

**NATIONAL HEALTH AND NUTRITION  
EXAMINATION SURVEY III  
CYCLE 2**

**BLOOD PRESSURE QUALITY CONTROL PROGRAM**

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## PREFACE

### NHANES III BLOOD PRESSURE QUALITY CONTROL PROGRAM - CYCLE 2

Blood pressure measurements are performed in the MEC by the physician on children (ages 5 to 19) and adults (20 years and above); the interviewers take measurements on adults only (17 years and above) in the household.

The blood pressure QC program consists of the following major elements:

- Quarterly recertification of interviewers and MEC physicians with a Westat home office standard.
- Semiannual recalibration of MEC Managers and/or Field Managers with the home office standard.
- Recertification of back-up physicians (and Westat consultant) with a Westat home office standard, as needed.
- Retraining of interviewers and physicians as needed due to performance problems.
- Annual retraining of interviewers and physicians that have had no QC problems in the interim.
- Quarterly reports to NCHS describing the recertification process and results.
- Administering hearing tests to all interviewers and physicians in the MEC at the beginning of their service and repeating these tests every two years thereafter -- Hearing Test Report.
- Editing of interviewer data forms.
- Quarterly reports of blood pressure data analyses from NCHS.
- Monitoring equipment and equipment repair.

To better locate a specific section of the document, refer to the Table of Contents.

## I. BLOOD PRESSURE CERTIFICATION

The blood pressure certification process is comprised of two parts: 1) a test on recognition of Korotkoff sounds using videotaped blood pressure examples (videotape test) and 2) performance on volunteer subjects (live performance).

### A. Videotape Test

Although the videotape test given to the interviewers and physicians is the same test, the recording and grading for each group is slightly different. On the videotape test, there are twelve blood pressure examples containing systolic, 4th phase diastolic (K4), and 5th phase diastolic (K5, the last sound) pulse sounds. Trainees watch the monitor and record manometer readings for systolic and diastolic pressures, according to the pulse sounds heard. Since the interviewers take blood pressure measurements on adults only, they record only Korotkoff 1 (K1) and Korotkoff 5 (K5) sounds, or a total of 24 readings. In addition to K1 and K5, the physicians record the Korotkoff 4 (K4) sounds which are frequently heard in children, a total of 36 readings. The results are scored as to the accuracy of each reading, and evaluated to determine whether the individual shows terminal digit preference, a tendency to read the manometer high/low, and/or inconsistency in measurement for repeated Korotkoff sounds.

To pass the videotape portion of the certification process, interviewers must have 80% of the K1 readings and 80% of the K5 readings within plus or minus four mm Hg of the standard. The accuracy of the physicians' readings is based, in addition, on having 80% of the K4 readings within plus or minus four of the standard. Any interviewer or physician who shows terminal digit preference, a high/low bias,\* is made aware of the problem(s), and a review of proper manometer reading completed. Any interviewer or physician who has over 20 percent inaccurate readings for K1, K4 or K5 and/or shows a lack of consistent measurement for repeated sounds must repeat the videotape test until successful.

### B. Live Performance

#### 1. Household Interviewers

Before performing blood pressures in the field, the interviewer must participate in a three-day blood pressure training program. The training program consists primarily of instruction/lecture on the first day with individual practice and feedback on the second and third days. (See the attached agenda, Exhibit A.) The training session culminates on the third day with blood pressure certification in which the interviewer must demonstrate proficiency in performing blood pressure measurements on two adult subjects, each observed and graded by different Westat trainers. During certification the interviewer must pass certain performance test criteria.

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\*The physicians are evaluated to see whether or not a high/low bias is noted separately for the 12 K1, K4, and K5 readings and for the 36 total readings. The interviewers are evaluated on the 12 K1 and K5 readings, and the 24 total readings. High/low bias refers to the occasion when the physician/interviewer consistently records the measurement higher and/or lower than the systolic and/or diastolic norm.

**a) Performance Test Criteria - Adults**

Each household interviewer's performance is evaluated using the following criteria. (See Exhibit B for further details as to which situations necessitate repeating the test.)

**(1) For Each Subject:**

- The pulse must be within plus or minus 4 of the trainer for 60 seconds.\*
- The MIL must be within plus or minus 10 mm Hg of the trainer (with two attempts allowed).
- The procedure must be followed as specified in the Blood Pressure Manual.
- The blood pressure readings must be within plus or minus 4 mm Hg of the trainer for 4 out of 6 readings.

**(2) For Both Subjects:**

- If a high/low bias is noted for the 12 total readings, the trainee will be retrained to correct this problem.
- The blood pressure readings must be within plus or minus 4 mm Hg of the trainer for 9 out of the 12 total readings.

**2. Physicians**

Before performing blood pressure measurements in the field, the physician must participate in a 1 1/2- to 2-day blood pressure training program. The training consists primarily of lecture and individual practice. (See the attached agenda, Exhibit C.) The training session culminates with blood pressure certification in which the physician must demonstrate proficiency in performing blood pressure measurements on four subjects, two children and two adults. In addition, the physicians are certified by two different trainers, each trainer observing one child and one adult. During certification the physician must pass certain performance test criteria.

**a) Performance Test Criteria - Adults**

Each physician's performance for adults is evaluated using the same criteria as those for the household interviewers (page 1). (See Exhibit D for further details as to which situations necessitate repeating the test.)

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\*Although the criteria is based on a time frame of 60 seconds, the pulse rate counted by both the interviewers and MEC physicians is for a period less than 60 seconds. The interviewers take the pulse for a period of 30 seconds; the physicians take the pulse for a period of 15 seconds. The interviewer must, therefore, be within plus or minus 2 of the trainer, whereas, the physicians must be within plus or minus 1.

**b) Performance Test Criteria - Children**

To pass certification on children, the following test criteria apply.

**(1) For Each Subject:**

- The pulse must be within plus or minus 4 of the trainer for 60 seconds.
- The MIL must be within plus or minus 10 mm Hg of the trainer (with two attempts allowed).
- The procedure must be followed as specified in the Blood Pressure Manual.
- The blood pressure readings must be within plus or minus 4 mm Hg of the trainer for 7 out of 9 readings.

**(2) For Both Subjects:**

- If high/low bias is noted for the 18 total readings, the physicians will be retrained to correct this problem.
- The blood pressure readings must be within plus or minus 4 mm Hg of the trainer for 4 out of 6 readings of K1, K4, and K5.

**C. Certification/Recertification Program**

The certification/recertification program automates the instructor's calculations when determining pass/fail for certification/recertification procedures. Overall performance (e.g., pass/fail) is then transferred to either the NHANES III Blood Pressure Certification/Recertification Summary for Household Interviewers (Exhibit G) or MEC Physicians (Exhibit H).

