

## WEIGHT

### 1. Background and Rationale

Weight is measured in kilograms using a standard balance beam scale. Body weight and body mass index (a mathematical function of weight and height) are important determinants of body composition. Weight and weight change are highly correlated with bone mineral density and rates of bone loss in the elderly, and may be associated with risk of disability and decline in physical function, as well as other conditions and endpoints associated with aging.

### 2. Equipment and Supplies

- Standard balance beam scale that can be read from front and back.

#### 2.1 Maintenance

- When not in use, rest the counterweight (larger weight) in the far right position.
- The top weight should rest in the left or zero position.
- The counterweight should always be lifted carefully before it is moved across the beam. This prevents wear on the notches that could lead to erroneous readings.
- Keep the scale on a level surface and move it as little as possible.

#### 2.2 Calibration

At the beginning of the study, and then yearly, the scale calibration should be checked by a local Department of Weights and Measures. If this is not possible, inform the Mr.OS Coordinating Center.

There are two options for monthly calibration. Choose one method that is appropriate for your site and use that method for the completion of the study.

Monthly calibration, option #1: Scale calibration should be checked monthly against known weights. Each center should have a 50 kg weight (Alternatively: two 25 kg weights or two 50 lb weights) for this purpose. (If these are not certified calibration weights, e.g. body building weights, their exact weight should be determined by the local Department of Weights and Measures.)

- Put both the top and bottom counterweights in the zero position. With no weight on the platform, the beam should “float.” Then put the known weights on the scale, and adjust the counterweights until the beam “floats.”
- If the beam does not “float” at zero with no weight on the platform, or if the measurement of the known weight is off by more than  $\pm 1$  kg, the scale may need to be repaired or replaced.

Perform calibration check for linearity once per month. Linearity is checked by weighing a volunteer and recording the weight. With the person still standing on the scale, add 5 kg (10 lb [4.5 kg]) using the test weight; then add 10 kg (25 lb [11.3 kg]); 15 kg (35 lb [15.9 kg]); and finally 20 kg (50 lb [22.7 kg]). The scale should reflect the volunteer’s weight plus the added weight within  $\pm 0.2$  kg. Record calibration measurements on the calibration form and retain in your records. Carry out the procedure on persons of different weights during the study so that you will accumulate a profile of the linearity of the scale throughout a range of weights.

Monthly calibration, option #2: Please see option #1 for general information.

- Weigh staff volunteer and record weight.
- Place 50 kilogram standard(s) on the scale and record weight. If a 50 kg weight is too heavy, two 25 kg weights or four 12.5 kg weights can be used instead.
- Have staff person stand on the scale with the standard weight, and record measurement.

### 3. Safety Issues and Exclusions

The measurement of weight using a standard balance beam scale poses no safety concerns or reasons for exclusion.

### 4. Subject and Exam Room Preparation

Study participants will be encouraged to empty their bladders and/or bowels prior to the measurement.

**Script:** “The measurement that we are about to take is more accurate if you use the bathroom before we measure you. If you need to use the bathroom it is down the hall.”

Weight is measured without shoes or heavy jewelry.

Ideally, the scale should be positioned so that the examiner can stand behind the beam facing the subject, and can move the beam weights without reaching around the subject.

## 5. Measurement Procedures

- 1) Before the participant steps onto the scale, lift the counterweight and position it all the way to the right. The top weight should be all the way to the left at the zero position.

The participant should stand quietly in the center of the platform, facing the balance beam, with their weight equally distributed on both feet, and not touching or supporting themselves on anything.

- 2) If a participant requires support from a cane while being weighed, weigh yourself with and without the participant's cane, etc., to determine its weight. Subtract the weight of the aid from the participant's weight before recording. In the event that it is necessary for the examiner to support the participant during weighing, provide the minimum support that is safe.
- 3) Adjust the counterweight, and then the top weight, until the beam is evenly balanced.
- 4) Weight is recorded to the nearest 0.1 kg.
- 5) A chart for converting kilograms to pounds should be mounted near the scale, so that participants can be told their weight in pounds.

**Script:** "In order to measure your weight, please remove your shoes and heavy jewelry, and empty your pockets. Please step forward onto the center of the scale."

Please note that if it is not possible to obtain weight on the standard balance beam scale, it is acceptable to use a portable digital scale that is used in home visits. This scale must be calibrated before use and the calibration log should be kept up-to-date.

## 6. Alert Values/Follow-up/Reporting

Weight will be included in the form given to the participant at the time of the visit. This measurement will also be included in the final report to the participant and their physician.

## 7. Quality Assurance

### 7.1 Training Requirements

No special qualifications or experience are required to perform this assessment. Training should include:

- Read and study manual
- Attend Mr.OS training session on techniques (or observe administration by experienced examiner)

- Practice on other staff or volunteers (Goal: minimize differences between repeat measurements)
- Discuss problems and questions with local expert or QC officer

### **7.2 Certification Requirements**

- Complete training requirements
- Demonstrate calibration check procedures for scale
- Conduct exam on 2 volunteers:
  - According to protocol, as demonstrated by completed QC checklist

### **7.3 Quality Assurance Checklist**

- Participant encouraged to use bathroom prior to measurement
- Examiner stands in front of participant, if feasible
- Measurement made in clinic gown without shoes, heavy jewelry, or other clothing
- Records weight to nearest 0.1 kg
- Ensures that participant stands still in center of platform
- Tells participant weight in pounds (and kilograms)
- Scale calibration log up-to-date
- Calibration linearity log up-to-date
- Log shows Department of Weights and Measures calibration

## **8. References**

1. Lohman TG, Roch AF, Martorell R, eds. Anthropometric Standardization Reference Manual. Human Kinetics Books, Champaign, Illinois, 1988.