---

Session: 450100 09/11/2006 08:30 AM - 12:00 AM

Body Composition (none)

---

**SP ID 420354 KYLE DUREY Male 49 years**

| Component           | Exam Status | Exam Comment     | Exam Comment Other |
|---------------------|-------------|------------------|--------------------|
| Body Measures       |             | (none)           |                    |
| Dietary             |             | (none)           |                    |
| DXA                 |             | (none)           |                    |
| ENO                 |             | (none)           |                    |
| Mec Interview       |             | (none)           |                    |
| OGTT                |             | (none)           |                    |
| Ophthalmology       |             | (none)           |                    |
| Oral Health         |             | (none)           |                    |
| Oral Health Pilot 2 |             | (none)           |                    |
| Phlebotomy          |             | (none)           |                    |
| Respiratory Health  |             | (none)           |                    |
| Spirometry          |             | (none)           |                    |
| Vision              |             | (none)           |                    |
| Lab Subsystem       | Required    | (none)           |                    |
| Physician           | Partial     | (none)           |                    |
| Bronchodilator      | Not Done    | safety exclusion |                    |
| Broncodilator       | Not Done    | safety exclusion |                    |

---

**SP ID 789767 DANIEL FRENCH Male 60 years**

| Component            | Exam Status | Exam Comment | Exam Comment Other |
|----------------------|-------------|--------------|--------------------|
| Blood Pressure Study |             | (none)       |                    |
| Body Composition     |             | (none)       |                    |
| Body Measures        |             | (none)       |                    |

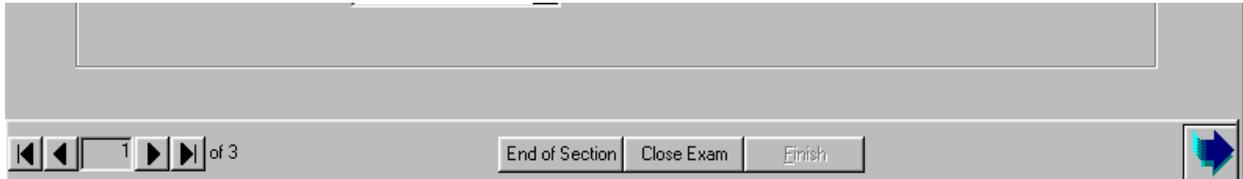
Page 5 of 15

Ready | MEC Layer: 12/8/2006 | Application: 7.0.0 | Connected to Coordinator | SP assigned to room | 02:40 PM

- The SP examination status report can be viewed for each SP in the session.
- The first column lists the components for which the SP is eligible.
- The second column displays the examination status: complete, partial, not done.
- The status remains blank until the SP has been to that component.
- If applicable, the status comment and “Other” comment are also listed.
- Scroll up and down to view all SPs in the session. Page up and page down may also be used.

#### 4.7.7 End of Section

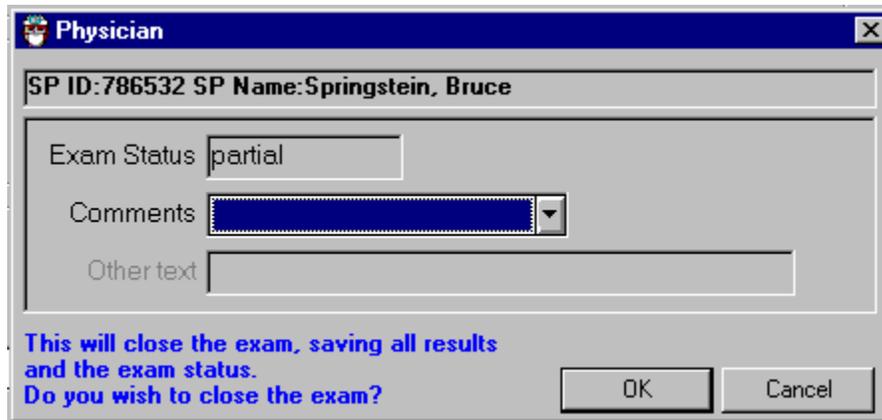
Exhibit 4-45. End of section



- The “End of Section” button is used to advance to the end of the current section without entering data in the required fields.
- The status defaults to “Not Done” and a comment is required. Select the appropriate comment for the situation.
- One potential situation is when there is not enough time at the end of a session to complete the entire examination, but the SP needs the STD and HIV information sheet to be able to obtain test results. The physician opens the examination, selects “End of Section” for the blood pressure and CV exclusion questions. The appropriate comment for both sections would be “No Time.”
- The “End of Section” button can be selected from each section.
- This allows the screens to advance through each section until the STD and HIV results screen appears.

#### 4.7.8 Close Examination Button

Exhibit 4-46. Prematurely closing examination



The screenshot shows a dialog box titled "Physician" with a close button (X) in the top right corner. The dialog box contains the following fields and controls:

- A text field at the top containing "SP ID:786532 SP Name:Springstein, Bruce".
- An "Exam Status" field with a text input containing "partial".
- A "Comments" field with a blue drop-down menu.
- An "Other text" field with a text input.
- A blue text message at the bottom: "This will close the exam, saving all results and the exam status. Do you wish to close the exam?".
- Two buttons at the bottom right: "OK" and "Cancel".

- The correct method of closing an examination is to select the “Finish” button after all the data have been entered.
- If there is a need to end the examination prematurely, the “Close” button can be selected at the bottom of the screen next to the “End of Section” button.
- When the “Close” button is selected, a pop-up box is displayed. The examination status defaults to “Not Done” or “Partial” depending on the stage of the examination when the “Close” button was pressed.
- Select the appropriate comment from the drop-down list.

## **5. REFERRALS**

### **5.1 Medical Referrals**

Although the primary purpose of the MEC examination is data collection, not diagnosis or treatment, the examination may produce findings that warrant further medical attention. There is an obligation to inform SPs of any abnormal results from the examinations and to refer SPs to appropriate providers for treatment. MEC physicians are responsible for referrals. Each examination component has a referral process built into the ISIS system. This automatic process alerts examining physicians to findings that may require a referral. SPs and their providers may already be aware of some findings, but others may have been revealed for the first time during the MEC exam. MEC physicians review the data provided and the categories set forth by the Physicians Advisory Group (PAG) to determine what type of referral, if any, is needed.

MEC physicians can arrange for a referral to a care provider for SPs who do not have a local provider. The local providers agree to accept referrals from the MEC examination prior to the arrival of the mobile examination team and prior to any examinations being carried out in the MEC. These advance arrangements are made through an advance arrangement team that includes a physician from the National Center for Health Statistics.

### **5.2 Referral Levels**

The MEC physician examiner makes decisions about referring SPs for additional care based on a system rated by three levels. This is important, because different MEC examinations generate various categories of urgent information that are often different, one from the other. Findings that are outside the normal limits should be reviewed by a qualified medical professional to determine if additional followup care is needed. These three levels of referral apply across all MEC examinations. The Physician's Advisory Group (PAG) at the National Center for Health Statistics (NCHS) defined the action required for each referral level. The edit limits or ranges for referrals in each component were defined by the component specialists and consultants and subsequently reviewed and approved by the PAG. Based on the results of any component of the MEC examination, physicians place SPs in one of three referral categories. They provide guidance to the MEC physician regarding the urgency of an

examination finding. The highest, most urgent referral is a Level 1 referral. Level 3 represents an examination finding that the physician reviews, but does not refer the SP for further care. This method of referral assures that physicians from both exam teams review all findings that appear out of the standardized norm, and that there is a record made that the physician reviewed the findings and made an informed decision, based from their medical background, about whether the SP should be referred.

### **5.2.1 Level 1 Referrals**

These referrals are generated when there are major medical findings that warrant immediate attention by a health care provider, such as a dangerously high blood pressure, and life threatening emergencies. SPs determined to need a Level 1 referral usually terminate further MEC examinations. SPs are transferred out of the MEC and into a hospital or other care facility. SPs who refuse treatment from this level of referral are asked to sign a release stating that they are aware of the examination findings, but they are refusing treatment against the advice of the MEC physician. SPs must sign the release form before leaving the MEC. The release is available in both English and Spanish.

### **5.2.2 Level 2 Referrals**

The MEC physician generates these referrals when there are major medical findings that require attention by a health care provider in the next 2 weeks because they are expected to cause adverse effects within this time. Level 2 referrals allow SPs to continue MEC examinations; however, they are advised to see their primary care provider within 2 weeks following the examination. A high, but not dangerously high blood pressure is an example of a level 2 referral.

### **5.2.3 Level 3 Referrals**

Level 3 referrals consist of either no out-of-range medical findings or minor medical findings that an examinee already knows about, is under care for, or does not require prompt attention by a medical provider. Level 3 findings do not necessarily generate referrals. Examinees receive a report of the findings from many of the examination components before leaving the MEC. In addition, a detailed

Report of Findings is sent from NCHS approximately 2 to 4 months after completion of the examination. The latter report contains the results of some findings that are not available before SPs leave the MEC.

Table 5-1. Table of referral levels

| Referral level | Category | Action   |
|----------------|----------|--|
| 1              | 4        | Indicates major medical findings that warrant immediate attention by a health care provider.   |
| 2              | 3        | Indicates major medical findings that warrant attention by a health care provider within the next 2 weeks. These findings are expected to cause adverse effects within this time period and they have previously been undiagnosed, unattended, nonmanifested, or not communicated to the examinee by his or her personal health care provider. |
| 3              | 1 & 2    | Indicates no major negative medical findings, or minor medical findings that an examinee already knows about, and is under care for, or findings that do not require prompt attention by a medical provider.   |

### 5.3 Basis for Referral

Referrals may be based on data collected during MEC examination components (examination data-related referrals) or based on subjective or objective observations made by any MEC examiner (observation referrals). These two types of referrals are described in detail in Sections 5.3.1 and 5.4, respectively.

#### 5.3.1 Examination Data Related Referrals

Examination data-related referrals are based on predefined criterion levels from the examination data. These criterion levels were defined by the physician advisory group and are built into the ISIS system such that when the limits are exceeded, the system automatically flags this information to the physician for the specific SP. The flag occurs when component data that are above or below the predefined limits are recorded. The examination components that send data-related referrals to the physician system are the laboratory (pregnancy and complete blood count), mental health (from the MEC Interviewer health examination), blood pressure from the physician’s examination, and spirometry results.

### 5.3.1.1 Pregnancy Referrals

A positive test for pregnancy activates a system notification to the physician for all SPs. Urine pregnancy tests are done on all SPs between the ages of 12 through 59 years. In addition, pregnancy tests are done on SPs aged 8 through 11 years if they reported during the household interview that menarche had begun. The physician is the person who informs the SP of these results since some SPs may be unaware of their pregnancy at the time of the test. The physician discloses results of positive pregnancy tests to the SP, unless the SP is 18 or over and had already reported the pregnancy during the interview. SPs under 18 years of age always see the physician when a positive pregnancy test is reported. Negative pregnancy test results are provided to SPs only upon the SP's specific request. Physicians discuss the importance of prenatal health care in situations where SPs have not seen a health care provider when they have a positive pregnancy test. Referrals are facilitated if appropriate. SPs with no source of prenatal care are referred to a local public health clinic or primary care provider.

### 5.3.1.2 Age Specific Pregnancy Referral Requirements

SPs 18 years and over who have a positive pregnancy test are referred as described in Section 5.3.1.1 above. There are referral requirements based on child abuse laws for SPs under 18 years of age. While counseling the pregnant minor, physicians take a brief history to determine whether the pregnancy may have resulted from sexual abuse. The index of suspicion for sexual abuse is based solely on what a minor discloses, rather than a full medical evaluation. Young women may refuse to provide information surrounding their pregnancy. If the information provided by a minor leads the physician to be concerned about possible, probable, or definite sexual abuse, **the parent/guardian is informed** and a report is filed with Child Protective Services (CPS). If the physician is unsure whether to report, the physician discusses the case with a social worker at Child Protective Services. When presenting the case, MEC physicians do not use the minor's name or any other identifier. If the social worker and physician agree that the referral to CPS should be made, the physician may provide the name and address of the minor. Physicians may followup the verbal reporting with a written documentation of findings relevant to the reporting. **These written reports are private, and are not collected in the NHANES database.** The age specific requirements are described in Section 5.3.1.3.

### 5.3.1.3 Unmarried Minors Pregnancy Referrals

Federal law requires physicians to report child abuse. The finding of a positive pregnancy test in an unmarried minor (under age 18) requires physicians to conduct a brief evaluation to determine the level of counseling and referral necessary. The physician discloses a positive pregnancy test result directly to the minor.

**If the minor is under 14 years of age**, physicians discuss the circumstances of the pregnancy with the child, inform the parent, and report the case to Child Protective Services (CPS). Pregnancy in such a young age is probable child abuse. If the physician is informed that the child is already receiving prenatal care, the physician verifies this information directly with the provider. In cases where the child is already receiving prenatal care and has received a full medical evaluation, no report to CPS is indicated.

**If the minor is 14 years and older**, physicians disclose results directly to the minor and assesses (a) whether the minor is already receiving prenatal care or pregnancy counseling, (b) whether minor's parent/guardian is aware of the pregnancy, and (c) whether the pregnancy is a result of child sexual abuse. If a minor who is 14 years or older is already receiving prenatal health care, physicians confirm this with the local provider. No further referral or parental notification is necessary unless other examination findings meet the criteria for referral. If the minor is not receiving prenatal care, the physician discusses the importance of a medical evaluation and pregnancy counseling for the SP, and facilitates a referral. SPs with no source of care are referred to a local public health clinic or primary care provider. Because a parent/guardian should be informed of a minor's pregnancy if she is not receiving prenatal care, the physician will offer to help the minor tell her parent/guardian before leaving the MEC. **If the minor strongly opposes the disclosure of the pregnancy test results to a parent or guardian, the physician respects the minor's confidentiality.**

### 5.3.2 Blood Pressure Referrals – Adults

The MEC physician takes the BP on all SPs 8 years old and over. Tables 5-2 through 5-4 provide the matrix of combinations of systolic and diastolic blood pressure results and the referrals that are generated when these BPs are present for adults. The left column specifies the minimum and maximum systolic pressure groupings. The first row specifies the minimum and maximum diastolic blood

pressure (DBP) categories. The matrix cells specify the BP category severity for the SBP and the DBP combination. The category severity defines the MEC referral level.

Table 5-2. Referral levels for blood pressure (adults)<sup>1</sup>

| Systolic | Diastolic |       |       |         |       |
|----------|-----------|-------|-------|---------|-------|
|          | <80       | 80-89 | 90-99 | 100-119 | >=120 |
| <120     | 1         | 2     | 3     | 4       | 5     |
| 120-139  | 2         | 2     | 3     | 4       | 5     |
| 140-159  | 3         | 3     | 3     | 4       | 5     |
| 160-209  | 4         | 4     | 4     | 4       | 5     |
| >= 210   | 5         | 5     | 5     | 5       | 5     |

<sup>1</sup>Based on the Seventh Report of the Joint National Committee on the Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. NIH Publication, 2003.

Table 5-3. Blood pressure referral levels, category, and action guideline (adults)

| Referral level | BP Category | Physician guideline referral action  |
|----------------|-------------|--|
| 1              | 5           | Indicates major medical findings (BP) that warrant immediate attention by a health care provider.  |
| 2              | 3 & 4       | Indicates major medical findings (BP) that warrant attention by a health care provider within the next 2 weeks. These findings are expected to cause adverse effects within this time period and they have previously been undiagnosed, unattended, nonmanifested, or not communicated to the examinee by his/her personal health care provider. |
| 2              | 2           | Indicates prehypertensive blood pressure, minor medical findings that an examinee already knows about, and is under care for, or findings that do not require prompt attention by a medical provider prior to a month.   |
| 3              | 1           | Indicates no abnormal BP findings.   |

Table 5-4. Adults BP referral letter comments

| BP Category | BP Referral level | Referral statement   |
|-------------|-------------------|--|
| <b>5</b>    | <b>1</b>          | The participant's blood pressure today is severely high.   |
| <b>4</b>    | <b>2</b>          | The participant's blood pressure today is very high based on the Seventh Report of the Joint National Committee on the Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. NIH Publication, 2003.   |
| <b>3</b>    | <b>2</b>          | The participant's blood pressure today is high. Based on the Seventh Report of the Joint National Committee on the Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. NIH Publication, 2003.   |
| <b>2</b>    | <b>2</b>          | The participant's blood pressure today is above normal and is in the prehypertensive range. Based on the Seventh Report of the Joint National Committee on the Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. NIH Publication, 2003. |
| <b>1</b>    | <b>3</b>          | The participant's blood pressure today is within the normal range. Based on the Seventh Report of the Joint National Committee on the Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. NIH Publication, 2003.                          |

Table 5-5. Table of blood pressure report of findings comment (adults)

| Report of findings level BP category | Report of findings message – English  | Report of findings message – Spanish  |
|--------------------------------------|---|---|
| 1                                    | Your blood pressure today <b>is within the normal range</b> . Based on the Seventh Report of the Joint National Committee on the Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. NIH Publication, 2003.                          | Su presión de sangre hoy <b>está dentro del rango normal</b> . Basado en el Séptimo Informe del Comité Conjunto Nacional de Prevención, Detección, Evaluación y Tratamiento de la Alta Presión Sanguínea. Publicación del NIH, 2003.  |
| 2                                    | Your blood pressure today is <b>above normal and is in the prehypertensive range</b> . Based on the Seventh Report of the Joint National Committee on the Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. NIH Publication, 2003. | Su presión de sangre hoy <b>es por encima de lo normal y está dentro del rango de prehipertensión</b> . Basado en el Séptimo Informe del Comité Conjunto Nacional de Prevención, Detección, Evaluación y Tratamiento de la Alta Presión Sanguínea. Publicación del NIH, 2003. |
| 3                                    | Your blood pressure today is <b>high</b> . Based on the Seventh Report of the Joint National Committee on the Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. NIH Publication, 2003.   | Su presión de sangre hoy es <b>alta</b> . Basado en el Séptimo Informe del Comité Conjunto Nacional de Prevención, Detección, Evaluación y Tratamiento de la Alta Presión Sanguínea. Publicación del NIH, 2003.   |
| 4                                    | Your blood pressure today is <b>very high</b> . Based on the Seventh Report of the Joint National Committee on the Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. NIH Publication, 2003.  | Su presión de sangre hoy es <b>muy alta</b> . Basado en el Séptimo Informe del Comité Conjunto Nacional de Prevención, Detección, Evaluación y Tratamiento de la Alta Presión Sanguínea. Publicación del NIH, 2003.   |
| 5                                    | Your blood pressure today is <b>severely high</b> .   | Su presión de sangre hoy es <b>severamente alta</b> .   |

(Note: ROF level number 5 should **not** have the NIH Publication referenced.)

### 5.3.3 Blood Pressure Referrals – Children

Children’s normal blood pressures vary by age, weight, and height. The table for children’s blood pressures is found at Appendix A, Child Blood Pressure Values.

Table 5-6. Referral comments for blood pressure (children)

| BP Category | Referral level | Referral statement*   |
|-------------|----------------|---|
| 4           | 1              | The participant’s blood pressure is <b>very high</b> based on the 1996 update of the Task Force Report on High Blood Pressure in Children and Adolescents. *                            |
| 3           | 2              | The participant’s blood pressure is <b>high</b> based on the 1996 update of the Task Force Report on High Blood Pressure in Children and Adolescents. *                                 |
| 2           | 3              | The participant’s blood pressure is <b>normal but at the high end of normal</b> based on the 1996 update of the Task Force Report on High Blood Pressure in Children and Adolescents. * |
| 1           | 3              | The participant’s blood pressure is <b>normal</b> based on the 1996 update of the Task Force Report on High Blood Pressure in Children and Adolescents. *                               |

\* 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.

Table 5-7. Table of blood pressure report of findings comment (children)\*

| Report of findings level<br>BP Category | Report of findings message  |
|---|---|
| 1                                       | Your child’s blood pressure today is <b>within the normal range</b> .*                    |
| 2                                       | Your child’s blood pressure today is <b>normal but at the high end of normal range</b> .* |
| 3                                       | Your child’s blood pressure today is <b>high</b> .*                                       |
| 4                                       | Your child’s blood pressure today is <b>very high</b> .*                                  |

\* 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.

### 5.3.4 Laboratory Values

Urine and blood are collected for various laboratory tests on all SPs 1 year old and over. A complete and detailed description of these tests can be found in the *NHANES Laboratory Procedures Manual*, January 2007. Some laboratory findings are available prior to SPs leaving the mobile examination center. These findings are provided to the SPs, and when these findings are outside the predetermined criterion levels for referral, physicians decide whether a referral is needed. When a referral is indicated, the physician provides the information to the SP. The laboratory findings and the parameters that generate referral advice to the physician are shown in Tables 5-8 and 5-9.

Table 5-8. Complete Blood Count Reference Ranges—Males

| Age in years                      | 1-5  |      | 6-18 |      | 19-65 |      | 66+  |       |
|-----------------------------------|------|------|------|------|-------|------|------|-------|
| White blood cell count (SI)       | 4.3  | 14.6 | 3.6  | 11.5 | 3.9   | 11.8 | 3.8  | 12.1  |
| Red cell count (SI )              | 3.98 | 5.3  | 4.14 | 5.78 | 4.18  | 5.86 | 3.57 | 5.67  |
| Hemoglobin (g/dL)                 | 10.7 | 14.2 | 11.9 | 16.9 | 13.1  | 17.5 | 11.4 | 17.1  |
| Hematocrit (%)                    | 32.1 | 41.7 | 35.3 | 49.9 | 38.7  | 51.4 | 33.9 | 50.9  |
| Mean cell volume (fL)             | 68.2 | 88.8 | 75.6 | 94.6 | 79.8  | 99.1 | 81.4 | 102.7 |
| Mean cell hemoglobin (pg)         | 22.3 | 30.6 | 25   | 32.3 | 26.3  | 34   | 26.3 | 35    |
| MCHC (g/dL)                       | 32.3 | 35.6 | 32.3 | 35.3 | 32.3  | 35.3 | 32.1 | 35.1  |
| Red cell distribution width (%)   | 11.4 | 15.8 | 11.4 | 14   | 11.4  | 14.5 | 11.8 | 16.2  |
| Platelet count (%) SI             | 212  | 546  | 179  | 439  | 152   | 386  | 124  | 384   |
| Mean platelet volume (fL)         | 6.1  | 8.9  | 6.6  | 10   | 6.8   | 10.1 | 6.6  | 10.2  |
| Lymphocyte percent (%)            | 22.8 | 68.4 | 17.5 | 54.3 | 16.1  | 47.9 | 12.3 | 46.4  |
| Monocyte percent (%)              | 4.6  | 15.2 | 4.8  | 13.7 | 4.4   | 13.5 | 4.6  | 14    |
| Segmented neutrophils percent (%) | 17.6 | 67.1 | 30.3 | 72.8 | 37.8  | 74.6 | 39.5 | 78.1  |
| Eosinophils percent (%)           | 0.7  | 11.3 | 0.7  | 11.5 | 0.7   | 8.5  | 0.6  | 8.8   |
| Basophils percent (%)             | 0.1  | 2.5  | 0.1  | 1.6  | 0.1   | 1.6  | 0.1  | 1.6   |

Table 5-9. Complete Blood Count Reference Ranges—Females

| Age in years                      | 1-5  |      | 6-18 |      | 19-65 |      | 66+  |       |
|-----------------------------------|------|------|------|------|-------|------|------|-------|
|                                   |      |      |      |      |       |      |      |       |
| White blood cell count (SI)       | 4.3  | 14   | 3.9  | 12.2 | 4.1   | 12.9 | 4    | 11.6  |
| Red cell count (SI )              | 3.96 | 5.28 | 3.84 | 5.24 | 3.64  | 5.2  | 3.51 | 5.34  |
| Hemoglobin (g/dL)                 | 11   | 14.2 | 11.2 | 15.1 | 10.6  | 15.6 | 10.9 | 15.9  |
| Hematocrit (%)                    | 32.5 | 41.9 | 33.5 | 44.6 | 32    | 45.9 | 32.8 | 47    |
| Mean cell volume (fL)             | 70.2 | 89.1 | 74.7 | 94.9 | 74.6  | 98.2 | 80.3 | 100.6 |
| Mean cell hemoglobin (pg)         | 23.3 | 30.8 | 24.5 | 32.6 | 24.3  | 33.8 | 26.4 | 34.5  |
| MCHC (g/dL)                       | 32.4 | 35.5 | 32.3 | 35.3 | 32.1  | 35.3 | 32.3 | 35.1  |
| Red cell distribution width (%)   | 11.3 | 15.4 | 11.3 | 14.8 | 11.4  | 16.3 | 11.6 | 16.3  |
| Platelet count (%) SI             | 215  | 547  | 190  | 446  | 168   | 441  | 155  | 428   |
| Mean platelet volume (fL)         | 6.1  | 8.9  | 6.6  | 10   | 6.8   | 10.2 | 6.7  | 10.5  |
| Lymphocyte percent (%)            | 21.6 | 68.8 | 17.2 | 54.7 | 14.1  | 47.6 | 13.7 | 46.9  |
| Monocyte percent (%)              | 4.2  | 14.4 | 4.3  | 12.7 | 3.8   | 11.6 | 4.4  | 12.8  |
| Segmented neutrophils percent (%) | 19.4 | 69.5 | 31.9 | 74.3 | 39.8  | 78.1 | 40.9 | 78.1  |
| Eosinophils percent (%)           | 0.6  | 9.9  | 0.6  | 9.9  | 0.6   | 7.3  | 0.6  | 7.5   |
| Basophils percent (%)             | 0.1  | 2.5  | 0.1  | 1.6  | 0.1   | 1.7  | 0.1  | 1.7   |

Reference ranges for normal values were calculated from the NHANES III data set using 95 percent reference interval(s) determined nonparametrically, through ranking the observations and determining the lower (2.5th percentile) and the upper (97.5th percentile) reference limits. The nonparametric (ranking) method was used because most measured hematology parameters have a skewed, non-Gaussian distribution.

**Action Limits.** Action limits are a guide to inform the physician that a CBC result(s) is/are abnormal. Since all specimens are run in duplicate, there is no reason to retest the sample.

- WBC male and female (all ages) < or = to  $3 \times 10^3 \mu\text{L}$  or > or = to  $16.0 \times 10^3 \mu\text{L}$
- Hgb male and female (<6 years) <6.5 g/dL or >14.5 g/dL
- Hgb female (>6 years) <6.5 g/dL or >16.0 g/dL
- Hgb male (>6 years) <6.5 g/dL or >18.0 g/dL
- PLT male and female (all ages) < $50 \times 10^3 \mu\text{L}$  or > $800 \times 10^3 \mu\text{L}$

Possible causes of abnormal parameters:

- High RBC, Hgb, or HCT—dehydration, polycythemia, shock, chronic hypoxia
- Low RBC, Hgb or HCT—anemia, thalassemia and other hemoglobinopathies
- Low MCV—microcytic anemia
- High MCV—macrocytic anemia, liver disease
- Low WBC—sepsis, marrow hypoplasia
- High WBC—acute stress, infection, malignancies
- Low platelets—risk of bleeding
- High platelets—risk of thrombosis

#### 5.3.4.1 Complete Blood Count (CBC)

The Beckman Coulter MAX® generates the CBC report. This machine directly measures the red blood count (RBC), white blood count (WBC), hemoglobin (Hgb), and differential percentage. The mean corpuscular volume (MCV), red cell distribution (RDW), platelets (PLT), and mean platelet volume (MPV) are derived from histograms while other values are calculated. The reference ranges for normal values were calculated from the NHANES III data set, using 95 percent reference interval. The following values are transmitted to the physician for review:

- **Red Blood Count** – Elevated RBC may reflect primary polycythemia (polycythemia rubra vera) or secondary causes of polycythemia (stress erythrocytosis, diseases associated with low oxygen, certain renal disorders, etc.) Decreased RBC count may indicate anemia.
- **Hemoglobin** – Abnormal Hgb measurements usually reflect the same conditions as the RBC count and can define the type of anemia.
- **Hematocrit** – Abnormal hematocrit values usually reflect the same conditions as the RBC and can help define the type of anemia.
- **White Blood Count** – High values (leukocytosis) may indicate a primary condition such as leukemia or a secondary condition such as infection. Low values (leukopenia) may indicate the presence of autoimmune, neoplastic, drug-induced, congenital, or other conditions. See below.

- **Lymphocytes** – Elevated counts (lymphocytosis) may be primary (leukemias, lymphomas, monoclonal B cell lymphocytosis) or secondary (viral infection, acute physical stress, pertussis, and chronic disorders such as autoimmune disease and cancer). Depressed counts (lymphopenia) can reflect a variety of uncommon inherited disorders or the more frequent acquired conditions such as viral and certain bacterial infections, the effects of immunosuppressive agents, and some chronic diseases.
- **Monocytes** – These cells, derived from the bone marrow are the precursors of tissue macrophages. Monocytosis is often seen in chronic infections (TB, brucellosis), acute protozoan and rickettsial diseases, and in neutropenia. Uncommon malignant disorders (monocytic leukemia, histiocytic lymphoma) and nonmalignant conditions (hemophagocytic syndromes) can also cause it.
- **Neutrophils** – Elevated neutrophils (granulocytosis) are seen in both primary (myelocytic leukemias, polycythemia rubra vera) and, more commonly, in secondary conditions (bacterial infections, chronic inflammation, corticosteroid use, cigarette smoking, etc.). Hereditary neutrophilia is rare. Decreased neutrophils (leukopenia) can also result from primary (myeloid malignancies, congenital disorders) and secondary (drug effect, viral infection, splenomegaly, autoimmune, and hereditary disorders) conditions.
- **MCH** – The mean corpuscular hemoglobin, in picograms, is calculated from the ratio of Hgb to RBC. This measure of hemoglobin per RBC is used in conjunction with the MCV and the MCHC to further define anemias. For example, the MCH is elevated in macrocytic anemias and depressed in microcytic, hypochromic anemia.
- **MCHC** – The mean corpuscular hemoglobin concentration is derived from the ratio of the Hgb to the VPRC. It is also used to help define anemias, being elevated in macrocytic anemias and depressed in hypochromic anemias.
- **RDW** – The red cell distribution width is a measure of the homogeneity of the RBC population. It is analogous to anisocytosis seen on microscopic examination. Most macrocytic and microcytic anemias, especially with reticulocytosis, will cause an increased RDW. There is no known pathological cause of a decreased RDW.
- **Platelets** – A decreased platelet count (thrombocytopenia) can be caused by production abnormalities (radiation, drug-induced, cancer, folate or B12 deficiency, myelodysplasia syndromes, HIV, alcohol abuse, etc.), accelerated removal (ITP, SLE, drug antibodies, certain infections, etc.), and hypersplenism. Elevated counts (thrombocytosis) can be primary (myeloproliferative disorders such as CML and PRV, essential thrombocythemia) or secondary (acute trauma, chronic iron deficiency, inflammatory disease, cancer, splenectomy, etc.).

When the values from the Beckman Coulter® report are interpreted, various interfering substances and conditions may affect these parameters:

- Abnormal BUN, glucose, or sodium levels could affect the MCV.

- Abnormal WBCs could affect lymphocytes, monocytes, and granulocytes.
- Abnormally small WBCs could affect white count, lymphocytes, monocytes, and granulocytes.
- Clumped platelets could affect white count, lymphocytes, monocytes, granulocytes, RBC, MCV, RDW, platelet count, and MPV.
- Cryofibrinogen and cryoglobulin crystals could affect white count, lymphocytes, monocytes, granulocytes, RBC, hemoglobin, platelet count, and MPV.
- An elevated WBC could affect RBC, hemoglobin, MCV, RDW, platelet count, and MPV parameters.
- Fragile WBCs could affect white count, lymphocytes, monocytes, granulocytes, platelet count, and MPV.
- Giant platelets could affect white count, lymphocytes, monocytes, granulocytes, RBC, MCV, RDW, platelet count, and MPV.
- Hemolyzed specimens could affect RBC, hemoglobin, platelet count, and MPV.
- Lipemic specimens could affect MCV.
- Severely icteric plasma causes increased hemoglobin. Evaluate CBC result carefully and report all parameters except the hemoglobin result.
- Nucleated RBC's could affect the white count, lymphocytes, monocytes, granulocytes, and hemoglobin values.

#### **5.4 Observation Referrals**

Observation referrals are not related to specific examination data. An observation referral includes any observation by the technician or other examination staff about an SP's nonemergency condition that may require attention by the physician. An observation referral is sent through the ISIS process from any examination component examiner and may be initiated during the examination, but is sent after the component examination is completed and the SP has left the component room. The examiner initiating the observation enters a message in the observation box and sends it electronically to the physician. The observation sets a flag in the physician component and coordinator applications and SPs are not checked out of the MEC until the physician reviews and acts on this observation. Examples of observations include information from a dietary interviewer when children or adult SPs are thought to be

malnourished, or mental health observations from a MEC interviewer. The physician will discuss the issue with the SP and refer as deemed medically necessary.