**D. Certification Recording Forms**

The Performance Certification/Recertification Form - Instructor Form will be used by the instructor during certification if the certification/recertification program is not available. This form is used by the instructor to record detailed information regarding the performance of each interviewer (Exhibit E) or physician (Exhibit F). Overall performance (e.g., pass/fail) is then transferred to either the NHANES III Blood Pressure Certification/Recertification Summary for Household Interviewers (Exhibit G) or MEC Physicians (Exhibit H).

## **E. Interviewers and/or Physicians Who Fail Certification**

Interviewers and/or physicians who fail the initial certification process are scheduled for retraining followed by another attempt at certification. Interviewers and/or physicians who fail certification procedures despite retraining shall be replaced.

## **II. BLOOD PRESSURE RECERTIFICATION**

Interviewers and physicians are (re)certified by a Westat home office trainer four times per year. Interviewers hired for a six-month period of time are certified during their initial training, then recertified at three months and at six months. The schedule for interviewers and physicians working one or more years is the same as for interviewers hired for a six-month period, plus at nine months. At the one-year interval, interviewers and physicians are retrained and recertified even if they have not been retrained for other reasons in the interim. Interviewers who leave the study, and who have not been recertified within the previous three months, are recertified upon leaving the study.

The recertification program is comprised of two parts: 1) a test on recognition of Korotkoff sounds using videotaped blood pressure examples (videotape test) and 2) performance on volunteer subjects (live performance).

### **A. Videotape Test**

The same recording and grading system is used for recertification as is used for certification (page 1).

### **B. Live Performance**

#### **1. Household Interviewers**

The recertification process begins with a practice session (simulated certification) during which interviewers take blood pressure measurements on one subject with trainer supervision. Using a Y-stethoscope, the trainer from the Westat home office and the interviewer are able to listen to the Korotkoff sounds simultaneously. The interviewer takes blood pressure measurements with supervision by the trainer on a total of five subjects. Although the first supervised blood pressure measurement is considered a practice, it is taken into consideration when evaluating the interviewer's overall performance. The same trainer monitors the interviewer for all five subjects.

#### **a) Recertification Parameters**

To pass the recertification process, the criteria listed on page 2 [(1)] are used in conjunction with the following parameters:

- Four of the five pulse measurements must be within  $\pm 4$  mm Hg of the trainer for one minute.
- Three of the five MILs must be within the  $\pm 10$  mm Hg of the trainer.

- Two of the five procedures must be perfect.
- If a high/low bias is noted separately for the 12 K1, and K5 readings, and/or the 24 total readings, this will be reviewed with the interviewer.
- The blood pressure readings must be within plus or minus 4 mm Hg of the trainer for 4 out of 6 readings for each of the four recertification subjects and 18 out of the 24 for the total readings.

## **2. Physicians**

The recertification process for physicians may begin with a practice session, if either the physician or trainer elects to do so. This practice is not considered when evaluating the physician's overall performance. The physician then takes blood pressure measurements on four subjects (2 on children, 2 on adults) with supervision by the trainer. These four subjects are used to evaluate the physician's overall performance. The same trainer monitors the physician for all four subjects.

### **C. Certification/Recertification Program**

Automates the instructor's calculations when determining pass/fail for certification/recertification procedures. Overall performance (e.g., pass/fail) is then transferred to either the NHANES III Blood Pressure Certification/Recertification Summary for Household Interviewers (Exhibit G) or MEC Physicians (Exhibit H).

### **D. Recertification Recording Forms**

The Performance Certification/Recertification Form - Instructor Form is completed by the instructor for each interviewer (Exhibit E) and physician (Exhibit F) tested if the certification/recertification program is not available. These forms are hand-carried or mailed to the Westat home office. Overall performance for recertification (e.g., pass/fail) is transferred to either the NHANES III Blood Pressure Certification/Recertification Summary for Household Interviewers (Exhibit G) or MEC Physicians (Exhibit H). The Summary form serves as a reference tool to monitor whether all interviewers and physicians are being recertified at the appropriate intervals.

### **E. Interviewers and/or Physicians Who Fail Recertification**

Interviewers and/or physicians who fail the recertification process are scheduled for retraining and recertification. Interviewers and/or physicians who fail recertification procedures despite retraining shall be replaced. Retraining, when necessary, is conducted by a Westat home office trainer. Dr. Brian Dolan, the Westat consultant, is responsible for giving feedback to the physicians as needed.

### III. REPORTS TO NCHS

Westat is responsible for summarizing results of recertification and training as well as problems revealed in interviewer collection of data on questionnaires on a quarterly basis. This includes but is not limited to:

- List of interviewers and physicians requiring retraining based on QC reports from NCHS and the results thereof.
- List of interviewers and physicians requiring retraining based on recertification and the results thereof.
- List of interviewers and physicians recertified at each recertification with a history of previous recertifications.
- List of interviewers and physicians with problems on recertification, what those problems were, and the results of followup observations.
- Summary of data collection problems found by the QC Coordinator/Editor.

### IV. RECALIBRATION OF MEC AND FIELD MANAGERS

Two times each year, the home office trainer(s) travel to the field to "recalibrate" stand, MEC and/or Field Managers in performing blood pressures. The recalibration program is identical to the recertification program for the household interviewers. Home office trainer(s) complete the Certification/Recertification Program or the Blood Pressure Certification/Recertification form for each manager (Exhibit E). (If forms are used they are delivered to Westat.) Overall performance for recalibration (e.g., pass/fail) is transferred to the NHANES III Blood Pressure Certification/Recertification Summary for MEC and Field Managers (Exhibit I).

### V. RECERTIFICATION OF BACK-UP PHYSICIANS AND CONSULTANT

The consultant for the physicians and the back-up physicians are recertified on an "as needed" basis, but at least once a year. The recertification program is identical to that of the MEC Physicians.

### VI. RETRAINING

#### A. Identifying Performance Problems Which Necessitate Retraining

Those interviewers with problems of missing data, bias, and technical error (from the blood pressure data analyses generated by NCHS) are identified quarterly. Interviewers and physicians receive individual feedback regarding his/her results from these analyses; this feedback is usually given following each interviewer's/physician's recertification session. NCHS is responsible for providing criteria for what constitutes a problem requiring retraining. Any interviewer or physician who appears to have problems on successive reports despite retraining shall be replaced.

