



PHYSICAL FUNCTION TESTS



ID NUMBER:

FORM CODE:

DATE: 11/30/2022
Version 5.0

ADMINISTRATIVE INFORMATION

0a. Completion Date: / /
Month Day Year

0b. Staff ID:

0c. Type of visit:
Full..... F
Abbreviated Clinic..... A → **Go to item 7**
Home Visit..... H → **Go to item 7**

A. CHAIR STANDS (This section for Full Clinic visit only)

Single Chair Stand

“This is a test of strength and stability in your legs in which you stand up from a chair without using your arms. Fold your arms across your chest, like this, and stand when I say GO, keeping your arms in this position. Any questions? Ready, Go!”

1. Single chair stand result:

- Participant refused or technical problems ₁ → **Go to item 3**
- Not attempted ₂
- Attempted, unable to stand ₃ → **Go to item 3**
- Rises using arms ₄ → **Go to item 3**
- Stands without using arms ₅ → **Go to item 2**

1a. Reason chair stand not attempted:

- Participant unable due to weakness or balance ₁ → **Go to item 3**
- Safety concerns ₂ → **Go to item 3**
- Other problem (see QxQ for examples of other problems) ₃

1b. Describe other problem: _____ → **Go to item 3**

Repeated Chair Stands

“This time I want you to stand up five times as quickly as you can, keeping your arms folded across your chest.” With the next instruction, cross your arms over your chest and then rise while emphasizing “full standing position,” and sit while emphasizing “all the way down: **“When you stand up, come to a full standing position each time, and when you sit down, sit all the way down each time. I will demonstrate two chair stands to show you how it is done.”** Do two chair stands quickly; count as you stand each time. Then begin the test. **“When I say GO stand five times in a row, as quickly as you can, without stopping. Stand up all the way and sit all the way down each time. Ready, Go!”** Start timing with “Go” and stop with the last stand or maximum of 1 minute.

2. Repeated chair stand result:

- Participant refused or technical problems ₁ → **Go to item 3**
- Not attempted ₂ → **Go to item 2c**
- Attempted, unable to complete 5 stands ₃ → 2a. Number completed: 0 1 2 3 4
- Completes 5 stands ₄ → 2b. Enter time for 5 stands: .

- 2c. Reason repeated chair stands not attempted:
 Participant unable due to weakness or balance ₁ → **Go to item 3**
 Safety concerns ₂ → **Go to item 3**
 Other problem (see QxQ for examples of other problems) ₃

2d. Describe other problem: _____ → **Go to item 3**

B. STANDING BALANCE (This section for Full Clinic visit only)

“I’m going to ask you to stand in several different positions that test your balance. I’ll demonstrate each position and then ask you to try to stand in each position for 10 seconds. I’ll stand next to you to provide support if you lose your balance. Do you have any questions?” For the balance tests, begin timing when (s)he lets go of your arm. Stop timing if (s)he takes a step, touches something for support, or reaches 10 seconds.

Semi Tandem Stand

“First, I would like you to try to stand with the side of the heel of one foot touching the big toe of the other foot for 10 seconds. Please watch while I demonstrate. You may put either foot in front. You can use your arms, bend your knees or move your body to maintain your balance. Try to hold your feet in position until I say stop. If you lose your balance, take a step like this. Hold onto my arm while you get in position.” Allow the participant to hold onto your arm to get balanced. “When you are ready, let go.”

3. Semi tandem stand result:
 Participant refused or technical problems ₁ → **Go to item 4**
 Not attempted ₂ → **Go to item 3b**
 Unable to attain position or hold for one second ₃ → **Go to item 4**

Holds position ≥1 but less than 10 seconds ₄ → 3a. Time for holding position: . → **Go to item 4**

Seconds Hundredths

Holds position for 10 seconds ₅ → **Go to item 5**

- 3b. Reason semi tandem stand not attempted:
 Participant unable due to balance problem ₁ → **Go to item 4**
 Safety concerns ₂ → **Go to item 4**
 Other problem (see QxQ for examples of other problems) ₃

3c. Describe other problem: _____ → **Go to item 4**

Side-by-side Stand (only if could not do Semi-Tandem for 10 seconds)

“Now, I would like you to try to stand with your feet together, side-by-side, for 10 seconds. You can use your arms, bend your knees or move your body to maintain your balance, but try not to move your feet. Try to hold this position until I tell you to stop. Hold on to my arm while you get in position. When you are ready, let go.”