## **5.5 Mental Health Observation Referrals**

The MEC interviewer asks the physician to see any SP who meets criteria for a potential mental health problem. The instructions to the MEC interviewer are included in this section to inform the physician with regard to the reasons and circumstances that the MEC interviewer may ask the physician to see an SP. In addition to the reasons stated in these instructions, the MEC interviewer may ask the physician to see an SP to evaluate a potential MH issue at other times.

### **5.5.1 MEC Interviewer Mental Health Observation Process**

Certain information volunteered or reported during the mental health interview should prompt an observation from the MEC interviewer to the MEC physician. These are listed below. MEC interviewers will complete an observation from their Utility screen. This observation goes to the physician Referral Review inbox screen. The physician is responsible for assessing the mental health concern and facilitating a referral when needed. If no referral is needed, the physician completes a MH observation from the physician menu bar Utility option.

### **5.5.2 MEC Interviewer Mental Health Referrals**

SPs 12 years and older are administered a Depression Screener questionnaire. Certain information volunteered or reported during the mental health interview should initiate an observation from the MEC interviewer to the MEC physician. These observations should be sent to the physician prior to the SP leaving the MEC interviewer examination and prior to the SP leaving the MEC. The question asked by the MEC interviewer that would prompt an observation to the physician for mental health assessment is:

DPQ090: Over the **last 2 weeks**, how often have you been bothered by the following problem: Thoughts that you would be better off dead or hurting yourself in some way?

Response categories for DPQ090 – Not at all, several days, more than half the days, nearly everyday.

Responses of several days, more than half the days, and nearly everyday require a physician observation. If the SP says he or she thought about it only one time in the last 2 weeks, the answer is coded as “several days.”

When the MEC interviewer determines that an SP meets the criteria, the interviewer will generate a mental health observation in the ISIS system. The observation will appear on the MD referral screen for review by the physician. The physician will code the observation as “action required,” which will cause ISIS to alert the coordinator that the physician needs to meet with the SP. The physician is responsible for assessing the mental health problem and facilitating a referral, if needed. The Mental Health Referral is a separate referral screen, as shown in Exhibit 5-1, below.

Exhibit 5-1. Mental health referral screen

The Advance Arrangements Team supplies this information.

The physician MUST print or save or the information will not be saved.

Session Requires Review

MEC Layer: 5/21/2004 | Application: Ver 12.6.7B | Not connected to Coordinator | 04:41 PM

### 5.5.3 MEC Physician

The MEC physician should document the encounter with an SP by either entering information describing the reason no referral was given in the physician MH Observation box, or by completing a MH referral.

### 5.5.4 Suicide

The MEC physician is not responsible for making psychiatric diagnoses; however, thoughts and plans for suicide should be considered seriously. The MEC physician should assess the need for a mental health referral for those who have either reported or voluntarily disclosed recent suicidal ideations or attempts.

Protocol for a MEC physician receiving an observation from the mental health interview:

- Assess if the SP is currently suicidal. Ask the SP if she or he is depressed or thinking about suicide now. If so, then probe as to whether she or he has a plan and/or set a time for doing this. A person who is suicidal with a plan to kill at a definite time is a **psychiatric emergency**, and a level 1 referral.

Protocol for a participant who is in imminent danger:

- If the SP is currently under psychiatric care, ask the SP for permission to call the mental health care provider. The physician should negotiate a followup with the provider. If the participant does not have a provider, call the **referral center provided by the advance arrangements team**.

Protocol for a participant who is not in imminent danger:

- If the SP is under the care of a psychiatrist or other mental health care provider, there may be no need to refer unless the participant provides some indication that his or her symptoms are worsening.
- If the SP has not seen a health professional for suicidal thoughts, then refer him or her to the specific clinics or crisis hotline **provided by the advance arrangements team**.

For minors under 18 years of age, the initial assessment should be done with the youth in private. If a referral is necessary, the participant's parent/guardian must be notified.

### **5.5.5 Homicidal Ideations/Threats**

Threats to kill a person or person(s) should be considered seriously. The MEC physician should judge the mental stability of the participant. The physician should ask about the specific plan for carrying out the threat and the timeframe. A homicidal threat with a lethal weapon and plan must be reported to the 911 system.

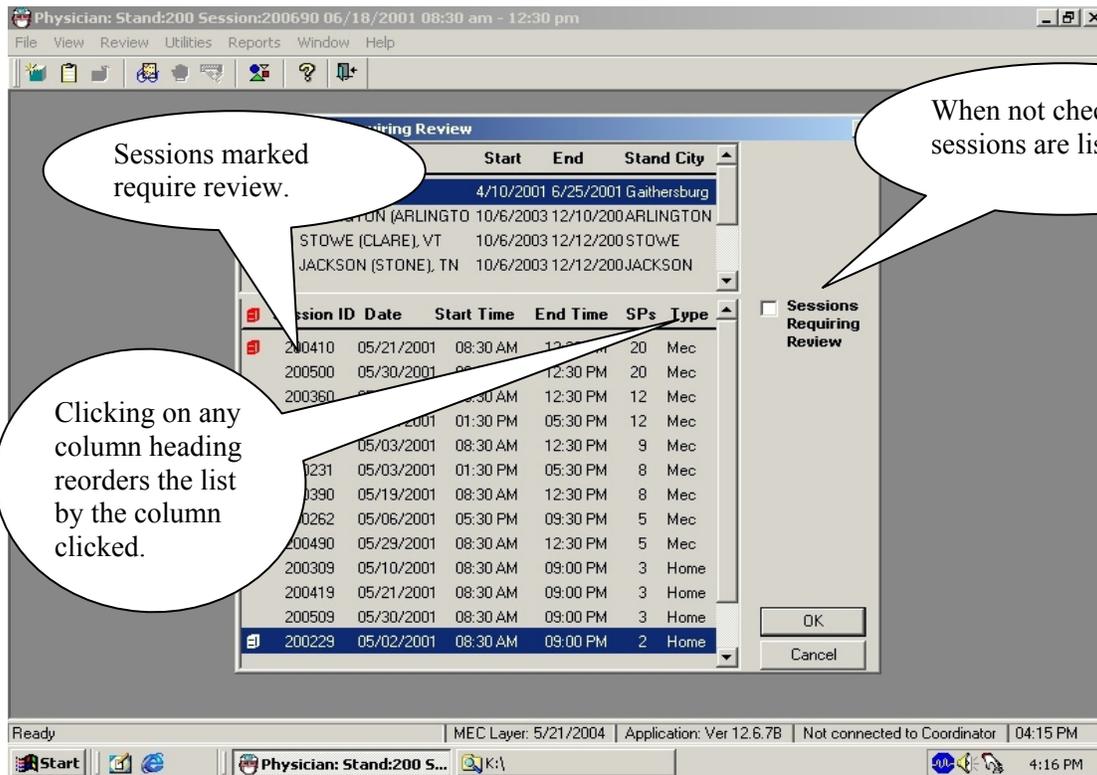
### **5.5.6 Reporting Child Abuse**

If a minor reports that he or she has been abused, the MEC physician should document the nature of the abuse. If warranted, the MEC physician should call **Child Protective Services at the number provided by the NHANES Advance Arrangements Team**. If the physician is unsure whether or not to refer, the physician should discuss the case with a social worker at Child Protective Services. When presenting the case, the MEC physician should not use the child's name or any other identifier. If the social worker and physician agree that the referral to CPS should be made, the physician may provide the name and address of the child.

## **5.6 Sessions Requiring Review**

All MEC sessions with an SP requiring a physician's review for referral determination must be reviewed. The "Sessions Requiring Review" box is displayed every time the physician logs on to the application, and the physician must review these sessions. When the ISIS application first opens for the physician component, the "Sessions Requiring Review" screen opens by default. The purpose of this screen is to prompt the physician to complete reviews for SPs in all previous sessions. The physician can select which sessions to review.

Exhibit 5-2. Review all MEC sessions in the current stand



- When the physician's application is opened, the "Sessions Requiring Review" pick list is displayed. If the physician does not want to review referrals at this time this screen may be closed by clicking on the "x" in the upper right corner or by clicking cancel in the lower right corner.
- The top part of the screen displays the current stand.
- The lower part of the screen displays the Sessions Review.
- To view all sessions in the current stand leave the box for "Sessions Requiring Review" unchecked. All sessions in the current stand will be displayed.
- To review a specific session, highlight and double click on that session and that session will be displayed.
- Click "Cancel" to exit without viewing any sessions.
- Close the screen when completed.

## 5.7 Data Entry Screens for Referrals

The following sections describe the ISIS screens and data entry process related to physician referrals. There are three types of screens related to referral: “Sessions Requiring Review,” “Review in Box” and “Referral Review.”

### 5.7.1 Review Menu

The review toolbar selection (Exhibit 5-3) has several review options: CV Medication Review, Referral Review, SP History, Review Other Sessions, and Physician Lookup. Each of these options is described in the following sections.

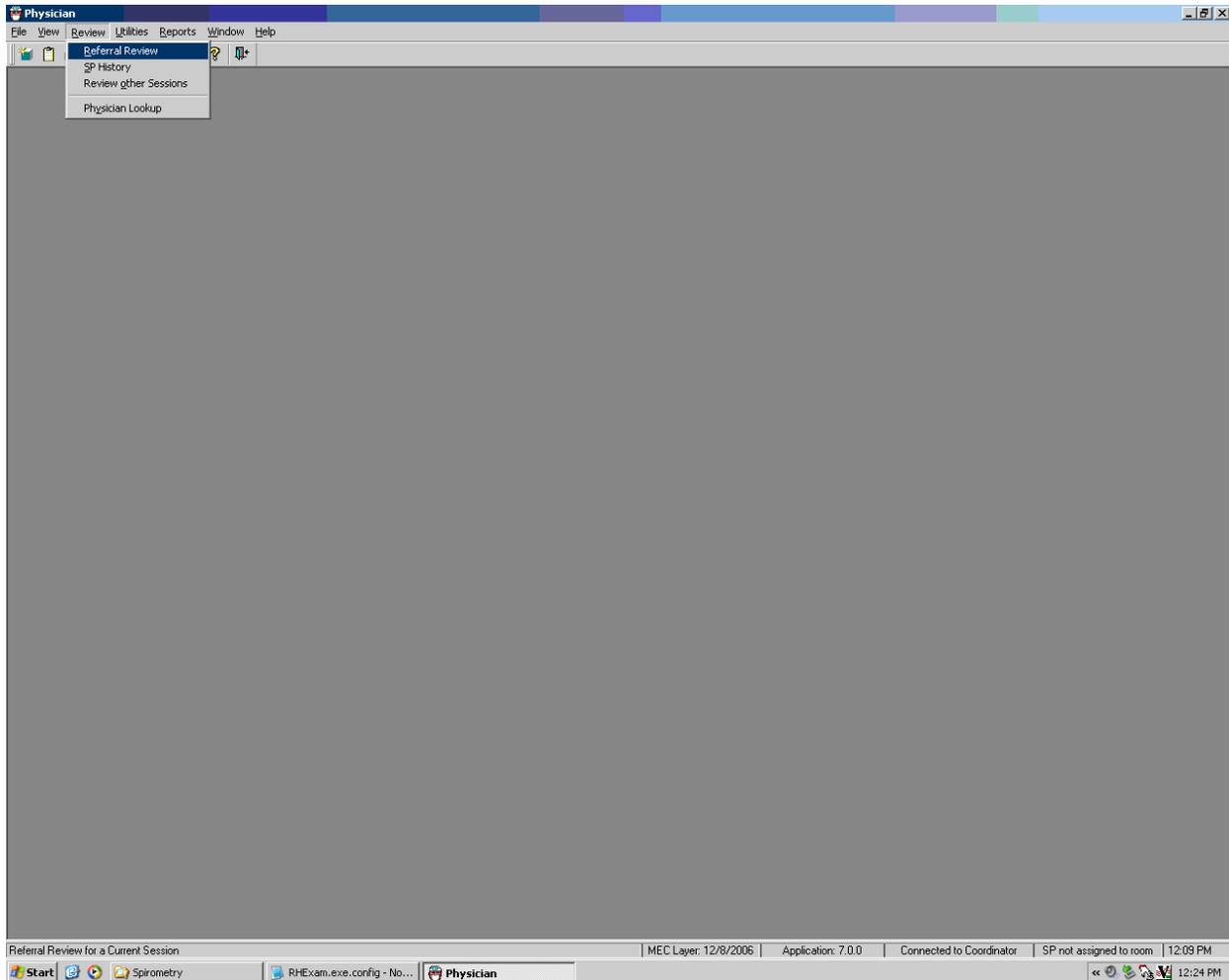
Exhibit 5-3. Review menu for selecting referral review



- Use this drop-down list to select the desired activity.
- Highlight the activity by pointing to it with the pointer.
- Click the activity to access the screens.

## 5.7.2 Review Box

Exhibit 5-4. Referral Review selection screen



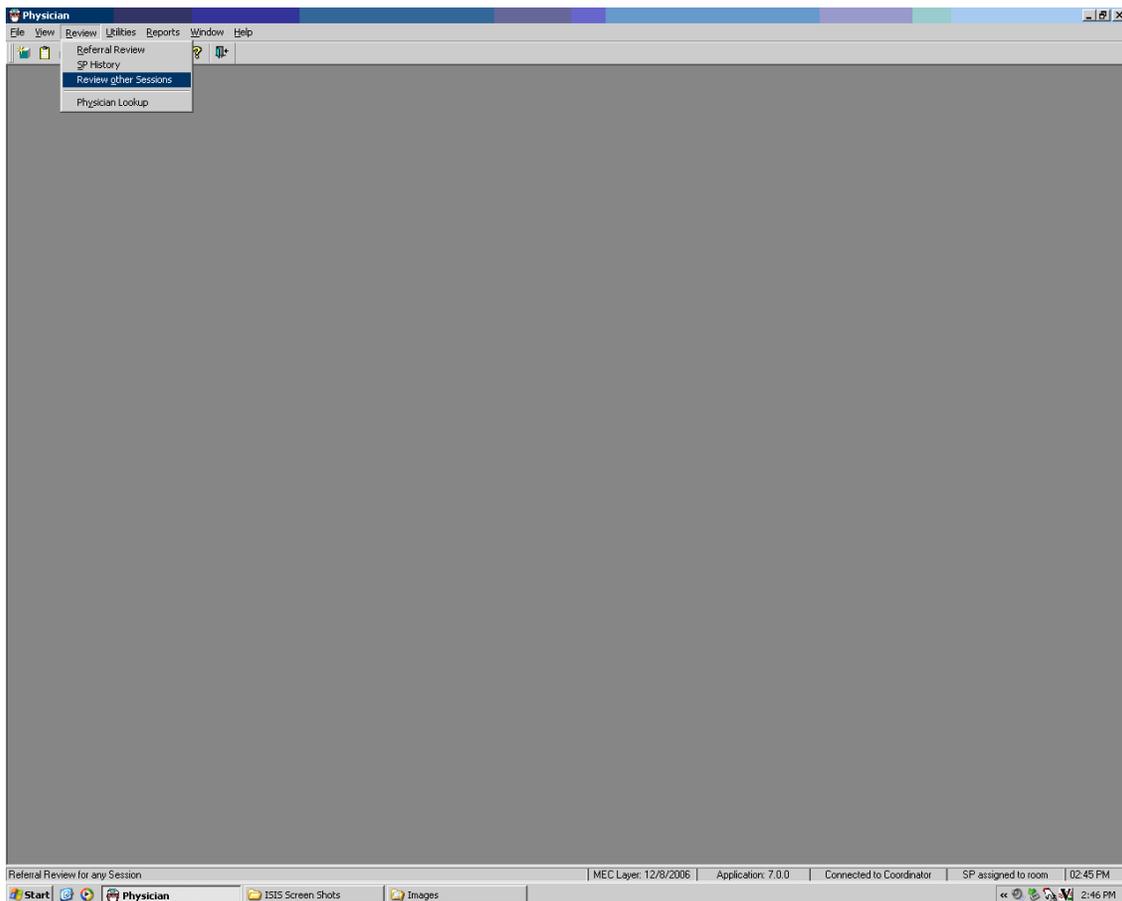
- The Referral Review box option is the screen where all SPs who require an assessment of the need for a referral can be viewed.
- To access the Review Inbox box, first access the desired session (see Exhibit 5-2), then select “Review” (see Exhibit 5-3) from the toolbar, and last, select “Referral Review” from the drop-down list (see Exhibit 5-4).
- This will access the referral review requirements for the current session.

### 5.7.3 Review Other Sessions

The “Sessions Requiring Review” is accessed from the “Review Other Sessions” drop-down list under the “Review” selection on the toolbar. The “Sessions Requiring Review” screens inform physicians which MEC sessions remain to be reviewed. The purpose of the review is to assure that all referrals are completed. This is especially important since some referrals may not be able to be completed while SPs are still available on the MEC. Physicians mark appropriate boxes about their referral decision for each SP.

Exhibit 5-5 shows the review selection, and drop-down selection list for “Review Other Sessions” option that accesses the Sessions Requiring Review.

Exhibit 5-5. Review other sessions

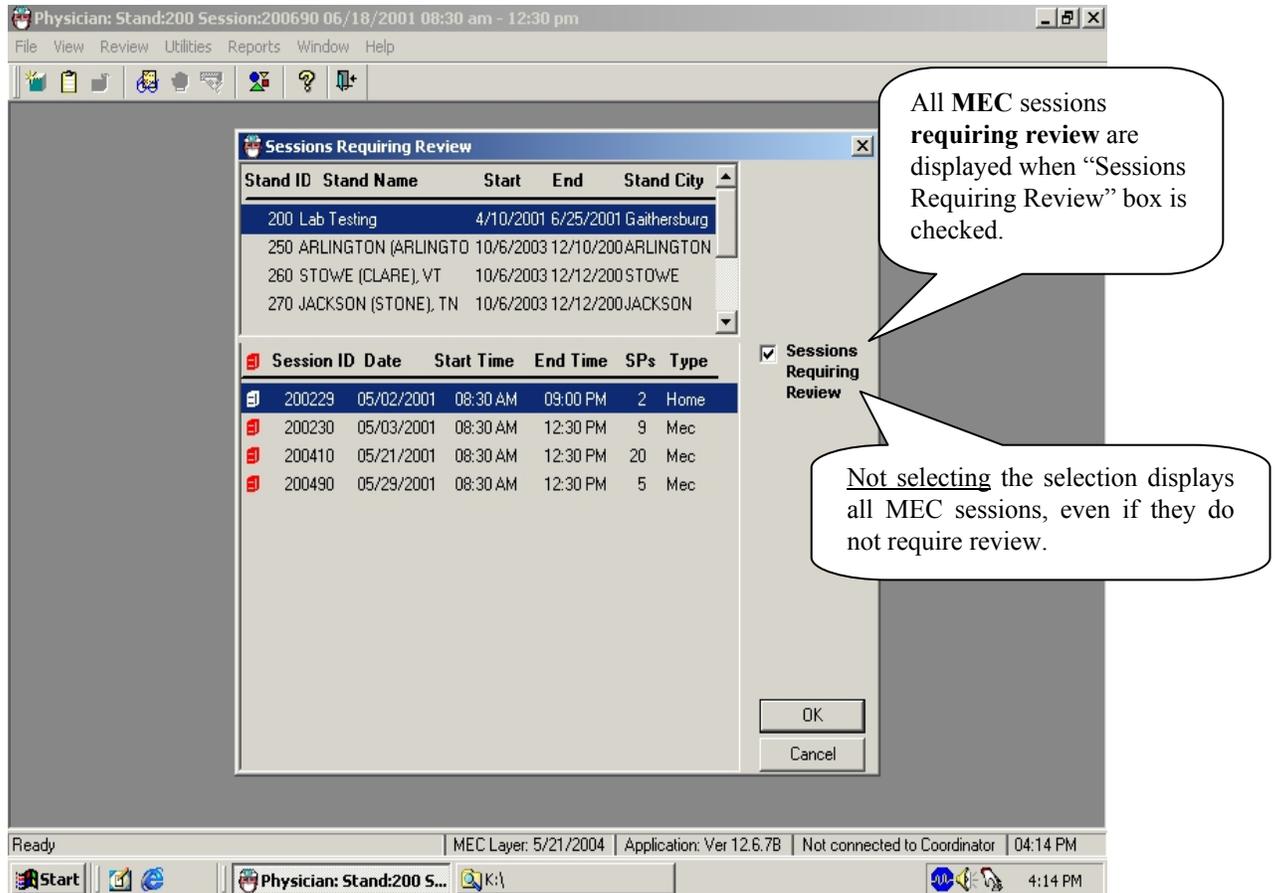


- When the “Review Other Sessions” option is clicked, the “Sessions Requiring Review” screen drop-down list is accessed. From this screen, physicians make choices about which sessions need to be reviewed.

## 5.7.4 Sessions Requiring Review

The top part of the “Sessions Requiring Review” screen displays the current stand location and number. The bottom part of the screen displays various sessions in the stand, depending on how they are selected by the physician.

Exhibit 5-6. MEC Sessions requiring review



- When the “Sessions Requiring Review” box is checked, all MEC sessions that require review are displayed.
- Referrals posted in the “Review Box” that the physician has not reviewed causes the application screen to display a **red marking beside the session indicating that the session requires review**.
- The **red mark remains** beside this session until the physician reviews all referrals in the session.
- When all referrals are completed or reviewed, the system removes the red flag.

## 5.7.5 Referral Review Inbox Screen

Exhibit 5-7. SPs referred back to MD for review for referral determination

The screenshot shows a software interface for a Referral Review Inbox. At the top, it displays 'Physician: Stand:500 Session:500820 12/22/1999 08:30 am - 12:30 pm'. Below this is a menu bar with 'View', 'Review', 'Utilities', 'Reports', 'Window', and 'Help'. A toolbar contains various icons. The main title bar reads 'Referral Review Stand:500 Session: 500820'. The data is presented in a table with columns for 'SP' (Name, ID, Age, Gender), 'Return', 'Pregnancy', and 'Reviewed Status'. A callout box points to the 'Reviewed Status' column for T. SELEMANCA, which contains the value '2' and a checkmark. A legend at the bottom explains the status codes: 1 - Reviewed, referral NOT required; 2 - Reviewed, referral required; 3 - Reviewed, referral complete; 4 - Reviewed, actions required; 5 - Referral required - SP signed release. At the bottom of the screen, it says 'Session Requires Review' and has 'Back' and 'Message' buttons.

| SP                  |        |     |        | Return | Pregnancy | Reviewed Status | Review |
|---------------------|--------|-----|--------|--------|-----------|-----------------|--------|
| Name                | ID     | Age | Gender |        |           |                 |        |
| A. VENUS            | 259740 | 12  | Male   |        |           |                 |        |
| F. HENDERMAN        | 268917 | 20  | Male   |        |           |                 |        |
| S. TEERN            | 348596 | 40  | Male   |        |           |                 |        |
| <b>Y. FELDER</b>    | 363591 | 30  | Female |        |           |                 |        |
| <b>U. JONES</b>     | 482357 | 18  | Female |        |           |                 |        |
| <b>T. SELEMANCA</b> | 491401 | 14  | Female | ✓      |           | 2               |        |
| B. GRAY             | 609907 | 15  | Female |        |           |                 |        |
| <b>T. JEFFREYS</b>  | 699437 | 60  | Male   |        |           |                 |        |
| <b>S. WONKY</b>     | 760287 | 10  | Female |        |           | 4               |        |
| <b>M. REDBIRD</b>   | 875807 | 50  | Female |        |           |                 |        |
| <b>K. JONES</b>     | 833474 | 44  | Female | ✓      |           |                 |        |

Reviewed Status Codes: 1 - Reviewed, referral NOT required  
2 - Reviewed, referral required  
3 - Reviewed, referral complete  
4 - Reviewed, actions required  
5 - Referral required - SP signed release

Session Requires Review [Back] [Message]

- The “Referral Review” box (Exhibit 5-7) has the stand and session numbers on the top bar.
- Names of SPs requiring review are highlighted in red. The boxes for components requiring review are enabled. All other boxes are disabled or “grayed out.”
- Note also that the SPs name is in red when a review is required.

### 5.7.6 Selecting SP for Detailed Referral Review

To complete the referral, the physician selects each SP in turn who has an indication that a review for referral determination is needed. The selection is made from the Referral Review screen.

Exhibit 5-8. SP Selection from review in box

|                     |        |           |   |   |  |   |   |  |
|---------------------|--------|-----------|---|---|--|---|---|--|
| <b>U. JONES</b>     | 482357 | 18 Female |   |   |  |   |   |  |
| <b>T. SELEMANCA</b> | 491401 | 14 Female | ✓ | 2 |  |   |   |  |
| B. GRAY             | 609907 | 15 Female |   |   |  |   |   |  |
| S. WINK             | 89437  | 60 Male   |   |   |  | 3 |   |  |
| S. WINK             | 760287 | 10 Female |   | 4 |  |   |   |  |
| <b>M. REDBIRD</b>   | 875807 | 50 Female |   |   |  |   |   |  |
| <b>K. JONES</b>     | 833474 | 44 Female | ✓ |   |  |   | 2 |  |

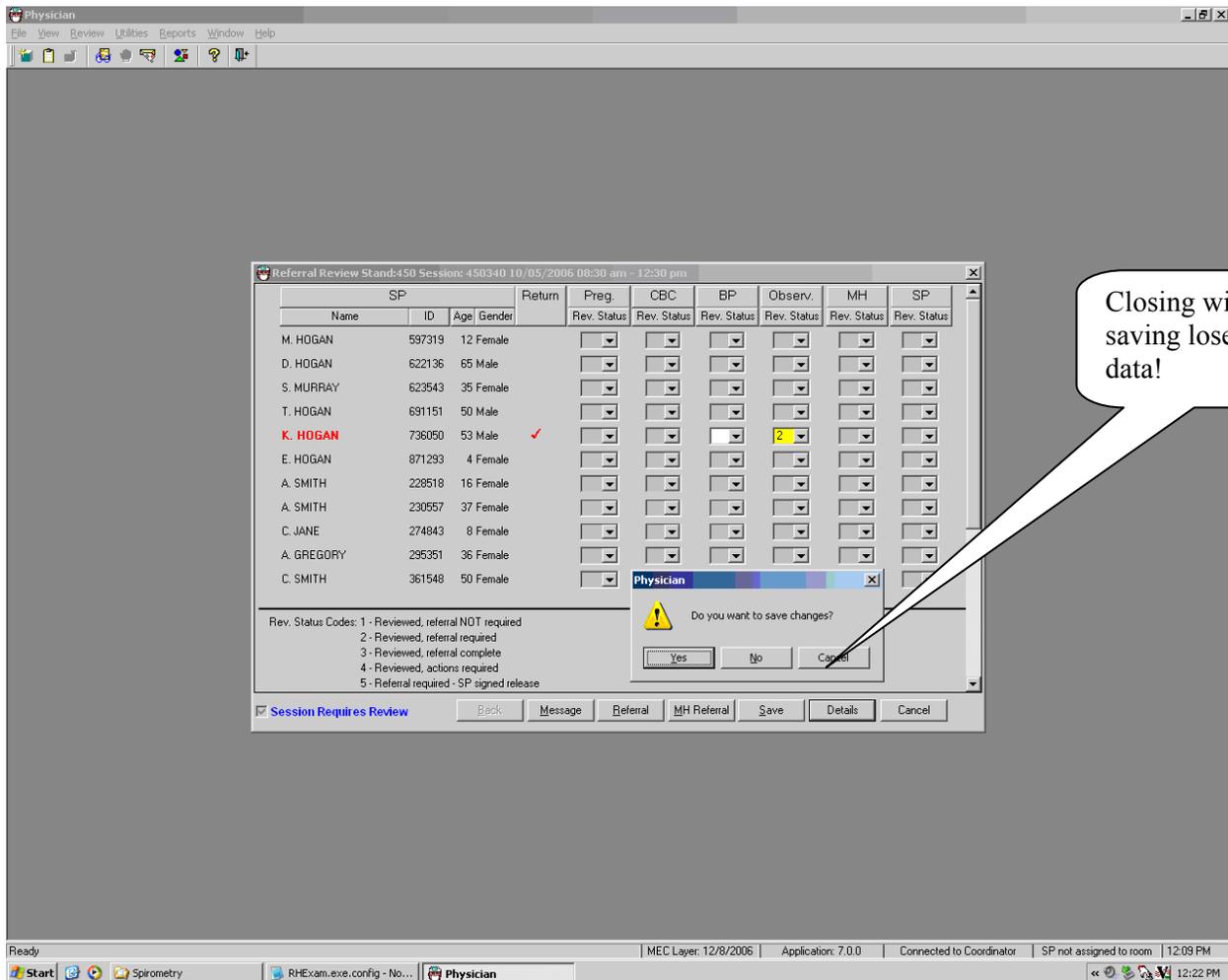
Reviewed Status Codes: 1 - Reviewed, referral NOT required  
2 - Reviewed, referral required  
3 - Reviewed, referral complete  
4 - Reviewed, actions required  
5 - Referral required - SP signed release

Session Requires Review

Back Message Save Referral **Details** Cancel

- To select the SP for review, move the cursor over the desired name.
- Highlight the name of the SP to be reviewed.
- Double click on the SP name, or, click the “Details” radio button.

Exhibit 5-9. Warning to save changes



- If you want to close a session before saving the results, a message will be displayed: “Do you want to save changes?”
- Click “Yes” to save and close this box. If all status codes are 1 and 3, the “Session Requires Review” box will be unchecked and the red flag will be removed from the session requiring review list.

“Session Requires Review”

Exhibit 5-10. Session Requires Review indicator



- A box at the bottom left of the screen is checked if the session requires review. The box is unchecked if no review is required.
- This box is especially useful if there is a long list of SPs. If the box is not checked, there is no need to scroll through the SP list.

Exhibit 5-11. Reviewed Status Codes legend



- The “Reviewed Status Codes” are listed at the bottom left of the screen.
- Code 1 – “Reviewed, referral not required”: If findings were reviewed but the situation does not require a referral, select Code 1 from the drop-down menu.
- Code 2 – “Reviewed, referral required”: If a referral is required but there is not enough time to do it or if the SP is in another exam, check Code 2. This keeps the referral session active. A referral Code 2 turns the physicians examination progress box on the coordinator’s screen (for that SP) to green. This alerts the coordinator that the SP must return to see the physician before checking out of the MEC. (If the SP has not completed the physicians exam component, the box does not turn green. When the SP checks into the physicians exam the box turns green). The box remains green as long as there are referrals for that SP with a referral Code 2. After the code is changed from 2 to another code, the box turns blue.
- Code 3 – “Reviewed, referral complete”: After the physician reviews the referral, sees the SP, and completes the referral letter, Code 3 is checked. If no other referrals are needed, the session will be considered complete.
- Code 4 – “Reviewed, action required”: This is similar but not the same as Code 2. This code is marked when the SP has been reviewed and a referral generated; however, the physician wants to take further action but has not been able to complete

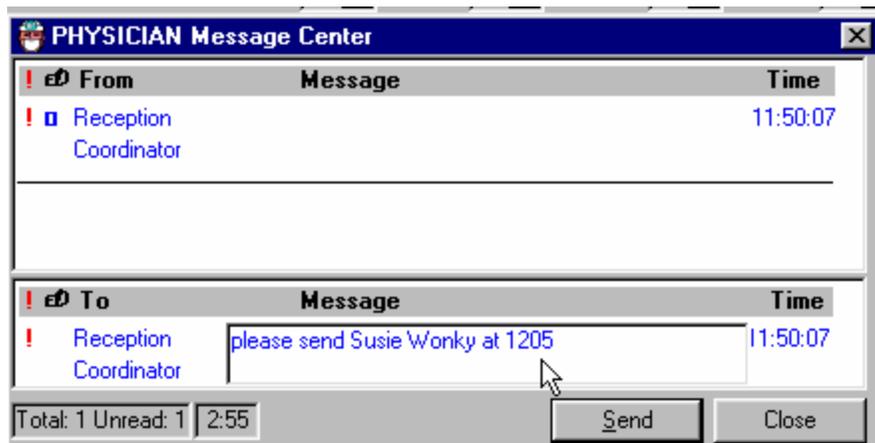
the action at this time. This situation could occur when the physician needs to telephone a health care provider but has been unable to complete the process. This may be carried over to the next day, or the next session. When Code 4 is checked, the SP may be checked out of the MEC but this session continues to be flagged, requiring review until this and other referrals are coded as 1 or 3.

- Code 5 – “Referral required – SP signed release”: When SPs refuse to accept a required referral, they sign a release form. The physician checks Code 5 which removes the red flag on the session if all other referrals are complete.

### 5.7.7 ISIS Message

To assure that SPs see the physician prior to leaving the MEC, the physician can send a message to the coordinator to specify a time to send the SP to the physician examination room to complete the referral.