Those interviewers/physicians who demonstrate less than adequate blood pressure measurement skills during recertification are required to practice the skill(s) causing difficulty. He/she must then show proficiency before taking blood pressure measurements in the field. Depending on the problem(s) noted, retraining is either conducted by a Westat home office trainer or by the Field/MEC Manager. For minor problems, the Field/MEC Manager observes and provides general feedback to the interviewer on his/her technique in the field office.

**B. Annual Retraining**

Once per year, all interviewers and physicians are retrained in the field by home office trainers. Training consists of two sessions. The first session usually covers blood pressure procedure, quality control measures, care and repair of equipment, a demonstration, and the videotape test. The second session is devoted to practice and recertification.

**VII. EDITING OF INTERVIEWER DATA FORMS**

**A. 100% Edit of Data Forms**

A 100% edit of interviewer data forms is performed by field office editing staff. They check for missing or illegible data. They also perform some simple consistency checks including:

- Checking to see that the systolic pressure is greater than the diastolic.
- Checking to see that the MIL is more than the systolic reading.
- Checking the computation of the average blood pressure.
- Checking the average against the table to see that the correct statement was read to the respondent concerning the interpretation of the results.
- Checking to see that the average measurement was computed using the second and third BP reading.
- Checking to see that reasons were recorded if no blood pressure was taken.
- Checking to see that a reason was recorded if the left arm was used.

**B. Recording Forms**

All forms related to blood pressure quality control are mailed to the Westat home office upon completion of the stand.

**1. Blood Pressure Problem Edit Sheet (Exhibit J)**

A complete edit of the Blood Pressure Measurement section of the Household Adult Questionnaire is performed by the Quality Control (QC) Coordinator. Each item on the questionnaire is checked. To

identify the appropriate responses to each item, the QC Coordinator refers to the instructions to the Blood Pressure Problem Edit Sheet (Exhibit J1) and to the question-by-question specifications in the Blood Pressure Manual. Whenever one or more errors are encountered on a questionnaire, such as an illegible or omitted entry, and/or an inconsistent entry, one problem edit sheet is completed for that questionnaire.

**2. NHANES III Record of Edited Blood Pressure Forms (Exhibit K)**

The Quality Control Coordinator keeps a record for each interviewer of all edited blood pressure forms for a specific stand. (See Exhibit K1 for instructions on the proper completion of the form.)

**3. End-Of-Stand Blood Pressure Report (Exhibit L)**

At the end of each stand, the Stand Coordinator reviews all Blood Pressure Problem Edit Sheets to verify that feedback was given to the interviewers, and summarizes the number of forms and the number of forms with problems for each interviewer. (This report also summarizes the number of recertifications completed during the stand, the number of hearing tests, the number of broken and repaired blood pressure equipment sent and received, the number of mercury spills, etc.)

**VIII. EQUIPMENT**

**A. Equipment Checks**

When interviewers join the study, they receive a set of blood pressure equipment from the Field Manager. They are required to sign for the equipment on the BP Equipment Sign Out Sheet (Exhibit M), and are responsible for maintaining and transporting the equipment until they return it to the Field Manager upon leaving the study, or until it is in need of repair.

The Field Manager receives back-up equipment as necessary to replace damaged interviewer equipment. The Field Manager is required to transport the sets of back-up equipment from one stand to the next. Any interviewer who receives back-up equipment is required to sign for it and is responsible for maintaining and transporting the equipment.

At the beginning of each stand, the Field Manager inventories all interviewer and back-up blood pressure equipment and checks each piece of equipment for proper functioning. He/She completes an inventory form and an equipment checklist for each set of blood pressure equipment. (See Exhibit N for the Blood Pressure Beginning Stand Inventory sheet and Exhibit O for the Blood Pressure Equipment Checklist - Field Manager.) The Field Manager files the inventory form and the equipment checklists in the field office blood pressure files until the end of the stand, then mails them to Westat.

Interviewers are required to perform daily and weekly checks on the blood pressure equipment and to complete the NHANES III Blood Pressure Equipment Checklist - Interviewer (Exhibit P). Interviewers turn in a completed checklist to the Field Manager each week. After reviewing the forms, the Field Managers then file the checklists in the field office until the end of the stand when they are sent to Westat.

#### **B. Equipment Repair**

When the Field Manager checks all interviewer blood pressure equipment at the beginning of the stand, a Damaged Blood Pressure Equipment Report (Exhibit Q) is completed for any damaged equipment that is found.

Interviewers are required to check their equipment daily before going to any sample person's home. If any damaged equipment is found, a Damaged Blood Pressure Equipment Report must be completed. Interviewers submit the damaged equipment and the completed form to the Field Manager.

The Field Manager checks all damaged equipment and reviews the Damaged Blood Pressure Equipment Reports that are submitted by the interviewers. The Field Manager then signs off on all Damaged Blood Pressure Equipment Report forms and submits these forms and the damaged equipment to the Stand Coordinator. The Stand Coordinator reviews all Damaged Blood Pressure Equipment Report forms. As soon as a piece of equipment becomes nonfunctional, Barbara Greene at NCHS (301/436-8267) and the appropriate person at Westat are notified. The damaged equipment and a copy of the form are mailed immediately to NCHS. Simultaneously, Westat mails replacement equipment to the field. One copy of the Damaged Blood Pressure Equipment Report is sent to the Westat home office and one copy is kept on file in the field office.

Barbara Greene (NCHS) obtains an NCHS purchase order for all damaged equipment. She then sends the equipment to Baum for repair. Repaired equipment is sent from Baum to Westat, where it is stored until needed.

## **IX**

### **HEARING TESTS**

At the beginning of all interviewers' and physicians' service, and every two years thereafter, hearing tests shall be conducted using the audiometry and tympanometry test given to the SPs at the MEC. A copy of the audiometry and tympanometry response form is used to report the hearing test results (Exhibit R).

The MEC Manager, in coordination with the Field Manager, is responsible for scheduling the testing, seeing that response forms are completed correctly, and sending a copy of the forms to the Westat home office.

**BLOOD PRESSURE QUALITY CONTROL PROGRAM ADMINISTRATION**

The Westat home office has overall responsibility for administering the quality control procedures.

**A. Field Staff Responsibilities****1. MEC Manager**

The MEC Manager is responsible for the technical aspects of blood pressure quality control which include scheduling hearing tests in coordination with the Field Manager. He/she also assists with recertification of interviewers as necessary.

