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## **WEIGHT AND HEIGHT PROTOCOL (IN SCHOOL)<sup>1</sup>**

### **1.1 Equipment**

- Table
- Privacy screens
- SECA 882 Scale from SECA Corporation
- 3'x3' plywood boards to place beneath the scale and the stadiometer (if you know that the floor is hard and level where the equipment is located at the school site, you do not need to have this board)
- Carpenters level, at least 3' in length
- Alcohol or Clorox wipes to wipe off scale after each student
- Baskets or bags for students' extra clothing and other items
- Stadiometer
- Small stepstool, if needed, because there is the possibility that some staff may be shorter than participating student are
- 12" ruler
- Comment logs for any necessary private notes about students measured

### **1.2 Personnel**

- Research assistants trained and certified in measuring height and weight according to study protocol

### **1.3 Procedures for Weight**

#### **1.3.1 Preparation**

1. Keep the battery unit unplugged from the scale unless it is being used on a daily basis.
2. The SECA 882 Scale does not give accurate weights above 400 lb (180 kg) maximum according to the manufacturer. Weighing such students using these scales may damage the scale. Prior to undertaking the screening, check with the school nurse or coach to be certain that there is no student greater than 400 lb in the school. For students over 350 lb (160 kg), the SECA 634 Scale must be used to obtain an accurate weight measurement. For other special circumstances, see the section on Special Circumstances below.

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<sup>1</sup> Adapted from the HEALTHY study (The HEALTHY Study Group, in press)

3. The scale should be calibrated monthly and checked daily for correct calibration. See the section on Equipment Calibration and Maintenance below for instructions.
4. Move scale CAREFULLY as electronic sensors are easily damaged.
5. Make sure control cable is locked into control box.
6. Place a 3'x3' plywood board beneath the scale prior to leveling unless the floor is hard and level.
7. Adjust scale feet so that (1) scale wheels are off carpet and (2) scale is level (use a carpenter's level to check).
8. Plug the scale in as required.
9. Turn scale on by pressing ON button.
10. If low battery signal appears, change batteries immediately (scale may not be accurate on low batteries).
11. Switch to kilogram display (light above that button will be ON to indicate kg measure).
12. Make sure you have a reading of ZERO before having subject step onto platform. Press Tare/Reweight if you do not have a zero reading.

### **1.3.2 Procedure**

1. Introduce yourself and explain what you are going to do.
2. Ask the student to remove any excess clothing (sweatshirts, sweaters, or jackets), to remove shoes, and place any items from pockets in baskets provided.
3. If the student has refused to remove excess clothing, do not take a measurement, and note the refusal on data collection form.
4. Have the student step up onto the scale, placing feet next to one another over the center of the scale. If the student's feet are longer than the scale, then heels and balls of feet should be on the scale and toes hanging off front. Make sure body weight is distributed evenly over both feet. Arms should hang freely by the sides of the body, head held up and facing forward.
5. Make sure the subject is not leaning to one side or forward or backward, and that the head is held stationary, looking straight ahead.
6. If the measurement drastically fluctuates, first make sure the student is still standing in the exact middle of the scale base with feet right next to each other. The further the center of weight is from the exact center of the base, the more likely the scale reading will fluctuate. This is more likely to happen with heavier and/or taller individuals. You may also need to check that the scale is still level.
7. When the readout is stable, record weight on data collection form to the nearest 0.1 kg. The student may want to know his/her value. DO NOT switch the scale to 'pounds' and re-measure—the opportunity for error due to forgetting to switch back is too great. Either use a calculator to multiply ( $\text{kg} \times 2.2 = \text{lb}$ ) or refer to a conversion chart (see appendix). Use a low voice that cannot be overheard.
8. Have the student step off the scale. Repeat procedures in steps 4 through 7 either immediately or after collecting a first height reading.
9. Record second weight on data collection form. If the first two measurements are  $\leq \pm 0.2$  kg of each other, stop and circle both measurements.
10. If the first two measurements are not  $\leq \pm 0.2$  kg of each other, repeat the procedures in steps 4-7, having the student step off the scale between each measurement until two values are  $\leq 0.2$  kg of each other. Record each measurement on data collection form—space is left for up to 4 measurements, although it is not expected to take that many. Circle the two measurements which are within 0.2 kg of each other and which are to be data entered. If you cannot obtain two measures within 0.2 kg of each other by the third

try, check the battery reading on the scale and summon the experienced measurer to conduct the final measure.