4. Side-by-side stand result:
 Participant refused or technical problems ₁ → **Go to item 7**
 Not attempted ₂ → **Go to item 4b**
 Unable to attain position or hold for one second ₃ → **Go to item 7**

Holds for ≥1 but less than 10 seconds ₄ → 4a. Time for holding position: . → **Go to item 7**

Seconds Hundredths

Holds for 10 seconds ₅ → **Go to item 7**

4b. Reason side-by-side stand not attempted:

- Participant unable due to balance problem ₁ → **Go to item 7**
- Safety concerns ₂ → **Go to item 7**
- Other problem (see QxQ for examples of other problems) ₃

4c. Describe other problem: _____ → **Go to item 7**

Tandem Stand

“Now I would like you to try to stand with the heel of one foot in front of and touching the toes of the other foot for 10 seconds. Please watch while I demonstrate. You may put either foot in front. You can use your arms, bend your knees or move your body to maintain your balance. Try to hold your feet in position until I say stop. If you lose your balance, take a step like this. Hold onto my arm while you get in position. When you are ready, let go.”

Trial 1

5. Tandem stand result – trial 1:

- Participant refused or technical problems ₁ → **Go to item 7**
- Not attempted ₂ → **Go to item 5b**
- Unable to attain position or hold for one second ₃ → **Go to item 7**

Holds position ≥ 1 but less than 10 seconds ₄ → 5a. Time for holding position: .
Seconds Hundredths

Holds position for 10 seconds ₅ → **Go to item 7**

5b. Reason tandem stand not attempted:

- Participant unable due to balance problem ₁ → **Go to item 7**
- Safety concerns ₂ → **Go to item 7**
- Other problem (see QxQ for examples of other problems) ₃

5c. Describe other problem: _____ → **Go to item 7**

Trial 2, “Let’s try this one more time.”

6. Tandem stand result – trial 2:

- Participant refused or technical problems ₁ → **Go to item 7**
- Not attempted ₂ → **Go to item 6b**
- Unable to attain position or hold for one second ₃ → **Go to item 7**

Holds position ≥ 1 but less than 10 seconds ₄ → 6a. Time for holding position: .
Seconds Hundredths

Holds position for 10 seconds ₅ → **Go to item 7**

6b. Reason tandem stand trial 2 not attempted:

- Participant unable due to balance problem ₁ → **Go to item 7**
- Safety concerns ₂ → **Go to item 7**
- Other problem (see QxQ for examples of other problems) ₃

6c. Describe other problem: _____ → **Go to item 7**

C. 4 METER WALK

Ask participants who arrive with walking aids if they think they can do this short walk without the device. **“I’m going to ask you to do a short walk over this 4 meter course two times. You will walk at your normal or usual pace for both trials. I will demonstrate. Place your feet with your toes behind, but just touching the starting line, like this. Walk a few steps past the finish line.”** Walk to the other end of the course at your usual pace, making certain you walk past the finish line before slowing or stopping. Start timing with participant’s first movement, and stop timing when the first foot completely crosses an imaginary plane extending vertically up from the finish line/tape.

Normal Pace Walk

“Do you have any questions? When I say “Go”, please walk at your normal pace. Remember to walk a few steps past the finish line. Ready? Go.”

Trial 1

7. 4 meter walk result – trial 1

- Participant refused or technical problems ₁ → **Go to item 9**
- Not attempted ₂ → **Go to item 7c**
- Completes with walking aid ₃ → 7a. . → **Go to item 9**
Seconds Hundredths
- Completes without walking aid ₄ → 7b. . → **Go to item 9**
Seconds Hundredth

7c. Reason normal pace walk not attempted:

- Participant unable to walk short distance ₁ → **Go to item 9**
- Safety concerns ₂ → **Go to item 9**
- Other problem (see QxQ for examples of other problems) ₃

7d. Describe other problem: _____ → **Go to item 9**

Trial 2

8. 4 meter walk – trial 2:

- Participant refused or technical problems ₁ → **Go to item 9**
- Not attempted ₂ → **Go to item 8c**
- Completes with walking aid ₃ → 8a. . → **Go to item 9**
Seconds Hundredths
- Completes without walking aid ₄ → 8b. . → **Go to item 9**
Seconds Hundredths

8c. Reason normal pace walk trial 2 not attempted:

- Participant unable to walk short distance..... ₁ → **Go to item 9**
- Safety concerns ₂ → **Go to item 9**
- Other problem (see QxQ for examples of other problems) ₃

8d. Describe other problem: _____ → **Go to item 9**

D. GRIP STRENGTH (This section for Full Clinic visit only)

“The next test I’ll ask you to do is the grip strength test. This device is used to measure the strength in your hand. Before starting, I will ask you a few questions to make sure it is safe for you to do this test.”