**2. Field Manager**

The Field Manager has the following responsibilities:

- Ensures that interviewers are performing equipment checks on a daily and weekly basis as specified during the blood pressure training.
- Collects blood pressure equipment checklists from interviewers each week and reviews them to be sure they have been completed correctly.
- Discusses and resolves problems with interviewers.
- Receives broken and malfunctioning equipment from the interviewers and documents problems on the Damaged Blood Pressure Equipment Report form. (Forms and broken equipment are given to the Stand Coordinator to be sent to NCHS.)
- Checks each interviewer's equipment when he/she arrives at a stand to ensure that it is complete and functioning properly.
- Transports back-up equipment (5 complete sets) between stands.
- Ensures that interviewers complete a Mercury Spill report form (Exhibit S) whenever a spill occurs. If a spill occurs in the home of an SP, he/she notifies the Stand Coordinator, who in turn notifies the MEC Manager immediately.
- Sees that proper procedures are followed by interviewers when cleaning up mercury spills.
- Makes the necessary on-site arrangements for retraining and recertification in collaboration with the Westat home office.
- Assists with the recertification of interviewers as necessary.
- Works (in conjunction with the Quality Control Coordinator) to ensure that feedback on problems identified from the edit check of the blood pressure forms has been given to the interviewers.

**3. Stand Coordinator**

The Stand Coordinator is responsible for the following:

- Ensures that hearing tests are performed when notified by the home office.
- Maintains documentation files in the Central Filing System for all phases of the blood pressure quality control program including edit forms, mercury spill reports, completed recertification forms (if any), equipment checklists, and equipment repair forms, and sends all documentation to Westat at the end of the stand.
- Maintains (with the assistance of the Office Manager) an adequate supply of all forms used in the blood pressure quality control program.
- Follows specified procedures for documenting, packing, and shipping equipment for repairs. (See Exhibit T for proper packing procedure.)
- Completes the End-of-Stand Blood Pressure Quality Control Report and sends it, along with all documentation, to the home office at the end of the stand.

**4. Quality Control Coordinator (Editor)**

The Quality Control Coordinator is responsible for editing the blood pressure data forms and providing feedback (in conjunction with the Field Manager) to interviewers on problems with accurate completion of blood pressure data forms.

Exhibit A

WESTAT

**INTERVIEWER PULSE AND BLOOD PRESSURE TRAINING**

Instructor A  
Instructor B

**First Day**

<u>Time</u>	<u>Topic</u>
9:00 a.m.	Welcome and Introduction to Blood Pressure Training Orientation to NHANES III
9:20 a.m.	Demonstration Film: "Measuring Blood Pressure"
9:45 a.m.	Description of Blood Pressure Equipment
10:00 a.m.	Break
10:15 a.m.	Introduction to Pulse Measurement Practice
10:45 a.m.	Introduction to Blood Pressure Procedure for Adults Demonstration
11:45 a.m.	Blood Pressure Sounds Videotape Presentation Blood Pressure Examples
12:30 p.m.	Lunch
1:30 p.m.	Korotkoff Sounds, Auscultatory Gap, Enhancement Procedures
1:50 p.m.	Practice Pulse and Blood Pressure Procedure
3:30 p.m.	Break
3:45 p.m.	Resume Practice Pulse and Blood Pressure Procedure
5:30 p.m.	Adjournment

Exhibit A (continued)

WESTAT

**INTERVIEWER PULSE AND BLOOD PRESSURE TRAINING**

Instructor A  
Instructor B

**Second Day**

<u>Time</u>	<u>Topic</u>
8:50 a.m.	Introductory Remarks
9:00 a.m.	Guided Practice in Pulse and Blood Pressure Procedure
10:15 a.m.	Break
10:30 a.m.	Resume Practice Pulse and Blood Pressure Procedure
11:30 a.m.	Review of Physical Measurements Procedures Written Review
12:00 p.m.	Lunch
1:00 p.m.	Videotape and Performance - Practice
1:20 p.m.	Simulated Certification
2:30 p.m.	Break
2:45 p.m.	Resume Simulated Certification
3:45 p.m.	Care of Equipment
5:00 p.m.	Adjournment
5:30 p.m.	Evening Session (as necessary)

Exhibit A (continued)

WESTAT

INTERVIEWER PULSE AND BLOOD PRESSURE TRAINING

Instructor A  
Instructor B

**Third Day**

<u>Time</u>	<u>Topic</u>
9:00 a.m.	Videotape and Performance - Test
9:20 a.m.	Certification
10:30 a.m.	Break
10:45 a.m.	Resume Certification
12:15 p.m.	Lunch
1:15 p.m.	Resume Certification
3:15 p.m.	Interviewing and Recording Procedures
5:00 p.m.	Adjournment
5:30 p.m.	Evening Session (as necessary)

Exhibit B

PULSE AND BLOOD PRESSURE CERTIFICATION  
PERFORMANCE TEST CRITERIA - HOUSEHOLD INTERVIEWERS

1. Incorrect performance of any one of the following points necessitates repeating the entire test.

Blood Pressure Measurement

Procedure

- Correct cuff selection after test fit
- Cuff centered, correct position, snugly wrapped
- Diaphragm headpiece placed approximately over brachial pulse point, not touching cuff or tubing (if feasible)
- Ear tips forward
- Inflation within plus or minus 10 mm Hg of MIL
- Deflation rate not exceeding 4 mm Hg per second

Readings

- MIL determined within plus or minus 10 mm Hg of instructor after two attempts
- At least 4/6 BP values for each test must be within plus or minus 4 mm Hg of instructor's reading; 9/12 BP values must be within plus or minus 4 mm Hg for both tests

2. Incorrect performance of any one of the following points necessitates feedback from the trainer, and requires practice by the interviewer with trainer supervision until proficient.

Pulse Measurement:

Procedure

- Palpate radial pulse if easily palpated by instructor

Reading

- Pulse within plus or minus 4 beats per minute of instructor's reading

Blood Pressure Measurement:

Procedure

- Subject position generally correct
- Reasonable attempt to locate brachial pulse
- Cuff fit tested after application and readjusted if necessary
- Rapid, incremental inflation for MIL
- 1 minute pause between each inflation
- Rapid inflation to MIL
- Tubing disconnected after inflation

Readings

No high or low bias noted for 12 Total Readings

Exhibit C

NHANES III PHYSICIAN'S TRAINING AGENDA  
(BLOOD PRESSURE ONLY)

Day 3

9:00 am	Not applicable
9:40 am	Not applicable
10:15 am	Break
11:30 am	Pulse and Blood Pressure; Equipment and Procedure
12:30 pm	Lunch
1:30 pm	Practice Procedure
2:00 pm	Blood Pressure Videotape
2:30 pm	Blood Pressure - Adult Practice
3:30 pm	Break
3:40 pm	Blood Pressure - Child Practice
5:00 pm	Adjournment

