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| **About the Measure** | |
| **Protocol Id** | 21501 |
| **Domain:** | Anthropometrics |
| **Measure:** | Weight |
| **Definition:** | **Current Weight - Measured** Current measured weight is the weight of the participant in kilograms. **Current Weight - Self-Reported\*** Self-reported weight is the weight in kilograms or pounds as reported by the participant.  \*NOTE: Self-reported weight values are considered to be less accurate and are used only when measured weight cannot be obtained. |
| **Purpose:** | Current weight is used to assess a child’s growth and development and an adult’s current health status. Overweight and obese status is associated with several serious comorbidities, including type 2 diabetes, cardiovascular disease, hypertension, and obstructive sleep apnea. |
| **Essential PhenX Protocols:** | Current Age [10101] Sex Assigned at Birth [11601] Gender Identity [11801] |
| **Related PhenX Protocols:** | Ethnicity and Race [11901] Birth Weight - Birth Weight Abstracted from Medical Records [20201] Birth Weight - Measured Weight at Birth [20202] Birth Weight - Proxy Reported Birth Weight [20203] Height - Knee Height [20701] Height - Recumbent Length [20702] Height - Standing Height [20703] Height - Self-Reported Height [20704] Hip Circumference - Hip Circumference v1 [20801] Hip Circumference - Hip Circumference [20802] Maximum Adult Weight [21001] Neck Circumference [21201] Total Pregnancy Weight Gain - Self-Reported Weight Gain [21301] Total Pregnancy Weight Gain - Abstracted From Prenatal Charts [21302] Total Pregnancy Weight Gain - Weight Measured During Gestation [21303] Weight Loss/Gain [21401] Waist Circumference - Waist Circumference NHANES [21601] Waist Circumference - Waist Circumference NCFS [21602] Waist Circumference - Framingham Heart Study [21603] Body Mass Index [570101] |
| **Measure Release Date:** | October 01, 2015 |

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| **About the Protocol** | |
| **Protocol Release Date:** | March 27, 2009 |
| **Protocol Review Date:** | October 01, 2015 |
| **PhenX Protocol Name:** | Weight - Measured Weight |
| **Protocol Name From Source:** | National Health and Nutrition Examination Survey (NHANES), Anthropometry Procedures Manual, 2007 |
| **Protocol Availability:** | Available |
| **Keywords:** | Anthropometrics; body mass index; BMI; obesity; ponderal index; weight for length; NHANES |
| **Description:** | Weight is measured using a digital floor scale. The instrument should be calibrated daily using standardized weights, and a log of calibration results should be maintained. |
| **Specific Instructions:** | Several overarching, critical issues for high-quality data collection of anthropometric measures that optimize the data in gene-environment etiologic research include (1) the need for training (and retraining) of study staff in anthropometric data collection; (2) duplicate collection of measurements, especially under field conditions; (3) use of more than one person for proper collection of measurements where required; (4) accurate recording of the protocols and the measurement units of data collection; and (5) use of required and properly calibrated equipment.  The notion of recommending replicate measurements comes from the reduction in random errors of measurement and accompanying improved measurement reliability when the mean of multiple measurements is used rather than a single measurement. This improvement in measurement reliability, however, depends on the reliability of a single measurement in the hands of the data collectors in a particular study (Himes, 1989). For example, if a measure such as standing height in a given study has a measurement reliability of 0.95 (expressed as an intraclass correlation coefficient), taking a second measurement and using the mean of the two measurements in analyses will improve the reliability to only 0.97, yielding only a 2% reduction in error variance for the additional effort. If, in the same study, the reliability of a single triceps skinfold measurement was 0.85, using the mean, including a replicate measurement, would raise the reliability to 0.92 and yield a 7% reduction in error variance, more than a three-fold improvement compared with recumbent length.  Because the benefits of taking replicate measurements are so closely linked with the existing measurement reliability, it is recommended that as a part of the training of those who will be collecting anthropometry data, a reliability study be conducted that will yield measurement reliability estimates for the data collectors, protocols, settings, and participants involved in that particular study (Himes, 1989). If the measurement reliability for a single measurement is greater than or equal to 0.95, the recommendation is that replicate measurements are not necessary and will yield little practical benefit. If the measurement reliability is less than 0.95, the recommendation is to include replicate measurements as prescribed.  If replicate measurements are indicated because of relatively low reliability, a second measurement should be taken, including having the participant step off and then back onto the scale. A third measurement should be taken if the first two measurements differ by 0.5 kg. If it is necessary to take a third measurement, the two closest measurements are averaged. Should the third measurement fall equally between the first two measurements, all three should be averaged.  The PhenX Anthropometrics Working Group and Expert Review Panel strongly recommend the assessment of weight using a measured protocol. Self-reported weight should be collected as a last resort only.  NOTE: Self-reported weight values are considered to be less accurate. Self-reported weight is subject to error and is used when measured weight cannot be obtained. |