11. If the scale registers maximum weight of 400 pounds (180 kg) or a valid weight measurement cannot be made for some other reason, then check the box for item 9 on data collection form if at Baseline Data Collection or check the box for use of the heavy duty scales and measure the subject again on the SECA 634 Scale. If a valid weight cannot be measured on either scale, then check the invalid weight box and make note of the reason why the measurement could not be made. See the section on Invalid or Missing Weight/Height Data Due to Special Circumstances for more details.
12. Either send the student with the clipboard to the next station, or take student to next station and give clipboard with forms to study staff there.
13. Take notes on a separate log (not data collection form which the kids will be carrying around) with ID and observations about kids whose weight measures may come under review, for example, 'very tall and skinny boy', 'short stocky girl', 'girl had recent growth spurt in height and has been on diet for weight'.

### **Procedures for Larger Weight Capacity Scales**

1. There are multiple stations for taking measurements, each surrounded by privacy screens. All stations have a regular scale. In addition, one station has the heavy duty scale--let's call it station X.
2. The students are directed to a station in a seemingly 'random' order, but all heavy kids are sent to station X, interspersed with normal kids.
3. All kids at station X are first put on the regular scale and weight is recorded, then on the heavy duty scale and weight is recorded. We explain that we are doing this to compare weights from the two scales as part of our study. For students weighed at station X, the procedures for the HD scale are identical to the regular scale, that is, continue to have the student step off the scale and repeat the steps until two measures within 0.2 kg are recorded. Record each measurement on data collection form—space is left for up to 4 measurements, although it is not expected to take that many. Circle the two measurements which are within 0.2 kg of each other and which are to be data entered. If you cannot obtain two measures within 0.2 kg of each other by the third try, check the battery reading on the scale and summon the experienced measurer to conduct the final measure.

## **1.4 Procedures for Height**

### **1.4.1 Preparation**

#### Stadiometer Set-up

1. Position the base vertically on the floor.
2. Place a 3'x3' plywood board beneath the stadiometer unless the floor is hard and level. Make sure board surface is level using a carpenter's level.
3. Head/foot piece may be secured at any location along stature extension using small wing nut in back of piece.