Exhibit 5-12. Message to coordinator



- Notify the coordinator when it is a good time to complete this referral.
- Click “Message” from the tool bar utilities, type a message, and send to the coordinator.

5.7.8 NHANES Release Form for SPs Refusing Referrals

Exhibit 5-13. NHANES Release Form

|   |  |  |
|---|--|--|
|                                    | <b>DEPARTMENT OF HEALTH &amp; HUMAN SERVICES</b> | Public Health Service<br>Centers for Disease Control and Prevention                        |
|   |  | National Center for Health Statistics<br>6525 Belcrest Road<br>Hyattsville, Maryland 20782 |
| <b>NHANES<br/>RELEASE FORM</b>  |  |  |
| Date:   |  |  |
| Stand:  |  |  |
| This is to certify that against the advice of the staff doctor I:   |  |  |
| (Check one)   |  |  |
| <input type="checkbox"/> am leaving the Mobile Exam Center  |  |  |
| <input type="checkbox"/> am removing _____<br><small>(name of sample person)</small><br>from the Mobile Exam Center |  |  |
| <input type="checkbox"/> choose no further medical referral or immediate follow-up.                                 |  |  |
| By so doing, I assume all responsibilities for my act.  |  |  |
| Signed _____  |  |  |
| Relationship _____  |  |  |
| Witness _____   |  |  |

- SPs who decline or refuse a medical referral, are asked to sign the NHANES Release Form (Exhibit 5-13). The date and stand number must be completed. The form is available in English and Spanish.

- This form is available for printing in the “Forms” directory.
- Ask the SP to place a check mark next to the correct ending for the reference sentence:

“This is to certify that against the advice of the staff doctor, I:”

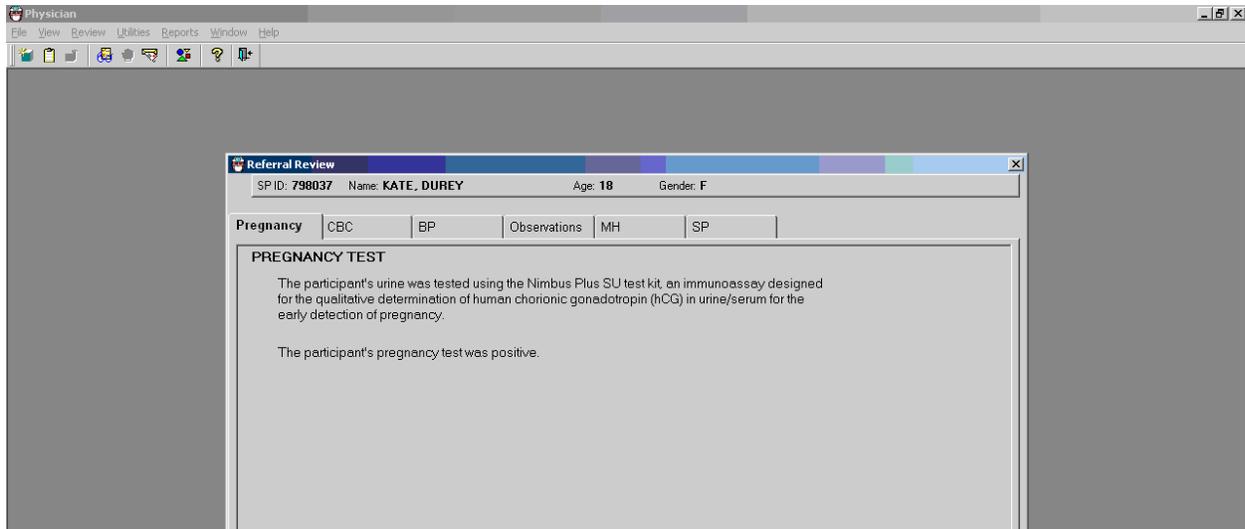
- am leaving the Mobile Exam Center
- am removing (name of sample person)
- choose no further medical referral or immediate followup.”

- Ask the SP to sign this form.
- Obtain a witness signature for the form.

### 5.7.9 Review in Box for Pregnancy Details

The potential data for referral are selected from tabs for each SP that is referred: Pregnancy, CBC, BP, LED, and Observations.

Exhibit 5-14. Details for pregnancy referral



- If the “Pregnancy” tab is checked, the results of the pregnancy test in the lab are displayed. The results can only be one of the following for pregnancy:
  - The pregnancy test is negative;
  - The pregnancy test is positive; or
  - The pregnancy test is invalid.
- Complete the referral as appropriate.

## 5.7.10 Review in Box for CBC Details

Exhibit 5-15. Details of complete blood count referral (1)

Physician

File View Review Utilities Reports Window Help

Referral Review

SP ID: 798037 Name: KATE, DUREY Age: 18 Gender: F

Pregnancy CBC BP Observations MH SP

**CBC**

| Complete Blood Count | Result | Units                  | Flag           | Reference Range |
|----------------------|--------|------------------------|----------------|-----------------|
| White Blood Count    | 16.8   | ( $\times 10^9/L$ )    | Extremely High | 4 - 12.4        |
| Lymphocytes          | 14.2   | (%)                    | Low            | 18.7 - 58.5     |
| Monocytes            | 15.0   | (%)                    | High           | 4.3 - 12.7      |
| Neutrophils          | 65.9   | (%)                    |                | 32.9 - 77.2     |
| Eosinophils          | 4.8    | (%)                    |                | 0.6 - 9.9       |
| Basophils            | 0.1    | (%)                    |                | 0.1 - 1.6       |
| Red Blood Count      | 4.3    | ( $\times 10^{12}/L$ ) |                | 3.9 - 5.2       |
| Hemoglobin           | 10.2   | (g/dL)                 | Low            | 11.2 - 15.1     |
| Hematocrit           | 39.4   | (%)                    |                | 33.5 - 44.6     |
| MCV                  | 92.0   | (fL)                   |                | 74.7 - 94.9     |
| MCH                  | 22.0   | (pg)                   | Low            | 24.5 - 32.6     |
| MCHC                 | 33.3   | (g/dL)                 |                | 32.3 - 35.3     |
| RDW                  | 15.1   | (%)                    | High           | 11.6 - 14.8     |
| Platelets            | 427.0  | ( $\times 10^9/L$ )    |                | 202 - 476       |

Close

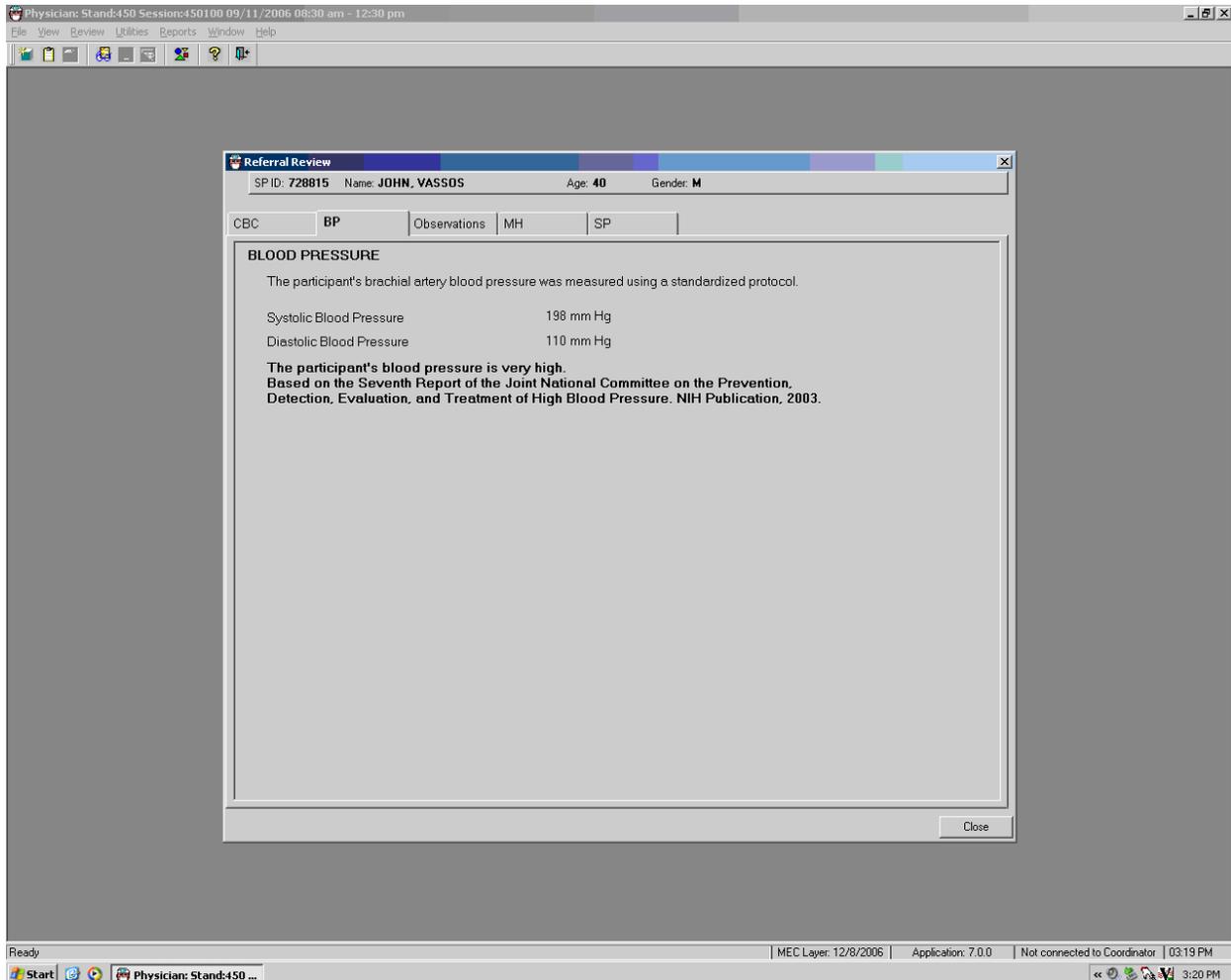
Ready | MEC Layer: 12/8/2006 | Application: 7.0.0 | Connected to Coordinator | SP not assigned to room | 03:08 PM

Start | Physician | 1515 Screen Shots | Images | 3:09 PM

- Click on the CBC tab to review the results of the MEC laboratory CBC.
- The names of the tests are displayed in the left columns along with the units of measurement.
- The reference ranges are displayed in the far right column.
- The results and units of measurement are displayed in the next two columns.
- The flagged items are displayed as “low, high, and extremely high.”
- Complete the referral as necessary.

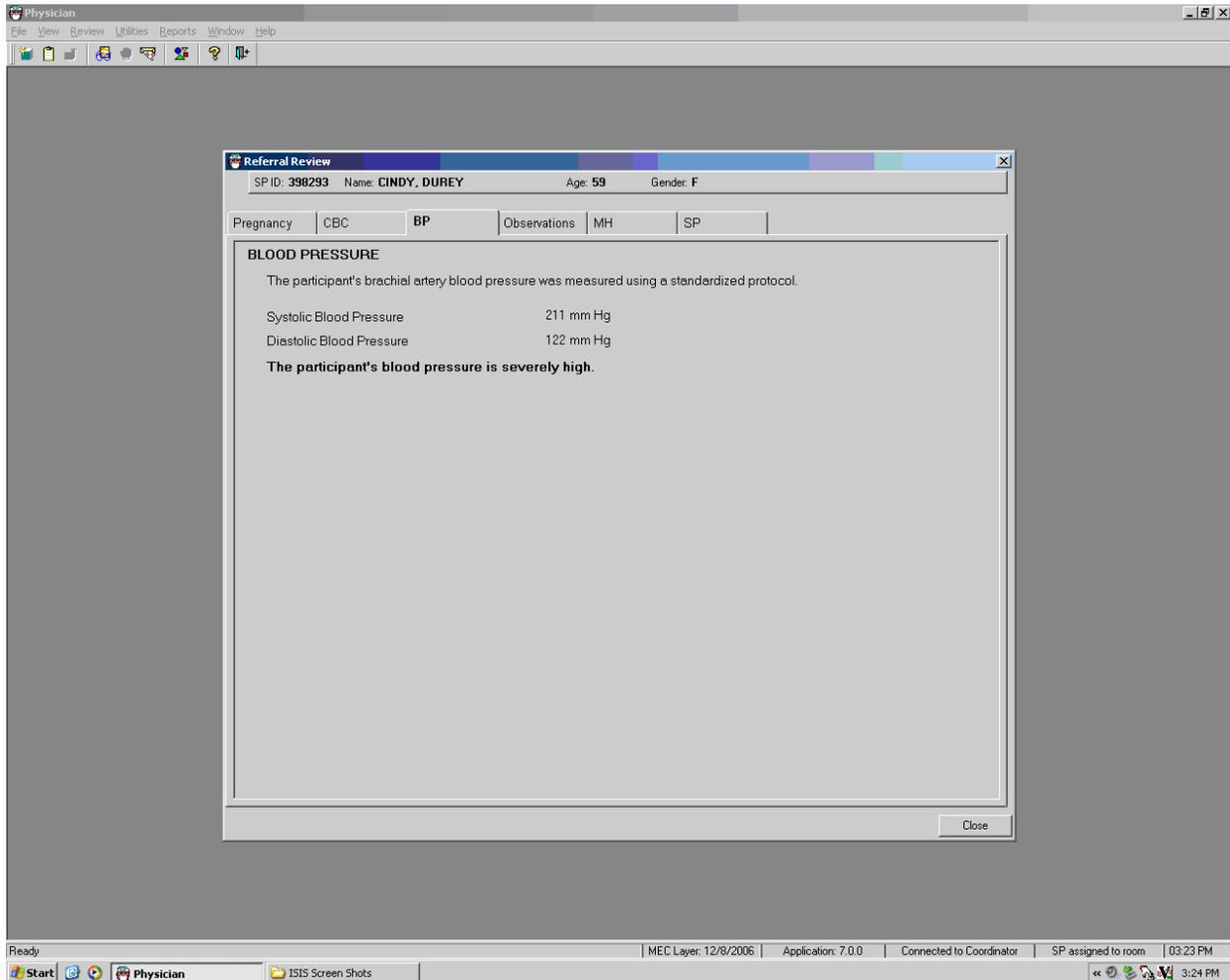
## 5.7.11 Review in Box – Blood Pressure Details

Exhibit 5-16. Details of very high blood pressure referral



- Click on the blood pressure tab to view the BP results.
- Complete the referral if necessary and enter the appropriate code.
- The blood pressure in the above example is very high for the age group and is a Level 2 referral. These results are discussed with the SP and the physician gives a Level 2 referral letter to the SP. The SP may take this letter to his or her health care provider.
- Click on the “Close” button to exit from this screen.

Exhibit 5-17. Details of severely high blood pressure referral

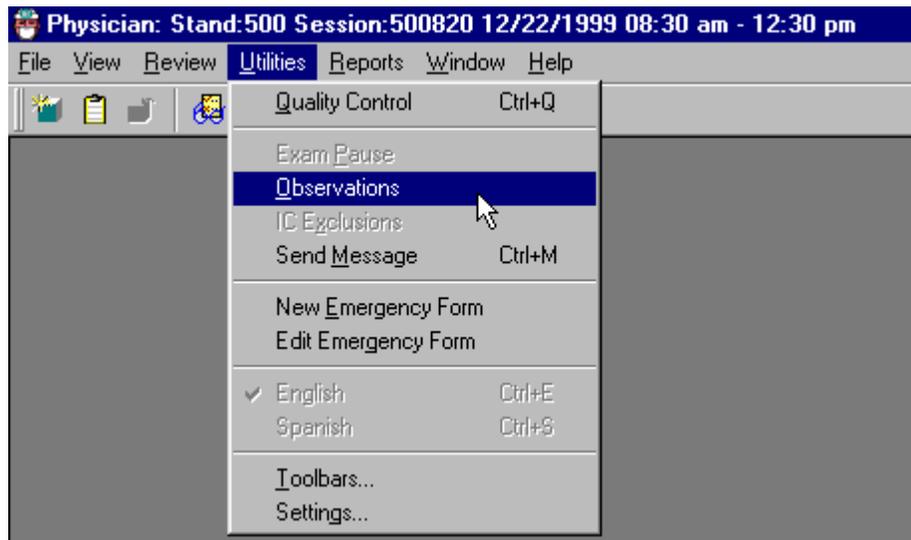


- The blood pressure in the above exhibit is severely high. This is a Level 1 referral. The physician should try to get an immediate referral to the SP's health care provider or to a local clinic.
- Complete the referral as necessary.
- Click on the "Close" button to exit this screen.

## 5.7.12 Observation Referrals

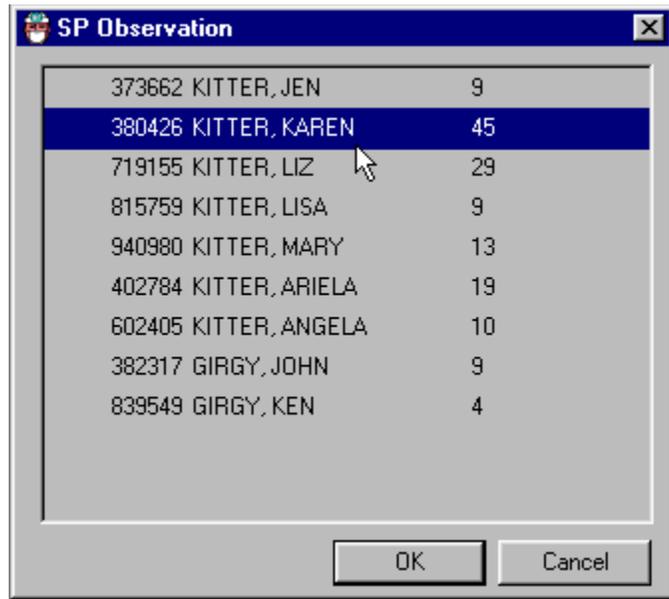
Observation referrals can be displayed by selecting “Observations” from the Utilities toolbar menu. This allows the physician to select any SP from the list of SPs referred for observation. The physician can also select the “Observations” tab from the Review in Box screen for the specific SP being reviewed.

Exhibit 5-18. Utilities menu for selecting observations referrals



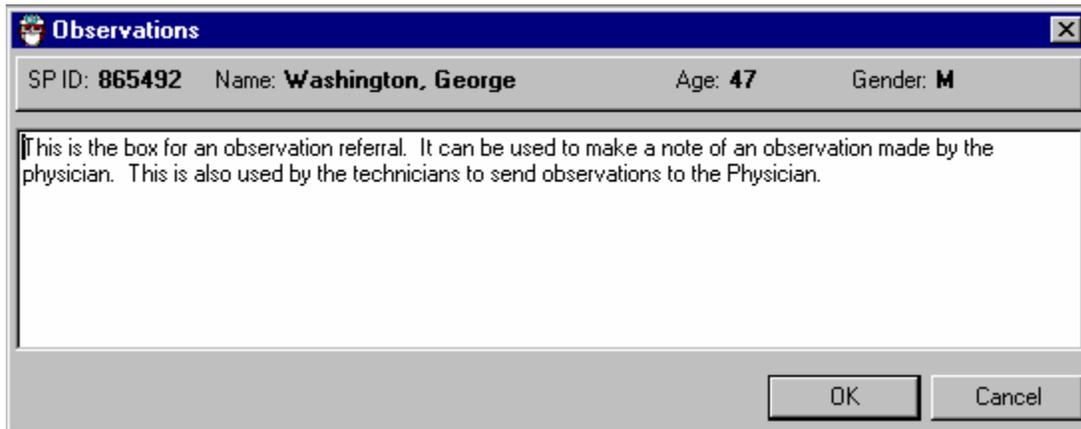
- Select the “Utilities” menu from the toolbar to access the Observations Referral window and then select Observations from the menu.

Exhibit 5-19. SP observation picklist



- The SP Observation picklist will appear with a list of all the names and ages of the SPs in the current session.
- Select the name of the SP for whom the observation referral is needed.

Exhibit 5-20. Observations referral box



- This is the Observations referral box that will be displayed in the other components. The technician will open this box, write the information in the referral information box, and send it to the physician.
- This will be flagged in the physicians exam system and the SP will not be able to leave the MEC until the physician has reviewed this referral.

### 5.7.13 Referral Letter

Exhibit 5-21. Clinic pick-up medical referral screen

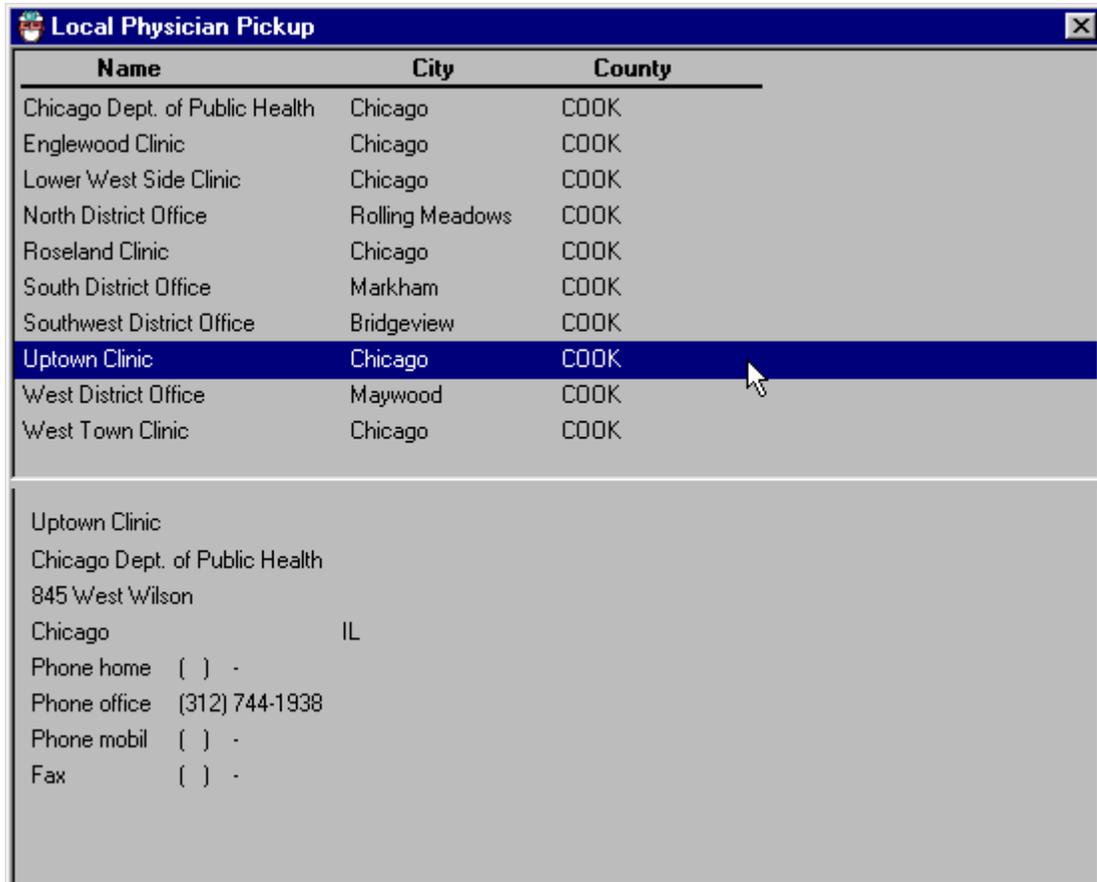
The screenshot shows a software window titled "SP Referral Information" with the following elements:

- Form Fields:** Clinic/Physician Name, Addr.1, Addr.2, City, State, Zip, Contact Name, Phone, Fax.
- medical referral Section:** Includes a checked "Print Referral" checkbox, radio buttons for "Clinic" (selected) and "Physician", and a "Clinic Pickup" button.
- Language Selection:** Radio buttons for "English" (selected) and "Spanish".
- Explanation Options:** Radio buttons for "Explained to SP" (selected), "Explained to Guardian", and "Explanation declined".
- Text Areas:** "Description of Explanation", "SP Response", and "Referral Comments".
- Buttons:** "Print", "Preview", "Save", "Close", "Back", "Message", "Referral", "Print Referral", "Save", "Details", "Cancel".
- Status Bar:** "Session Requires Review" (checked), "Create a referral letter", "MEC Layer: 5/21/2004", "Application: Ver 12.6.7B", "Not connected to Coordinator", "04:40 PM".

- When the “Medical Referral” button is clicked, the above box is displayed. Click on “Clinic Pickup” to view a list of local clinics. Click on “Physician” to see a list of local providers.
- The address and phone number will appear in the appropriate boxes.
- Enter a description of your explanation of the referral to the SP, and how the SP responds.
- The box at the bottom of the screen (Referral Comments) is for entering physician comments. These comments will appear on the second page of the referral letter.

### 5.7.14 Local Physician Pickup

Exhibit 5-22. Local physician and clinic pickup referral letter addresses



| Name                           | City            | County      |
|--------------------------------|-----------------|-------------|
| Chicago Dept. of Public Health | Chicago         | COOK        |
| Englewood Clinic               | Chicago         | COOK        |
| Lower West Side Clinic         | Chicago         | COOK        |
| North District Office          | Rolling Meadows | COOK        |
| Roseland Clinic                | Chicago         | COOK        |
| South District Office          | Markham         | COOK        |
| Southwest District Office      | Bridgeview      | COOK        |
| <b>Uptown Clinic</b>           | <b>Chicago</b>  | <b>COOK</b> |
| West District Office           | Maywood         | COOK        |
| West Town Clinic               | Chicago         | COOK        |

Uptown Clinic  
Chicago Dept. of Public Health  
845 West Wilson  
Chicago IL  
Phone home ( ) -  
Phone office (312) 744-1938  
Phone mobil ( ) -  
Fax ( ) -

- Select the name of the clinic or health care provider.

## 5.7.15 Referral Address Information

Exhibit 5-23. Local physician and clinic pickup data entered for referral letter information

The screenshot displays a software window titled "SP Referral Information" within a larger application window "Referral Review Stand:200 Session: 200502 05/30/2001 05:30 pm - 09:30 pm". The form contains the following fields and options:

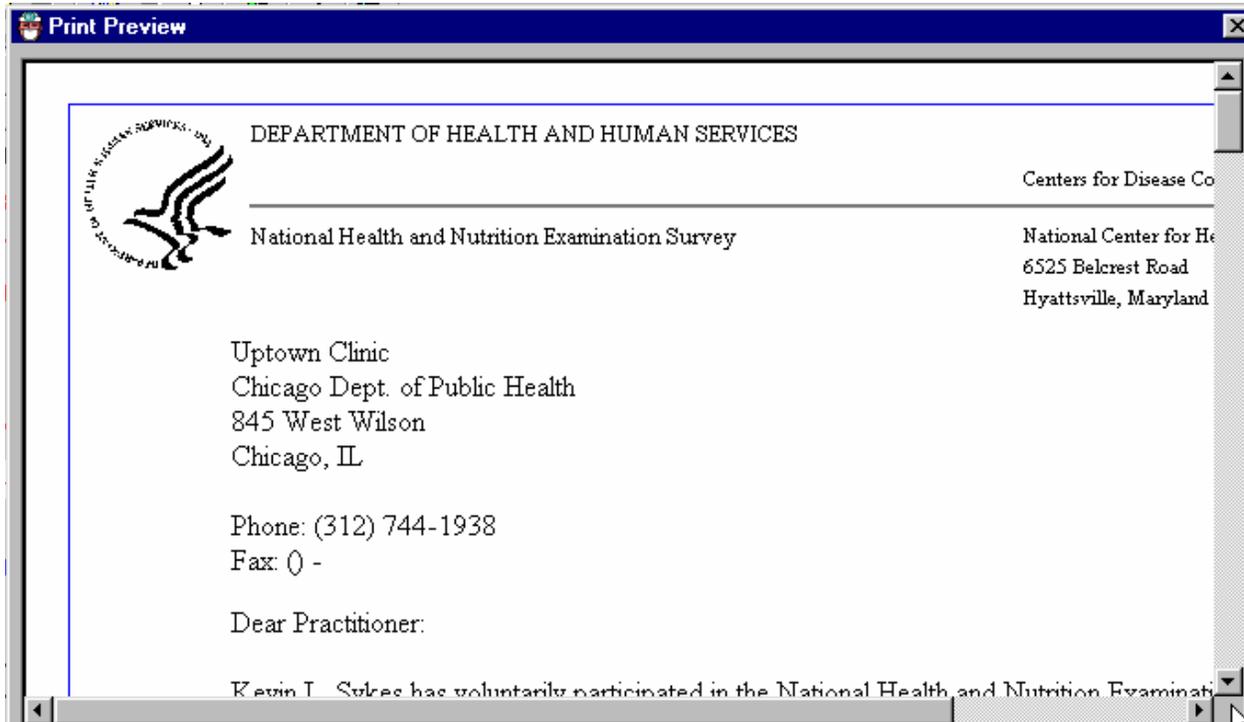
- Clinic/Physician Name:** Text input field.
- Addr.1:** Text input field.
- Addr.2:** Text input field.
- City, State, Zip:** Text input field with a dropdown for state.
- Contact Name:** Text input field.
- Phone:** Text input field with a dropdown for area code.
- Fax:** Text input field with a dropdown for area code.
- medical referral:** Section containing:
  - Print Referral** (button)
  - Clinic** (radio button) with a **Clinic Pickup** button.
  - Physician** (radio button).
  - Radio buttons for explanation type:
    - Explained to SP**
    - Explained to Guardian**
    - Explanation declined**
- Language:** Radio buttons for **English** (selected) and **Spanish**.
- Description of Explanation:** Large text area.
- SP Response:** Large text area.
- Referral Comments:** Large text area.
- Buttons:** **Print**, **Preview**, **Save**, **Close**.
- Footer:**  **Session Requires Review**, **Back**, **Message**, **Referral**, **Print Referral**, **Save**, **Details**, **Cancel**.

The Windows taskbar at the bottom shows the Start button, a taskbar with "Physician: Stand:200 S...", and the system tray with the time "4:41 PM".

- Describe the explanation given to the SP and the SP response in the appropriate fields. These entries will not appear on the referral letter.
- The “Referral Comments” field may be used to enter comments to the referral physician.

## 5.7.16 Referral Letter Review

Exhibit 5-24. Preview referral letter



- Select “Preview” from the Session Review in Box screen.
- A preview of the referral letter will be displayed. Use the scroll bar to view all areas of the letter.

5.7.17 Referral Letter

Exhibit 5-25. Referral letter mock-up

|   |  |  |
|---|--|--|
|  | <b>DEPARTMENT OF HEALTH &amp; HUMAN SERVICES</b> | Public Health Service<br>Centers for Disease Control and Prevention                        |
|   |  | National Center for Health Statistics<br>6525 Belcrest Road<br>Hyattsville, Maryland 20782 |

<Insert Clinics Name> or <SPs Physician>  
<Insert Clinic Address>  
<Insert Clinic City, ST, Zip>  
<Insert Point of Contact>  
<Insert Phone Number>

Dear Doctor:

<SP Name> has voluntarily participated in the fourth National Health and Nutrition Examination Survey conducted at special facilities of the U.S. Public Health Service. The objectives of the survey are to obtain information on the health and nutrition status of the U.S. population. As a result of the testing that was done, it was noted that on <Exam Date>, a finding was revealed that was outside the survey's medically acceptable range. This finding is described on the attached Referral Comments page.

**<Insert the following paragraph for SPs with Blood Pressure Level 1>**  
As indicated on the Referral Comments page the participant's blood pressure measurements were severely high. The measurements were taken three times; and the values indicated are the average of the last two measures. All survey participants with severely high blood pressure are instructed to see their doctor or clinic the same day, or go to a hospital emergency room to have their blood pressure rechecked.

This examination is intended to collect health measures for research. It is not a complete physical exam. No attempt has been made to diagnose or treat medical conditions of the participants. The findings disclosed to you are done so with the participant's permission.

Should you have any questions, you may contact me at the Mobile Exam Center. The phone number is <MEC Physician Phone> until <MEC Stand End Date>. After that date you may contact Dr. Kathryn Porter at the National Center for Health Statistics, Monday through Friday 9 AM to 6PM, EST. The toll free number is 1-800-452-6115.

Cordially,

<MEC Physician Name>, M.D.

- The data display for this referral letter includes all areas for referral in a single letter.
- See the next exhibit for the second page that will be attached to this referral.

## **6. SAFETY ISSUES AND EMERGENCY PROCEDURES**

### **6.1 Safety in the Mobile Examination Center (MEC)**

The best approach to emergency situations in the MEC is to prevent problems from developing into emergencies whenever possible, and to be well prepared for those emergencies that cannot be avoided. It is the responsibility of all examination staff members to participate in maintaining safety in the MEC by staying alert for potentially unsafe conditions or unusual sample person (SP) behavior, and by being thoroughly familiar with the current NHANES procedures for emergencies.