Day 4

9:00 am	Videotape and Blood Pressure - Practice
10:00 am	Videotape Test
10:30 am	Blood Pressure Certification
10:15 am	Break
10:30 am	Resume Certification

Exhibit D

PULSE AND BLOOD PRESSURE CERTIFICATION  
PERFORMANCE TEST CRITERIA - PHYSICIANS

1. Incorrect performance of any one of the following points necessitates repeating the entire test.

Blood Pressure Measurement

Procedure

- Correct cuff selection after test fit
- Cuff centered, correct position, snugly wrapped
- Diaphragm (or bell) headpiece placed approximately over brachial pulse point, not touching cuff or tubing (if feasible)
- Ear tips forward
- Inflation within plus or minus 10 mm Hg of MIL
- Deflation rate not exceeding 4 mm Hg per second

Readings

- MIL determined within plus or minus 10 mm Hg of instructor after two attempts
- For adults: At least 4/6 BP values for each test must be within plus or minus 4 mm Hg of instructor's reading; 9/12 BP values must be within plus or minus 4 mm Hg for both tests
- For Children: At least 7/9 BP values for each test must be within plus or minus 4 mm Hg of instructor's reading; 4/6 BP values must be within plus or minus 4 for K1, K4, and K5 for both tests

Exhibit D (continued)

2. Incorrect performance of any one of the following points necessitates feedback from the trainer, and requires practice by the interviewer with trainer supervision until proficient.

Pulse Measurement:

Procedure

- Palpate radial pulse if easily palpated by instructor

Reading

- Pulse within plus or minus 4 beats per minute of instructor's reading

Blood Pressure Measurement:

Procedure

- Subject position generally correct
- Reasonable attempt to locate brachial pulse
- Cuff fit tested after application and readjusted if necessary
- Rapid, incremental inflation for MIL
- 1 minute pause between each inflation
- Rapid inflation to MIL
- Tubing disconnected after inflation

Readings

- No high or low bias noted for 18 Total readings for children and 12 Total readings for adults

PERFORMANCE CERTIFICATION/RECERTIFICATION FORM - INSTRUCTOR FORM

INTERVIEWER NAME: \_\_\_\_\_ DATE: \_\_\_\_\_

INSTRUCTOR NAME: \_\_\_\_\_ PRACTICE: \_\_\_\_\_ TEST: \_\_\_\_\_

Record Readings for Each Subject In the Spaces Below:

Performance Item*	Adult Subject #1	Adult Subject #2	Adult Subject #3	Adult Subject #4
<b>A. Pulse Measurement</b>				
a. Radial palpation (+)	_____	_____	_____	_____
b. Reading - Trainee	_____	_____	_____	_____
- Instructor	_____	_____	_____	_____
(within $\pm$ 4 beats/min. of Instructor) (+)	_____	_____	_____	_____
<b>B. Blood Pressure Measurement</b>				
1. Subject's position	( )	( )	( )	( )
2. Cuff Application				
a. Cuff selection (+)	( )	( )	( )	( )
b. Brachial palpation	( )	( )	( )	( )
c. Cuff application (+)	( )	( )	( )	( )
d. Test of fit	( )	( )	( )	( )
<b>3. MIL</b>				
<b>1st attempt</b>				
a. Inflation rate	( )	( )	( )	( )
b. Disconnect tubing	( )	( )	( )	( )
c. Value (Trainee)	_____	_____	_____	_____
(Instructor)	_____	_____	_____	_____
<b>2nd attempt</b>				
a. Inflation rate	( )	( )	( )	( )
b. Disconnect tubing	( )	( )	( )	( )
c. Value (Trainee)	_____	_____	_____	_____
(Instructor)	_____	_____	_____	_____
(within $\pm$ 10 mm Hg of Instructor) (+)	_____	_____	_____	_____

\*For procedure items, enter (✓) if satisfactory or (x) if deficient. Enter note on specific deficiency observed.

(+) In \_\_\_\_\_'s entire test must be repeated if done improperly on certification.

Exhibit E (Continued)

4. BP Measurement	Adult Subject #1			Adult Subject #2			Adult Subject #3			Adult Subject #4		
	BP #1	BP #2	BP #3	BP #1	BP #2	BP #3	BP #1	BP #2	BP #3	BP #1	BP #2	BP #3
a. 1 minute pause	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
b. Stethoscope placement (+)	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
c. Ear tips forward (+)	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
d. Inflation rate	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
e. Maximum inflation (MIL $\pm$ 10) (+)	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
f. Deflation rate (< 5/sec) (+)	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
g. Disconnect tubing	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
h. Reading-Trainee	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
- Instructor	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____

At least 4/5 BP values for each subject must be within  $\pm$  4 mm Hg of instructor's reading, and then 9/12 BP (or 18/24) values must be within  $\pm$  4 mm Hg for all tests. (+)

Use Table 1 to determine if trainee is consistently reading high or low for K1, K5, and total readings. (+)

i. Factors affecting measurement (if any) \_\_\_\_\_

C. Scoring

Pulse - Procedure	P	F	P	F	P	F	P	F
- Accuracy	P	F	P	F	P	F	P	F
BP - Procedure	P	F	P	F	P	F	P	F
- MIL	P	F	P	F	P	F	P	F
- Accuracy	P	F	P	F	P	F	P	F

Instructor Comments: \_\_\_\_\_

Table		Total readings	K1*	K5*
Follow steps (1) - (6)				
(1) # of (+) readings				Trainee has bias if the number listed in (5) is 5 (the number below)
(2) # of (-) readings				0
(3) Sum of (1) and (2)				1
(4) Is (1) or (2) smaller? (Circle)	1	2	1	2
(5) If 1 circled in (4), enter # from (1)				2
If 2 circled in (4), enter # from (2)				3
(6) Use answers in (3) and (5) on Table 1 to determine bias				4
				5
				6

# Exhibit F. Performance Certification/Recertification Form - Instructor Form

## PERFORMANCE CERTIFICATION/RECERTIFICATION FORM - INSTRUCTOR FORM

INTERVIEWER NAME: \_\_\_\_\_ DATE: \_\_\_\_\_

INSTRUCTOR NAME: \_\_\_\_\_ PRACTICE: \_\_\_\_\_ TEST: \_\_\_\_\_

Record Readings for Each Subject in the Spaces Below:

	Child Subject #1	Child Subject #2	Adult Subject #1	Adult Subject #2
<b>Performance Item:</b>				
<b>A. Pulse Measurement</b>				
a. Radial palpation (+)	_____	_____	_____	_____
b. Pleading - Trainee - Instructor (within 2-4 beats/min of instructor) (+)	_____	_____	_____	_____
<b>B. Blood Pressure Measurement</b>				
1. Subject's position	( )	( )	( )	( )
2. Cuff Application				
a. Cuff selection (+)	( )	( )	( )	( )
b. Brachial palpation	( )	( )	( )	( )
c. Cuff application (+)	( )	( )	( )	( )
d. Test of fit	( )	( )	( )	( )
3. ML				
<b>1st attempt</b>				
a. Inflation rate	( )	( )	( )	( )
b. Disconnect tubing	( )	( )	( )	( )
c. Value (instructor) (Trainee)	_____	_____	_____	_____
<b>2nd attempt</b>				
a. Inflation rate	( )	( )	( )	( )
b. Disconnect tubing	( )	( )	( )	( )
c. Value (instructor) (Trainee)	_____	_____	_____	_____
(within 2-10 mm Hg of instructor) (+)				

\*For procedure items, enter (✓) if satisfactory or (x) if deficient. Enter note on specific deficiency observed

( ) indicates entire test must be repeated if done improperly

# Exhibit F. Performance Certification/Recertification Form - Instructor Form (continued)

4. BP Measurement	Child Subject #1			Child Subject #2			Adult Subject #1			Adult Subject #2		
	BP #1	BP #2	BP #3	BP #1	BP #2	BP #3	BP #1	BP #2	BP #3	BP #1	BP #2	BP #3
a. 30 second pause	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
b. Sphygmomanometer placement (+)	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
c. Ear tips forward (+)	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
d. Inflation rate	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
e. Maximum inflation	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
f. PML $\pm$ 10% (+)	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
g. Deflation rate (< 5/sec) (+)	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
h. Disconnect tubing	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
i. Reading-Trainee	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
- Instructor	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )

**Adults:** At least 4/8 BP values for each test must be within  $\pm 4$  mm Hg of instructor's reading, and then 9/12 BP values must be within  $\pm 4$  mm Hg for both tests. (+)

**Children:** At least 7/8 BP values for each test must be within  $\pm 4$  mm Hg of instructor's reading, and then 4/8 BP values must be within  $\pm 4$  mm Hg for K1, K4, and K5. (+)

Use Table 1 to determine if trainee is consistently reading high or low for total readings on children/adults. (+)

### I. Factors affecting measurement (# any)

### C. Scoring

Pulse - Procedure	P	F	P	F
- Accuracy	P	F	P	F
BP - Procedure	P	F	P	F
- ML	P	F	P	F
- Accuracy	P	F	P	F

Instructor Comments:

Follow steps (1) - (6)	Total readings (adults)	Total readings (children)	Total number entered in (1) in this column	Total number of the number listed in (1) in 5 the number below
(1) # of (+) readings			0-8	0
(2) # of (-) readings			9-11	1
(3) Sum of (1) and (2)			12-16	2
(4) Is (1) or (2) smaller? (Circle)	1	2	15-16	3
(5) If 1, circle in (1) enter # from (1)			17-19	4
(6) If 2, circle in (2) enter # from (2)			20-22	5
			23-26	6

(+) The answers in (1) and (2) on Table 1 to determine bias





Exhibit I

NHANES III Blood Pressure Certification/Recertification Summary for MEC and Field Managers

MEC Manager	ID #	Hearing Test			1 Jan - Mar	Status	Exam	Outcome	2 Apr - Jun	Status	Exam	Outcome	3 July - Sept	Status	Exam	Outcome	4 Oct - Dec	Status	Exam	Outcome	
		Re- sults	First tested	Retake date																	

Field Manager																					

Status Codes:

- L = Leave of absence
- T = Terminated
- Q = Quit

Outcome Codes:

- P = Passed
- P2 = Passed after second attempt
- R = Retained and passed
- F = Failed - Scheduled for retraining
- F/T = Failed and terminated
- I = Incomplete

Type of Examination:

- C = Certification
- R = Recertification

Hearing Test Result Codes:

- P = Pass
- F = Fail
- O = Outside limits for one or more frequencies

Exhibit J

**BLOOD PRESSURE EDIT PROBLEM SHEET**

Editor Name \_\_\_\_\_ Date \_\_\_\_\_

Interviewer Name \_\_\_\_\_ SP ID# \_\_\_\_\_

Stand Number \_\_\_\_\_

Missing data (describe) \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

No BP taken; no reason recorded

Left arm used; no reason recorded

MIL < systolic

Diastolic > systolic

Wrong statement circled in report

Average of 2nd and 3rd BP measures incorrect

Other (describe) \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Feedback given by \_\_\_\_\_  
Name

Date \_\_\_\_\_

Exhibit J1

**Instructions for Completing the Blood Pressure Edit Problem Sheet**

Instructions for completing each item on the Blood Pressure Edit Problem Sheet are as follows:

- Editor Name: Record your first and last name in the space provided.
- Interviewer Name: Record the interviewer's first and last name in the space provided.
- Stand Number: Record the three-digit stand number in the space provided.
- Date: Record two digits each for the month, day, and year the Blood Pressure Form was edited.
- SP ID#: Record the SP's seven-digit ID number as it appears on the cover of the Household Interview Form - Adult.
- Missing data: Review each item in order. If an item is left blank, a comment should be recorded in ZA4, ZA8, or ZA13 according to the "Revised Instructions to Interviewers for Completing the Blood Pressure Measurement Form." If an item is left blank and no reason is recorded by the interviewer, record the item's number in "Missing Data" section of this form.

Consistency checks:

- NO BP taken, no reason recorded: Refer to item ZA8. If the systolic and diastolic values are not recorded in the "READING" column, an entry should be made in the "BP NOT DONE" or the "BP REFUSED" column. If the systolic and diastolic values are not recorded for ZA8a, b, c and/or d in the "READING" column and a reason is not recorded in the "BP NOT DONE" or "BP REFUSED" column, check this box.
- Left arm used, no reason recorded: Refer to item ZA4. If box "2 Left" is marked, a reason must be checked in the space provided in item ZA4. If no reason is recorded in the space provided in item ZA4, check this box.
- MIL less than systolic: Refer to items ZA7 and ZA8. The value recorded for the MIL in ZA7 should be greater than the systolic (SBP) values recorded in ZA8a, b, c and/or d. If the value recorded for the MIL in ZA7 is less than the value recorded for the systolic in ZA8a, b, c and/or d, check this box.
- Diastolic greater than systolic: Refer to items ZA8a, b, c and/or d. The systolic (SBP) value should be greater than diastolic (DBP (5th sound)). If the diastolic value is greater than the systolic value in item ZA8a, b, c, and/or d, check this box.