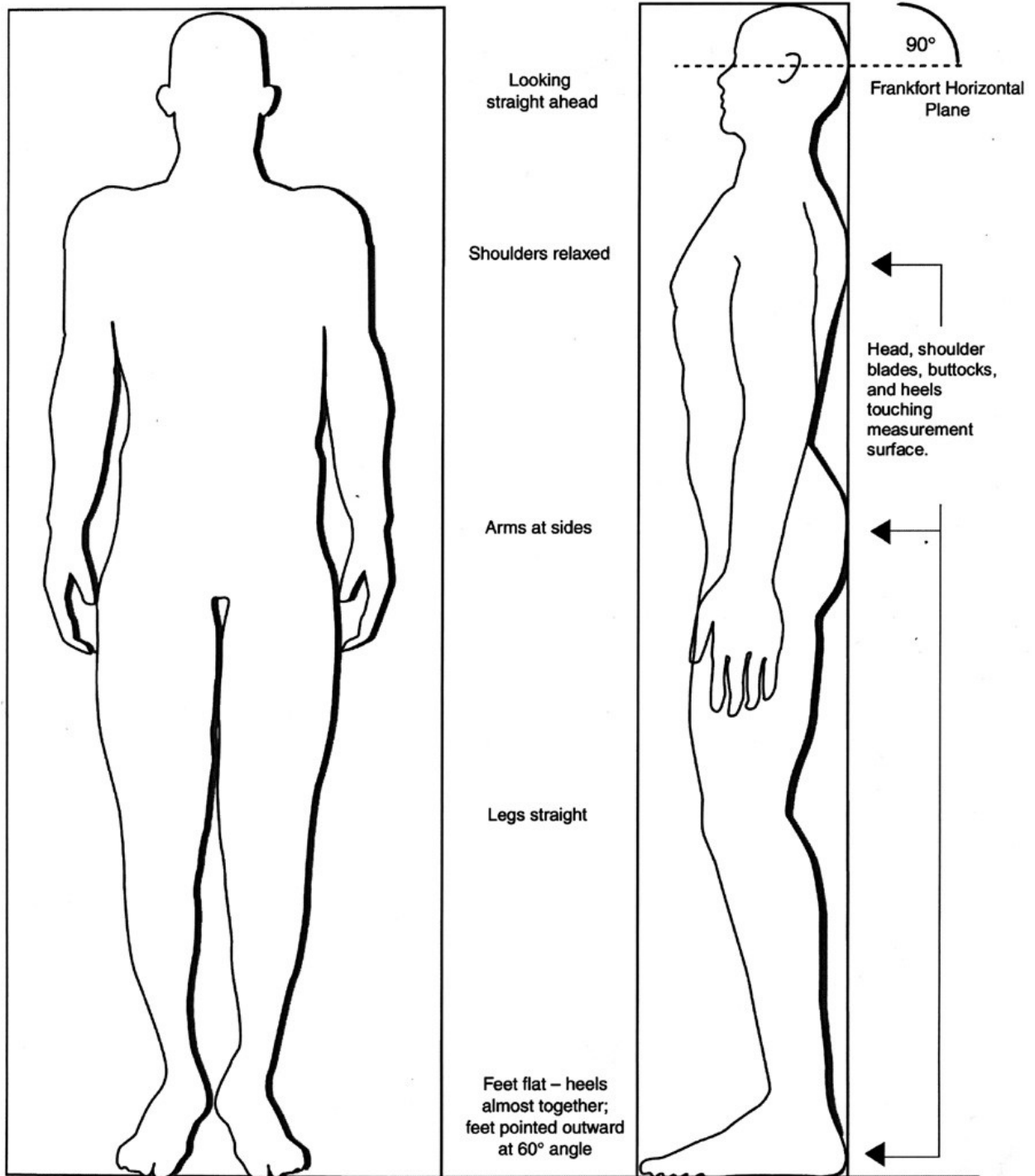
#### Precautions

1. When possible, locate unit in a corner so that the chance of someone walking into the unit from either side is minimized. However, be sure that there is sufficient space for a student to stand comfortably upright without touching the lateral walls (at least 2 feet away from the lateral wall should be sufficient for even the largest student).

2. Do not leave students unattended around unit in vertical configuration with stature extension in place.

#### **1.4.2 Procedure**

1. Introduce yourself and explain what you are going to do.
2. Ask the student to sit and remove shoes. Student may keep on socks or hose.
3. If the student refuses to comply with procedures, then he/she is not measured and no height is recorded on data collection form. Indicate that a valid measurement is not available and make note of the reason why a valid measurement is not available.
4. Refer to the diagram below (from National Health and Nutritional Examination Survey Anthropometry Procedures Manual, 2002). Have the student stand erect with the mid-axillary line perpendicular to the floor, weight distributed evenly on both feet, arms hanging freely by the sides of the body with the palms facing the thighs.



5. Ask the student to place ankles or knees together, whichever come together first. If the student has knock-knees, the feet are separated so that the medial borders of the knees are in contact but not overlapping.
6. The scapula and buttocks are in contact with the vertical board if possible, or whichever part of the body touches the board first.
7. Verify position on the right side of the body. If the heels, buttocks, scapula, and posterior aspect of the head cannot be placed in one vertical place while maintaining a

reasonable natural stance, position the student so that only the buttocks and heels or the head are in contact with the vertical board. If the student's buttocks are large enough that sliding the heels all the way to board back causes irregular or very unnatural posture, allow student to stand with feet under hips.

8. Ask for permission to touch the student, and, if given, position the student's head in the Frankfort horizontal plane. In this position an imaginary line parallel to the floor can be drawn from the bottom of the eye socket (orbital margin) to the external opening of the ear (external auditory canal) – which is also equivalent to drawing a line from the corner of the eye where the upper and lower lid meet to the top of where the ear attaches to the head. If necessary, ask the student's permission to reposition head. Reposition by gently placing one hand under the chin and the other on top of the head and tilt the head up or down until proper alignment is achieved with eyes looking straight ahead. If the student does not give permission, then use verbal instructions for the student to position head.
9. Ask the student to inhale deeply and maintain a fully erect position without altering the load on the heels. Holding a deep breath makes the individual stand up straighter and taller, and allows for a more stable and reliable reading. If the student is breathing heavily enough to cause oscillations in the level, you must wait until the student settles down or ask the student to exhale and hold his/her breath.
10. Position the headboard firmly on top of the head with sufficient pressure to compress the hair to the scalp (see notes below regarding interfering hair styles).
11. Some students have hairstyles that may interfere with measurement of height. In this circumstance there are two possible ways to deal with this, dependent on the preference of the student.
  - a. If the student gives permission and the hairstyle is easy to modify, then make the modification (e.g., remove ponytails on top of head).
  - b. If a hairstyle is not easy to undo (or the student refuses to undo it), leave the hair as is and obtain the height as described (net height). Then ask the student to be seated and using a small clear ruler measure the distance from the scalp to the top of the hairstyle (interference height). Note the interference height (in cm) in the margin of the form and subtract this value from the net height to get the actual height recorded.
12. Get eye-level with the headboard—stand on a stool or bend down as necessary.
13. Read from the side of stadiometer to the nearest 0.1 centimeter. Use the SIDE measuring scale, not the front scale, so you are better able to judge the student's posture.
14. Record height (to scalp, not to top of hair) on data collection form.
15. Have the student step off the stadiometer. Repeat procedures in steps 4 through 13 either immediately or after collecting a weight reading.
16. Record second height on the data collection form. If the first two measurements are  $\leq \pm 1.0$  cm of each other, stop and circle both measurements on Form ST3.
17. If the first two measurements are not  $\leq \pm 1.0$  cm of each other, repeat the procedures in steps 4-13, having the student step off the stadiometer between each measurement until two values are  $\leq \pm 1.0$  cm of each other. Record each measurement on the data collection form—space is left for up to 4 measurements, although it is not expected to take that many. Circle the two measurements which are within 1.0 cm of each other and which are to be data entered. If you cannot obtain two measures within 1.0 cm of each other by the third try, summon the experienced measurer to conduct the final measure.
18. Height is measured and recorded once. The student may want to know his/her value. Read off the 'feet-inches' side of the stadiometer or use a calculator to multiply (cm x .3937 = in) or refer to a conversion chart (see appendix). Use a low voice that cannot be overheard.