9. Do you have any pain or arthritis in either hand or wrist?

- Yes _Y
- No _N → **Go to item 10**
- a. In which hand or wrist is the pain or arthritis?
 - Right _R
 - Left _L
 - Both _B
- b. Has the pain or arthritis in your hand(s) or wrist(s) gotten worse recently?
 - Yes _Y
 - No _N
- c. Will the pain or arthritis in your hand(s) or wrist(s) keep you from squeezing as hard as you can?
 - Yes _Y
 - No _N

10. Have you had any surgery on either hand or wrist in the past 3 months?

- Yes _Y

No _N → Go to Test

a. Was the surgery on your right, left or both hands or wrists?

Right _R → Test left side only

Left _L → Test right side only

Both _B → Do not test

“Which hand is your preferred or best hand to test for maximum strength?” This response determines which hand is tested unless this side was excluded in the previous screening questions. Record response. **“Please extend that arm in front of your body and rest it on the table with your arm straight and wrist on the mouse pad.”** Demonstrate proper positioning of the dynamometer then place wrist strap around the participant’s wrist and position participant. (S)he should be seated facing a table at shoulder level with arm extended in front of participant approximately 90° and resting on the table with the elbow held straight (180°). The dynamometer must be perpendicular to the table and hanging off the table edge during testing. Adjust the grip until correct position attained. Allow one submaximal practice trial to determine if the participant understands the procedure and that the grip size is appropriate. **“Are the bars the right distance apart for a comfortable grip? Now try it once just to get the feel of it. For this practice, just squeeze gently. It won't feel like the bars are moving, but your strength will be recorded.”** Show dial to participant then reset to zero. **“You’ll do this two times. When I say “squeeze”, squeeze as hard as you can. Ready? Squeeze! Squeeze! Squeeze! Now, stop.”**

11a. Hand used: _R Right _L Left

11b. Trial 1 kg Allow 15 to 20 sec rest in between trials

Reset to zero. **“Now, one more time. Squeeze as hard as you can. Ready. Squeeze! Squeeze! Squeeze! Now, stop.”**

11c. Trial 2 kg

11d. Completion Status:

Did 1 trial _A

Did 2 trials _B

Excluded _C

Unable to do..... _D



INSTRUCTIONS FOR THE PHYSICAL FUNCTION (PFX) FORM

I. General Instructions

This form is completed at the clinic visit only. The PFX is collected in its entirety at the ARIC clinic visit for the non-ACHIEVE participants and at the ACHIEVE/BHFU annual visits for the ARIC/ACHIEVE shared participants. This form should be completed for all participants, even those who do not undergo a physical function assessment.

Prior to training for the “Physical Function” Exam form, all examiners should complete the online training module for the National Institute on Aging Short Physical Performance Battery (SPPB) as described in ARIC Manual 32. Note that the video does not include training on grip strength. The video should be reviewed prior to initial training session and every 6 months. Details on downloading the video can be found at this website by clicking “Instructions - pdf”. “CD (Download and Execute) – (exe)” contains the video material to be downloaded.

In general, since motivation and level of understanding can have a significant impact on performance, each component of the exam should be administered strictly according to the protocol. Do not provide additional description or encouragement beyond the key points provided by the standard scripts.

Allow the participant to rest between tests if out of breath or fatigued during the assessments.

The instructions in this QxQ also apply for the ARIC Generation 2 Study.

II. Detailed Instructions for each Item

- 0a. Enter the date on which the participant was seen in the clinic.
- 0b. Enter the staff ID for the person who completed this form.
- 0c. Item 0c and accompanying instructions only apply to the ARIC visit form. Enter the type of visit: full clinic visit, abbreviated clinic visit, or home visit. If it is a full clinic visit, go to question 1 and begin chair stands. If it is an abbreviated clinic visit or a home visit, go to question 7 and begin the 4-meter walk; in the abbreviated clinic visits and home visits, the chair stands, balance tests and grip strength will not be offered. **See Section C: SPPB 4 Meter Walk for special considerations for home visits.**

A. SPPB Chair Stands

Walking aids are not allowed. This task is only offered in the full clinic visit.