Exhibit J1

**Instructions for Completing the Blood Pressure Edit Problem Sheet (Continued)**

Please note: If the entire blood pressure procedure was not done, that is, items ZA2 through ZA8 are blank, check to see that a reason is recorded in item ZA1, or item ZA9. If no reason is recorded in item ZA1 or ZA9, check item I in the Name/SSAN section of the Household Adult Questionnaire form. If the reason for no blood pressure is recorded there, transcribe the reason to item ZA9 and check the "No BP taken; no reason recorded" box. If no reason is recorded in item I of the Name/SSAN section of the Household Adult Questionnaire form, check the "No BP taken; no reason recorded" box.

- **Wrong statement circled on report:** Refer to the Adult Report of Pulse and Blood Pressure Findings to confirm that the statement to be read to the SP has been correctly circled. If the wrong statement is circled, check this box. Send by FAX (301) 738-8379 to Susan Rogers at Westat the following:
  - Section ZA of the Adult Questionnaire
  - Adult Report of Pulse and Blood Pressure Findings, and
  - The Blood Pressure Edit Sheet
- **Average of second and third blood pressure measures incorrect:** Refer to the Adult Report of Pulse and Blood Pressure Findings and items ZA8a, b, c and/or d of the blood pressure measurement section of the Household Adult Questionnaire. Confirm that the average of the second and third blood pressure measures has been calculated correctly and recorded on the Adult Report of Pulse and Blood Pressure Findings. If the average of the second and third measures is incorrectly calculated or not recorded, check this box.
- **Other problems:** If, as you review the blood pressure section, you notice other inconsistencies or problems, describe the problem in the "other problems" section of this form. Examples are given below:

If any of the entries are illegible, record the item numbers of the illegible entries with the comment illegible; record this in the "other problems" section of this form.

If the entire blood pressure procedure was not done for medical reasons, this should be documented in item ZA1 only. If you find that the interviewer has documented that the blood pressure was not done for medical reasons on any other part of the form, record this in the "other problems" section of this form.

If you notice that the interviewer is recording comments on any part of the blood pressure section other than the spaces provided in items ZA4, ZA8, or ZA13, record this in the "other problems" section of this form.
- **Feedback given by:** After the QC coordinator/Field Manager gives verbal feedback to the interviewer about problems identified on the SP Edit Problem Sheet, s/he should sign in the space provided.
- **Date:** Record two digits each for the months, day, and year that verbal feedback was given.



Exhibit K1

**Instructions for Completing the Record of Edited Blood Pressure Forms**

Complete a new form for each interviewer. Record the following information:

- **Editor Name:** Record your first and last name in the space provided.
- **Interviewer Name:** Record the interviewer's first and last name in the space provided.

For each edited blood pressure form record the following information:

- **SP ID #:** Record the SP's seven digit ID number as it appears on the cover of the Household Interview Form - Adult (or if a preprinted label is available, attach it to the form).
- **Date:** Record two digits each for the month, day, and year the Blood Pressure Form was edited.
- **No problem noted:** Review the blood pressure section for missing or illegible data. Perform consistency checks. If, after the edit of the Blood Pressure Form is complete, no problems are noted, check this box.
- **Problem noted:** If, during the edit of the Blood Pressure Form, any problem, e.g., missing data, illegible data, inconsistent entries, is noted, check this box. Please be aware that if this box is checked, a Blood Pressure Edit Problem Sheet must be completed.

**END-OF-STAND BLOOD PRESSURE QUALITY CONTROL REPORT**

**Certification Procedures**

**Recertifications**

**Number Passed** \_\_\_\_\_

**Number Failed** \_\_\_\_\_

**Hearing Tests**

**Number Passed** \_\_\_\_\_

**Number Failed** \_\_\_\_\_

**Number of Interviewers Retrained** \_\_\_\_\_

**Numbers of Interviewers Observed** \_\_\_\_\_

**Equipment**

**Number of mercury spills** \_\_\_\_\_

**Number of damaged equipment items identified** \_\_\_\_\_

**Number of damaged equipment items sent to NCHS for repairs** \_\_\_\_\_

**Number of repaired equipment items received from Westat** \_\_\_\_\_

**Number of new equipment items received from Westat** \_\_\_\_\_

**Blood Pressure Forms Edit**

<b><u>ID No. of Interviewer</u></b>	<b><u>No. of Edits Completed</u></b>	<b><u>No. of Forms with Problems</u></b>
-------------------------------------	--------------------------------------	--





Exhibit O

NHANES III

BLOOD PRESSURE EQUIPMENT CHECKLIST

FIELD MANAGER

Field Manager Name \_\_\_\_\_

Date of Test |\_|\_|-|\_|\_|-|\_|\_|

Interviewer Name \_\_\_\_\_

Stand No. \_\_\_\_\_

Interviewer ID No. \_\_\_\_\_

Item	Yes	No	Comments
1. Level of mercury at zero			
2. Mercury bounces with valve closed			
3. Cracks in glass tube			
4. Cap at top of tube is secure			
5. Spilled mercury in the manometer case			
6. Cracks, tears in cuffs, bulb and manometer/stethoscope tubing			
7. Cracks in stethoscope diaphragm			
8. Did blood pressure system pass "coffee can" air leak test			
9. Other			

Exhibit P

NHANES III  
BLOOD PRESSURE EQUIPMENT CHECKLIST  
INTERVIEWER

Interviewer Name \_\_\_\_\_

Week Beginning |\_\_|\_|-|\_\_|\_|-|\_\_|\_|

Interviewer ID# \_\_\_\_\_

Week Ending |\_\_|\_|-|\_\_|\_|-|\_\_|\_|

Stand No. \_\_\_\_\_

Item	Day													
	1		2		3		4		5		6		7	
	Yes	No												
1. Level of mercury at zero														
2. Mercury bounces with valve closed														
3. Cracks in glass tube														
4. Cap at top of tube is secure														
5. Spilled mercury in the manometer case														
6. Cracks, tears in cuffs, bulb and manometer/stethoscope tubing														
7. Cracks in stethoscope diaphragm														
8. Did blood pressure system pass "coffee can" air leak test (weekly)														
9. Other														
<b>COMMENTS</b>														

\_\_\_\_\_  
Initials of Field Manager  
Reviewing Checklist

Exhibit Q

NHANES III

**Damaged Blood Pressure Equipment Report**

Equipment Name _____	
Serial # (If applicable) _____	
Description of Problem _____	
_____	
_____	
_____	
Interviewer ID No. _____	
Interviewer Signature _____	Date ____/____/____
Field Manager ID No. _____	Date ____/____/____
Field Manager Signature _____	