19. Either send the student with the clipboard to the next station, or take student to next station and give clipboard with forms to study staff there.
20. Take notes on a separate log (not on data collection form which the kids will be carrying around) with ID and observations about kids whose height measures may come under review, for example, 'very tall and skinny boy', 'short stocky girl', 'girl had recent growth spurt in height and has been on diet for weight'.

### **1.5 Invalid or Missing Weight/Height Data Due to Special Circumstances**

There are going to be cases of students coming to health screening from whom we cannot get a reliable or valid height or weight:

- They may have a permanent condition such as using a wheelchair, using leg braces, twisted spine, etc.
- They may have a temporary condition such as a cast or other substantial wrap around an injury or are verifiably pregnant.
- They may refuse to be measured or take off heavy layers of clothing or jewelry.
- They may weigh more than the maximum capacity of the scale.

Other situations may arise that cause us to be unable to provide legitimate height and weight measurements. We do not want to exclude any student from participating, but we do not want to use invalid data.

- If the student has a temporary condition, such as a cast or wrap around an injury, try to make arrangements on a case-by-case basis to get height and weight under fasting conditions at a later date when the injury has healed.
- If the student uses a wheelchair or is otherwise permanently unable to provide height and weight measures, study staff needs to judge whether to explain to the student that we won't need to measure height and weight or whether to proceed with the measurement procedures in order to maintain good relations. If recorded, check the flag(s) to indicate not to use the height and/or weight.

# The Next Generation Health Study

## Weight Script

Hello. My name is \_\_\_\_\_ and I am a health researcher from the NEXT Generation Health Study team. I'm going to take your weight today at least twice and possibly up to four times. Please remove everything from your pockets and any large or heavy jewelry (including watches) and put everything in this basket. Also, please remove your shoes. If you are wearing a sweater, sweat shirt, or a jacket, please remove it also.

***Student refusal:*** *If the student has refused to remove excess clothing, do not take a measurement, and note the refusal on data collection form.*

Now I will take your weight. Is it okay with you if I support you by holding your elbow as you step onto the scale?

Please stand with your feet evenly spaced over the center of the scale. Make sure your weight is balanced between your two feet. Keep your hands at your sides and look straight ahead at the sticker or poster on the wall.

***[Perform weight measurement]***

Ok, now we are going to repeat the measure.

***[Perform repeat weight measurement]***

You are all done! Thank you so much for your help.



# The Next Generation Health Study

## Height Script

Hello. My name is \_\_\_\_\_ and I am going to measure your height today. We will measure your height at least twice and possibly up to four times. Please sit down and take off your shoes and glasses. You may keep on your socks. Also, if you have anything tied around your waist like a sweatshirt or sweater, please remove that as well.

Before we get started, can you think of any reason why your height measurement may not be accurate today?

***[Document any reason student may provide].***

Now I'm going to ask you to step onto the height platform and turn to face me. Is it okay with you if I support you by holding your elbow as you step onto the platform? Move backwards until some part of your body (heels, upper back, buttocks) touches the board. Now bring your feet together until your ankles or knees touch, whichever is first, and stand up straight. Your arms should be straight down at your sides, palms facing in.

Now I'm going to position your head. Is it ok if I touch you?

***Student refusal:*** *If the student refuses to be touched, do not complete the measurement. Indicate that a valid measurement is not available and make note of the reason why a valid measurement is not available.*

Please do not move your head until we finish. Now, hold your head still, look straight ahead, and keep your feet flat; stand up tall.

***[Position the student following the instructions provided in the protocol]***

Please do not move your head from this position until the measurement is finished.

***[Perform height measurement]***

Ok, now we are going to repeat the measure.

***[Perform repeat height measurement]***

You are all done! Thank you so much for your help.