Single chair stand:

Question 1: A demonstration of this test is not required. Record completion status of the single chair stand. If the participant refuses to do the test, probe for the reason to determine if it is due to a physical problem with weakness or balance. “Participant refused or technical problems” should be reserved for reasons that have no relationship to what is being measured; for example, lack of interest or time, technical, staffing, and environmental problems are included in the category with refusals. If the participant stands without using arms, go to question 2. If the participant does not attempt the chair stand, continue to 1a. Otherwise, go to question 3.

Question 1a and 1b. Record the reason the chair stand was not attempted. "Participant unable due to weakness or balance" can be selected if the participant or proxy tells the examiner they are unable to stand without pushing or without assistance from another person or an aid. It may be necessary to demonstrate the chair stand once. Even if the participant can do the task, ask the participant if they think it would be safe to try the chair stand. If they say no, or if the examiner has concerns after asking the participant if they think it would be safe, skip the test and record the response as "Safety concerns". If Other problem is selected, describe the problem in 1b. Examples of other problems include: fracture, sprains, amputation, cognitive problems e.g. could not understand the instructions.

Repeated Chair Stands

Question 2: This test should be demonstrated. Participants will have successfully performed the single chair stand. Record completion status. If the participant refuses to do the test, probe for the reason to determine if it is due to a physical problem with weakness or balance. "Participant refused or technical problems" should be reserved for reasons unrelated to chair stand ability, such as lack of interest or time, technical, staffing, and environmental problems. If the participant says the single chair stand was difficult and they cannot do 5 more, offer a one-minute break. Assure them that the number they can do is important to record, even if it is less than five. If they do not want to do the repeated chair stands due to difficulty, record "Not attempted" and go to 2c and select "Unable due to weakness or balance." If the participant did not attempt because of safety concerns expressed by the participant, proxy, or examiner, select "Not attempted" in question 2 then "Safety concerns in question 2c then go to question 3. If the participant attempted but was unable to complete 5 stands, record the number completed in question 2a. If the participant completed 5 chair stands, record the time in seconds and hundredths of seconds (00.00) in question 2b. If the participant does not attempt the repeated chair stand, skip to item 2c.

Question 2c and 2d. Record the reason the repeated chair stand was not attempted. If Other problem is selected, describe the problem in 2d. Examples of other problems include: a fracture, sprains, amputation, cognitive problems e.g. could not understand the instructions.

B. SPPB Standing Balance

Walking aids are not allowed. This is only offered in the full clinic visit. Read the script and demonstrate each task. Start timing when the participant lets go of your arm or the wall. Stop the stopwatch if they take a step or grab for support. Record to 0.01 second how long participant is able to hold this position. Say, "STOP" after 10 seconds.

For all balance tests in this section, if the participant refuses to do the test, probe for the reason to determine if it is due to a physical problem with weakness or balance. "Participant refused or technical problems" should be reserved for reasons unrelated to standing balance, such as lack of interest or time, technical, staffing, and environmental problems. If the test was not attempted, record "Not attempted" and go to the subquestion to record the reason the test was not done. If the participant, proxy, or the examiner thinks the participant was physically unable due to observed or reported experiences of unsteady gait or poor balance, record "Unable due to balance". The "Safety Concerns" option for balance tests is primarily used when it is less obvious if the participant can do the test, but participant, proxy or examiner have concerns about safety with the task.

Question 3: Record completion status of the semi-tandem stance. If the participant held the stance for 1 second or more but less than 10 seconds, record the time in seconds and

hundredths of a second (0.00) in question 3a, then go to question 4. If the position was held for the full 10 seconds, record “Holds position for 10 seconds”, skip question 4 and go to question 5. If the participant held the semi-tandem stand for 10 seconds, also score the side-by-side stand as “held for 10 seconds”.

If the participant feels it would be unsafe to try, probe for the reason, and reassure the participant that you will help them into the position. If they still feel they should not attempt it, record, “Participant refused or technical problems” or “Not attempted” (whichever is appropriate) for this and the more difficult stands. If “Not attempted” is selected, skip to 3b.