Promotion of safety and prevention of accidents and emergencies in the MEC is of particular concern in NHANES in view of the proportion of elderly sample persons that will be participating in the survey. The number of elderly respondents will be significant as a result of an intentional oversampling and removal of the upper age limit on the examination.

#### **6.1.1 Elderly Sample Persons**

Care should be taken with all elderly sample persons to minimize confusion and ensure the safe completion of the examination. Elderly SPs should be escorted when moving between exam procedures and the coordinator's area, and should not be left alone for more than a few minutes, such as when changing clothes.

Instructions to elderly SPs should be provided in a clear, calm manner, and repeated as needed. It should not be assumed that the directions are understood until the SP offers an appropriate response. It may be necessary to guide SPs through each step required, such as providing a urine specimen or changing into a gown, to successfully complete a task. If the SP has difficulty understanding or performing tasks, try to offer one instruction or direction at a time and wait until the SP understands before proceeding.

Exam staff should be particularly alert to complaints or concerns from elderly SPs, as elderly SPs may not clearly communicate the extent of their discomfort or concern. Staff members will need to further investigate SP complaints and to refer all potential problems to the MEC physician.

### **6.1.2 Sample Persons in Wheelchairs**

Some SPs may arrive for the examination in wheelchairs, and the exam staff will have to facilitate the SPs' entry into the MEC and their progress through the examination. The field office will alert the MEC manager and coordinator that an examinee uses a wheelchair for mobility so that the lift outside the LED examination room can be assembled.

SPs in wheelchairs will enter the MEC through the LED examination room, and then will be taken to the reception area where the coordinator will check them in and initiate the exam. The MEC trailers are large enough to allow passage of most wheelchairs. In the event a SP's wheelchair cannot move easily through the MEC, the SP may be transferred to the MEC wheelchair located in the wheelchair-accessible bathroom. If the SP can bear sufficient weight on at least one leg or can otherwise support him or herself during the transfer, the physician and another exam staff member should assist him or her into the MEC wheelchair to facilitate movement throughout the MEC.

Sample persons who cannot bear most of their weight on one leg and need assistance in transferring to the MEC chair should not be lifted or moved out of their wheelchairs. Lifting or moving SPs without their assistance could result in injury to a SP or staff member, and is unwarranted. SPs should remain in their wheelchairs and receive the exams that can be conducted in that position. When the transfer of a SP raises questions, the physician should make the decision to transfer or not transfer a SP.

### **6.1.3 Children in the MEC**

Children in the MEC should be monitored at all times when not participating in an exam component. Young children should not be permitted to walk through the MEC unescorted, and should not interfere with the performance of any examinations.

When waiting for an exam, young or unruly children should remain in the reception area under the supervision of the MEC coordinator and assistant coordinator. Other staff members, when available, may be asked to assist the MEC coordinator and assistant coordinator during particularly busy sessions. Toys are available to entertain young children.

Staff members should be alert to the presence of children in the MEC, and always investigate the behavior of young children walking unattended through the exam center.

## **6.2 Safety Precautions**

A number of precautions have been taken to promote safety in the exam center.

### **6.2.1 Mobile Exam Center Preparation**

- Fire extinguishers have been placed throughout the MEC to allow rapid response to fire. Exit doors are present in every trailer.
- A drug kit, an automated external defibrillator, a portable oxygen tank, and portable blood pressure equipment is kept in one box in the physician's exam room in each caravan. All staff must be able to recognize and locate this equipment without delay.
- Pocket masks for CPR are in the following areas: the coordinator's station, vision room, CV fitness room, physician's exam room, MEC interview room #2, dietary interview room #1, LED room, the staff room, phlebotomy room, body composition room, anthropometry room, and dental exam room.
- The phone number "911" is to be used to activate EMS if applicable for the MEC location. The telephone number and address of the local fire and rescue squad will also be posted at the coordinator's station and in the staff room by the telephone.
- The address of the MEC will be posted in the coordinator's station and staff room so that the location can be reported correctly to EMS.
- The MEC is a "NO SMOKING" facility. Neither staff nor SPs may smoke in the exam center. Should a staff member or SP have the need to smoke, she or he should step outside the MEC.

### **6.2.2 Mobile Examination Staff Preparation**

- All examination staff members are certified in cardiopulmonary resuscitation, Course Level C, and recertified biannually.
- A physician is required to be present when SPs are in the MEC.

- All examination staff are required to be in the MEC while a session is in progress, and whenever SPs are in the MEC.
- All staff are required to be thoroughly familiar with the safety issues and emergency procedures.
- Mock emergency drills will be held periodically in the mobile exam center to simulate a medical emergency and permit practice of emergency procedures.

### **6.2.3 On-Site Preparations at Each Stand**

- The field office or the advance arrangements team will contact and meet with local fire and rescue representatives to orient them to the location and structure of the MEC.
- The field office will provide advance notice to the MEC coordinator of any SPs who will require assistance entering or moving through the exam center. The coordinator will inform the MEC manager so that appropriate preparations can be made.
- The physician will review the medication history from the household interview for each SP prior to the examination session in which the SP's appointment is scheduled. The SP medication information can be accessed by the physician in the ISIS Physician's Exam application.

### **6.3 Reporting SP Problems to the MEC Physician**

SPs who report feeling ill or who appear to feel ill should be reported to the MEC physician at the earliest opportunity. At times SPs may have nonspecific complaints such as viral illnesses, joint pain, or fatigue, that do not appear to warrant an emergency response. Exam staff members should offer to have the physician speak with a SP who has a particular complaint. If the SP is reluctant or refuses, and there is any question about the health or safety of the SP, staff members should consult the physician for recommendations on how to proceed through the exam.

## **6.4 Medical Management and Referrals**

### **6.4.1 Medical Referrals**

Although the primary purpose of the MEC examination is data collection, not diagnosis or treatment, the exam may produce findings that warrant further medical attention. There is an obligation to inform the SP of any abnormal results from the exams, and to refer the SP to the appropriate provider for treatment. The MEC physician is responsible for the referral process. Each exam component has a referral process built into the ISIS system, which will alert the physician to findings that may require a referral. Some of the exam findings may already be known to the SPs and their providers, but others may have been unknown up until the day of the MEC exam. Based on the results of any component of the MEC examination, the physician will place the examinee in one of three categories:

- Level I Major medical findings that warrant immediate attention by a health care provider, e.g., dangerously high blood pressure, emergencies.
- Level II Major medical findings that warrant attention by a health care provider in the next 2 weeks because they are expected to cause adverse effects within this time period.
- Level III Minor medical findings that an examinee and his or her physician already know about. Medical findings that do not require prompt attention by a medical provider.

A Level I referral usually results in termination of the MEC exam, with a transfer of the SP out of the MEC and into a hospital or other care facility. If a SP refuses treatment, she or he must sign a release stating that she or he is aware of the exam findings and is refusing treatment against the advice of the MEC physician. The SP must sign the release form before leaving the MEC.

An SP with a Level II referral can continue the MEC examination, and will be advised to see his or her primary care provider within the 2 weeks following the exam. If the SP does not have a care provider, the MEC physician can arrange for the SP to see a local provider who has previously agreed to accept referrals from the MEC exam.

## 6.4.2 Medical Management

The following section describes some medical scenarios that may occur during the MEC examination and actions to be taken by the MEC physician. The section also provides guidance in determining the level of referral for an examinee.

### 6.4.2.1 Allergic Reactions

Examinees that experience allergic reactions will be treated according to the procedures adopted from Phil Lieberman, M.D., *Conn's Current Therapy*, 1981, which states: "the therapy of anaphylaxis and anaphylactic reactions is subdivided into those procedures which are to be performed immediately and those which require a more detailed evaluation of the patient prior to transfer to the institution." Procedures that should be instituted immediately are:

1. The administration of epinephrine is the most important single therapeutic measure. Epinephrine should be administered at the first appearance of symptoms. Early administration can prevent more serious manifestations. The route of administration should be intramuscular or subcutaneous. Intravenous administration should be avoided if possible, being reserved only for those rare instances in which there is loss of consciousness and obvious severe cardiovascular collapse.

The dose of intramuscular or subcutaneous epinephrine is 0.3 to 0.5ml of a 1:1000 concentration. Injections may be administered every 10 to 15 minutes until an effect is achieved or until tachycardia or other side effects supervene.

The aforementioned subcutaneous and intramuscular dose is for adults. Children should receive a dose of 0.01 ml per kg of 1:1000 epinephrine to a maximum of 0.3 ml.

2. The airway should be checked immediately. Laryngeal edema and angioedema of the tissue surrounding the airway is the most rapid cause of death.
3. The SP should be placed in a recumbent position and his or her feet elevated.
4. Nasal oxygen should be started.
5. Vital signs should be obtained and monitored every 10 to 15 minutes for the duration of the attack.

After the procedures noted above have been done, a more extensive evaluation can be performed. The injection of epinephrine may be sufficient to prevent further symptoms. If, however, the SP continues to have difficulty, other measures are instituted as deemed appropriate according to the patient's evaluation.

#### **6.4.2.2 First Aid for Choking**

Infants, children, and adults who are choking as a result of a foreign body obstruction should be treated according to the guidelines recommended in basic life support courses.

For adults and children older than 1 year, the Heimlich maneuver is the treatment of choice. A series of six to ten rapid, upward abdominal thrusts can be performed until the foreign body is expelled. If the obstruction is not relieved using the Heimlich maneuver, the victim's airway should be opened using the tongue-jaw lift. If the object can be visualized, it can be removed with a finger sweep. If the object cannot be visualized, blind finger sweeps can be attempted on adults. Blind finger sweeps can cause further airway obstruction and should never be done on children.

For choking infants, place the infant face down on the rescuer's forearm in a 60-degree head-down position with the head and neck stabilized. A series of back blows and chest thrusts should be performed until the airway obstruction is relieved.

For further information on treatment of choking victims, both conscious and unconscious, consult the First Aid Handbook.

#### **6.4.2.3 Seizures**

Examinees who experience a seizure while in the MEC should receive immediate attention from the physician. The following steps should be taken to secure the safety of the examinee:

- Step 1. Position the examinee on the ground.
- Step 2. Insert an oral airway if the jaw is relaxed (do not **force** any object into the mouth).
- Step 3. Remove glasses and loosen collar.

Step 4. Remove objects from vicinity of examinee to prevent injury.

Step 5. Monitor vital signs.

The MEC physician must use his or her clinical judgment based on the examinee's past medical history, the type and duration of the seizure, the cause of the seizure, and current seizure medication to determine whether or not the person needs emergency medical care or can be sent home. The MEC physician is also responsible for maintaining an airway, giving any indicated medications, and directing care of a seizing examinee until an ambulance arrives or the seizure is over.

#### 6.4.2.4 Hypoglycemia

Most conditions of hypoglycemia can be treated while the subject is conscious with the simple administration of juice and other first aid measures. If hypoglycemia is suspected in the case of an unconscious examinee, the following steps may be taken after emergency assistance is summoned:

Step 1. Recognition of hypoglycemia based on available history:

- Bizarre behavior and other clinical signs of possible glucose insufficiency should lead the physician to think of hypoglycemia. Hypoglycemia may develop in both diabetic and nondiabetic individuals.

Step 2. Basic life support:

- Immediate management includes positioning (supine), airway maintenance, oxygen administration, and monitoring of vital signs. The hypoglycemic examinee will not regain consciousness until the blood glucose level is elevated.

Step 3. Definitive management:

- An unconscious person with a prior history of diabetes mellitus is always presumed to be hypoglycemic unless other causes of unconsciousness are present. Definitive management of the unconscious diabetic usually entails the administration of a carbohydrate by the most effective route available. The most effective route is usually intravenous administration of 50 percent dextrose solution. The unconscious examinee must **never** be given anything by mouth, since this may add to the possibility of airway obstruction or pulmonary aspiration. In the absence of intravenous fluids, definitive management must await the arrival of local emergency assistance.

#### **6.4.2.5 Use of Oxygen**

When the oxygen tank is used in the MEC, the flow rate should be set between 3-6 liters/minute unless the person has Chronic Obstructive Pulmonary Disease (COPD). With the use of the nasal cannula, a flow range of 3-6 liters/minute produces a forced inspiratory oxygen of 40 to 50 percent.

If the SP has COPD, the flow rate should be set at 2 liters per minute. At this rate, there is little to no danger of interfering with the hypoxic-breathing stimulus present in COPD.

### **6.5 Emergency Procedures**

#### **6.5.1 Medical Emergencies Overview**

Before examinations begin at a stand, the MEC manager will have obtained information from the advance team about the types and availability of emergency medical services and oxygen suppliers in the area where the MEC is located. The MEC manager will also make the arrangements for the emergency medical service to tour the MEC prior to the start day of SP examinations. Emergency medical services can include those available at nearby hospitals, hospital ambulance services, and emergency services available from police and fire rescue squads as well as from other county or local rescue squads. The MEC manager will select the best services available from the standpoint of convenience to the MEC and availability of service and equipment. In some cases, it may be desirable to select two services. This information will be summarized on a fact sheet and posted by all the telephones in the MEC. The phone number “911” is to be used if applicable for the MEC location. However, the telephone numbers of the nearest police, fire, and rescue squads will also be posted. Execution of emergency procedures and the proper use of all emergency equipment will be the responsibility of the MEC physician. The primary response of the MEC physician should be to stabilize the examinee’s condition and to expedite a safe transfer to the nearest emergency medical treatment facility.

The MEC examinations are designed to be safe for examinees. To ensure maximal safety the physician must be able to handle the initial management of an examinee in distress.

The response of the physician is limited by a number of factors. There are no nurses, respiratory therapists, physician’s assistants, or other specialized staff that are necessary for a high level

emergency response. The MEC is not a diagnostic or treatment center, and the liability insurance obtained for Westat physicians does not cover any type of treatment procedure (except emergency stabilization). Within these restrictions, the appropriate response of the physician should be, as previously stated, to stabilize the examinee in distress and facilitate a safe and expedited transfer to the nearest medical facility.

The physician is responsible for directing the care of a patient in the event of an emergency. Staff members are responsible for the tasks assigned to them under the direction of the MEC manager and the physician.

The best overall approach to medical emergencies is prevention. The physician may be called upon to decide if some procedures should not be administered to certain examinees to avoid potential medical problems if the examinee does not fit easily into the preexisting medical exclusion categories for that procedure. The examining physician can at his or her discretion proscribe certain procedures such as cardiovascular fitness and other tests if he or she believes the test may endanger an examinee's health. The specific reasons for excluding the examinee should be recorded in the system in the comment drop-down list.

A first aid manual titled *The American Medical Association's Handbook of First Aid and Emergency Care 1990*, will be available as a reference review guide. Standard first aid approaches are to be followed for common problems such as faints, minor seizures, falls, and other minor injuries. The MEC physician will determine the level of treatment and referral based on the circumstances of each case. Caution should be exercised and there should be no hesitation to send an examinee to an emergency room when circumstances warrant.

The physician is to be notified immediately of any situation involving an examinee whose safety is of concern. Any questionable situation should be considered an emergency and evaluated by the physician. In addition to the equipment and supplies that are transported to the site at the time of the emergency, a list of the medications (prescription and nonprescription) that the examinee is currently taking will be available. The medication list may provide pertinent medical history information to the physician so that a more accurate assessment of the examinee can be made and the appropriate emergency treatment given. The medication list is the one obtained by the interviewer in the household questionnaire, and is available in the Physician's Exam ISIS application.

When ambulance personnel trained in emergency medical care arrive to transport an examinee in distress (Level I referral) the physician should make an assessment of whether he or she should accompany the examinee to the emergency room. The decision should be based on maximizing safety for the examinee. If the physician determines that he or she should accompany the examinee to the hospital, the MEC must be closed. The field office will contact the examinee’s family as soon as possible to inform them of the incident and the medical facility to which the examinee was taken. The physician may also contact the examinee’s designated primary health care providers as soon as possible to inform them of the occurrence and name of the medical facility to which the examinee was taken.

**6.5.1.2 Emergency Supplies and Equipment**

A limited number of emergency supplies will be located in the physician’s room. The supplies on hand will be an oxygen tank, nasal cannulas, a portable blood pressure kit, a stethoscope, an automated external defibrillator, a drug kit, and an ambu bag and pocket CPR mask. The drug kit contains the following items:

|                         |                       |               |              |
|-------------------------|-----------------------|---------------|--------------|
| Albuterol (17g)         | Metered dose canister | 90 mcg/puff   | Inhaled      |
| Ammonia                 | Ammonia Aspirol       | 0.3 ml        | Inhaled      |
| Epinephrin-adult        | EpiPen                | 0.3mg 1:1000  | IM injection |
| Epinephrin-peds         | EpiPen Jr.            | 0.15mg 1:2000 | IM injection |
| Glucose – tube          | Insta-Glucose 31 gm   | 1-2 tbsp      | Oral         |
| Nitroglycerin (25 tabs) | Nitrostat             | 0.4mg 1/150gr | Sublingual   |

Please note the drug kit does not contain antiarrhythmic medications or narcotics. Only the physician should administer emergency procedures and use the contents of the emergency supplies other than the stethoscope and blood pressure cuff.

### **6.5.1.3 MEC Standard Medical Emergency Protocol**

Due to the limited space in the MEC trailers, congregations of more than three or four people in one room are almost impossible. Subsequently, staff response to an emergency has been designed to limit the number of people needed to be together at one time. For example, a true cardiac or respiratory arrest requires only three people to be close to the patient for an extended period of time; two staff members to perform CPR and one physician. Two staff members will act as a runner and a recorder, but will be required to do so without hindering the performance of CPR or the physician's access to the patient. Once an ambulance arrives, the path to the victim must be clear to allow transfer to EMS staff. If possible, the closest emergency exit door should be opened for EMS personnel to transfer the patient to an ambulance. Other types of emergencies, such as a fall or a seizure, will require the presence of the physician and only one or two staff as requested by the physician and the MEC manager. There should be no spectators in the vicinity that may inhibit care of a patient.

### **6.5.1.4 Staff Roles in an Emergency**

#### **First Responder**

The first responder is the person who either discovers the victim or is with the victim at the time of the event. Do not leave the victim alone at any time. Call for another staff member to alert the coordinator and the physician of the situation immediately and initiate CPR if needed. The first person who responds to your call will be the runner for the event. If another staff member is immediately available, call for that person to assist you with CPR. If no one is available, continue one-person CPR until someone arrives to assist you. Once the physician arrives, explain briefly what happened and she or he will direct care of the patient while you and your partner continue CPR. The physician will also ensure that there is a designated recorder for the event. If the physician is the first person on the scene, she or he should call for help to alert the coordinator and MEC manager immediately and then initiate CPR if needed. The physician should continue one-person CPR until two other staff members arrive to take over CPR while the physician directs care of the patient. The MEC manager will confirm that all roles in the emergency response have been filled, and that all unneeded staff are clear of the area. If the coordinator has taken on a role in the emergency, the MEC manager will assign another staff member to take over for the coordinator. The coordinator will then return to the reception area to manage the SPs in the MEC. If

the MEC manager is not in the MEC at the time of the event, the chief health technologist should be notified to follow the MEC manager's emergency protocol responsibilities.

### **Coordinator**

The coordinator's responsibilities in the event of an emergency are as follows:

1. Activate the Emergency Medical Services (EMS) system by calling 911 or other emergency number posted at the coordinator station. Request an ambulance for a medical emergency and give the location of the MEC, which will be posted at the coordinator's station.
2. Notify the MEC manager of the emergency and provide any information you have regarding the need for staff assignments. If the MEC manager is not in the MEC at the time of the event, notify the chief health technologist who will then follow the MEC manager's emergency protocol responsibilities.
3. Retrieve any SPs left unattended in exam rooms while staff members are assisting with the emergency. Staff should remain in the exam rooms with the SPs if they are not called upon to assist in the emergency. All other SPs should remain in the reception area with the coordinator. If the event occurs in the reception area, SPs in the reception area should be escorted to other exam rooms.
4. Remain in the reception area with the SPs or designate another staff member to do so. Maintain calm and assure SPs the situation is under control.

### **MEC Manager**

The MEC manager's responsibilities in the event of an emergency are as follows:

1. Check that the following staff are on the scene: 1 runner, 1 recorder, 2 people performing CPR, and the physician.
2. Check that all other staff members are clear of the area.
3. Post the assistant coordinator or other available staff member outside the MEC to direct EMS to the site of the emergency.
4. If possible, open the emergency exit closest to the site of the emergency to facilitate transfer of the patient to EMS.

5. Contact the field office immediately after the SP has left the MEC to inform the field office manager of the emergency. The field office will notify the SP's family of the event if the SP came alone to the MEC.

If the MEC manager is not available at the time of the emergency, the chief health technologist will follow the protocol for the MEC manager's responsibilities.

### **Assistant Coordinator**

The assistant coordinator will be stationed outside the entrance to the MEC and will direct EMS into the MEC and to the site of the emergency. If an emergency exit door has been opened, the assistant coordinator will direct EMS to the emergency exit door to facilitate transfer of the victim. If the assistant coordinator is not available, another staff member can be designated to guide the EMS team.

### **MEC Physician**

The MEC physician is responsible for directing care of the SP until EMS arrives. Once the emergency equipment is on the scene, the physician should ensure that a staff member is recording events on the MEC Incident/Emergency Report form. The physician should not perform tasks such as CPR unless the physician is the first person on the scene. If the physician is the first responder, she or he should begin CPR until two other staff members arrive. The physician is also responsible for the operation of the automated external defibrillator and the administration of medications. The physician will follow the ACLS algorithm and emergency protocols as outlined in the physician manual. When ambulance personnel trained in emergency medical care arrive to transport a SP in distress (Level I referral) the physician should make an assessment of whether she or he should accompany the SP to the emergency room. The decision whether or not to provide an escort to the hospital should be based on maximizing safety for the SP. If the physician determines that she or he should accompany the SP to the hospital, the MEC must be closed. If possible, the physician should obtain consent from the SP or the SP's family to contact the SP's designated primary health care provider as soon as possible to report the occurrence and give the name of the medical facility to which the SP was taken.

## **Recorder**

Any staff member could be called upon to act as recorder for the event. The recorder will be responsible for documenting the time of the emergency and the sequence of events that follow the initiation of emergency care on the MEC Incident/Emergency Report form (Exhibit 6-3).<sup>\*</sup> The order of the events and time sequence are the critical elements in documentation. MEC Incident/Emergency Report forms will be kept in the physician's emergency kit and are available on ISIS by clicking on the ambulance icon in the Toolbox. Instructions for completing this form are found in Exhibit 6-4 of this manual.

## **Runner**

Generally, the first person to respond to the call for help will be the runner for the event. The runner's first responsibility is to notify the physician, the coordinator, and the MEC manager of the event. Once the appropriate people have been notified, the runner is responsible for retrieving supplies and equipment, and making phone calls as directed by staff at the scene.

Other staff members should remain clear of the site and assist in keeping order in the MEC unless asked to help. No SPs should be left alone in the MEC. If a staff member has a role in the emergency and is in the process of examining a SP, the SP will be returned to the reception area while the staff member is in the emergency. All other staff will remain in the exam rooms with SPs until the crisis has passed. The coordinator is responsible for managing SPs in the reception area. The MEC manager is responsible for managing the MEC staff. In the absence of the MEC manager, the chief technologist will manage the MEC staff response during the emergency.

### **6.5.1.5 The Physician's Role and AED Operation**

As explained previously, the MEC is not a diagnostic or treatment center, and the liability insurance obtained for Westat physicians does not cover any type of treatment procedure (except emergency stabilization). The primary response of the MEC physician should be to stabilize the

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<sup>\*</sup> All exhibits are located at the end of this chapter.

examinee's condition and to expedite a safe transfer to the nearest emergency medical treatment facility. MEC physicians are required to be BLS certified. The physician is the only person responsible for the operation of the automated external defibrillator (AED), and the administration of oxygen and medications (Exhibit 6-1). The AED can be placed on a patient for the purpose of monitoring a heart rhythm, but only one lead will be displayed. The physician is not expected to make a diagnosis based on the AED monitor. The AED should be used only for monitoring a heart rate, or when ventricular tachycardia or ventricular fibrillation is suspected or imminent. Any patient who is unconscious is a candidate for application of the AED. The AED will advise a shock only in the event of ventricular tachycardia or fibrillation. The AED does not have cardioversion capability, nor will the physician be able to deliver a shock if the AED does not advise a shock. As there are no antiarrhythmic medications in the emergency drug kit, the response to a cardiac emergency is basic life support with defibrillation if indicated.

#### **6.5.1.6 Documentation**

After the SP has left the MEC, the physician should make sure that the incident and outcome are documented in the automated system in the physician's ISIS application. The physician will also complete a full report on a separate form, the MEC Incident/Emergency Report form, described below. The recorder will also use this form to record events on the scene. The recorder's notes of the event will be especially important in the completion of the physician's report, and should be kept with the physician's documentation of the incident. The MEC manager should review the final report prepared by the physician and add any information not included in the physician's report. The MEC manager's addendum should include only information about the event that is not in the physician's report. Any discrepancies in reports should be brought to the attention of the Director of MEC Operations before being made final. Notification and documentation of the emergency incident should be directed to Catherine Novak, Director of MEC Operations, as soon as possible.

#### **6.5.1.7 MEC Incident/Emergency Report Form**

A hard copy form titled "MEC Incident/Emergency Report" will be utilized for recording the sequence of events or actions that are taken during the emergency response. An example of the form is shown in Exhibit 6-3. Guidelines for completion of the form are in Exhibit 6-4. During the emergency,

the recorder will use the form to record vitals, treatments, and some patient outcomes. The physician will then use the recorder's notes to complete a final official MEC Incident/Emergency Report form. The MEC manager will then review the final form with the physician and make any necessary additions.

The NHANES Emergency Protocol Checklist (Exhibit 6-2), and the MEC Incident/Emergency Report Form Documentation Guidelines (Exhibit 6-4) are located in the emergency kit in the physician's exam room. The NHANES Emergency Protocol Checklist is also located in the major hallways of the MEC.

## **6.6 Psychiatric/Behavioral Problem Procedures**

There are situations that may arise regarding SP behavior that will require special handling. They include:

- Previous psychological injuries, deterioration, and/or deprivation – Due to changes in mental status, the SP may seem confused or may actually have dementia.
- Inebriation due to intoxication with alcohol and/or drugs – The SP will be less able to grasp ideas, reason, problem-solve, calculate, and attend to the tasks at hand. Therefore, the potential for injury, trauma, and violence is present.
- Belligerence – This will include SPs with noncompliant or abusive behavior.
- Suicidal/Homicidal Ideation – If a SP expresses intent to harm him/herself or someone else, the SP should be referred to the physician. The physician will evaluate the SP and determine the need for a referral to a psychiatric facility.

If the SP is so demented, confused, intoxicated, or belligerent that it is impossible to continue the examination, the MEC manager should calmly terminate the MEC examination and have the examinee leave the center without delay. For those examinees who require assistance going home, have a family member escort them home or call a cab.

Suicidal and homicidal ideation are considered psychiatric emergencies and are generally handled by referral. Guidelines for handling SPs who express suicidal or homicidal intent are included in the physician's manual.

For any psychiatric emergency, an incident form should be completed, and the incident reported by telephone to the Director of MEC Operations as soon as possible.

## **6.7 Natural Disaster Procedures**

In the event of an unforeseeable occurrence (i.e., hurricane, tornado, fire, etc.), certain procedures should be followed depending on whether the event happens prior to or during an examination session.

### **6.7.1 Disaster Prior to an Examination Session (Predicted Event)**

- The stand coordinator should contact the home office for instructions regarding whether to cancel the session. If the session is canceled, the stand coordinator will then notify the MEC manager, who in turn will notify the MEC staff.
- If residents of mobile homes and trailers have been notified to evacuate, the stand coordinator should make the decision to cancel the session. She or he should then call the home office to report the occurrence and cancellation of the session and notify the MEC manager. The MEC manager should notify the MEC staff.
- The stand coordinator and MEC manager may place the staff on stand-by procedures, with instructions to be ready to work but accessible by phone at home awaiting orders from the MEC manager regarding status of operations.

### **6.7.2 Disaster During an Examination Session**

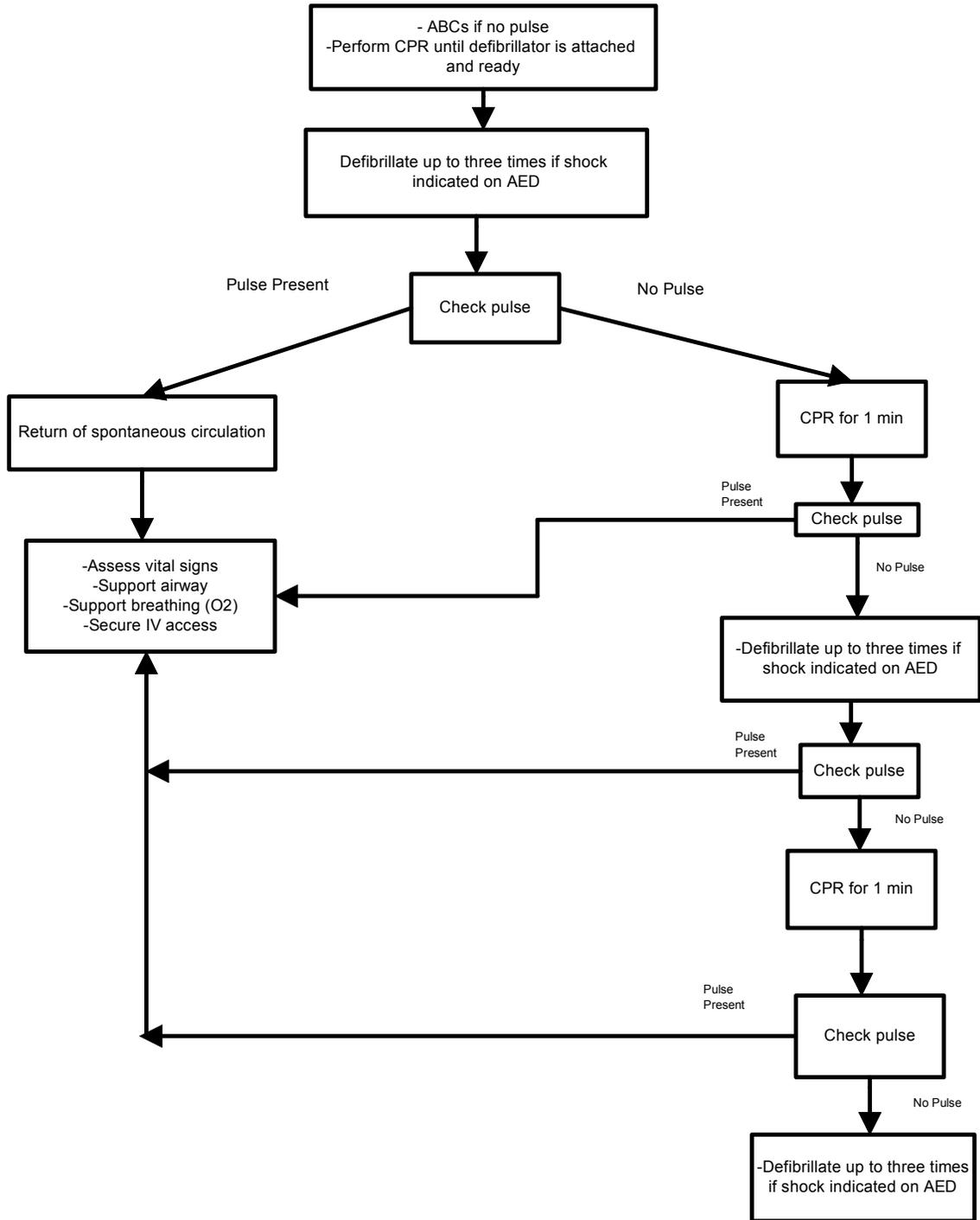
If an examination session is underway and SPs are in the MEC when the MEC manager or coordinator is notified by the field office of a pending natural event, the following procedures should be followed:

- The MEC manager and the physician should make a joint decision regarding closing the MEC and/or canceling the session. The first priority should be the safety of the SPs and staff.
- The MEC staff and SPs should evacuate the MEC as soon as possible and go directly to a safe haven, such as a building close by or the staff hotel. The staff and SPs should remain at this site until the impending event is over and it is safe to proceed outside.

- After the event, the MEC manager and the physician should decide whether or not to continue the exam session if the SPs are willing to stay for the rest of the session.
- If either the decision is made to cancel the session or the SPs decline to remain, the appointments for those SPs will need to be rescheduled by the field office.
- It is essential for the MEC manager to notify the stand coordinator of the outcome of events. The stand coordinator should then notify the home office immediately.
- Examiners who were conducting an exam or interview at the time evacuation of the MEC was ordered should interrupt the exam in the ISIS system. The reason for interruption of the exam must be accurately documented in ISIS and in room logs as soon as possible after the MEC is reopened.
- The MEC coordinator should be sure to document the reason for exam components omitted because of the closure of the MEC.