Date Equipment Shipped to NCHS ____/____/____
Stand Coordinator Signature _____
Stand Coordinator ID No. _____



Exhibit R

OMB No. 0920-0237

**AUDIOMETRY AND TYMPANOMETRY**  
**AGES 6-19 YEARS**

a. STAFF NO. _____	b. Audiometer No. _____	c. Tympanometer No. _____	d. SAMPLE NO _____
<b>A. CONDITIONS AFFECTING TEST RESULTS (ALL AGES)</b>			
1. Have you had a cold or sinus problems within the past week?		1 <input type="checkbox"/> yes    2 <input type="checkbox"/> no (Q3)	
2. Do you have a cold or sinus problems today?		1 <input type="checkbox"/> yes    2 <input type="checkbox"/> no	
3. Have you been exposed to a very loud noise within the past 24 hours?		1 <input type="checkbox"/> yes    2 <input type="checkbox"/> no (Q%)	
4. How many hours ago did the noise end?		66 <input type="checkbox"/> Less than 1 hour _____ # hours ago	
5. Have you listened to music with headphones or ear phones within the past 24 hours?		1 <input type="checkbox"/> yes    2 <input type="checkbox"/> no (Q7)	
6. How many hours ago did you stop listening?		66 <input type="checkbox"/> Less than 1 hour _____ # hours ago	
7. Have you had buzzing, ringing or other noises in your ears today?		2 <input type="checkbox"/> No 3 <input type="checkbox"/> Right 4 <input type="checkbox"/> Left 5 <input type="checkbox"/> Both	
8. Have you had an earache within the past week?		2 <input type="checkbox"/> No 3 <input type="checkbox"/> Right 4 <input type="checkbox"/> Left 5 <input type="checkbox"/> Both	
9. Do you now have a tube in your right or left ear?*		2 <input type="checkbox"/> No 3 <input type="checkbox"/> Right 4 <input type="checkbox"/> Left 5 <input type="checkbox"/> Both	

PBS 6214-3  
Rev. 08/88



Exhibit R (Continued)

D TYMPANOMETRY

Right Ear

1  Obtained  
2  Not obtained

Left Ear

1  Obtained  
2  Not obtained

RESULTS OF TYMPANOMETRY:

1  Satisfactory Test  
2  Test incomplete  
3  Test not done

REASONS TEST INCOMPLETE OR NOT DONE:

1  Software malfunction  
2  Hardware malfunction or lack of supplies  
3  Insufficient time available or room not available  
4  Examinee refused  
5  Examinee medically excluded by staff for safety  
6  Examinee has pre-existing condition that would affect validity of test  
7  Examinee unable to physically cooperate  
8  Examinee unable to understand test instructions due to language barrier  
9  Examinee unable to understand test instructions due to other reasons  
10  Examinee uncooperative  
11  Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



Exhibit S (Continued)

6. Please list the replacement equipment you will need.

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_
6. \_\_\_\_\_
7. \_\_\_\_\_
8. \_\_\_\_\_
9. \_\_\_\_\_

**B. TO BE COMPLETED BY MEC MANAGER:**

1. \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_  
Your Name ID No. Date

2. Did you report the incident to a local agency?  Yes  No

3. If you reported the spill, please list Agency, Contact Person and Telephone Number below:

\_\_\_\_\_  
Agency  
\_\_\_\_\_  
Contact Person  
\_\_\_\_\_  
Tel. No.

4. Will Agency visit spill site?  Yes  No

5. If you did not report the spill, please record your reason(s) below:

\_\_\_\_\_  
\_\_\_\_\_

**C. TO BE COMPLETED BY FIELD MANAGER:**

1. \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_  
Your Name ID No. Date

2. Was the mercury spill handled correctly?  Yes  No  
If no, please explain problems below.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

## **PACKING BLOOD PRESSURE EQUIPMENT FOR SHIPPING**

### **Introduction**

Blood pressure equipment needs special packing in order to prevent hazardous mercury spills and contamination. Manometers should always be packed and shipped on their sides so that the mercury reservoir is positioned at the bottom of the manometer case. (Placing the manometer in a position where the reservoir is on the bottom allows the mercury to flow out of the glass tube and back into the reservoir for storage.) All equipment including manometers, cuffs, and stethoscopes should be packaged separately in plastic bags to prevent extensive contamination in the event of a mercury leak. If possible, manometers should be packed in a separate box for shipping. Manometers should be shipped by ground transport only to prevent mercury leaks which can occur when the manometers are exposed to extreme fluctuations in air pressure.

### **Supplies**

You will need the following supplies to pack and transport blood pressure equipment:

- **sturdy cardboard box**
- **bubble paper, Styrofoam chips, or newspaper**
- **plastic bags (to hold manometer, or extra cuffs, etc.)**
- **twist ties**
- **black magic marker**
- **courier service labels**
- **strapping tape**

### **Procedures**

Follow the instructions below to pack blood pressure equipment for shipping:

1. **Pack manometers as follows:**
  - **With the manometer case open, connect the cuff tubing to the manometer and close the thumb valves.**
  - **Wrap the cuff securely.**

Exhibit T (Continued)

- Place the cuff in the upper end of the case.
  - Place the manometer tubing to the right side of the case.
  - Check that the thumb valve is closed and insert it in the catch provided for it by gently slipping the thumb valve backward into the catch.
  - Gently pull the top of the case towards you until it touches the bottom of the case; then gently push on the top of the case to close.
  - Place the manometer in a plastic bag and securely close the bag with a twist tie.
  - Place a layer of insulation on the bottom of the box. Position the manometer on top of the insulation on its side ensuring that the mercury reservoir is closest to the bottom of the box. Most manometers will have a "This Side Up" label for the appropriate direction of placement.
  - Place any additional manometers in the box in the same manner described above. Manometers should be securely positioned to prevent them from falling over during transport. Make sure the manometers are well insulated from each other and from the sides of the box.
2. If you are shipping extra cuffs or stethoscopes in the same box as a manometer, be sure to place each cuff in plastic bag and close the bag with a twist tie. If possible place each stethoscope in a box (to fit); then place the box in a plastic bag and close the bag with a twist tie.
  3. Make sure all equipment is securely packed and well insulated. Close the box and use strapping tape to secure it.
  4. Use a magic marker to write "This Side Up" on each side of the box with arrows pointing to the top of the box. Also write "Fragile - Handle with Care" on the top and sides of the box.
  5. Complete appropriate courier service labels and attach them to shipping container.
  6. Ship all manometers using ground transport only. If a shipment contains only cuffs and/or stethoscopes you may ship by air transport.