Question 3b and 3c. Record the reason the semi tandem stand was not attempted. If Other problem is selected, describe the problem in 3c. Examples of other problems include: fracture, sprains, amputation, cognitive problems e.g. could not understand the instructions,

Question 4: This question is skipped if the participant held the position in question 3 for 10 seconds. Record the completion status of the side-side-by stance then go to question 7. If the participant held the stance for 1 second or more but less than 10 seconds, record the time in seconds and hundredths of a second (0.00) in 4a, then go to question 7. If the participant did not attempt the side-by-side stand, continue to 4b.

Question 4b and 4c. Record the reason the side-by-side stand was not attempted. If Other problem is selected, describe the problem in 4c and then skip to item 7. Examples of other problems include: fracture, sprains, amputation, cognitive problems e.g. could not understand the instructions

Question 5: If the participant is unable to hold the semi-tandem stand for at least 10 seconds, do not attempt the tandem stand in question 5. For those who held the semi-tandem stance in question 3 for 10 seconds, continue with question 5. Record the completion status of the tandem stand. If the participant held the stance for 1 second or more but less than 10 seconds, record the time in seconds and hundredths of a second (0.00) in 5a, then offer a second attempt. (Question 6). If the position was held for the full 10 seconds, record “Holds position for 10 seconds”, skip question 6 and go to question 7. If the participant does not attempt the tandem stand, skip to 5b.

Question 5b and 5c. Record the reason the tandem stand was not attempted. If Other problem is selected, describe the problem in 5c, and then skip to item 7. Examples of other problems include: fracture, sprains, amputation, cognitive problems e.g. could not understand the instructions

Question 6: This is a second attempt at the tandem stand if the time holding the tandem stand was 1 second or more but less than 10 seconds. Record completion status. If the participant holds the position for 1 second or more but less than 10 seconds, record the time for holding the position in 6a, then go to question 7. If the participant did not attempt the second tandem stand, skip to item 6b.

Question 6b and 6c. Record the reason the second tandem stand was not attempted. If Other problem is selected, describe the problem in 6c. Examples of other problems include: fracture, sprains, amputation, cognitive problems e.g. could not understand the instructions

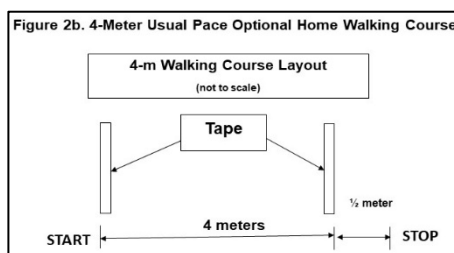
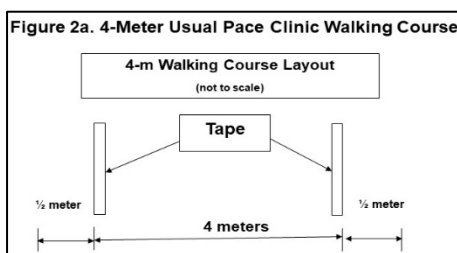
C. SPPB Four Meter Walk

Two timed walks measure the time taken to walk 4 meters on a pre-marked course at the participant’s usual pace. Make certain participants begin the walk with toes at the start line and that they walk past the finish line before slowing or stopping. If necessary, participants may use

walking aids, such as a walker, rollator, or cane. Ask participants who arrive with walking aids if they think they can do this short walk without the device, as many with aids will be both comfortable and capable of doing the walks without a walking aid. This applies for home visits as well. The examiner can ask the participant if they have a walking aid and if they feel safe performing the walk without it. The participant should know, however, that the walking test can be done with or without the walking aid.

For home or clinic exams, read the script, demonstrate, then have the participant perform the task. Start timing with the participant's first movement. Follow along a few paces behind and a little to the side of the participant. Stop timing when the first foot completely crosses an imaginary plane extending vertically up from the ending line/tape.