# Exhibit 6-1. AED Algorithm

Automated External Defibrillation (AED) Treatment Algorithm  
Emergency cardiac care pending arrival of EMS personnel



## **NHANES Emergency Protocol Checklist**

Call for help and initiate CPR if needed

Send runner to notify physician and coordinator of the emergency

### MEC Coordinator:

Activate EMS by calling 911 or other emergency number

Retrieve unattended SPs and return them to the reception area

Remain with SPs in reception area, and provide reassurance

### Physician:

Direct staff care of victim

Operate automated external defibrillator

Give medications

Determine if victim needs a physician escort to the hospital

### MEC manager:

Ensure adequate staff for emergency response

Open the emergency exit door closest to the scene

Post assistant coordinator or other staff member outside the MEC to greet ambulance personnel

Notify the field office of the event once the SP has left the MEC

### Runner:

Notify staff, obtain equipment and supplies as directed

### Recorder:

Record events on the MEC Emergency/Incident Report Form

### Assistant coordinator:

Direct ambulance personnel to emergency site

**Staff not requested to be involved in the emergency must stay away from the scene, remain in the exam rooms with SPs, and assist in maintaining order in the MEC.**

Exhibit 6-3. MEC Incident/Emergency Report form



**DEPARTMENT OF HEALTH & HUMAN SERVICES**

Public Health Service  
Centers for Disease Control and Prevention

National Center for Health Statistics  
6525 Belcrest Road  
Hyattsville, Maryland 20782

**MEC INCIDENT/EMERGENCY REPORT**

**Incident/Emergency**

Incident     Emergency

**Person Type**

SP     Tech     Other

**General Information**

|                 |           |                 |
|-----------------|-----------|-----------------|
| Physician Name: |           | Recorder Name:  |
| Emergency Date: |           | Runner Name(s): |
| Start Time:     | End Time: | Who Called 911: |
| Location:       |           | Who Found:      |
| Description:    |           |                 |

**Personal Information**

|            |             |              |         |
|------------|-------------|--------------|---------|
| Person ID: |             | Age:         | Gender: |
| Last Name: | First Name: | Middle Name: |         |

DEPARTMENT OF HEALTH & HUMAN SERVICES



**DEPARTMENT OF HEALTH & HUMAN SERVICES**

Public Health Service  
Centers for Disease Control and Prevention

National Center for Health Statistics  
6525 Belcrest Road  
Hyattsville, Maryland 20782

**Vitals**

| Time | Heart Rate | Systolic BP | Diastolic BP | Respiratory Rate | Comments |
|------|------------|-------------|--------------|------------------|----------|
|      |            |             |              |                  |          |
|      |            |             |              |                  |          |
|      |            |             |              |                  |          |
|      |            |             |              |                  |          |
|      |            |             |              |                  |          |
|      |            |             |              |                  |          |
|      |            |             |              |                  |          |
|      |            |             |              |                  |          |
|      |            |             |              |                  |          |
|      |            |             |              |                  |          |

**Treatment**

| Time | Medication/Equipment | Comment |
|------|----------------------|---------|
|      |                      |         |
|      |                      |         |
|      |                      |         |
|      |                      |         |
|      |                      |         |
|      |                      |         |
|      |                      |         |
|      |                      |         |
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|      |                      |         |



**DEPARTMENT OF HEALTH & HUMAN SERVICES**

Public Health Service  
Centers for Disease Control and Prevention

National Center for Health Statistics  
6525 Belcrest Road  
Hyattsville, Maryland 20782

**Symptoms**

Empty text box for recording symptoms.

**Observation**

Empty text box for recording observations.

**Assessment**

Empty text box for recording assessment.

**Plan**

Empty text box for recording the plan.



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National Center for Health Statistics  
6525 Belcrest Road  
Hyattsville, Maryland 20782

**Urgent Care**

|   |                |                           |
|---|----------------|---------------------------|
| <input type="checkbox"/> Transported to Hospital              | Hospital Name: |                           |
| Ambulance Arrival Time:                                       |                | Ambulance Departure Time: |
| Emergency Service Name:                                       |                |                           |
| <input type="checkbox"/> Physician Accompanied SP to Hospital |                |                           |

**Notification**

|  |                    |            |
|--|--------------------|------------|
| <input type="checkbox"/> Family Member Notified    | Name:              | Date/time: |
| Relation:  |                    |            |
| <input type="checkbox"/> Family Physician Notified | Family Phys Named: | Date/time: |

Signature: \_\_\_\_\_

Date: \_\_\_\_\_



#### Exhibit 6-4. MEC Incident/Emergency Form Documentation Guidelines

The Vitals and Treatment sections on page 2 should be completed first during the emergency. If the spaces on page 2 are insufficient, the last page should be used for recording vital signs. The 'comments' section of the last page can be used to record treatments. The remaining sections should be completed as soon as the emergency is over. The recorder should collect most of the information requested on page 1 before turning the notes over to the physician for compilation of the final report. The following information is to be documented:

##### Page 1:

- Check either Incident or Emergency, depending on the event. The difference is to be determined by the physician and the MEC manager;
- Check whether the person was a SP, a tech, or other (such as a guest or someone who has accompanied a SP to the exam);
- Names of the physician, runner, recorder, person who called 911, and person who found the victim;
- Date of the emergency response;
- Time that the emergency response started, beginning from the time the victim was found;
- Time that the emergency response ended, i.e., time the ambulance arrived or time the victim left the MEC;
- Location of the emergency in the MEC;
- Description of the victim upon discovery; and
- If the victim is a SP, escort, or guest, the sample number, age, gender, and first and last names should be recorded. If the victim is a staff member, the first and last names are sufficient.

##### Page 2:

- Vitals and Treatment sections to be recorded at the time of the event by the recorder.

##### Page 3:

- The sections Symptoms, Observation, Assessment, and Plan are to be completed by the physician after the event.

Exhibit 6-4. MEC Incident/Emergency Form Documentation Guidelines (continued)

Page 4:

- The section Urgent Care is to be completed by the physician if the SP is transported to a hospital;
- The section Notification will be completed by the MEC manager after notifying the field office of the emergency; and
- If the physician has obtained consent from the SP or the SP's family to contact the SP's care provider, the physician must record the name of the physician and the date and time the physician was notified of the SP's status.

## 7. DOCUMENTATION OF INCIDENTS AND EMERGENCIES

### 7.1 Incident Forms

If an incident occurs in the MEC, the physician is called to assess the SP. The physician completes an Incident Form as soon as possible after the incident has occurred. Blank Incident/Emergency Forms are kept in the emergency kit in the Physician Exam Room. Blank Incident/Emergency Forms may also be printed directly from the ISIS system using the following steps:

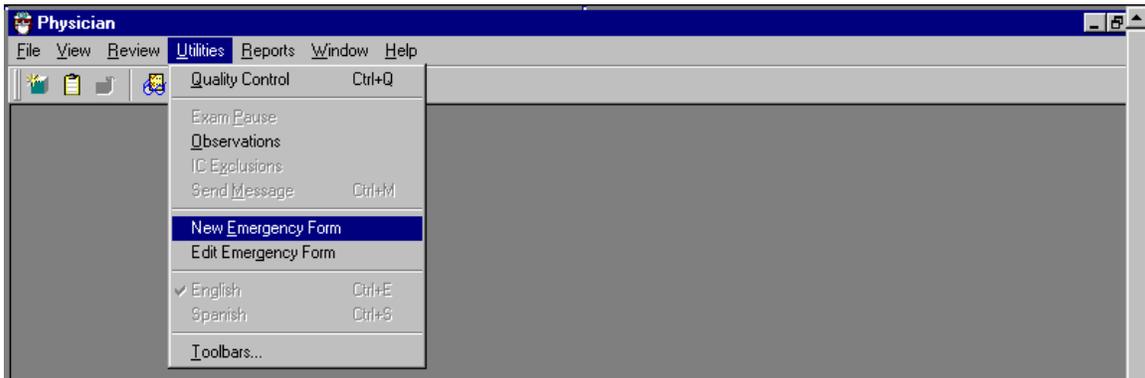
- At the Desktop, open Microsoft Word.
- Select “File.”
- Select “Open.”
- Go to the network drive.
- Select MEC STAFF “H.”
- Select “Blank Forms.”
- Select “Incident/Emergency Forms.”
- A blank form will be opened in “Read-only” mode.
- Select “Print” and click “OK” to print a hard copy of the blank form.

The blank form can be used to temporarily record the details of the incident if it is not convenient to enter the information directly into the system.

At a convenient time, the information is entered directly into the system.

See Exhibit 7-1 for the “Utilities” menu. Exhibit 7-2 is a blank Incident Form. Exhibit 7-3 shows an Incident Form with the vitals completed.

Exhibit 7-1. Utilities menu for Incident/Emergency Form



At the “Utilities” menu, select “New Emergency Form” and press “Enter.”

Exhibit 7-2. Incident Form – blank

A screenshot of the "Incident/Emergency Form" window. The window has a title bar "Incident/Emergency Form" and a close button. It contains several sections: "Incident/Emergency" with radio buttons for "Incident" (selected) and "Emergency"; "Person Type" with radio buttons for "SP" (selected), "Tech", and "Other"; a form area with fields for "Phys. ID:" (1221), "Recorder Name:" (dropdown), "Emergency Date:" (05/22/06), "Runner Name(s):" (dropdown), "Start Time:" (02:03 PM), "End Time:" (00:00 AM), "Who Called 911:" (dropdown), "Location:" (text), "Who Found:" (dropdown), and "Description:" (text area); "Personal Info" with fields for "Person ID:", "Age:", "Gender:", "Last name:", "First name:", and "Middle name:"; a tabbed interface with tabs for "Vitals", "Symptoms", "Observation", "Assessment", "Plan", "Misc.", "Treatment", "Urgent Care", and "Notification"; a table with columns "Time:", "Heart Rate:", "Systolic:", "Diastolic:", "Respiratory Rate:", and "Comments:"; and buttons for "Insert", "Delete", "Print", "Close", and "Save".

- Select “Incident” or “Emergency” as appropriate.
- Select the “Person Type.” The choices are “SP,” “Staff,” or “Other.” “Other” may include visitors or guests.

- The “Date” is automatically entered as the current date. If the incident occurred on an earlier date, the date entered should be the date the incident occurred. The date is a required field.
- The “Start Time” is automatically entered as the time the form was opened. If the incident occurred at an earlier time, the time entered should be the time the incident started. The start time is a required field.
- **NOTE:** “AM” is changed to “PM” by pressing “Shift-P” (press the Shift key and the P key) and “PM” is changed to “AM” by pressing “Shift A” (press the Shift key and the “A” key).
- The “End Time” is the time the incident was resolved. This is a required field.
- Enter the location where the incident occurred in the “Location” field.
- Enter a brief description of the incident in the “Description” field.
- Enter the SP’s (or staff) ID in the ID field and press the Tab key. The remainder of the “Personal Information” will be automatically entered.

Exhibit 7-3. Incident Form – vitals

The screenshot shows a software window titled "Incident/Emergency Form". It contains several sections:

- Incident/Emergency:** Radio buttons for "Incident" (selected) and "Emergency".
- Person Type:** Radio buttons for "SP" (selected), "Tech", and "Other".
- Phys. ID:** Text field containing "1221".
- Recorder Name:** Dropdown menu showing "Brown, Francesca K".
- Emergency Date:** Text field containing "05/22/06".
- Runner Name(s):** Dropdown menu showing "Brown, Francesca K".
- Start Time:** Text field containing "03:26 PM".
- End Time:** Text field containing "03:36 PM".
- Who Called 911:** Dropdown menu.
- Location:** Text field containing "Mec1".
- Who Found:** Dropdown menu.
- Description:** Text area containing "hghggihghgig".
- Personal Info:**
  - Person ID: 123456
  - Age: 22
  - Gender: Male
  - Last name: koon
  - First name: Jack
  - Middle name:

Below these fields is a tabbed interface with tabs for "Vitals", "Symptoms", "Observation", "Assessment", "Plan", "Misc.", "Treatment", "Urgent Care", and "Notification". The "Vitals" tab is active and contains a table with the following data:

| Time:    | Heart Rate: | Systolic: | Diastolic: | Respiratory Rate: | Comments:                                       |
|----------|-------------|-----------|------------|-------------------|---|
| 03:26 AM | 80          | 102       | 78         | 10                | conscious, orientated x3, no injuries           |
| 03:36 AM | 76          | 106       | 76         | 10                | alert, orientated, wants to continue with exams |

At the bottom of the window are buttons for "Print", "Close", "Save", "Insert", and "Delete".

- To add a line to enter “Vitals” information, right click (click the right button on the mouse) and select “Add” or “Insert.” This may also be used to delete a line.
- Enter the time the vital signs were taken and then enter the heart rate/minute, systolic and diastolic blood pressure, and respiratory rate/minute.
- Enter a comment to describe the SP’s condition at the time the vital signs were taken. Add additional lines as necessary.

Exhibit 7-4. Incident Form – observations

Click on the Symptoms, Observation, Assessment, Plan, or the miscellaneous (Misc.) tab to open the appropriate field. Information for each of the fields is entered as free text (Exhibit 7-4).

Exhibit 7-5. Incident Form – save

**Incident/Emergency Form**

**Incident/Emergency**  
 Incident  Emergency

**Person Type**  
 SP  Tech  Other

Phys. ID: 1221 Recorder Name: Brown, Francesca K  
 Emergency Date: 05/23/06 Runner Name(s): Brown, Francesca K  
 Start Time: 08:25 AM End Time: 10:00 AM Who Called 911:  
 Location: phlebotomy Who Found: Carolyn, Stevens  
 Description: fainted after blood draw

**Personal Info**  
 Person ID: 123456 Age: 39 Gender: Female  
 Last name: sommere First name: simone Middle name:

**Physician**  
 Do you want to close without save changes?  
 Yes No

| Time:    | Heart Rate: | Systolic: | Diastolic: | Respiratory Rate: | Comments:                                       |
|----------|-------------|-----------|------------|-------------------|---|
| 10:30 AM | 80          | 102       | 78         | 10                | conscious, orientated x3, no injuries           |
| 10:40 AM | 76          | 106       | 76         | 10                | alert, orientated, wants to continue with exams |

Print Close Save Insert Delete

- Select “File” and choose “Save” to close and save the form.
- If you close without saving, a message will be displayed “Do you want to save changes?” (See Exhibit 7-5.)
- Click “Yes” if you want to close and save the form or changes made to the form.
- Click “No” if you want to close without saving the form or changes made to the form.
- Click “Cancel” if you do not want to close the form at this time.

Exhibit 7-6. Incident Form – required fields

If you try to close the form without entering an “End Time,” a message will be displayed “Please enter a valid time.” (See Exhibit 7-6.) Click “OK” and enter the time the incident/emergency was completed.

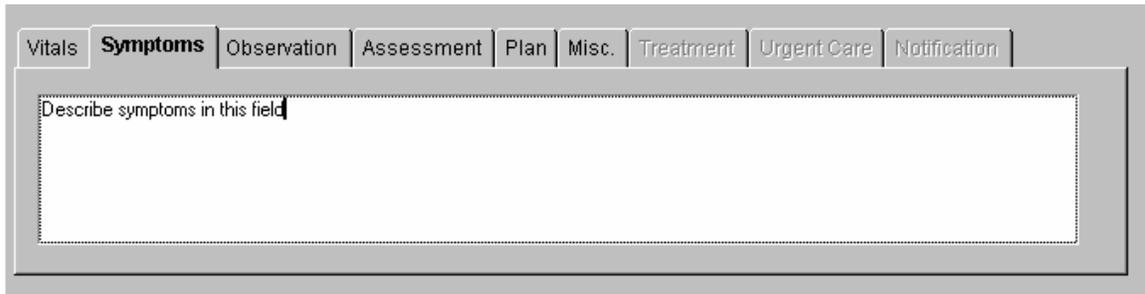
If you try to close the form and the “End Time” is not valid (end time must be later than start time), the above message will be displayed. Click “OK” and enter the correct time.

Exhibit 7-7. Incident Form tab marks – vitals

| Vitals   |             |           |            |                   |   |  |  |  |  |
|----------|-------------|-----------|------------|-------------------|---|--|--|--|--|
| Time:    | Heart Rate: | Systolic: | Diastolic: | Respiratory Rate: | Comments:                                       |  |  |  |  |
| 10:30 AM | 80          | 102       | 78         | 10                | conscious, orientated x3, no injuries           |  |  |  |  |
| 10:40 AM | 76          | 106       | 76         | 10                | alert, orientated, wants to continue with exams |  |  |  |  |

Exhibit 7-7 shows the tab for “Vitals” for both the Incident and Emergency Forms.

Exhibit 7-8. Incident Form – symptoms



The screenshot shows a web-based form interface with a horizontal tabbed menu at the top. The tabs are labeled: Vitals, **Symptoms**, Observation, Assessment, Plan, Misc., Treatment, Urgent Care, and Notification. The 'Symptoms' tab is highlighted with a dark background and white text. Below the tabs is a large, empty rectangular text area with a dotted border. The text 'Describe symptoms in this field' is positioned at the top left of this area.

Exhibit 7-8 shows the tab for “Symptoms” for both Incident and Emergency Forms.

Exhibit 7-9. Incident Form – observation



The screenshot shows the same web-based form interface as Exhibit 7-8, but with the 'Observation' tab selected and highlighted. The text area below the tabs is larger and includes a vertical scrollbar on the right side. The text 'Describe observations in this field' is at the top left of the text area.

Exhibit 7-9 shows the tab for “Observations” for both Incident and Emergency Forms.

Exhibit 7-10. Incident Form – assessment



The screenshot shows the same web-based form interface, but with the 'Assessment' tab selected and highlighted. The text area below the tabs is the same size as in Exhibit 7-9 and includes a vertical scrollbar on the right side. The text 'Describe assessment in this field' is at the top left of the text area.

Exhibit 7-10 shows the tab for “Assessment” for both Incident and Emergency Forms.

Exhibit 7-11. Incident Form – plan

|                             |          |             |            |             |       |           |             |              |
|-----------------------------|----------|-------------|------------|-------------|-------|-----------|-------------|--------------|
| Vitals                      | Symptoms | Observation | Assessment | <b>Plan</b> | Misc. | Treatment | Urgent Care | Notification |
| Describe plan in this field |          |             |            |             |       |           |             |              |

Exhibit 7-11 shows the tab for “Plan” for both Incident and Emergency Forms.

Exhibit 7-12. Incident Form – miscellaneous

|  |          |             |            |      |              |           |             |              |
|--|----------|-------------|------------|------|--------------|-----------|-------------|--------------|
| Vitals                                     | Symptoms | Observation | Assessment | Plan | <b>Misc.</b> | Treatment | Urgent Care | Notification |
| Use this field for miscellaneous comments. |          |             |            |      |              |           |             |              |

Exhibit 7-12 shows the tab for “Miscellaneous” for both Incident and Emergency Forms.



## 7.2 Emergency Forms

Exhibit 7-14. Emergency Form – blank

The screenshot shows a software window titled "Incident/Emergency Form". At the top, there are two sections: "Incident/Emergency" with radio buttons for "Incident" and "Emergency" (selected), and "Person Type" with radio buttons for "SP", "Tech", and "Other" (selected). Below these are several input fields: "Phys. ID:" (10), "Recorder Name:" (dropdown), "Emergency Date:" (02/14/1999), "Runner Name(s):" (dropdown), "Start Time:" (10:39 AM), "End Time:" (00:00 AM), "Who Called 911:" (dropdown), "Location:" (text), and "Who Found:" (dropdown). A "Description:" text area is also present. A "Personal Info" section contains fields for "Person ID:", "Age:", "Gender:", "Last name:", "First name:", and "Middle name:". Below this is a tabbed interface with tabs for "Vitals", "Symptoms", "Observation", "Assessment", "Plan", "Misc.", "Treatment", "Urgent Care", and "Notification". The "Vitals" tab is active, showing a table with columns for "Time:", "Heart Rate:", "Systolic:", "Diastolic:", "Respiratory Rate:", and "Comments:". The table is currently empty.

The data entry for the Emergency Form (Exhibit 7-14) is similar to data entry for the Incident Form.

- Select "Incident" or "Emergency" as appropriate.
- Select the "Person Type." The choices are "SP," "Staff," or "Other." "Other" may include visitors or guests.

The "Date" is automatically entered as the current date. If the incident occurred earlier, the date entered should be the date the incident occurred. The date is a required field.

The "Start Time" is automatically entered as the time the form was opened. If the incident occurred earlier, the time entered should be the time the incident started. The "Start Time" is a required field.

**NOTE:** "AM" is changed to "PM" by pressing "Shift-P" (press the Shift key and the P key) and "PM" is changed to "AM" by pressing "Shift A" (press the Shift key and the A key).

Exhibit 7-15. Emergency Form – data

**Incident/Emergency**  
 Incident  Emergency

**Person Type**  
 SP  Tech  Other

**Phys. ID:** 1221 Recorder Name: Brown, Francesca K  
 Emergency Date: 05/23/06 Runner Name(s): Brown, Francesca K Cheney, Jillian May  
 Start Time: 08:48 AM End Time: 00:00 AM Who Called 911: Carolyn, Stevens  
 Location: Bathroom, trailer 4 Who Found: DeCosta, Kelley N.  
 Description: found unconscious in bathroom

**Personal Info**  
 Person ID: 123456 Age: 16 Gender: Male  
 Last name: koon First name: rascal Middle name:

**Vitals** | Symptoms | Observation | Assessment | Plan | Misc. | Treatment | Urgent Care | Notification

| Time:    | Heart Rate: | Systolic: | Diastolic: | Respiratory Rate: | Comments:                                     |
|----------|-------------|-----------|------------|-------------------|---|
| 08:50 AM | 60          | 90        | 54         | 8                 | unconscious, shallow respirations, weak pulse |
| 09:00 AM | 62          | 96        | 68         | 10                | conscious, confused                           |

Insert Delete

Exhibit 7-15 shows a completed Emergency Form. The “End Time” is the time the incident was resolved. This is a required field.

- Enter the location where the incident occurred in the “Location” field.
- Enter a brief description of the incident in the “Description” field.
- Enter the SP’s (or staff) ID in the ID field and press the Tab key. The remainder of the “Personal Information” will be automatically entered.
- To add a line to enter “Vitals” information, right click (click the right button on the mouse) and select “Add” or “Insert.” This may also be used to delete a line.
- Enter the time the vital signs were taken and then enter the heart rate/minute, systolic and diastolic blood pressure, and respiratory rate/minute.
- Enter a comment to describe the SP’s condition at the time the vital signs were taken.
- Add more lines as necessary.

- Enter free text information in the Vitals, Symptoms, Observation, Assessment, Plan, and Miscellaneous fields.
- To add a line to enter “Treatment” information, right click (click the right button on the mouse) and select “Add” or “Insert.” This may also be used to delete a line.
- Enter the time the treatment was administered.
- Select the “Medication” administered or “Equipment” used by clicking on the arrow to pull down the menu with the list of medications.
- Highlight the appropriate medication.

The medications in the emergency kit are displayed in Exhibits 7-16 and 7-17.

Exhibit 7-16. Emergency Report Form – treatment 1

| Vitals   | Symptoms | Observation   | Assessment | Plan | Misc. | <b>Treatment</b> | Urgent Care | Notification |
|----------|----------|---|------------|------|-------|------------------|-------------|--------------|
| Time:    |          | Medication/Equipment:   |            |      |       | Comment:         |             |              |
| 12:10 AM |          | <div style="border: 1px solid black; padding: 5px;">           Glucose - tube 1-2 tbsp PO (Insta-Glucose 31 gm.)<br/>           Ringers Lactate - 1000 ml IV<br/>           Nitroglycerin - 0.4 mg 1/150gr SL (Nitrostat)<br/>           Oxygen - nasal canula<br/>           Oxygen - Mask<br/>           Defibrillator         </div> |            |      |       |                  |             |              |
|          |          |   |            |      |       | Insert           | Delete      |              |

Exhibit 7-17. Emergency Report Form – treatment 2

| Vitals   | Symptoms | Observation  | Assessment | Plan | Misc. | <b>Treatment</b> | Urgent Care | Notification |
|----------|----------|--|------------|------|-------|------------------|-------------|--------------|
| Time:    |          | Medication/Equipment:  |            |      |       | Comment:         |             |              |
| 12:10 AM |          | <div style="border: 1px solid black; padding: 5px;">           Albuterol - 90 mcg/puff - inhalation (metered dose canister)<br/>           Ammonia - 0.3 ml - inhalation (ammonia aspirol)<br/>           Dextrose - 5% 500 ml IV<br/>           Dextrose - adult - 50% 50 ml 500 mg/ml IV (prefilled)<br/>           Dextrose - child - 25% 10 ml 250 mg/ml IV (prefilled)<br/>           Epinehprin - adult - 0.3 mg 1:1000 - IM (EpiPen)         </div> |            |      |       |                  |             |              |
|          |          |  |            |      |       | Insert           | Delete      |              |

Additional medications or equipment in the pick list for Emergency Medications/Equipment.

Exhibit 7-18. Emergency Report Form – urgent care

Vitals | Symptoms | Observation | Assessment | Plan | Misc. | Treatment | **Urgent Care** | Notification

Transported to hospital Hospital Name:

Ambulance arrival time:  Ambulance departure time:

Emergency Service Name:

Physician accompanied SP to Hospital

- If the SP needs to be transported to a hospital or clinic, click on the “Urgent Care” tab (Exhibit 7-18).
- Check the box labeled “Transported to hospital.”
- Enter the name of the hospital in the “Hospital Name” field.
- Enter the arrival and departure time of the ambulance.
- Enter the name of the Emergency Service.
- Check the appropriate box if the physician accompanied the SP to the hospital.

Exhibit 7-19. Emergency Report Form – notification

', 'Relation: ', and 'Date/time: ', and 'Date/time: 

Vitals | Symptoms | Observation | Assessment | Plan | Misc. | Treatment | Urgent Care | **Notification**

Family Member Notified Name:  Date/time:

Relation:

Family Physician Notified Physician Name:  Date/time:

- Click on the “Notification” tab and enter information about notification of family member and/or physician (Exhibit 7-19).

### 7.2.1 Emergency Report Hard-Copy Form

An example of the hard-copy printout of the Emergency Report Form is displayed in Exhibits 7-20 and 7-21.

Exhibit 7-20. Emergency Report hard-copy form (page 1)

**Emergency Report for Thomas Jefferson**

02/14/1999

**General Information**

Person Type: SP Recorder Name: Braddock, Ivy  
 Emergency Date: 02/14/1999 Runner Name(s): Guerrero, Olga Pinkerton, Ronald  
 Start Time: 10:44 AM End Time: 11:30 AM Who Called 911: Trumbore, Steve  
 Location: Bathroom, trailer 4 Who Found: Maples, Sean  
 Description: found unconscious in bathroom,

**Personal Info**

Person ID: 705142 Age: 46 Gender: Male  
 Last name: Jefferson First name: Thomas Middle name:

**Symptoms**

**Vitals**

| Time     | Heart Rate | Systolic | Diastolic | Respiratory Rate | Comments                                      |
|----------|------------|----------|-----------|------------------|---|
| 10:45 AM | 52         |          |           | 8                | unconscious, shallow respirations, weak pulse |
| 10:50 AM | 58         | 96       | 68        | 10               | conscious , confused,                         |

**Observations**

Describe observations in this field.

**Assessment**

Describe assessment in this field.

**Plan**

Describe plan in this field.

**Miscellaneous**

Additional field for miscellaneous comments.

**Treatment**

| Time     | Medication/Equipment  | Comment |
|----------|-----------------------|---------|
| 10:45 AM | Oxygen - nasal canula |         |

Exhibit 7-21. Emergency Report hard-copy form (page 2)

| Emergency Report for Thomas Jefferson                         |                                    | 02/14/1999                   |
|---|------------------------------------|------------------------------|
| <b>Urgent Care</b>  |                                    |                              |
| <input type="checkbox"/> Transported to hospital              | Hospital Name:                     |                              |
| Ambulance arrival time: 00:00 AM                              | Ambulance departure time: 00:00 AM |                              |
| Emergency service name:                                       |                                    |                              |
| <input type="checkbox"/> Physician accompanied SP to Hospital |                                    |                              |
| <b>Notification</b>   |                                    |                              |
| <input checked="" type="checkbox"/> Family Member N           | Name: Mary                         | Date/time: 02/14/99 11:00 AM |
|   | Relation: wife                     |                              |
| <input checked="" type="checkbox"/> Family Physician Notified | Family Physician Name: Comstock    | Date/time: 02/14/99 11:30 AM |

## 8. PHYSICIAN EQUIPMENT QUALITY CONTROL

### 8.1 Equipment and Room Set Up Checks

The equipment, room supplies, and room set up need to be checked on a regular basis. Some checks are completed daily and others need only be completed on a weekly basis or at the beginning of each stand. These checks include calibration checks, maintenance inspection of equipment and supplies, and preparation of the room and equipment for the session exams.

Each time you log onto the application, the system will remind you to do Quality Control (QC) checks if the checks have not been completed for that time period. The checks are to be completed daily, weekly, and/or every stand. If you do not have time to do the checks when you logon, you can bypass this message and complete the checks at a later time. However, this message will be displayed each time you logon until you have completed the checks for that time period. After you have completed the checks and entered this in the system, the message box with the reminder will not be displayed again until the appropriate time period has passed.

The daily, weekly, and once-a-stand checks are listed in the following sections.

#### 8.1.1 Daily

Confirm the daily equipment checks for blood pressure measurement are complete.

- Check the shape of the meniscus (it should be rounded on the top).
- Check to see that the level of the mercury in the glass tube is zero.
- Check that the mercury rises easily in the tubing and does not bounce noticeably.
- Check for cracks in the glass manometer tube.
- Check that the cap at the top of the calibrated glass tube is secure.
- Check the pressure control valve for sticks or leaks. Use the following procedure to check for air leaks.
  - Connect the inflation system and wrap it around the calibration cylinder;
  - Inflate to 250 mm Hg;

- Open valve and deflate to 200 mm Hg and close valve; and
  - Wait for 10 seconds; if mercury column falls more than 10 mm Hg, there is an air leak in the system.
- Check the stethoscope for cracks.
  - Wipe both sides of the blood pressure cuff with disinfectant wipes. Cuffs will be wiped after each use during the exam.

### 8.1.2 Weekly

- Complete all daily checks.
- Check the functioning of all emergency equipment.

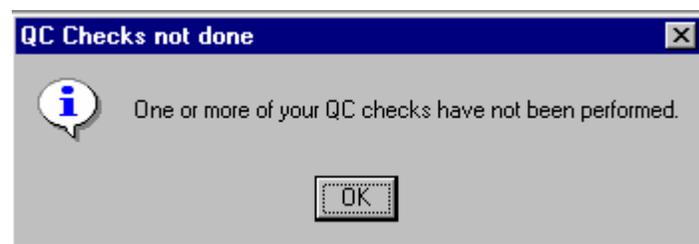
### 8.1.3 Stand

- Complete all daily checks.
- Complete all weekly checks.
- Remove bladders from BP cuff and wash the cuffs with soap and water. Allow the cuffs to dry completely.

## 8.2 Data Entry Screens for QC on Equipment

When you log onto the application (Exhibit 8-1) before the Quality Control checks are performed, the system displays a message: “One or more of your QC checks have not been performed.”

Exhibit 8-1. Quality Control reminder message box

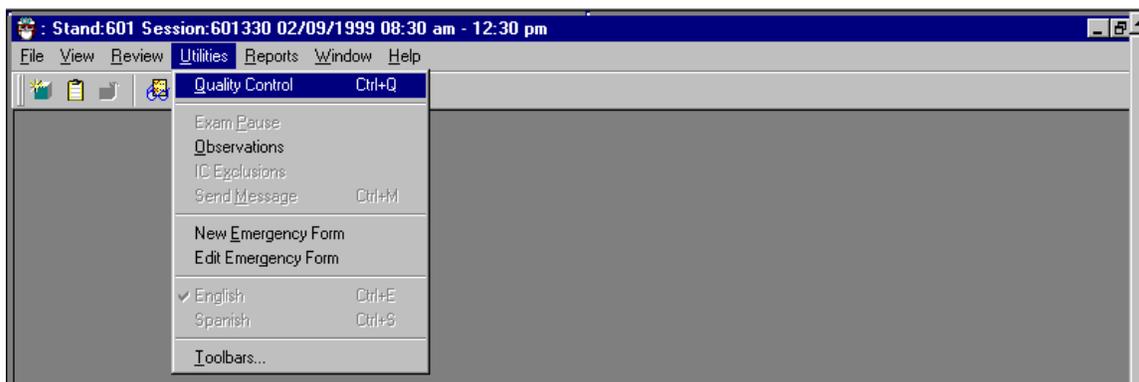


Click “OK” to this message.

When you want to complete the QC checks, select “Utilities,” then select Quality Control from the menu (Exhibit 8-2).

Clicking on the QC icon from the Toolbar can also access the QC screens.