| **Protocol:** | **Current Weight - Measured**  Note: Detailed videos illustrating the procedure can be found on the National Health and Nutrition Examination Survey (NHANES) website at [link[www.cdc.gov/nchs/video/nhanes3\_anthropometry/weight/weight.htm|http://www.cdc.gov/nchs/video/nhanes3\_anthropometry/weight/weight.htm]].  A digital scale or beam balance is used to weigh participants.  Participants are asked to wear an examination gown and socks or light clothes without shoes. Only undergarments are worn beneath the gown. Infants should wear a clean diaper and t-shirt if they have not been placed in an examination gown. The procedures for obtaining the weight measurement are as follows:  The examiner briefly informs the participant that his/her weight will be measured. Participants are asked to remove objects such as cell phones, wallets, and toys from their pockets.  1. The health technician directs participants to stand in the center of the scale platform with hands at their sides and looking straight ahead.  2. The weight measurement is recorded in kilograms.  3. Special situations:   * Small children: Infants and toddlers who cannot stand alone on the scale will be weighed with an adult, or with an infant’s scale. If an adult is holding the child, then the adult guardian or the health technician will stand alone on the scale so the scale can be tared. This sets the scale readout to zero. The child is then handed to the adult and the child’s weight is measured. * If the participant is wearing a cast or medical prosthesis, make a note in the record of the location and place. * If the participant wore street clothes instead of the examination gown, make a note of this in the record. It is acceptable for infants to wear diapers or underpants and a t-shirt. * Participants should not be weighed if they are wearing shoes. * Note that special consideration may be needed for participants whose weight exceeds the capacity of the study scale. For example, weight can be obtained using two portable scales:   + Have the participant stand with one foot on each portable scale.   + Combine the two results to approximate the weight.   + Record the weight.   + If the weight equals the capacity of both portable scales, note that the weight Equals Capacity (EC) of the scales.   Record **current** weight in kilograms.  Repeat weight measurement. |
| **Selection Rationale:** | The National Health and Nutrition Examination Survey 2007-2008 protocols were selected as best practice methodology and are the most widely used protocols to assess weight. Weight measurements are used to calculate body mass index, assess nutritional status, and predict morbidity and mortality. |
| **Source:** | Centers for Disease Control and Prevention, National Center for Health Statistics. (2007-2008). *National Health and Nutrition Examination Survey (NHANES) Anthropometry Procedures Manual*. Hyattsville, MD: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention.  Certification for the Spanish translation can be found [link[www.phenxtoolkit.org/toolkit\_content/Spanish/translation\_certification\_feb2018.pdf|here]]. |
| **Language** | English Spanish Chinese |
| **Participant:** | All ages. Adult participants who cannot stand unassisted are excluded. |
| **Personnel and Training Required:** | Technicians should be trained in the basic techniques of anthropometric measurements. |
| **Equipment Needs:** | Digital scale or beam balances. Portable scales have also been used in the National Health and Nutrition Examination Survey. A standard weight is used to calibrate the scale. A tare function is used when weighing infants and children. The tare function is a feature found in clinical scale equipment. |
| **Standards** | |  |  |  |  | | --- | --- | --- | --- | | **Standard** | **Name** | **ID** | **Source** | | Logical Observation Identifiers Names and Codes (LOINC) | Measured weight proto | 62297-7 | [LOINC](http://s.details.loinc.org/LOINC/<INSERT_ID>.html?sections=Web) | |
| **General References:** | None |
| **Mode of Administration:** | Physical Examination |
| **Derived Variables:** | Ponderal index (PI, neonates and infants), weight for length (birth to 36 months), Body Mass Index (BMI; 2 years to adults, but some references from birth) **BMI**   |  |  | | --- | --- | | **Measurement Units** | **Formula and Calculation** | | Kilograms and meters (or centimeters) | Formula: weight (kg)/[height (m)]2 With the metric system, the formula for BMI is weight in kilograms divided by height in meters squared. Because height is commonly measured in centimeters, divide height in centimeters by 100 to obtain height in meters. Example: Weight = 68 kg, Height = 165 cm (1.65 m) Calculation: 68 ÷ (1.65)2 = 24.98 |   Centers for Disease Control and Prevention. (2015). *Body Mass Index*. Retrieved from [link[www.cdc.gov/healthyweight/assessing/bmi/|http://www.cdc.gov/healthyweight/assessing/bmi/]] |
| **Requirements:** | |  |  | | --- | --- | | **Requirement Category** | **Required (Yes/No)** | | **Major equipment** | No | | **Specialized training** | No | | **Specialized requirements for biospecimen collection** | No | | **Average time of greater than 15 minutes in an unaffected individual** | No | |
| **Annotations for Specific Conditions:** | None |
| **Process and Review:** | The [link[phenxtoolkit.org/about/teams#erp1-members|Expert Review Panel #1]] reviewed the measures in the Anthropometrics, Diabetes, Physical Activity and Physical Fitness, and Nutrition and Dietary Supplements domains.  Guidance from the ERP includes:  • Added replicate measure language  • Changed unit of measurement  Back-compatible: no changes to Data Dictionary  Previous version in Toolkit archive ([link[www.phenxtoolkit.org/domains/view/20000#tab5content|link]]) |