The four meter walk is the only test completed for abbreviated visits and home visits. The home assessment of walking speed requires a space of 4 meters to walk and an additional $\frac{1}{2}$ meter on one end, or, if space allows, on both ends of the course. If $\frac{1}{2}$ meter is only available on one end, the participant will perform the first trial, walking past the tape on the end with the additional $\frac{1}{2}$ meter space, then walk back to the beginning to do the 2nd trial. Allow up to a minute to rest between the two trials, if needed. The section for the 4-meter walk on the PFX form should be completed for all participants, including those who do not complete it. The course should be marked with paper or masking tape that does not leave residue. Two options for the course are shown below:



Do not assess walking speed in the home in the following situations:

1. There are home environment hazards in the only space available that would prevent the participant from being able to safely complete the walk. Question 7 should be marked “Participant refused or technical problem”. Examples of potential hazards include:
 - a. High pile or shag carpeting
 - b. Clutter or other fall hazards on the floor
 - c. Loose carpet or tile
 - d. Lack of adequate space
 - e. Pets that impede a clear walking path
 - f. Inappropriate participant clothing or footwear (e.g., long housecoats/robes, slippers or sandals)
 - g. Poor lighting
2. Participants who are bedbound. Question 7 should be completed as “Not attempted”, and the response for 7a should be “Participant unable to walk short distance”.
3. Participants who hold onto walls or furniture for balance while walking in the home AND who do not have or will not use an assistive device. Score “Not attempted” and “Safety concerns” in 7 and 7a respectively.

For participants whose mobility is unclear or limited, ask questions to determine if participants can walk across a small room, as this usually indicates the participant is a good candidate for the 4-meter walk (specific questions are provided in the operations manual).

For those with limited or unclear mobility, show the length of the course using a tape measure, pre-measured rope, lightweight chain or other measuring tool, and ask the participant and/or proxy "Do you think you can walk this distance?" Let the participant know that assistive devices (e.g. cane, walker, rollator) are allowed. If the participant or proxy describes an inability to walk this far, the participant response should be "Not attempted" and then "Participant unable to walk short distance". If they think they can walk the 4-meters, the examiner should ask "Do you think it would be safe to walk this distance at your usual pace?" If they think it is safe, attempt the test. If the participant, proxy, or examiner is concerned that participant is a fall risk or has other safety concerns, do not attempt the 4-meter walk. Score the form "Not attempted" in question 7 and "Safety concerns" in 7a.

If the test is not performed due to the home environment or technical problems, such as high-pile or shag carpeting, clutter or other fall hazards in the floor, lack of adequate space, inadequate time, staffing problems, participant does not want tape on their flooring, **record as "Participant refused or technical problem."** Question 7: Record completion status of the first 4-meter walk. For those who complete the task, record the time to the nearest 0.01 second in the appropriate line (7a or 7b), either "Completes with walking aid" or "Completes without walking aid". If the participant did not attempt the 4-meter walk, skip to item 7c.

Question 7c and 7d. Record the reason the 4 meter walk was not attempted. If Other problem is selected, describe the problem in 7d and then skip to item 9 (full visit) or end the form (abbreviated or home visit). Examples of other problems include: fracture, sprains, amputation, cognitive problems.

Question 8. Now repeat the usual pace walk and record the completion status. For those who completed the walk, record the time to the nearest 0.01 second in the appropriate area (8a or 8b), depending on whether or not they used a walking aid. If the participant did not attempt the second trial of the usual pace walk, skip to item 8c.

Question 8c and 8d. Record the reason the second tandem stand was not attempted. If Other problem is selected, describe the problem in 8d, and then continue to item 9 (full visit) or end the form (abbreviated or home visit). Examples of other problems include: fracture, sprains, amputation, cognitive problems.

D. Grip Strength

Grip strength is only offered in the full clinic visit. Read the script to the participant. Assess fit of the dynamometer and adjust if necessary. Position the participant, demonstrate use and allow one submaximal practice trial. Ask each question in questions 9-10. The only exclusion criteria is surgery in both hands in the past 3 months.

Question 9: Ask about pain or arthritis in either hand or wrist; if "Yes", go to question 9a. If "No", go to question 10. Questions 9a, 9b, and 9c query the participant on affected side, recent exacerbation, and perception of effect it may have on grip strength.

Question 10: Ask the participant about surgery on the hands or wrists in the past three months. If s/he has not had surgery, go to question 11. If s/he has had surgery, go to question 10a (determine laterality).

Question 11a. Record which hand the participant is using to obtain maximum strength. This is typically the dominant hand.

Question 11b. Record the kilograms from the first trial, rounding to the nearest 2 kg. If exactly between two even numbers on dynamometer, round up. Reset to zero.

Question 11c. Record the kilograms from the second trial.

Question 11b. Record the completion status.