Exhibit 8-2. Utilities menu to select Quality Control



When QC is selected from the Utilities menu, the User ID entry box (Exhibit 8-3) will be displayed.

Exhibit 8-3. Quality Control log-on



Each physician will have a personal ID. This ID will be used to identify the person who completed the QC checks for this time period.

Enter your User ID and click “OK.”

If you do not want to do the QC checks at this time, click “Cancel.”

On the QC screens, check “Done” for the listed items when that item has been completed (Exhibits 8-4 to 8-6).

Exhibit 8-4. Quality Control daily checks (1)

| QC Check   | Done                     | Result | Comment |
|--|--------------------------|--------|---------|
| Wipe both sides of BP cuffs with disinfectant wipes (wipe after each use)                | <input type="checkbox"/> |        |         |
| Check stethoscope diaphragm for cracks   | <input type="checkbox"/> |        |         |
| Check the pressure control valve for sticks or leaks                                     | <input type="checkbox"/> |        |         |
| Check the cuffs, pressure bulb, and manometer and stethoscope tubing for cracks or tears | <input type="checkbox"/> |        |         |

You are not required to enter anything in the “Result” or “Comment” fields unless there is a problem.

The “Result” field is used to enter values for selected QC items if required.

The “Comments” field is used to enter information about problems encountered with the QC item check.

Exhibit 8-5. Quality Control daily checks (2)

| QC Check   | Done                     | Result | Comment |
|--|--------------------------|--------|---------|
| Check stethoscope diaphragm for cracks   | <input type="checkbox"/> |        |         |
| Check the pressure control valve for sticks or leaks                                     | <input type="checkbox"/> |        |         |
| Check the cuffs, pressure bulb, and manometer and stethoscope tubing for cracks or tears | <input type="checkbox"/> |        |         |
| Check that the cap at the top of the calibrated glass tube is secure                     | <input type="checkbox"/> |        |         |

Buttons: OK, Cancel

Use the scroll bar to move to the next items on the list.

Exhibit 8-6. Quality Control daily checks (3)

| QC Check   | Done                                | Result        | Comment  |
|--|-------------------------------------|---------------|--|
| Check for cracks in the glass tube   | <input checked="" type="checkbox"/> |               |  |
| Check that the mercury rises easily in the tubing and does not bounce noticeably | <input checked="" type="checkbox"/> |               |  |
| Check the shape of the meniscus  | <input checked="" type="checkbox"/> |               |  |
| Check to see that the level of mercury in glass tube is zero                     | <input checked="" type="checkbox"/> | meniscus at 4 | Unable to adjust by turning on side. MEC Manager informed. |

Buttons: OK, Cancel

Use the scroll bar to move to the remaining items.

If there is a problem with one of the items, enter a value if appropriate and then enter a comment in the Comment box briefly describing the nature of the problem.

Report the problem to the MEC manager. Note in the Comments field that the MEC manager has been informed.

When you are finished with the daily item checks, click “OK” to close the QC box (Exhibit 8-7).

Exhibit 8-7. Quality Control weekly checks

| QC Check                                     | Done                     | Result | Comment |
|--|--------------------------|--------|---------|
| Complete daily checks                        | <input type="checkbox"/> |        |         |
| Check functioning of all emergency equipment | <input type="checkbox"/> |        |         |
| Complete inventory of emergency medications  | <input type="checkbox"/> |        |         |

Check “Done” for each item on the weekly checks when complete (Exhibit 8-8).

Exhibit 8-8. Quality Control stand checks

| QC Check   | Done                     | Result | Comment |
|--|--------------------------|--------|---------|
| Complete daily checks  | <input type="checkbox"/> |        |         |
| Complete weekly checks   | <input type="checkbox"/> |        |         |
| Remove all BP cuffs from bladder and wash cuffs with soap and water. | <input type="checkbox"/> |        |         |

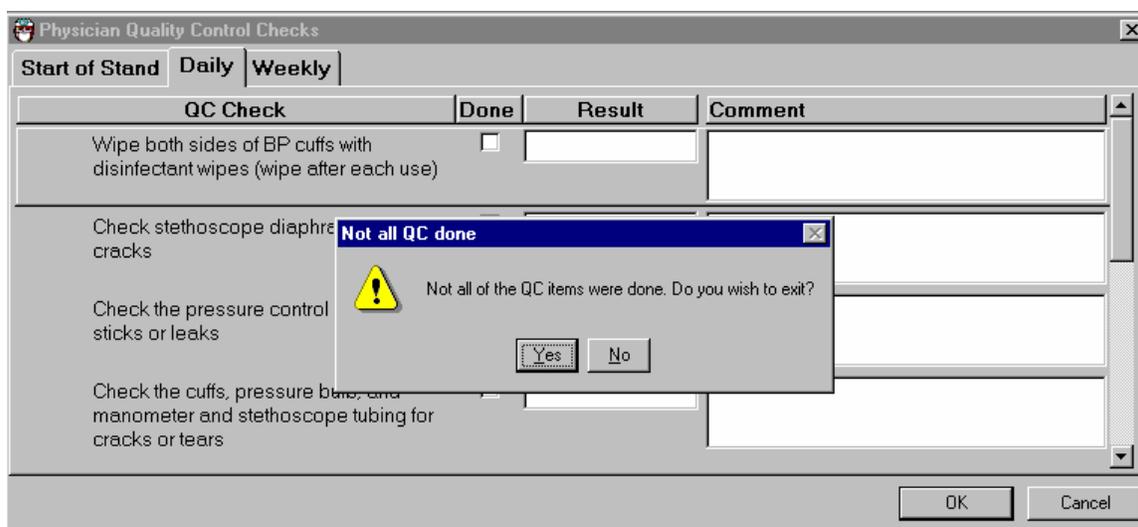
Complete all “Start of Stand” checks.

“Start of Stand” checks include all daily and weekly checks.

When you have completed all checks, click “OK” to close the QC box.

If you do not check that all items are complete (Exhibit 8-9), the system will display this message: “Not all the QC items were done. Do you wish to exit?”

Exhibit 8-9. Quality Control incomplete entry



If you want to complete the items before exiting, click “No” to this message and complete the items.

If you do not wish to exit without completing all the QC checks, click “Yes” to this message.

If all QC items were not complete, the system will remind you each time you logon that the QC checks are not complete.

## Appendix A

### Child Blood Pressure Values

**APPENDIX A. CHILD BLOOD PRESSURE VALUES**

**Girls – Age 6**

**Percentile of height = Less than 10%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <68               | 68 - 71 | 72 - 85 | ≥ 86 |
| < 104           | 1                 | 2       | 3       | 4    |
| 104 - 107       | 2                 | 2       | 3       | 4    |
| 108 - 120       | 3                 | 3       | 3       | 4    |
| ≥ 121           | 4                 | 4       | 4       | 4    |

**Percentile of height = 10 - 24%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <68               | 68 - 71 | 72 - 85 | ≥ 86 |
| < 105           | 1                 | 2       | 3       | 4    |
| 105 - 108       | 2                 | 2       | 3       | 4    |
| 109 - 121       | 3                 | 3       | 3       | 4    |
| ≥ 122           | 4                 | 4       | 4       | 4    |

**Percentile of height = 25 - 49%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <69               | 69 - 72 | 73 - 85 | ≥ 86 |
| < 106           | 1                 | 2       | 3       | 4    |
| 106 - 109       | 2                 | 2       | 3       | 4    |
| 110 - 122       | 3                 | 3       | 3       | 4    |
| ≥ 123           | 4                 | 4       | 4       | 4    |

**Percentile of height = 50 - 74%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <70               | 70 - 73 | 74 - 86 | ≥ 87 |
| < 108           | 1                 | 2       | 3       | 4    |
| 108 - 110       | 2                 | 2       | 3       | 4    |
| 111 - 124       | 3                 | 3       | 3       | 4    |
| ≥ 125           | 4                 | 4       | 4       | 4    |

**Child Blood Pressure Values  
Girls - Age 6 (continued)**

**Percentile of height = 75 - 89%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <70               | 70 - 73 | 74 - 87 | ≥ 88 |
| < 109           | 1                 | 2       | 3       | 4    |
| 109 - 112       | 2                 | 2       | 3       | 4    |
| 113 - 125       | 3                 | 3       | 3       | 4    |
| ≥ 126           | 4                 | 4       | 4       | 4    |

**Percentile of height = 90 - 94%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <71               | 71 - 74 | 75 - 88 | ≥ 89 |
| < 110           | 1                 | 2       | 3       | 4    |
| 110 - 113       | 2                 | 2       | 3       | 4    |
| 114 - 126       | 3                 | 3       | 3       | 4    |
| ≥ 127           | 4                 | 4       | 4       | 4    |

**Percentile of height = 95% and higher**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <72               | 72 - 75 | 76 - 88 | ≥ 89 |
| < 111           | 1                 | 2       | 3       | 4    |
| 111 - 114       | 2                 | 2       | 3       | 4    |
| 115 - 127       | 3                 | 3       | 3       | 4    |
| ≥ 128           | 4                 | 4       | 4       | 4    |

**Child Blood Pressure Values  
Girls - Age 7**

**Percentile of height = Less than 10%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <69               | 69 - 72 | 73 - 86 | ≥ 87 |
| < 106           | 1                 | 2       | 3       | 4    |
| 106 - 109       | 2                 | 2       | 3       | 4    |
| 110 - 122       | 3                 | 3       | 3       | 4    |
| ≥ 123           | 4                 | 4       | 4       | 4    |

**Percentile of height = 10 - 24%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <70               | 70 - 73 | 74 - 86 | ≥ 87 |
| < 107           | 1                 | 2       | 3       | 4    |
| 107 - 110       | 2                 | 2       | 3       | 4    |
| 111 - 123       | 3                 | 3       | 3       | 4    |
| ≥ 124           | 4                 | 4       | 4       | 4    |

**Percentile of height = 25 - 49%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <70               | 70 - 73 | 73 - 87 | ≥ 88 |
| < 108           | 1                 | 2       | 3       | 4    |
| 108 - 111       | 2                 | 2       | 3       | 4    |
| 112 - 124       | 3                 | 3       | 3       | 4    |
| ≥ 125           | 4                 | 4       | 4       | 4    |

**Percentile of height = 50 - 74%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <71               | 71 - 74 | 75 - 87 | ≥ 88 |
| < 109           | 1                 | 2       | 3       | 4    |
| 109 - 112       | 2                 | 2       | 3       | 4    |
| 113 - 125       | 3                 | 3       | 3       | 4    |
| ≥ 126           | 4                 | 4       | 4       | 4    |

**Child Blood Pressure Values  
Girls - Age 7 (continued)**

**Percentile of height = 75 - 89%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <72               | 72 - 75 | 76 - 88 | ≥ 89 |
| < 111           | 1                 | 2       | 3       | 4    |
| 111 - 114       | 2                 | 2       | 3       | 4    |
| 115 - 127       | 3                 | 3       | 3       | 4    |
| ≥ 128           | 4                 | 4       | 4       | 4    |

**Percentile of height = 90 - 94%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <72               | 72 - 75 | 76 - 89 | ≥ 90 |
| < 112           | 1                 | 2       | 3       | 4    |
| 112 - 115       | 2                 | 2       | 3       | 4    |
| 116 - 128       | 3                 | 3       | 3       | 4    |
| ≥ 129           | 4                 | 4       | 4       | 4    |

**Percentile of height = 95% and higher**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <73               | 73 - 76 | 77 - 89 | ≥ 90 |
| < 113           | 1                 | 2       | 3       | 4    |
| 113 - 115       | 2                 | 2       | 3       | 4    |
| 116 - 129       | 3                 | 3       | 3       | 4    |
| ≥ 130           | 4                 | 4       | 4       | 4    |

**Child Blood Pressure Values  
Girls - Age 8**

**Percentile of height = Less than 10%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <71               | 71 - 74 | 75 - 87 | ≥ 88 |
| < 108           | 1                 | 2       | 3       | 4    |
| 108 - 111       | 2                 | 2       | 3       | 4    |
| 112 - 124       | 3                 | 3       | 3       | 4    |
| ≥ 125           | 4                 | 4       | 4       | 4    |

**Percentile of height = 10 - 24%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <71               | 71 - 74 | 75 - 87 | ≥ 88 |
| < 109           | 1                 | 2       | 3       | 4    |
| 109 - 111       | 2                 | 2       | 3       | 4    |
| 112 - 125       | 3                 | 3       | 3       | 4    |
| ≥ 126           | 4                 | 4       | 4       | 4    |

**Percentile of height = 25 - 49%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <71               | 71 - 74 | 75 - 88 | ≥ 89 |
| < 110           | 1                 | 2       | 3       | 4    |
| 110 - 113       | 2                 | 2       | 3       | 4    |
| 114 - 126       | 3                 | 3       | 3       | 4    |
| ≥ 127           | 4                 | 4       | 4       | 4    |

**Percentile of height = 50 - 74%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <72               | 72 - 75 | 76 - 88 | ≥ 89 |
| < 111           | 1                 | 2       | 3       | 4    |
| 111 - 114       | 2                 | 2       | 3       | 4    |
| 115 - 127       | 3                 | 3       | 3       | 4    |
| ≥ 128           | 4                 | 4       | 4       | 4    |

**Child Blood Pressure Values  
Girls - Age 8 (continued)**

**Percentile of height = 75 - 89%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <73               | 73 - 76 | 77 - 89 | ≥ 90 |
| < 113           | 1                 | 2       | 3       | 4    |
| 113 - 115       | 2                 | 2       | 3       | 4    |
| 116 - 128       | 3                 | 3       | 3       | 4    |
| ≥ 129           | 4                 | 4       | 4       | 4    |

**Percentile of height = 90 - 94%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <74               | 74 - 77 | 78 - 90 | ≥ 91 |
| < 114           | 1                 | 2       | 3       | 4    |
| 114 - 117       | 2                 | 2       | 3       | 4    |
| 118 - 130       | 3                 | 3       | 3       | 4    |
| ≥ 131           | 4                 | 4       | 4       | 4    |

**Percentile of height = 95% and higher**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <74               | 74 - 77 | 78 - 91 | ≥ 92 |
| < 114           | 1                 | 2       | 3       | 4    |
| 114 - 117       | 2                 | 2       | 3       | 4    |
| 118 - 130       | 3                 | 3       | 3       | 4    |
| ≥ 131           | 4                 | 4       | 4       | 4    |

**Child Blood Pressure Values  
Girls - Age 9**

**Percentile of height = Less than 10%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <72               | 72 - 75 | 76 - 88 | ≥ 89 |
| < 110           | 1                 | 2       | 3       | 4    |
| 110 - 113       | 2                 | 2       | 3       | 4    |
| 114 - 126       | 3                 | 3       | 3       | 4    |
| ≥ 127           | 4                 | 4       | 4       | 4    |

**Percentile of height = 10 - 24%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |     |
|-----------------|-------------------|---------|---------|-----|
|                 | <72               | 72 - 75 | 76 - 88 | <89 |
| < 110           | 1                 | 2       | 3       | 4   |
| 110 - 113       | 2                 | 2       | 3       | 4   |
| 114 - 126       | 3                 | 3       | 3       | 4   |
| ≥ 127           | 4                 | 4       | 4       | 4   |

**Percentile of height = 25 - 49%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <72               | 72 - 75 | 76 - 89 | ≥ 90 |
| < 112           | 1                 | 2       | 3       | 4    |
| 112 - 114       | 2                 | 2       | 3       | 4    |
| 115 - 128       | 3                 | 3       | 3       | 4    |
| ≥ 129           | 4                 | 4       | 4       | 4    |

**Percentile of height = 50 - 74%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <73               | 73 - 76 | 77 - 89 | ≥ 90 |
| < 113           | 1                 | 2       | 3       | 4    |
| 113 - 116       | 2                 | 2       | 3       | 4    |
| 117 - 129       | 3                 | 3       | 3       | 4    |
| ≥ 130           | 4                 | 4       | 4       | 4    |

**Child Blood Pressure Values  
Girls - Age 9 (continued)**

**Percentile of height = 75 - 89%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <74               | 74 - 77 | 78 - 90 | ≥ 91 |
| < 114           | 1                 | 2       | 3       | 4    |
| 114 - 117       | 2                 | 2       | 3       | 4    |
| 118 - 130       | 3                 | 3       | 3       | 4    |
| ≥ 131           | 4                 | 4       | 4       | 4    |

**Percentile of height = 90 - 94%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <75               | 75 - 78 | 79 - 91 | ≥ 92 |
| < 116           | 1                 | 2       | 3       | 4    |
| 116 - 118       | 2                 | 2       | 3       | 4    |
| 119 - 132       | 3                 | 3       | 3       | 4    |
| ≥ 133           | 4                 | 4       | 4       | 4    |

**Percentile of height = 95% and higher**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <75               | 75 - 78 | 79 - 92 | ≥ 93 |
| < 116           | 1                 | 2       | 3       | 4    |
| 116 - 119       | 2                 | 2       | 3       | 4    |
| 120 - 132       | 3                 | 3       | 3       | 4    |
| ≥ 133           | 4                 | 4       | 4       | 4    |

**Child Blood Pressure Values  
Girls - Age 10**

**Percentile of height = Less than 10%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |     |
|-----------------|-------------------|---------|---------|-----|
|                 | <73               | 73 - 76 | 77 - 89 | ≥90 |
| < 112           | 1                 | 2       | 3       | 4   |
| 112 - 115       | 2                 | 2       | 3       | 4   |
| 116 - 128       | 3                 | 3       | 3       | 4   |
| ≥ 129           | 4                 | 4       | 4       | 4   |

**Percentile of height = 10 - 24%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |     |
|-----------------|-------------------|---------|---------|-----|
|                 | <73               | 73 - 76 | 77 - 89 | ≥90 |
| < 112           | 1                 | 2       | 3       | 4   |
| 112 - 115       | 2                 | 2       | 3       | 4   |
| 116 - 128       | 3                 | 3       | 3       | 4   |
| ≥ 129           | 4                 | 4       | 4       | 4   |

**Percentile of height = 25 - 49%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |     |
|-----------------|-------------------|---------|---------|-----|
|                 | <73               | 73 - 76 | 77 - 90 | ≥91 |
| < 114           | 1                 | 2       | 3       | 4   |
| 114 - 116       | 2                 | 2       | 3       | 4   |
| 117 - 130       | 3                 | 3       | 3       | 4   |
| ≥ 131           | 4                 | 4       | 4       | 4   |

**Percentile of height = 50 - 74%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <74               | 74 - 77 | 78 - 91 | ≥ 92 |
| < 115           | 1                 | 2       | 3       | 4    |
| 115 - 118       | 2                 | 2       | 3       | 4    |
| 119 - 131       | 3                 | 3       | 3       | 4    |
| ≥ 132           | 4                 | 4       | 4       | 4    |

**Child Blood Pressure Values  
Girls - Age 10 (continued)**

**Percentile of height = 75 - 89%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <75               | 75 - 78 | 79 - 91 | ≥ 92 |
| < 116           | 1                 | 2       | 3       | 4    |
| 116 - 119       | 2                 | 2       | 3       | 4    |
| 120 - 132       | 3                 | 3       | 3       | 4    |
| ≥ 133           | 4                 | 4       | 4       | 4    |

**Percentile of height = 90 - 94%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <76               | 76 - 79 | 80 - 92 | ≥ 93 |
| < 118           | 1                 | 2       | 3       | 4    |
| 118 - 120       | 2                 | 2       | 3       | 4    |
| 121 - 134       | 3                 | 3       | 3       | 4    |
| ≥ 135           | 4                 | 4       | 4       | 4    |

**Percentile of height = 95% and higher**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <76               | 76 - 79 | 80 - 93 | ≥ 94 |
| < 118           | 1                 | 2       | 3       | 4    |
| 118 - 121       | 2                 | 2       | 3       | 4    |
| 122 - 134       | 3                 | 3       | 3       | 4    |
| ≥ 135           | 4                 | 4       | 4       | 4    |

**Child Blood Pressure Values  
Girls - Age 11**

**Percentile of height = Less than 10%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <74               | 74 - 77 | 78 - 90 | ≥ 91 |
| < 114           | 1                 | 2       | 3       | 4    |
| 114 - 117       | 2                 | 2       | 3       | 4    |
| 118 - 130       | 3                 | 3       | 3       | 4    |
| ≥ 131           | 4                 | 4       | 4       | 4    |

**Percentile of height = 10 - 24%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <74               | 74 - 77 | 78 - 90 | ≥ 91 |
| < 114           | 1                 | 2       | 3       | 4    |
| 114 - 117       | 2                 | 2       | 3       | 4    |
| 118 - 130       | 3                 | 3       | 3       | 4    |
| ≥ 131           | 4                 | 4       | 4       | 4    |

**Percentile of height = 25 - 49%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <74               | 74 - 77 | 78 - 91 | ≥ 92 |
| < 116           | 1                 | 2       | 3       | 4    |
| 116 - 118       | 2                 | 2       | 3       | 4    |
| 119 - 131       | 3                 | 3       | 3       | 4    |
| ≥ 132           | 4                 | 4       | 4       | 4    |

**Percentile of height = 50 - 74%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <75               | 75 - 78 | 79 - 92 | ≥ 93 |
| < 117           | 1                 | 2       | 3       | 4    |
| 117 - 120       | 2                 | 2       | 3       | 4    |
| 121 - 133       | 3                 | 3       | 3       | 4    |
| ≥ 134           | 4                 | 4       | 4       | 4    |

**Child Blood Pressure Values  
Girls - Age 11 (continued)**

**Percentile of height = 75 - 89%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <76               | 76 - 79 | 80 - 92 | ≥ 93 |
| < 118           | 1                 | 2       | 3       | 4    |
| 118 - 121       | 2                 | 2       | 3       | 4    |
| 122 - 134       | 3                 | 3       | 3       | 4    |
| ≥ 135           | 4                 | 4       | 4       | 4    |

**Percentile of height = 90 - 94%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <77               | 77 - 80 | 81 - 93 | ≥ 94 |
| < 119           | 1                 | 2       | 3       | 4    |
| 119 - 122       | 2                 | 2       | 3       | 4    |
| 123 - 135       | 3                 | 3       | 3       | 4    |
| ≥ 136           | 4                 | 4       | 4       | 4    |

**Percentile of height = 95% and higher**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <77               | 77 - 80 | 81 - 94 | ≥ 95 |
| < 120           | 1                 | 2       | 3       | 4    |
| 120 - 123       | 2                 | 2       | 3       | 4    |
| 124 - 136       | 3                 | 3       | 3       | 4    |
| ≥ 137           | 4                 | 4       | 4       | 4    |

**Child Blood Pressure Values  
Girls - Age 12**

**Percentile of height = Less than 10%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <75               | 75 - 78 | 79 - 91 | ≥ 92 |
| < 116           | 1                 | 2       | 3       | 4    |
| 116 - 118       | 2                 | 2       | 3       | 4    |
| 119 - 132       | 3                 | 3       | 3       | 4    |
| ≥ 133           | 4                 | 4       | 4       | 4    |

**Percentile of height = 10 - 24%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <75               | 75 - 78 | 79 - 91 | ≥ 92 |
| < 116           | 1                 | 2       | 3       | 4    |
| 116 - 119       | 2                 | 2       | 3       | 4    |
| 120 - 132       | 3                 | 3       | 3       | 4    |
| ≥ 133           | 4                 | 4       | 4       | 4    |

**Percentile of height = 25 - 49%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <75               | 75 - 78 | 79 - 92 | ≥ 93 |
| < 117           | 1                 | 2       | 3       | 4    |
| 117 - 120       | 2                 | 2       | 3       | 4    |
| 121 - 133       | 3                 | 3       | 3       | 4    |
| ≥ 134           | 4                 | 4       | 4       | 4    |

**Percentile of height = 50 - 74%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |     |
|-----------------|-------------------|---------|---------|-----|
|                 | <76               | 76 - 79 | 80 - 93 | ≥94 |
| < 119           | 1                 | 2       | 3       | 4   |
| 119 - 122       | 2                 | 2       | 3       | 4   |
| 123 - 135       | 3                 | 3       | 3       | 4   |
| ≥ 136           | 4                 | 4       | 4       | 4   |

**Child Blood Pressure Values  
Girls - Age 12 (continued)**

**Percentile of height = 75 - 89%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <77               | 77 - 80 | 81 - 93 | ≥ 94 |
| < 120           | 1                 | 2       | 3       | 4    |
| 120 - 123       | 2                 | 2       | 3       | 4    |
| 124 - 136       | 3                 | 3       | 3       | 4    |
| ≥ 137           | 4                 | 4       | 4       | 4    |

**Percentile of height = 90 - 94%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <78               | 78 - 81 | 82 - 94 | ≥ 95 |
| < 120           | 1                 | 2       | 3       | 4    |
| 120 - 124       | 2                 | 2       | 3       | 4    |
| 125 - 137       | 3                 | 3       | 3       | 4    |
| ≥ 138           | 4                 | 4       | 4       | 4    |

**Percentile of height = 95% and higher**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <78               | 78 - 81 | 82 - 95 | ≥ 96 |
| < 120           | 1                 | 2       | 3       | 4    |
| 120 - 125       | 2                 | 2       | 3       | 4    |
| 126 - 138       | 3                 | 3       | 3       | 4    |
| ≥ 139           | 4                 | 4       | 4       | 4    |

**Child Blood Pressure Values  
Girls - Age 13**

**Percentile of height = Less than 10%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <76               | 76 - 79 | 80 - 92 | ≥ 93 |
| < 117           | 1                 | 2       | 3       | 4    |
| 117 - 120       | 2                 | 2       | 3       | 4    |
| 121 - 133       | 3                 | 3       | 3       | 4    |
| ≥ 134           | 4                 | 4       | 4       | 4    |

**Percentile of height = 10 - 24%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <76               | 76 - 79 | 80 - 92 | ≥ 93 |
| < 118           | 1                 | 2       | 3       | 4    |
| 118 - 121       | 2                 | 2       | 3       | 4    |
| 122 - 134       | 3                 | 3       | 3       | 4    |
| ≥ 135           | 4                 | 4       | 4       | 4    |

**Percentile of height = 25 - 49%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <76               | 76 - 79 | 80 - 93 | ≥ 94 |
| < 119           | 1                 | 2       | 3       | 4    |
| 119 - 122       | 2                 | 2       | 3       | 4    |
| 123 - 135       | 3                 | 3       | 3       | 4    |
| ≥ 136           | 4                 | 4       | 4       | 4    |

**Percentile of height = 50 - 74%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <77               | 77 - 80 | 81 - 94 | ≥ 95 |
| < 120           | 1                 | 2       | 3       | 4    |
| 120 - 123       | 2                 | 2       | 3       | 4    |
| 124 - 137       | 3                 | 3       | 3       | 4    |
| ≥ 138           | 4                 | 4       | 4       | 4    |

**Child Blood Pressure Values  
Girls - Age 13 (continued)**

**Percentile of height = 75 - 89%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <78               | 78 - 81 | 82 - 94 | ≥ 95 |
| < 120           | 1                 | 2       | 3       | 4    |
| 120 - 125       | 2                 | 2       | 3       | 4    |
| 126 - 138       | 3                 | 3       | 3       | 4    |
| ≥ 139           | 4                 | 4       | 4       | 4    |

**Percentile of height = 90 - 94%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <79               | 79 - 82 | 83 - 95 | ≥ 96 |
| < 120           | 1                 | 2       | 3       | 4    |
| 120 - 126       | 2                 | 2       | 3       | 4    |
| 127 - 139       | 3                 | 3       | 3       | 4    |
| ≥ 140           | 4                 | 4       | 4       | 4    |

**Percentile of height = 95% and higher**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <79               | 79 - 82 | 83 - 96 | ≥ 97 |
| < 120           | 1                 | 2       | 3       | 4    |
| 120 - 127       | 2                 | 2       | 3       | 4    |
| 128 - 140       | 3                 | 3       | 3       | 4    |
| ≥ 141           | 4                 | 4       | 4       | 4    |

**Child Blood Pressure Values  
Girls - Age 14**

**Percentile of height = Less than 10%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <77               | 77 - 80 | 81 - 93 | ≥ 94 |
| < 119           | 1                 | 2       | 3       | 4    |
| 119 - 122       | 2                 | 2       | 3       | 4    |
| 123 - 135       | 3                 | 3       | 3       | 4    |
| ≥ 136           | 4                 | 4       | 4       | 4    |

**Percentile of height = 10 - 24%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <77               | 77 - 80 | 81 - 93 | ≥ 94 |
| < 120           | 1                 | 2       | 3       | 4    |
| 120 - 122       | 2                 | 2       | 3       | 4    |
| 123 - 136       | 3                 | 3       | 3       | 4    |
| ≥ 137           | 4                 | 4       | 4       | 4    |

**Percentile of height = 25 - 49%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <77               | 77 - 80 | 81 - 94 | ≥ 95 |
| < 120           | 1                 | 2       | 3       | 4    |
| 120 - 124       | 2                 | 2       | 3       | 4    |
| 125 - 137       | 3                 | 3       | 3       | 4    |
| ≥ 138           | 4                 | 4       | 4       | 4    |

**Percentile of height = 50 - 74%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <78               | 78 - 81 | 82 - 95 | ≥ 96 |
| < 120           | 1                 | 2       | 3       | 4    |
| 120 - 125       | 2                 | 2       | 3       | 4    |
| 126 - 138       | 3                 | 3       | 3       | 4    |
| ≥ 139           | 4                 | 4       | 4       | 4    |

**Child Blood Pressure Values  
Girls - Age 14 (continued)**

**Percentile of height = 75 - 89%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <79               | 79 - 82 | 83 - 95 | ≥ 96 |
| < 120           | 1                 | 2       | 3       | 4    |
| 120 - 126       | 2                 | 2       | 3       | 4    |
| 127 - 140       | 3                 | 3       | 3       | 4    |
| ≥ 141           | 4                 | 4       | 4       | 4    |

**Percentile of height = 90 - 94%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <80               | 80 - 83 | 84 - 96 | ≥ 97 |
| < 120           | 1                 | 2       | 3       | 4    |
| 120 - 128       | 2                 | 2       | 3       | 4    |
| 129 - 141       | 3                 | 3       | 3       | 4    |
| ≥ 142           | 4                 | 4       | 4       | 4    |

**Percentile of height = 95% and higher**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <80               | 80 - 83 | 84 - 97 | ≥ 98 |
| < 120           | 1                 | 2       | 3       | 4    |
| 120 - 128       | 2                 | 2       | 3       | 4    |
| 129 - 141       | 3                 | 3       | 3       | 4    |
| ≥ 142           | 4                 | 4       | 4       | 4    |

**Child Blood Pressure Values  
Girls - Age 15**

**Percentile of height = Less than 10%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <78               | 78 - 81 | 82 - 94 | ≥ 95 |
| < 120           | 1                 | 2       | 3       | 4    |
| 120 - 123       | 2                 | 2       | 3       | 4    |
| 124 - 136       | 3                 | 3       | 3       | 4    |
| ≥ 137           | 4                 | 4       | 4       | 4    |

**Percentile of height = 10 - 24%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <78               | 78 - 81 | 82 - 94 | ≥ 95 |
| < 120           | 1                 | 2       | 3       | 4    |
| 120 - 124       | 2                 | 2       | 3       | 4    |
| 125 - 137       | 3                 | 3       | 3       | 4    |
| ≥ 138           | 4                 | 4       | 4       | 4    |

**Percentile of height = 25 - 49%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <78               | 78 - 81 | 82 - 95 | ≥ 96 |
| < 120           | 1                 | 2       | 3       | 4    |
| 120 - 125       | 2                 | 2       | 3       | 4    |
| 126 - 138       | 3                 | 3       | 3       | 4    |
| ≥ 139           | 4                 | 4       | 4       | 4    |

**Percentile of height = 50 - 74%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <79               | 79 - 83 | 84 - 96 | ≥ 97 |
| < 120           | 1                 | 2       | 3       | 4    |
| 120 - 126       | 2                 | 2       | 3       | 4    |
| 127 - 139       | 3                 | 3       | 3       | 4    |
| ≥ 140           | 4                 | 4       | 4       | 4    |

**Child Blood Pressure Values  
Girls - Age 15 (continued)**

**Percentile of height = 75 - 89%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <80               | 80 - 84 | 85 - 97 | ≥ 98 |
| < 120           | 1                 | 2       | 3       | 4    |
| 120 - 128       | 2                 | 2       | 3       | 4    |
| 129 - 141       | 3                 | 3       | 3       | 4    |
| ≥ 142           | 4                 | 4       | 4       | 4    |

**Percentile of height = 90 - 94%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <80               | 80 - 84 | 85 - 97 | ≥ 98 |
| < 120           | 1                 | 2       | 3       | 4    |
| 120 - 129       | 2                 | 2       | 3       | 4    |
| 130 - 142       | 3                 | 3       | 3       | 4    |
| ≥ 143           | 4                 | 4       | 4       | 4    |

**Percentile of height = 95% and higher**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <80               | 80 - 84 | 85 - 98 | ≥ 99 |
| < 120           | 1                 | 2       | 3       | 4    |
| 120 - 130       | 2                 | 2       | 3       | 4    |
| 131 - 143       | 3                 | 3       | 3       | 4    |
| ≥ 144           | 4                 | 4       | 4       | 4    |

**Child Blood Pressure Values  
Girls - Age 16**

**Percentile of height = Less than 10%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <78               | 78 - 81 | 82 - 95 | ≥ 96 |
| < 120           | 1                 | 2       | 3       | 4    |
| 120 - 124       | 2                 | 2       | 3       | 4    |
| 125 - 137       | 3                 | 3       | 3       | 4    |
| ≥ 138           | 4                 | 4       | 4       | 4    |

**Percentile of height = 10 - 24%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <78               | 78 - 81 | 82 - 95 | ≥ 96 |
| < 120           | 1                 | 2       | 3       | 4    |
| 120 - 125       | 2                 | 2       | 3       | 4    |
| 126 - 138       | 3                 | 3       | 3       | 4    |
| ≥ 139           | 4                 | 4       | 4       | 4    |

**Percentile of height = 25 - 49%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <79               | 79 - 82 | 83 - 95 | ≥ 96 |
| < 120           | 1                 | 2       | 3       | 4    |
| 120 - 126       | 2                 | 2       | 3       | 4    |
| 127 - 139       | 3                 | 3       | 3       | 4    |
| ≥ 140           | 4                 | 4       | 4       | 4    |

**Percentile of height = 50 - 74%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <80               | 80 - 83 | 84 - 96 | ≥ 97 |
| < 120           | 1                 | 2       | 3       | 4    |
| 120 - 127       | 2                 | 2       | 3       | 4    |
| 128 - 140       | 3                 | 3       | 3       | 4    |
| ≥ 141           | 4                 | 4       | 4       | 4    |

**Child Blood Pressure Values  
Girls - Age 16 (continued)**

**Percentile of height = 75 - 89%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <80               | 80 - 84 | 85 - 97 | ≥ 98 |
| < 120           | 1                 | 2       | 3       | 4    |
| 120 - 129       | 2                 | 2       | 3       | 4    |
| 130 - 142       | 3                 | 3       | 3       | 4    |
| ≥ 143           | 4                 | 4       | 4       | 4    |

**Percentile of height = 90 - 94%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <80               | 80 - 84 | 85 - 98 | ≥ 99 |
| < 120           | 1                 | 2       | 3       | 4    |
| 120 - 130       | 2                 | 2       | 3       | 4    |
| 131 - 143       | 3                 | 3       | 3       | 4    |
| ≥ 144           | 4                 | 4       | 4       | 4    |

**Percentile of height = 95% and higher**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <80               | 80 - 85 | 86 - 98 | ≥ 99 |
| < 120           | 1                 | 2       | 3       | 4    |
| 120 - 131       | 2                 | 2       | 3       | 4    |
| 132 - 144       | 3                 | 3       | 3       | 4    |
| ≥ 145           | 4                 | 4       | 4       | 4    |

**Child Blood Pressure Values  
Girls - Age 17**

**Percentile of height = Less than 10%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <78               | 78 - 81 | 82 - 95 | ≥ 96 |
| < 120           | 1                 | 2       | 3       | 4    |
| 120 - 124       | 2                 | 2       | 3       | 4    |
| 125 - 138       | 3                 | 3       | 3       | 4    |
| ≥ 139           | 4                 | 4       | 4       | 4    |

**Percentile of height = 10 - 24%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <79               | 79 - 82 | 83 - 95 | ≥ 96 |
| < 120           | 1                 | 2       | 3       | 4    |
| 120 - 125       | 2                 | 2       | 3       | 4    |
| 126 - 138       | 3                 | 3       | 3       | 4    |
| ≥ 139           | 4                 | 4       | 4       | 4    |

**Percentile of height = 25 - 49%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <79               | 79 - 82 | 83 - 96 | ≥ 97 |
| < 120           | 1                 | 2       | 3       | 4    |
| 120 - 126       | 2                 | 2       | 3       | 4    |
| 127 - 139       | 3                 | 3       | 3       | 4    |
| ≥ 140           | 4                 | 4       | 4       | 4    |

**Percentile of height = 50 - 74%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <80               | 80 - 83 | 84 - 96 | ≥ 97 |
| < 120           | 1                 | 2       | 3       | 4    |
| 120 - 128       | 2                 | 2       | 3       | 4    |
| 129 - 141       | 3                 | 3       | 3       | 4    |
| ≥ 142           | 4                 | 4       | 4       | 4    |

**Child Blood Pressure Values  
Girls - Age 17 (continued)**

**Percentile of height = 75 - 89%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <80               | 80 - 84 | 85 - 97 | ≥ 98 |
| < 120           | 1                 | 2       | 3       | 4    |
| 120 - 129       | 2                 | 2       | 3       | 4    |
| 130 - 142       | 3                 | 3       | 3       | 4    |
| ≥ 143           | 4                 | 4       | 4       | 4    |

**Percentile of height = 90 - 94%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <80               | 80 - 85 | 86 - 98 | ≥ 99 |
| < 120           | 1                 | 2       | 3       | 4    |
| 120 - 130       | 2                 | 2       | 3       | 4    |
| 131 - 143       | 3                 | 3       | 3       | 4    |
| ≥ 144           | 4                 | 4       | 4       | 4    |

**Percentile of height = 95% and higher**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <80               | 80 - 85 | 86 - 98 | ≥ 99 |
| < 120           | 1                 | 2       | 3       | 4    |
| 120 - 131       | 2                 | 2       | 3       | 4    |
| 132 - 144       | 3                 | 3       | 3       | 4    |
| ≥ 145           | 4                 | 4       | 4       | 4    |

**Child Blood Pressure Values  
Boys - Age 6**

**Percentile of height = Less than 10%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <68               | 68 - 71 | 72 - 85 | ≥ 86 |
| < 105           | 1                 | 2       | 3       | 4    |
| 105 - 108       | 2                 | 2       | 3       | 4    |
| 109 - 121       | 3                 | 3       | 3       | 4    |
| ≥ 122           | 4                 | 4       | 4       | 4    |

**Percentile of height = 10 - 24%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <68               | 68 - 71 | 72 - 85 | ≥ 86 |
| < 106           | 1                 | 2       | 3       | 4    |
| 106 - 109       | 2                 | 2       | 3       | 4    |
| 110 - 122       | 3                 | 3       | 3       | 4    |
| ≥ 123           | 4                 | 4       | 4       | 4    |

**Percentile of height = 25 - 49%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <69               | 69 - 72 | 73 - 86 | ≥ 87 |
| < 108           | 1                 | 2       | 3       | 4    |
| 108 - 111       | 2                 | 2       | 3       | 4    |
| 112 - 124       | 3                 | 3       | 3       | 4    |
| ≥ 125           | 4                 | 4       | 4       | 4    |

**Percentile of height = 50 - 74%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <70               | 70 - 73 | 74 - 87 | ≥ 88 |
| < 110           | 1                 | 2       | 3       | 4    |
| 110 - 113       | 2                 | 2       | 3       | 4    |
| 114 - 126       | 3                 | 3       | 3       | 4    |
| ≥ 127           | 4                 | 4       | 4       | 4    |

**Child Blood Pressure Values  
Boys - Age 6 (continued)**

**Percentile of height = 75 - 89%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <71               | 71 - 74 | 75 - 88 | ≥ 89 |
| < 111           | 1                 | 2       | 3       | 4    |
| 111 - 114       | 2                 | 2       | 3       | 4    |
| 115 - 128       | 3                 | 3       | 3       | 4    |
| ≥ 129           | 4                 | 4       | 4       | 4    |

**Percentile of height = 90 - 94%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <72               | 72 - 75 | 76 - 90 | ≥ 91 |
| < 113           | 1                 | 2       | 3       | 4    |
| 113 - 116       | 2                 | 2       | 3       | 4    |
| 117 - 129       | 3                 | 3       | 3       | 4    |
| ≥ 130           | 4                 | 4       | 4       | 4    |

**Percentile of height = 95% and higher**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <72               | 72 - 75 | 76 - 89 | ≥ 90 |
| < 113           | 1                 | 2       | 3       | 4    |
| 113 - 116       | 2                 | 2       | 3       | 4    |
| 117 - 130       | 3                 | 3       | 3       | 4    |
| ≥ 131           | 4                 | 4       | 4       | 4    |

**Child Blood Pressure Values  
Boys - Age 7**

**Percentile of height = Less than 10%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <70               | 70 - 73 | 74 - 87 | ≥ 88 |
| < 106           | 1                 | 2       | 3       | 4    |
| 106 - 109       | 2                 | 2       | 3       | 4    |
| 110 - 122       | 3                 | 3       | 3       | 4    |
| ≥ 123           | 4                 | 4       | 4       | 4    |

**Percentile of height = 10 - 24%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |     |
|-----------------|-------------------|---------|---------|-----|
|                 | <70               | 70 - 73 | 74 - 87 | <88 |
| < 107           | 1                 | 2       | 3       | 4   |
| 107 - 110       | 2                 | 2       | 3       | 4   |
| 111 - 121       | 3                 | 3       | 3       | 4   |
| ≥ 122           | 4                 | 4       | 4       | 4   |

**Percentile of height = 25 - 49%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <71               | 71 - 74 | 75 - 88 | ≥ 89 |
| < 109           | 1                 | 2       | 3       | 4    |
| 109 - 112       | 2                 | 2       | 3       | 4    |
| 113 - 125       | 3                 | 3       | 3       | 4    |
| ≥ 126           | 4                 | 4       | 4       | 4    |

**Percentile of height = 50 - 74%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <72               | 72 - 75 | 76 - 89 | ≥ 90 |
| < 111           | 1                 | 2       | 3       | 4    |
| 111 - 114       | 2                 | 2       | 3       | 4    |
| 115 - 127       | 3                 | 3       | 3       | 4    |
| ≥ 128           | 4                 | 4       | 4       | 4    |

**Child Blood Pressure Values  
Boys - Age 7 (continued)**

**Percentile of height = 75 - 89%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <73               | 73 - 76 | 77 - 90 | ≥ 91 |
| < 113           | 1                 | 2       | 3       | 4    |
| 113 - 116       | 2                 | 2       | 3       | 4    |
| 117 - 129       | 3                 | 3       | 3       | 4    |
| ≥ 130           | 4                 | 4       | 4       | 4    |

**Percentile of height = 90 - 94%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <74               | 74 - 77 | 78 - 91 | ≥ 92 |
| < 114           | 1                 | 2       | 3       | 4    |
| 114 - 117       | 2                 | 2       | 3       | 4    |
| 118 - 130       | 3                 | 3       | 3       | 4    |
| ≥ 131           | 4                 | 4       | 4       | 4    |

**Percentile of height = 95% and higher**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <74               | 74 - 77 | 78 - 91 | ≥ 92 |
| < 115           | 1                 | 2       | 3       | 4    |
| 115 - 118       | 2                 | 2       | 3       | 4    |
| 119 - 131       | 3                 | 3       | 3       | 4    |
| ≥ 132           | 4                 | 4       | 4       | 4    |

**Child Blood Pressure Values  
Boys - Age 8**

**Percentile of height = Less than 10%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <71               | 71 - 74 | 75 - 88 | ≥ 89 |
| < 107           | 1                 | 2       | 3       | 4    |
| 107 - 110       | 2                 | 2       | 3       | 4    |
| 111 - 124       | 3                 | 3       | 3       | 4    |
| ≥ 125           | 4                 | 4       | 4       | 4    |

**Percentile of height = 10 - 24%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <72               | 72 - 75 | 76 - 89 | ≥ 90 |
| < 109           | 1                 | 2       | 3       | 4    |
| 109 - 111       | 2                 | 2       | 3       | 4    |
| 112 - 125       | 3                 | 3       | 3       | 4    |
| ≥ 126           | 4                 | 4       | 4       | 4    |

**Percentile of height = 25 - 49%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <72               | 72 - 76 | 77 - 90 | ≥ 91 |
| < 110           | 1                 | 2       | 3       | 4    |
| 110 - 113       | 2                 | 2       | 3       | 4    |
| 114 - 127       | 3                 | 3       | 3       | 4    |
| ≥ 128           | 4                 | 4       | 4       | 4    |

**Percentile of height = 50 - 74%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <73               | 73 - 77 | 78 - 91 | ≥ 92 |
| < 112           | 1                 | 2       | 3       | 4    |
| 112 - 115       | 2                 | 2       | 3       | 4    |
| 116 - 128       | 3                 | 3       | 3       | 4    |
| ≥ 129           | 4                 | 4       | 4       | 4    |

**Child Blood Pressure Values  
Boys - Age 8 (continued)**

**Percentile of height = 75 - 89%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <74               | 74 - 78 | 79 - 92 | ≥ 93 |
| < 114           | 1                 | 2       | 3       | 4    |
| 114 - 117       | 2                 | 2       | 3       | 4    |
| 118 - 130       | 3                 | 3       | 3       | 4    |
| ≥ 131           | 4                 | 4       | 4       | 4    |

**Percentile of height = 90 - 94%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <75               | 75 - 78 | 79 - 92 | ≥ 93 |
| < 115           | 1                 | 2       | 3       | 4    |
| 115 - 118       | 2                 | 2       | 3       | 4    |
| 119 - 132       | 3                 | 3       | 3       | 4    |
| ≥ 133           | 4                 | 4       | 4       | 4    |

**Percentile of height = 95% and higher**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <76               | 76 - 79 | 80 - 93 | ≥ 94 |
| < 116           | 1                 | 2       | 3       | 4    |
| 116 - 119       | 2                 | 2       | 3       | 4    |
| 120 - 132       | 3                 | 3       | 3       | 4    |
| ≥ 133           | 4                 | 4       | 4       | 4    |

**Child Blood Pressure Values  
Boys - Age 9**

**Percentile of height = Less than 10%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <72               | 72 - 75 | 76 - 89 | ≥ 90 |
| < 109           | 1                 | 2       | 3       | 4    |
| 109 - 112       | 2                 | 2       | 3       | 4    |
| 113 - 125       | 3                 | 3       | 3       | 4    |
| ≥ 126           | 4                 | 4       | 4       | 4    |

**Percentile of height = 10 - 24%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |     |
|-----------------|-------------------|---------|---------|-----|
|                 | <73               | 73 - 76 | 77 - 90 | <91 |
| < 110           | 1                 | 2       | 3       | 4   |
| 110 - 113       | 2                 | 2       | 3       | 4   |
| 114 - 126       | 3                 | 3       | 3       | 4   |
| ≥ 127           | 4                 | 4       | 4       | 4   |

**Percentile of height = 25 - 49%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <74               | 74 - 77 | 78 - 91 | ≥ 92 |
| < 112           | 1                 | 2       | 3       | 4    |
| 112 - 115       | 2                 | 2       | 3       | 4    |
| 116 - 128       | 3                 | 3       | 3       | 4    |
| ≥ 129           | 4                 | 4       | 4       | 4    |

**Percentile of height = 50 - 74%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <75               | 75 - 78 | 79 - 92 | ≥ 93 |
| < 114           | 1                 | 2       | 3       | 4    |
| 114 - 117       | 2                 | 2       | 3       | 4    |
| 118 - 130       | 3                 | 3       | 3       | 4    |
| ≥ 131           | 4                 | 4       | 4       | 4    |

**Child Blood Pressure Values  
Boys - Age 9 (continued)**

**Percentile of height = 75 - 89%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <75               | 75 - 79 | 80 - 86 | ≥ 87 |
| < 115           | 1                 | 2       | 3       | 4    |
| 115 - 118       | 2                 | 2       | 3       | 4    |
| 119 - 132       | 3                 | 3       | 3       | 4    |
| ≥ 133           | 4                 | 4       | 4       | 4    |

**Percentile of height = 90 - 94%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <76               | 76 - 79 | 80 - 93 | ≥ 94 |
| < 117           | 1                 | 2       | 3       | 4    |
| 117 - 120       | 2                 | 2       | 3       | 4    |
| 121 - 133       | 3                 | 3       | 3       | 4    |
| ≥ 134           | 4                 | 4       | 4       | 4    |

**Percentile of height = 95% and higher**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <77               | 77 - 80 | 81 - 94 | ≥ 95 |
| < 118           | 1                 | 2       | 3       | 4    |
| 118 - 120       | 2                 | 2       | 3       | 4    |
| 121 - 134       | 3                 | 3       | 3       | 4    |
| ≥ 135           | 4                 | 4       | 4       | 4    |

**Child Blood Pressure Values  
Boys - Age 10**

**Percentile of height = Less than 10%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <73               | 73 - 76 | 77 - 90 | ≥ 91 |
| < 111           | 1                 | 2       | 3       | 4    |
| 111 - 114       | 2                 | 2       | 3       | 4    |
| 115 - 127       | 3                 | 3       | 3       | 4    |
| ≥ 128           | 4                 | 4       | 4       | 4    |

**Percentile of height = 10 - 24%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <73               | 73 - 77 | 78 - 91 | ≥ 92 |
| < 112           | 1                 | 2       | 3       | 4    |
| 112 - 115       | 2                 | 2       | 3       | 4    |
| 116 - 128       | 3                 | 3       | 3       | 4    |
| ≥ 129           | 4                 | 4       | 4       | 4    |

**Percentile of height = 25 - 49%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <74               | 74 - 78 | 79 - 91 | ≥ 92 |
| < 114           | 1                 | 2       | 3       | 4    |
| 114 - 116       | 2                 | 2       | 3       | 4    |
| 117 - 130       | 3                 | 3       | 3       | 4    |
| ≥ 131           | 4                 | 4       | 4       | 4    |

**Percentile of height = 50 - 74%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <75               | 75 - 79 | 80 - 93 | ≥ 94 |
| < 115           | 1                 | 2       | 3       | 4    |
| 115 - 118       | 2                 | 2       | 3       | 4    |
| 119 - 132       | 3                 | 3       | 3       | 4    |
| ≥ 133           | 4                 | 4       | 4       | 4    |

**Child Blood Pressure Values  
Boys - Age 10 (continued)**

**Percentile of height = 75 - 89%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <76               | 76 - 80 | 81 - 93 | ≥ 94 |
| < 117           | 1                 | 2       | 3       | 4    |
| 117 - 120       | 2                 | 2       | 3       | 4    |
| 121 - 133       | 3                 | 3       | 3       | 4    |
| ≥ 134           | 4                 | 4       | 4       | 4    |

**Percentile of height = 90 - 94%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <77               | 77 - 80 | 81 - 94 | ≥ 95 |
| < 119           | 1                 | 2       | 3       | 4    |
| 119 - 121       | 2                 | 2       | 3       | 4    |
| 122 - 135       | 3                 | 3       | 3       | 4    |
| ≥ 136           | 4                 | 4       | 4       | 4    |

**Percentile of height = 95% and higher**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <78               | 78 - 81 | 82 - 95 | ≥ 96 |
| < 119           | 1                 | 2       | 3       | 4    |
| 119 - 122       | 2                 | 2       | 3       | 4    |
| 123 - 135       | 3                 | 3       | 3       | 4    |
| ≥ 136           | 4                 | 4       | 4       | 4    |

**Child Blood Pressure Values  
Boys - Age 11**

**Percentile of height = Less than 10%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <74               | 74 - 77 | 78 - 91 | ≥ 92 |
| < 113           | 1                 | 2       | 3       | 4    |
| 113 - 116       | 2                 | 2       | 3       | 4    |
| 117 - 129       | 3                 | 3       | 3       | 4    |
| ≥ 130           | 4                 | 4       | 4       | 4    |

**Percentile of height = 10 - 24%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <74               | 74 - 77 | 78 - 91 | ≥ 92 |
| < 114           | 1                 | 2       | 3       | 4    |
| 114 - 117       | 2                 | 2       | 3       | 4    |
| 118 - 130       | 3                 | 3       | 3       | 4    |
| ≥ 131           | 4                 | 4       | 4       | 4    |

**Percentile of height = 25 - 49%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <75               | 75 - 78 | 79 - 92 | ≥ 93 |
| < 115           | 1                 | 2       | 3       | 4    |
| 115 - 118       | 2                 | 2       | 3       | 4    |
| 119 - 132       | 3                 | 3       | 3       | 4    |
| ≥ 133           | 4                 | 4       | 4       | 4    |

**Percentile of height = 50 - 74%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <76               | 76 - 79 | 80 - 93 | ≥ 94 |
| < 117           | 1                 | 2       | 3       | 4    |
| 117 - 120       | 2                 | 2       | 3       | 4    |
| 121 - 134       | 3                 | 3       | 3       | 4    |
| ≥ 135           | 4                 | 4       | 4       | 4    |

**Child Blood Pressure Values  
Boys - Age 11 (continued)**

**Percentile of height = 75 - 89%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <77               | 77 - 80 | 81 - 94 | ≥ 95 |
| < 119           | 1                 | 2       | 3       | 4    |
| 119 - 122       | 2                 | 2       | 3       | 4    |
| 123 - 135       | 3                 | 3       | 3       | 4    |
| ≥ 136           | 4                 | 4       | 4       | 4    |

**Percentile of height = 90 - 94%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <78               | 78 - 81 | 82 - 95 | ≥ 96 |
| < 120           | 1                 | 2       | 3       | 4    |
| 120 - 123       | 2                 | 2       | 3       | 4    |
| 124 - 137       | 3                 | 3       | 3       | 4    |
| ≥ 138           | 4                 | 4       | 4       | 4    |

**Percentile of height = 95% and higher**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <78               | 78 - 81 | 82 - 95 | ≥ 96 |
| < 120           | 1                 | 2       | 3       | 4    |
| 120 - 124       | 2                 | 2       | 3       | 4    |
| 125 - 137       | 3                 | 3       | 3       | 4    |
| ≥ 138           | 4                 | 4       | 4       | 4    |

**Child Blood Pressure Values  
Boys - Age 12**

**Percentile of height = Less than 10%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <74               | 74 - 77 | 78 - 91 | ≥ 92 |
| < 115           | 1                 | 2       | 3       | 4    |
| 115 - 118       | 2                 | 2       | 3       | 4    |
| 119 - 131       | 3                 | 3       | 3       | 4    |
| ≥ 132           | 4                 | 4       | 4       | 4    |

**Percentile of height = 10 - 24%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <75               | 75 - 78 | 79 - 92 | ≥ 93 |
| < 116           | 1                 | 2       | 3       | 4    |
| 116 - 119       | 2                 | 2       | 3       | 4    |
| 120 - 132       | 3                 | 3       | 3       | 4    |
| ≥ 133           | 4                 | 4       | 4       | 4    |

**Percentile of height = 25 - 49%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <75               | 75 - 79 | 80 - 93 | ≥ 94 |
| < 118           | 1                 | 2       | 3       | 4    |
| 117 - 121       | 2                 | 2       | 3       | 4    |
| 122 - 134       | 3                 | 3       | 3       | 4    |
| ≥ 135           | 4                 | 4       | 4       | 4    |

**Percentile of height = 50 - 74%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <76               | 76 - 80 | 81 - 94 | ≥ 95 |
| < 119           | 1                 | 2       | 3       | 4    |
| 119 - 122       | 2                 | 2       | 3       | 4    |
| 123 - 136       | 3                 | 3       | 3       | 4    |
| ≥ 137           | 4                 | 4       | 4       | 4    |

**Child Blood Pressure Values  
Boys - Age 12 (continued)**

**Percentile of height = 75 - 89%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <77               | 77 - 81 | 82 - 95 | ≥ 96 |
| < 120           | 1                 | 2       | 3       | 4    |
| 120 - 124       | 2                 | 2       | 3       | 4    |
| 125 - 138       | 3                 | 3       | 3       | 4    |
| ≥ 139           | 4                 | 4       | 4       | 4    |

**Percentile of height = 90 - 94%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <78               | 78 - 81 | 82 - 95 | ≥ 96 |
| < 120           | 1                 | 2       | 3       | 4    |
| 120 - 126       | 2                 | 2       | 3       | 4    |
| 127 - 139       | 3                 | 3       | 3       | 4    |
| ≥ 140           | 4                 | 4       | 4       | 4    |

**Percentile of height = 95% and higher**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <79               | 79 - 82 | 83 - 96 | ≥ 97 |
| < 120           | 1                 | 2       | 3       | 4    |
| 120 - 126       | 2                 | 2       | 3       | 4    |
| 127 - 140       | 3                 | 3       | 3       | 4    |
| ≥ 141           | 4                 | 4       | 4       | 4    |

**Child Blood Pressure Values  
Boys - Age 13**

**Percentile of height = Less than 10%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <75               | 75 - 78 | 79 - 92 | ≥ 93 |
| < 117           | 1                 | 2       | 3       | 4    |
| 117 - 120       | 2                 | 2       | 3       | 4    |
| 121 - 133       | 3                 | 3       | 3       | 4    |
| ≥ 134           | 4                 | 4       | 4       | 4    |

**Percentile of height = 10 - 24%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <75               | 75 - 78 | 79 - 92 | ≥ 93 |
| < 118           | 1                 | 2       | 3       | 4    |
| 118 - 121       | 2                 | 2       | 3       | 4    |
| 122 - 135       | 3                 | 3       | 3       | 4    |
| ≥ 136           | 4                 | 4       | 4       | 4    |

**Percentile of height = 25 - 49%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <76               | 76 - 79 | 80 - 93 | ≥ 94 |
| < 120           | 1                 | 2       | 3       | 4    |
| 120 - 123       | 2                 | 2       | 3       | 4    |
| 124 - 136       | 3                 | 3       | 3       | 4    |
| ≥ 137           | 4                 | 4       | 4       | 4    |

**Percentile of height = 50 - 74%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <77               | 77 - 80 | 81 - 94 | ≥ 95 |
| < 120           | 1                 | 2       | 3       | 4    |
| 120 - 125       | 2                 | 2       | 3       | 4    |
| 126 - 138       | 3                 | 3       | 3       | 4    |
| ≥ 139           | 4                 | 4       | 4       | 4    |

**Child Blood Pressure Values  
Boys - Age 13 (continued)**

**Percentile of height = 75 - 89%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <78               | 78 - 81 | 82 - 95 | ≥ 96 |
| < 120           | 1                 | 2       | 3       | 4    |
| 120 - 127       | 2                 | 2       | 3       | 4    |
| 128 - 140       | 3                 | 3       | 3       | 4    |
| ≥ 141           | 4                 | 4       | 4       | 4    |

**Percentile of height = 90 - 94%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <79               | 79 - 82 | 83 - 96 | ≥ 97 |
| < 120           | 1                 | 2       | 3       | 4    |
| 120 - 128       | 2                 | 2       | 3       | 4    |
| 129 - 141       | 3                 | 3       | 3       | 4    |
| ≥ 142           | 4                 | 4       | 4       | 4    |

**Percentile of height = 95% and higher**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <79               | 79 - 82 | 83 - 96 | ≥ 97 |
| < 120           | 1                 | 2       | 3       | 4    |
| 120 - 129       | 2                 | 2       | 3       | 4    |
| 130 - 142       | 3                 | 3       | 3       | 4    |
| ≥ 143           | 4                 | 4       | 4       | 4    |

**Child Blood Pressure Values  
Boys - Age 14**

**Percentile of height = Less than 10%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <75               | 75 - 79 | 80 - 92 | ≥ 93 |
| < 120           | 1                 | 2       | 3       | 4    |
| 120 - 123       | 2                 | 2       | 3       | 4    |
| 124 - 136       | 3                 | 3       | 3       | 4    |
| ≥ 137           | 4                 | 4       | 4       | 4    |

**Percentile of height = 10 - 24%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <76               | 76 - 79 | 80 - 93 | ≥ 94 |
| < 120           | 1                 | 2       | 3       | 4    |
| 120 - 124       | 2                 | 2       | 3       | 4    |
| 125 - 137       | 3                 | 3       | 3       | 4    |
| ≥ 138           | 4                 | 4       | 4       | 4    |

**Percentile of height = 25 - 49%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <77               | 77 - 80 | 81 - 94 | ≥ 95 |
| < 120           | 1                 | 2       | 3       | 4    |
| 120 - 126       | 2                 | 2       | 3       | 4    |
| 127 - 139       | 3                 | 3       | 3       | 4    |
| ≥ 140           | 4                 | 4       | 4       | 4    |

**Percentile of height = 50 - 74%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <78               | 78 - 81 | 82 - 95 | ≥ 96 |
| < 120           | 1                 | 2       | 3       | 4    |
| 120 - 127       | 2                 | 2       | 3       | 4    |
| 128 - 141       | 3                 | 3       | 3       | 4    |
| ≥ 142           | 4                 | 4       | 4       | 4    |

**Child Blood Pressure Values  
Boys - Age 14 (continued)**

**Percentile of height = 75 - 89%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <79               | 79 - 82 | 83 - 96 | ≥ 97 |
| < 120           | 1                 | 2       | 3       | 4    |
| 120 - 129       | 2                 | 2       | 3       | 4    |
| 130 - 143       | 3                 | 3       | 3       | 4    |
| ≥ 144           | 4                 | 4       | 4       | 4    |

**Percentile of height = 90 - 94%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <79               | 79 - 83 | 84 - 97 | ≥ 98 |
| < 120           | 1                 | 2       | 3       | 4    |
| 120 - 131       | 2                 | 2       | 3       | 4    |
| 132 - 144       | 3                 | 3       | 3       | 4    |
| ≥ 145           | 4                 | 4       | 4       | 4    |

**Percentile of height = 95% and higher**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <80               | 80 - 83 | 84 - 97 | ≥ 98 |
| < 120           | 1                 | 2       | 3       | 4    |
| 120 - 131       | 2                 | 2       | 3       | 4    |
| 132 - 145       | 3                 | 3       | 3       | 4    |
| ≥ 146           | 4                 | 4       | 4       | 4    |

**Child Blood Pressure Values  
Boys - Age 15**

**Percentile of height = Less than 10%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <76               | 76 - 80 | 81 - 93 | ≥ 94 |
| < 120           | 1                 | 2       | 3       | 4    |
| 120 - 125       | 2                 | 2       | 3       | 4    |
| 126 - 139       | 3                 | 3       | 3       | 4    |
| ≥ 140           | 4                 | 4       | 4       | 4    |

**Percentile of height = 10 - 24%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <77               | 77 - 80 | 81 - 94 | ≥ 95 |
| < 120           | 1                 | 2       | 3       | 4    |
| 120 - 126       | 2                 | 2       | 3       | 4    |
| 127 - 140       | 3                 | 3       | 3       | 4    |
| ≥ 141           | 4                 | 4       | 4       | 4    |

**Percentile of height = 25 - 49%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <78               | 78 - 82 | 83 - 95 | ≥ 96 |
| < 120           | 1                 | 2       | 3       | 4    |
| 120 - 128       | 2                 | 2       | 3       | 4    |
| 129 - 141       | 3                 | 3       | 3       | 4    |
| ≥ 142           | 4                 | 4       | 4       | 4    |

**Percentile of height = 50 - 74%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <79               | 79 - 82 | 83 - 96 | ≥ 97 |
| < 120           | 1                 | 2       | 3       | 4    |
| 120 - 130       | 2                 | 2       | 3       | 4    |
| 131 - 143       | 3                 | 3       | 3       | 4    |
| ≥ 144           | 4                 | 4       | 4       | 4    |

**Child Blood Pressure Values  
Boys - Age 15 (continued)**

**Percentile of height = 75 - 89%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <80               | 80 - 83 | 84 - 97 | ≥ 98 |
| < 120           | 1                 | 2       | 3       | 4    |
| 120 - 132       | 2                 | 2       | 3       | 4    |
| 133 - 145       | 3                 | 3       | 3       | 4    |
| ≥ 144           | 4                 | 4       | 4       | 4    |

**Percentile of height = 90 - 94%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <80               | 80 - 84 | 85 - 98 | ≥ 99 |
| < 120           | 1                 | 2       | 3       | 4    |
| 121 - 133       | 2                 | 2       | 3       | 4    |
| 134 - 147       | 3                 | 3       | 3       | 4    |
| ≥ 148           | 4                 | 4       | 4       | 4    |

**Percentile of height = 95% and higher**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <80               | 80 - 84 | 85 - 98 | ≥ 99 |
| < 120           | 1                 | 2       | 3       | 4    |
| 120 - 134       | 2                 | 2       | 3       | 4    |
| 135 - 147       | 3                 | 3       | 3       | 4    |
| ≥ 148           | 4                 | 4       | 4       | 4    |

**Child Blood Pressure Values  
Boys - Age 16**

**Percentile of height = Less than 10%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <78               | 78 - 81 | 82 - 95 | ≥ 96 |
| < 120           | 1                 | 2       | 3       | 4    |
| 120 - 128       | 2                 | 2       | 3       | 4    |
| 129 - 141       | 3                 | 3       | 3       | 4    |
| ≥ 142           | 4                 | 4       | 4       | 4    |

**Percentile of height = 10 - 24%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <78               | 78 - 82 | 83 - 95 | ≥ 96 |
| < 120           | 1                 | 2       | 3       | 4    |
| 120 - 129       | 2                 | 2       | 3       | 4    |
| 130 - 142       | 3                 | 3       | 3       | 4    |
| ≥ 143           | 4                 | 4       | 4       | 4    |

**Percentile of height = 25 - 49%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <79               | 79 - 82 | 83 - 96 | ≥ 97 |
| < 120           | 1                 | 2       | 3       | 4    |
| 120 - 131       | 2                 | 2       | 3       | 4    |
| 132 - 144       | 3                 | 3       | 3       | 4    |
| ≥ 145           | 4                 | 4       | 4       | 4    |

**Percentile of height = 50 - 74%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <80               | 80 - 83 | 84 - 97 | ≥ 98 |
| < 120           | 1                 | 2       | 3       | 4    |
| 120 - 133       | 2                 | 2       | 3       | 4    |
| 134 - 146       | 3                 | 3       | 3       | 4    |
| ≥ 147           | 4                 | 4       | 4       | 4    |

**Child Blood Pressure Values  
Boys - Age 16 (continued)**

**Percentile of height = 75 - 89%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <80               | 80 - 84 | 85 - 98 | ≥ 99 |
| < 120           | 1                 | 2       | 3       | 4    |
| 120 - 134       | 2                 | 2       | 3       | 4    |
| 135 - 148       | 3                 | 3       | 3       | 4    |
| ≥ 149           | 4                 | 4       | 4       | 4    |

**Percentile of height = 90 - 94%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |       |
|-----------------|-------------------|---------|---------|-------|
|                 | <80               | 80 - 85 | 86 - 99 | ≥ 100 |
| < 120           | 1                 | 2       | 3       | 4     |
| 120 - 136       | 2                 | 2       | 3       | 4     |
| 137 - 150       | 3                 | 3       | 3       | 4     |
| ≥ 151           | 4                 | 4       | 4       | 4     |

**Percentile of height = 95% and higher**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |       |
|-----------------|-------------------|---------|---------|-------|
|                 | <80               | 80 - 86 | 87 - 99 | ≥ 100 |
| < 120           | 1                 | 2       | 3       | 4     |
| 120 - 136       | 2                 | 2       | 3       | 4     |
| 137 - 150       | 3                 | 3       | 3       | 4     |
| ≥ 151           | 4                 | 4       | 4       | 4     |

**Child Blood Pressure Values  
Boys - Age 17**

**Percentile of height = Less than 10%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <80               | 80 - 83 | 84 - 97 | ≥ 98 |
| < 120           | 1                 | 2       | 3       | 4    |
| 120 - 130       | 2                 | 2       | 3       | 4    |
| 131 - 144       | 3                 | 3       | 3       | 4    |
| ≥ 145           | 4                 | 4       | 4       | 4    |

**Percentile of height = 10 - 24%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <80               | 80 - 84 | 85 - 98 | ≥ 99 |
| < 120           | 1                 | 2       | 3       | 4    |
| 120 - 131       | 2                 | 2       | 3       | 4    |
| 132 - 145       | 3                 | 3       | 3       | 4    |
| ≥ 146           | 4                 | 4       | 4       | 4    |

**Percentile of height = 25 - 49%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |      |
|-----------------|-------------------|---------|---------|------|
|                 | <80               | 80 - 85 | 86 - 98 | ≥ 99 |
| < 120           | 1                 | 2       | 3       | 4    |
| 120 - 133       | 2                 | 2       | 3       | 4    |
| 134 - 146       | 3                 | 3       | 3       | 4    |
| ≥ 147           | 4                 | 4       | 4       | 4    |

**Percentile of height = 50 - 74%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |         |       |
|-----------------|-------------------|---------|---------|-------|
|                 | <80               | 80 - 86 | 87 - 99 | ≥ 100 |
| < 120           | 1                 | 2       | 3       | 4     |
| 120 - 135       | 2                 | 2       | 3       | 4     |
| 136 - 148       | 3                 | 3       | 3       | 4     |
| ≥ 149           | 4                 | 4       | 4       | 4     |

**Child Blood Pressure Values  
Boys - Age 17 (continued)**

**Percentile of height = 75 - 89%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |          |       |
|-----------------|-------------------|---------|----------|-------|
|                 | <80               | 80 - 86 | 87 - 100 | ≥ 101 |
| < 120           | 1                 | 2       | 3        | 4     |
| 120 - 137       | 2                 | 2       | 3        | 4     |
| 148 - 150       | 3                 | 3       | 3        | 4     |
| ≥ 151           | 4                 | 4       | 4        | 4     |

**Percentile of height = 90 - 94%**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |          |       |
|-----------------|-------------------|---------|----------|-------|
|                 | <80               | 80 - 87 | 88 - 101 | ≥ 102 |
| < 120           | 1                 | 2       | 3        | 4     |
| 120 - 138       | 2                 | 2       | 3        | 4     |
| 139 - 151       | 3                 | 3       | 3        | 4     |
| ≥ 152           | 4                 | 4       | 4        | 4     |

**Percentile of height = 95% and higher**

| Systolic(mm Hg) | Diastolic (mm Hg) |         |          |       |
|-----------------|-------------------|---------|----------|-------|
|                 | <80               | 80 - 88 | 89 - 102 | ≥ 103 |
| < 120           | 1                 | 2       | 3        | 4     |
| 120 - 139       | 2                 | 2       | 3        | 4     |
| 140 - 152       | 3                 | 3       | 3        | 4     |
| ≥ 153           | 4                 | 4       | 4        | 4     |

Appendix B  
Child Blood Pressure References

## APPENDIX B. CHILD BLOOD PRESSURE REFERENCES

### Blood Pressure - Children

#### Referral Levels:

|                            |  |
|----------------------------|--|
| Level 1 (category 4)       | Indicates major medical findings that warrant immediate attention by a health care provider.   |
| Level 2 (category 3)       | Indicates major medical findings that warrant attention by a health care provider within the next 2 weeks. These findings are expected to cause adverse effects within this time period and they have previously been undiagnosed, unattended, nonmanifested, or not communicated to the examinee by his or her personal health care provider. |
| Level 3 (categories 1 & 2) | Indicates no medical findings; minor medical findings that an examinee already knows about, and is under care for; or findings that do not require prompt attention by a medical provider.   |

#### Referral Comments for Blood Pressure (Children)

#### Referral Comments:

|  |                            |  |
|--|----------------------------|--|
| Statement for blood pressure in category 4 | <b>Level 1 referral</b>    | The participant's blood pressure is <b>very high</b> based on the 1996 update of the Task Force Report on High Blood Pressure in Children and Adolescents.*                            |
| Statement for blood pressure in category 3 | <b>Level 2 referral</b>    | The participant's blood pressure is <b>high</b> based on the 1996 update of the Task Force Report on High Blood Pressure in Children and Adolescents.*                                 |
| Statement for blood pressure in category 2 | <b>Level 3 no referral</b> | The participant's blood pressure is <b>normal but at the high end of normal</b> based on the 1996 update of the Task Force Report on High Blood Pressure in Children and Adolescents.* |
| Statement for blood pressure in category 1 | <b>Level 3 no referral</b> | The participant's blood pressure is <b>normal</b> based on the 1996 update of the Task Force Report on High Blood Pressure in Children and Adolescents.*                               |

### Report of Findings Comments:

- Category 4 Your child's blood pressure today is **very high**.
- Category 3 Your child's blood pressure today is **high**.
- Category 2 Your child's blood pressure today is **normal but at the high end of the normal range**.
- Category 1 Your child's blood pressure today is **normal**.

\* 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.

Appendix C  
Adult Blood Pressure Reference Tables

**APPENDIX C. ADULT BLOOD PRESSURE REFERENCE TABLES**

**Referral levels for adult blood pressure<sup>1</sup>**

| Systolic | Diastolic |          |          |          |          |
|----------|-----------|----------|----------|----------|----------|
|          | <80       | 80-89    | 90-99    | 100-119  | >=120    |
| <120     | 1         | 2        | 3        | 4        | <b>5</b> |
| 120-139  | 2         | 2        | 3        | 4        | <b>5</b> |
| 140-159  | 3         | 3        | 3        | 4        | <b>5</b> |
| 160-209  | 4         | 4        | 4        | 4        | <b>5</b> |
| >= 210   | <b>5</b>  | <b>5</b> | <b>5</b> | <b>5</b> | <b>5</b> |

<sup>1</sup> Based on the Seventh Report of the Joint National Committee on the Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. NIH Publication, 2003.

**Blood Pressure Referral Levels, Category, and Action Required**

| Referral Level | BP Category      | Physician Guideline Referral Action  |
|----------------|------------------|--|
| Level 1        | Category 5       | Indicates major medical findings that warrant immediate attention by a health care provider.   |
| Level 2        | Categories 3 & 4 | Indicates major medical findings that warrant attention by a health care provider within the next 2 weeks. These findings are expected to cause adverse effects within this time period and they have previously been undiagnosed, unattended, nonmanifested, or not communicated to the examinee by his or her personal health care provider. |
| Level 2        | Category 2       | Indicates prehypertensive blood pressure, minor medical findings that an examinee already knows about and is under care for, or findings that do not require prompt attention by a medical provider within a month.  |
| Level 3        | Category 1       | Indicates no abnormal medical findings.  |

**Table of Blood Pressure Report of Findings Comments – English and Spanish**

| <b>Report of Findings level</b> | <b>Report of Findings Message - English</b>   | <b>Report of Findings Message - Spanish</b>   |
|---------------------------------|---|---|
| 1                               | Your blood pressure today is within the normal range, based on the Seventh Report of the Joint National Committee on the Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. NIH Publication, 2003.                          | Su presión de sangre hoy está dentro del rango normal. Basado en el Séptimo Informe del Comité Conjunto Nacional de Prevención, Detección, Evaluación y Tratamiento de la Alta Presión Sanguínea. Publicación del NIH, 2003.  |
| 2                               | Your blood pressure today is above normal and is in the prehypertensive range, based on the Seventh Report of the Joint National Committee on the Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. NIH Publication, 2003. | Su presión de sangre hoy es por encima de lo normal y está dentro del rango de prehipertensión. Basado en el Séptimo Informe del Comité Conjunto Nacional de Prevención, Detección, Evaluación y Tratamiento de la Alta Presión Sanguínea. Publicación del NIH, 2003. |
| 3                               | Your blood pressure today is high, based on the Seventh Report of the Joint National Committee on the Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. NIH Publication, 2003.   | Su presión de sangre hoy es alta. Basado en el Séptimo Informe del Comité Conjunto Nacional de Prevención, Detección, Evaluación y Tratamiento de la Alta Presión Sanguínea. Publicación del NIH, 2003.   |
| 4                               | Your blood pressure today is very high, based on the Seventh Report of the Joint National Committee on the Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. NIH Publication, 2003.  | Su presión de sangre hoy es muy alta. Basado en el Séptimo Informe del Comité Conjunto Nacional de Prevención, Detección, Evaluación y Tratamiento de la Alta Presión Sanguínea. Publicación del NIH, 2003.   |
| 5                               | Your blood pressure today is severely high.   | Su presión de sangre hoy es severamente alta.   |

**(Note: ROF level number 5 should not have the NIH Publication referenced.)**

**Report of Findings Comments:**

- Category 5 - Your blood pressure today is **severely high**.
- Category 4 - Your blood pressure today is **very high**.
- Category 3 - Your blood pressure today is **high**.
- Category 2 - Your blood pressure today is above normal **and in the prehypertensive range**.
- Category 1 - Your blood pressure today is **within the normal range**.

## Appendix D

### Exclusions Based on Medical Conditions and Medication Listings for Bronchodilator

## APPENDIX D. EXCLUSIONS BASED ON MEDICAL CONDITIONS

From Responses to Household Questionnaire

### Respiratory Health (RDQ) -

- RDQ.080 (if 12 or more attacks, 77, or 99 exclude) Wheezing in past 12 months
- RDQ.110 (if 1, 7, or 9, exclude) Wheezing that limits speech (last 12 months)

### Vision (VIQ) -

- VIQ.020 (if 1,7, or 9, exclude) Blind
- VIQ.030 (if 5,7, or 9, exclude) Very poor eyesight

### DSQ.240

- Medications will be available in SP History in Physician's Exam. Physician will check this list and exclude based on medication on the Exclusion list.

### See Exclusionary Medication List:

The household interviewer will have the participant get his or her medication bottles and will enter the complete product name of the medication in CAPI. This list of medications will be compared to the medications on the Exclusion list - see p. D-2. Participants taking a medication that is on the Exclusion Medication list will be excluded from the bronchodilator subcomponent.

## **MEDICATION LISTINGS FOR MEC PHYSICIAN'S DRUG REVIEW AND BRONCHODILATOR TYPE EVALUATION**

### **Potassium Lowering Drugs**

These include the Loop Diuretics, Thiazides and Derivatives.

Loop Diuretics:

- Bumetanide
- Ethacrynate Sodium
- Ethacrynic Acid
- Torsemide

Thiazide Diuretics and Derivatives:

- Bendroflumethiazide
- Chlorothiazide
- Chlorthalidone
- Hydrochlorothiazide
- Hydroflumethiazide
- Indapamide
- Methyclothiazide
- Metolazone
- Polythiazide,
- Trichlormethiazide

### **Potassium Raising Drugs**

These include Potassium Supplements, Angiotensin Converting Enzyme Inhibitors, Angiotensin II Receptor Antagonists, Potassium Sparing Diuretics, and Combination drugs of which contain a potassium raising drug:

Angiotensin Converting Enzyme Inhibitors:

- Benazepril HCl
- Captopril
- Enalapril Maleate
- Fosinopril Sodium
- Lisinopril
- Moexipril HCl
- Perindopril Erbumine
- Quinapril HCl
- Ramipril
- Trandolapril

Angiotensin II Receptor Antagonists:

Candesartan Cilexetil  
Eprosartan Mesylate  
Irbesartan  
Losartan Potassium  
Olmesartan Medoxomil  
Telmisartan, Valsartan

Potassium Sparing Diuretics:

Amiloride  
Acetazolamide  
Dichlorphenamide  
Methazolamide  
Sironolactone  
Tiamterine

Combination Diuretics Designed to be Potassium Sparing:

Dyazide  
Maxizide  
Moduretic

Tricyclic Antidepressants:

| <u>Generic Name</u> | <u>Brand Name</u> |
|---------------------|-------------------|
| Amoxapine           | Asendin           |
| Amitriptyline       | Elavil            |
| Clomipramine HCl    | Anafranil         |
| Desipramine         | Pertofrane        |
| Doxepin             | Sinequan          |
| Imipramine          | Norfranil         |
| Nefazodone          | Nefazodone        |
| Nortriptyline       | Pamelor           |
| Protriptyline       | Vivactil          |
| Trimipramine        | Surmontil         |

Anticonvulsants:

Carbamazepine  
Clonazepam  
Divalproex Sodium EC  
Diazepam  
Ethosuximide  
Ethotoin  
Felbamate  
Fosphenytoin Sodium

Gabapentin  
Levetiracetam  
Lamotrigine  
Methsuximide  
Oxcarbazepine  
Phenacemide  
Phenytoin  
Primidone  
Tiagabine HCl  
Topiramate  
Valproic Acid  
Zonisamide

Long Acting  $\beta$ 2-Agonist Bronchodilators:

Advair  
Advair Diskus (combines Serevent and an anti-inflammatory drug)  
Serevent  
Serevent discus (salmeterol)  
Foradil

(These drugs take longer to begin to work, but their benefits last longer, even up to 12 hours. Serevent and Foradil are the only inhaled, long-acting beta 2-agonists available. They are used twice a day to maintain open airways for long term-control. Serevent and Foradil are available in dry powder inhaler (DPI) form.)

Short Acting  $\beta$ 2-Agonist Bronchodilators:

Albuterol (Proventil HFA, Ventolin HFA, Accuneb)  
Alupent  
Combivent (combines a beta 2-agonist and an anticholinergic)  
Duoneb (combines a beta 2-agonist and an anticholinergic)  
Maxair  
Xopenex  
Bitolterol Mesylate  
Clenbuterol HCl  
Formoterol Fumarate  
Isoetharine HCl Nebulizer Solution  
Isoproterenol HCl  
Levalbuterol HCl Nebulizer Solution  
Levalbuterol HCl Nebulizer Solution  
Metaproterenol Sulfate  
Pirbuterol  
Terbutaline Sulfate

Short Acting Anti-Cholinergic Inhalers:

Atrovent (ipratropium)  
Tiotropium (Spiriva)

(Short-acting beta 2-agonists or anticholinergics are also called "quick acting," "reliever," or "rescue" medications because they relieve asthma symptoms very quickly by opening the airways. These inhalers are the best for treating sudden and severe or new asthma symptoms. They work within 20 minutes and last four to six hours).

MAO Inhibitors:

Isocarboxazid (Marplan)  
Phenelzine Sulfate (Nardil)  
Tranylcypromine Sulfate (Parnate)

Class 1 Antiarrhythmics:

Amiodarone (Cordarone)  
Bretylum (Bretylol)  
Bretylol (Bretylum)  
Cardioquin (Quinidine, Quinalan, Quinidex, Quinaglute)  
Cordarone (Amiodarone)  
Disopyramide (Norpace)  
Dofetilide  
Enkaid (Encainide)  
Ethmozine (Moricizine)  
Flecainide (Tambocor)  
Ibutilide  
Lidocaine (Xylocaine, Xylocard)  
Mexiletine (Mexitil) Mexitil (Mexilitine)  
Moricizine (Ethmozine)  
Norpace (Disopyramide)  
Procainamide (Pronestyl, Procan SR)  
Procan SP (Procainamide, Pronestyl)  
Pronestyl (Procan SP, Procainamide)  
Propafenone (Rhythmol)  
Rhythmol (Propafenone)  
Tambocore (Flecainide)  
Tocainide (Tonocard)  
Tonocard (Tocainide)  
Quinaglute (Cardioquin, Quinidine, Quinora, Quinalan, Quinidex)  
Quinidine (Quinora, Quinalan, Cardioquin, Quinidex, Quinaglute)  
Quinalan (Quinora, Cardioquin, Quinidex, Quinaglute, Quinidine)  
Quinora (Quinidine, Quinalan, Cardioquin, Quinidex, Quinaglute)  
Xylocaine (Lidocaine, Xylocard)  
Xylocard (Lidocaine, Xylocaine)

Long-acting Beta 2-agonists:

- Advair, Advair Diskus (combines Serevent and an anti-inflammatory drug)
- Serevent, Serevent discus (salmeterol)
- Foradil

(These drugs take longer to begin to work, but their benefits last longer, even up to 12 hours. Serevent and Foradil are the only inhaled, long-acting beta 2-agonists available. They are used twice a day to maintain open airways for long term-control. Serevent and Foradil are available in dry powder inhaler (DPI) form.)

Short-acting Beta 2-agonists include:

- Albuterol (Proventil HFA, Ventolin HFA, Accuneb)
- Alupent
- Combivent (combines a beta 2-agonist and an anticholinergic, see below)
- Duoneb (combines a beta 2-agonist and an anticholinergic, see below)
- Maxair
- Xopenex

Short-acting Anti-Cholinergic Inhalers Include:

- Atrovent (ipratropium)

(Short-acting beta 2-agonists or anticholinergics are also called "quick acting," "reliever," or "rescue" medications because they relieve asthma symptoms very quickly by opening the airways. These inhalers are the best for treating sudden and severe or new asthma symptoms. They work within 20 minutes and last 4 to 6 hours.)

Appendix E  
STD Information Sheets and Role Plays

## MEC INFORMATION SHEETS

### INFECTIONS WITH HERPES SIMPLEX VIRUS TYPE 2

#### Mode of infection

- Almost always sexual

#### Laboratory assay used in NHANES

- Type specific immunodot assay using sera, which measures antibodies specific for HSV-2. This test result is an indicator of past infection.

#### Frequency

- Approximately 1 in 10 adolescents
- Increases with age among white adults to over 1 in 4 adults
- Increases with age among black adults to over 1 in 2 adults

#### Location of the initial infection and of symptoms

- Women
  - Skin around the vagina, urethra, and rectum
  - Skin of inner thighs and on the buttocks
  - In the vagina and on the cervix
- Men
  - Skin on and around the penis
  - Skin of inner thighs
  - Rectum and skin around the rectum and on the buttocks

#### Latent infection

- Most of the time, the virus remains dormant in nerve cells connected to the lower spinal cord.

- Symptoms occur when the virus begins to replicate in skin cells around the nerve endings.

### **Symptoms of uncomplicated infection**

- Most infected individuals report no symptoms.
- Blisters that break to form multiple small tender sores that heal spontaneously within a week.
- Episodes recur with highly variable frequency, symptom-free intervals ranging from days to months.

### **Complications**

- Occasionally, the sores are sufficiently painful to interfere with urination.
- Rarely, infection of the brain occurs.
- Rarely, babies born to infected women contract serious infections.

### **Diagnosis**

- Blood tests to detect antibody.
  - In NHANES, a special blood test is used that is not yet available to most physicians. The blood test detects antibody and is usually correct, but no test is 100% accurate.
  - Physicians can order blood tests, but they do not reliably distinguish between the type 2 herpes simplex virus infection and type 1 infection that is the infection that most commonly causes fever blisters of the mouth and is not usually sexually transmitted.
- Cultures and other tests detect the virus in blisters and sores, except during the later stage of healing.
- Frequently, the blisters, sores, and history of recurrences are characteristic, and the physician requires no laboratory test to make the diagnosis.

**NOTE:** Except by using the NHANES type of blood test, the infection cannot be detected unless blisters or ulcers are present.

## **Treatment**

- No treatment is curative.
- Antiviral drugs suppress symptoms, which usually recur after the drug is stopped.
- Treatment of each recurrence, separately, is not usually worthwhile, because healing occurs before the drug can act.

## **Preventing infection of others**

- Transmission-related factors
  - Intimate, usually sexual, contact is required.
  - Infected individuals are most infectious when they have sores, but they most often infect others when they are asymptomatic.
  - Infected individuals, who never have symptoms, often shed herpes virus, but how many are infectious is unknown.
- Prevention measures should be taken, but they are not entirely effective.
  - Visit a physician, who can help the infected person determine when a herpes outbreak is occurring.
  - Avoid intercourse during outbreaks.
  - Use condoms.
  - Make sex partners aware of need for preventive measures and residual risks.

## **MEC INFORMATION SHEETS**

### **INFECTIONS WITH HUMAN IMMUNODEFICIENCY VIRUS**

#### **Mode of infection**

- Sexual transmission and percutaneous blood exposure (IV drug use, needle sticks in health care workers, etc.).

#### **Laboratory assay used in NHANES**

- Serum is screened for HIV-1 antibody using an FDA-licensed enzyme immuno assay kit. Repeatedly reactive specimens are then tested by an FDA-licensed Western blot assay.

#### **Frequency**

- Approximately 3 in 1,000 adults
- Approximately 2 in 1,000 white adults
- Approximately 11 in 1,000 black adults
- Approximately 4 in 1,000 Mexican American adults

#### **Diagnosis**

- Blood tests to detect antibody

#### **Incubation (infection to AIDS diagnosis)**

- Median 8-10 years in untreated individual, but varies by age.
- Treatment with HAART (highly active antiretroviral therapy) is altering the median incubation time.

#### **Treatment**

- HAART, if given early, can slow or stop disease progression.
- Treatment of opportunistic infections as they occur.

### **Preventing infection of others**

- Condom use has been demonstrated to be effective against transmission.
- Only abstinence or monogamous relationship (between two HIV negative partners) is totally effective in preventing exposure.

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### Reproductive Health/Sexually Transmitted Diseases

| STD  | Symptoms  | Treatment   | Things to Know  |
|--|---|---|---|
| HIV/AIDS<br>(virus)                          | <p>None or mild flu-like symptoms early in infection.</p> <p>With onset of AIDS many years after infection, persistent cough, unexplained weight loss, diarrhea, fever, etc.</p>  | <p>Treatment is available to slow or stop disease progression.</p> <p>Many serious AIDS-related infections can be prevented by medications.</p> | <p>Early treatment can delay serious complications.</p> <p>Treatment of pregnant HIV positive women can reduce transmission to the baby.</p>  |
| Gonorrhea<br>(clap, drip, GC)<br>(bacterium) | <p>Most women and many men have no symptoms.</p> <p><b>Women:</b> Abnormal vaginal discharge, burning on urination or lower abdominal pain.<br/><b>Men:</b> Discharge of pus from penis; burning on urination.</p>              | <p>Can be cured with antibiotics. Sex partners need to be treated.</p>  | <p>If not treated, can lead to more serious problems. Gonorrhea can lead to infertility in women.<br/>A mother can pass the infection on to her baby.</p>                                 |
| Chlamydia<br>(bacterium)                     | <p>Most women and many men have no symptoms.</p> <p><b>Women:</b> Mild or no symptoms; vaginal discharge; burning on urination or lower abdominal pain.<br/><b>Men:</b> Discharge from penis; burning or pain on urination.</p> | <p>Can be cured with antibiotics. Sex partners need to be treated.</p>  | <p>If not treated, Chlamydia can lead to more serious problems. Reproductive organs can be damaged (Pelvic Inflammatory Disease).<br/>A mother can pass the infection on to her baby.</p> |

**Reproductive Health/Sexually Transmitted Diseases (continued)**

| <b>STD</b>                                  | <b>Symptoms</b>   | <b>Treatment</b>  | <b>Things to Know</b>  |
|---|---|---|--|
| Genital Herpes (virus)                      | <p>Most women and many men have no symptoms.</p> <p>Painful blisters.<br/>Painful urination.<br/>Swollen glands in groin area and fever.</p>  | Herpes cannot be cured but medication can reduce symptoms.                          | <p>Symptoms disappear and may recur at any time.</p> <p>Infected persons are most likely to transmit the infection when they have symptoms, but they can also transmit when they don't have symptoms.</p> <p>In rare instances a mother can give herpes to her infant during childbirth.</p> |
| Bacterial Vaginosis (BV) (bacterial growth) | <p><b>Women:</b><br/>Most women have no symptoms. Others have a gray, thin vaginal discharge with an odor.</p>  | Can be cured with antibiotics. May recur and require repeat or long-term treatment. | <p>If not treated, can lead to more serious problems.</p> <p>It is very important for pregnant women to get treated.</p> <p>Women who have never had sexual intercourse can get BV.</p>  |
| Trichomonas (protozoan)                     | <p>Many women have no symptoms. Some women have a yellow gray or green vaginal discharge with an odor.</p> <p>Burning, irritation of the vaginal area.</p>                              | Can be cured with antibiotics. Sex partners need to be treated.                     | It is very important for pregnant women to get treated.  |
| Syphilis (bacterium)                        | <p>Many women and men have no symptoms.</p> <p>Painless ulcers in the genital area.</p> <p>New infection may produce sore genitals, an unusual rash, fever, or swollen lymph nodes.</p> | Can be cured with antibiotics.  | <p>If not treated, syphilis can lead to long-term health problems including heart disease and nerve problems.</p> <p>It is very important for pregnant women to get treated.</p>   |

**Reproductive Health/Sexually Transmitted Diseases (continued)**

| <b>STD</b>                   | <b>Symptoms</b>   | <b>Treatment</b>   | <b>Things to Know</b>   |
|------------------------------|---|--|---|
| Human Papillomavirus (virus) | <p>Many people have no symptoms.</p> <p>Symptoms and signs of infection are genital warts, abnormal Pap smear, cervical lesions, and cervical cancer.</p> | HPV is not cured with medicine, but symptoms can be treated. | <p>Some types of HPV are linked to cervical cancer, others to genital warts.</p> <p>HPV infection can resolve on its own.</p> |

For information and/or test results, call the NHANES Health Educator: 1-888-301-2360, Monday – Friday 9 AM to 6 PM Eastern Standard Time.

Your participation is giving researchers valuable information about the number of people in this country who are infected with sexually transmitted diseases (STDs). In order to get accurate numbers, we test all survey participants in your age group, even if you are not at risk for getting these diseases.

Your test results are completely confidential and will not be reported to your family, employers, insurers, or intimate contacts. Your doctor can receive results only with your permission. Test results are given only to you. Four weeks after the exam, you may call our health educator toll free at 1-888-301-2360 for your STD results (including HIV testing for those aged 18-49 years). You must provide your password before any results are given out. Please make sure you remember this password when you call. If a health problem is identified, you will be told how to get evaluated and treated.

Other phone numbers you can call:  
 National STD Hotline  
 1-800-227-8922

and the AIDS Hotline  
 1-800-342-AIDS

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## **ROLE PLAY—SCENARIO 1:**

### **Client**

Sam is a 45-year-old divorcé who left his former wife about a year ago. He was married for 20 years and has two children. He has never had an STD, just a urinary tract infection once. He has heard much about HIV/AIDS and is worried how to date safely in the '90s. He is a sample person for the NHANES survey and is willing to be tested for STDs. He is in general good health and looks forward to developing a new romantic relationship.

### **Counselor**

You will be counseling Sam a 45-year-old divorcé who has recently rejoined the dating scene. He is worried about HIV/AIDS and wants to become romantically involved again but safely. He is not very aware of the various types of STDs and the associated symptoms.

You will need to provide a smooth segue into this part of the physician's exam. Discuss the purpose of testing for STD/HIV and why these special tests have a different mechanism for reporting. Assure confidentiality of the survey and test results. If asked, explain and educate Sam on the various STDs, risk behaviors associated with transmission, complications, testing methods, and possible treatments available if found to be infected. In closing, you will arrange for Sam to call to obtain his results if he wishes, in a confidential manner.

### **Observer**

As the observer, you are not to interrupt or engage in the counseling session. Take side notes of the counselor's ability to cover the major points listed:

- Smooth segue into STD/HIV component of physician's exam;
- Assure confidential manner of testing and obtaining results;

- When asked, explain the various types of STDs, risk behaviors, testing methods, associated symptoms, and treatments available if found to be infected; and
- Mechanisms for client to obtain results.

Did the counselor listen to the client to assess risk and knowledge level of the client about STDs?

Did the counselor use open-ended questions to better assess the client's level of understanding?

Did the client appear to understand the level of communication that the counselor was speaking from?

Did the counselor adequately cover the bullets highlighted above?

## **ROLE PLAY—SCENARIO 2:**

### **Client**

Julie is a 19-year-old college student. She has never had an STD and has recently become sexually involved with her boyfriend, Bob, whom she has been dating for 1 year. She has heard about STDs but is not very familiar with symptoms or ways to be tested for them. She is in general good health and looks forward to a happy and healthy future with Bob when she finishes college.

### **Counselor**

You will be counseling Julie, a 19-year-old college student, who has recently become sexually active with her boyfriend Bob. She is not very aware of the various types of STDs and the associated symptoms.

You will need to provide a smooth segue into this part of the physician's exam. Discuss the purpose of testing for STD/HIV and why these special tests have a different mechanism for reporting. Assure confidentiality of the survey and tests methods involved. If asked, explain and educate Julie on the various STDs, risk behaviors associated with transmission, sequelae, testing methods, and possible treatments available if found to be infected. In closing, you will arrange for Julie to call to obtain her results if she wishes, in a confidential manner.

### **Observer**

As the observer you are not to interrupt or engage in the counseling session. Take side notes of the counselor's ability to cover the major points listed:

- Smooth segue into STD/HIV component of physician's exam;
- Assure confidential manner of testing and obtaining results;

- When asked, explain the various types of STDs, risk behaviors, testing methods, associated symptoms, and treatments available if found to be infected; and
- Mechanisms for client to obtain results.

Did the counselor listen to the client and address specific questions about STDs?

Did the counselor use open-ended questions to better assess the client's level of understanding?

Did the client appear to understand the level of communication that the counselor was speaking from?

Did the counselor adequately cover the bullets highlighted above?

### **ROLE PLAY—SCENARIO 3:**

#### **Client**

Jack Williams is 42-years-old and married with two children. He has been married for 12 years and works for a new car dealer. He spent 4 years in the Navy and was once infected with gonorrhea while on leave in Japan. While in the Navy he had to attend presentations about STD/HIV and is familiar with their symptoms and treatment.

#### **Counselor**

You will be talking to Jack about the NHANES project and seeking his permission to test him for STDs and HIV.

You will provide a smooth segue into this part of the examination, assure him that everything is confidential, and explain the test procedures. Explain why he is being tested, the purpose of the project, and what your role is with the project. If Jack agrees to be tested, make arrangements for him to call back for his test results.

#### **Observer**

Do not interrupt the session. Take notes of the following:

- Smooth segue into STD/HIV component of physician's exam;
- Assure confidential manner of testing and obtaining results;
- When asked, explain the various types of STDs, risk behaviors, testing methods, associated symptoms, and treatments available if found to be infected; and
- Mechanisms for client to obtain results.

Did the counselor address the above checklist?

Did the counselor address questions the client may have asked?