

## Timed Walk and Hand Grip Strength Protocol

### Background and Purpose:

One goal of the MACS is to assess whether HIV and its treatments are associated with increased risks of certain chronic conditions. Chronic infection, inflammation and compromised of the immune system together with treatment-related comorbidities may increase the risk of frailty compared to uninfected individuals at the same chronological age. In addition, little is known about HIV in the aging population. Physical performance assessments, including strength and mobility, are components of the frailty syndrome; and are standards in the determination of the physical effects of aging; and are being used by other studies, including the Cardiovascular Health Study (CHS). Using these same measurements in the MACS will allow comparative analyses between cohorts.

### Definitions:

Orthosis: An orthopedic appliance or apparatus used to support, align, prevent or correct deformities; or to improve the function of moveable parts of the body. In this exam we are specifically checking for lower extremity orthoses: plastic or metal leg braces at or above the ankle.

Prosthesis: An artificial substitute for a missing body part, such as an arm or leg, used for functional or cosmetic purposes, or both.

### Equipment and Supplies:

- 4-meter measuring tape
- 2 Jamar Dynamometers (calibrated once per year or as manufacturer suggests)
- Stop watch
- Tape, to mark measured walk course

### Methods:

The performance-based measurements are to be administered by a MACS interviewer or physical examiner. They may be administered at any point during the visit. The MACS staff is trained to administer the individual components of the exam in the following sequence:

1. Explain the procedure to the study participant using a standardized script.
2. Demonstrate the procedure to the study participant at every visit. Researchers have found that many participants repeat the demonstrated procedure closely and pay less attention to the verbal command.

3. Ask the participant if he has any questions.
4. Briefly explain the procedure once again.
5. Ask the study participant to perform the procedure.
6. All timed procedures are begun with the words, "Ready? Go!"

## SECTION A: MEASURED WALK

### Tester Instructions:

Identify a walking course of 4 meters by marking the beginning and ending lines on the floor with highly visible tape. Place the walkway in an area where there is ample space to finish the walk without the end point being close to a wall or other impediments, such as office furniture, plants, and other structures. The course should be free of obstacles. Otherwise, the participant may hesitate or reduce his normal pace for fear of bumping into an obstacle and getting hurt.

Fill in the MACSID, Visit Number, Date, and Examiner Code.

If the participant refuses to perform the measured walk, fill in the "Refused" bubble at the beginning of Section A and complete questions A1-A6. Ask the participant about any items that cannot be determined by observation alone. Go to Section B: Grip Strength.

- A1. *"Does the participant use an assistive device for walking?"* If the response is "NO," go to question A2. If the response is "YES," please record the type of assistive device used in question A1a.
- Standard cane: A straight "stick" with a curved or straight handle that makes contact with the floor at one point.
  - Quad cane: A device that is similar to the standard cane at the proximal end, but branches out to four "legs" at the distal end, making contact with the floor at four points. A TRIPOD CANE should be placed in this category, as well.
  - Walker: A frame device upon which the user may support himself with both hands.
  - Wheelchair
  - White cane: This cane has red band at the bottom and is used by blind and visually impaired persons.

- Crutches
- Other: If any device other than those listed above is used, please specify in the space provided. Reliance upon another person for support does not constitute a “device.”

A2. *“Is the participant wearing a lower extremity orthosis (plastic or metal leg brace at or above the ankle)?”* This refers to the participant’s current use of such an aid. He should be wearing the device at the clinic for the exam. An orthosis used at other times (at night, for instance) should not be recorded here.

An orthosis worn below the ankle (for example, a device worn in the shoes for fallen arches) does not qualify in this definition. Ask the participant if you cannot determine whether he uses an orthosis.

A3. *“Is the participant missing any limbs?”* Major limbs only are considered here: arms (including hands) and legs (including feet). A missing finger or other digit does not constitute a missing limb. A limb is considered missing whether or not an artificial limb is replacing the natural body part. If “NO”, go to question A5. If “YES,” mark “YES” or “NO” to indicate which limb(s) in questions A3a – A3d.

A4. *“Is the participant wearing a prosthesis (artificial limb)?”* If the participant is missing a limb, the use of an artificial limb or prosthesis is to be recorded here. This refers to the participant’s current use of such an aid. He should be wearing the device at the clinic for the exam. If the participant has mentioned owning a prosthesis but is not currently wearing it, it is not to be recorded here. Ask the participant if you cannot determine if he uses a prosthesis. If “NO”, go to question A5. If “YES,” mark “YES” or “NO” to indicate which limb(s) in questions A4a – A4d.

A5. *“Does the participant have paralysis of an extremity or side of the body?”* Ask the participant if you cannot determine whether he has paralysis. If “NO”, go to question A6. If “YES,” mark “YES” or “NO” to indicate which side of the body is paralyzed in questions A5a and A5b.

A6. *“Was the measured walk test attempted?”* If “YES,” go to “PROMPT”. If “NO,” indicate the reason the measured walk was not attempted (e.g., physical or cognitive impairment, or other specified reasons) and go to Section B.

## **MEASURED WALK ATTEMPT #1:**

**Prompt Script:** “In this test, I would like you to walk at your usual pace starting at this line and continue walking past the line at the end of the hall until I tell you to stop. Do

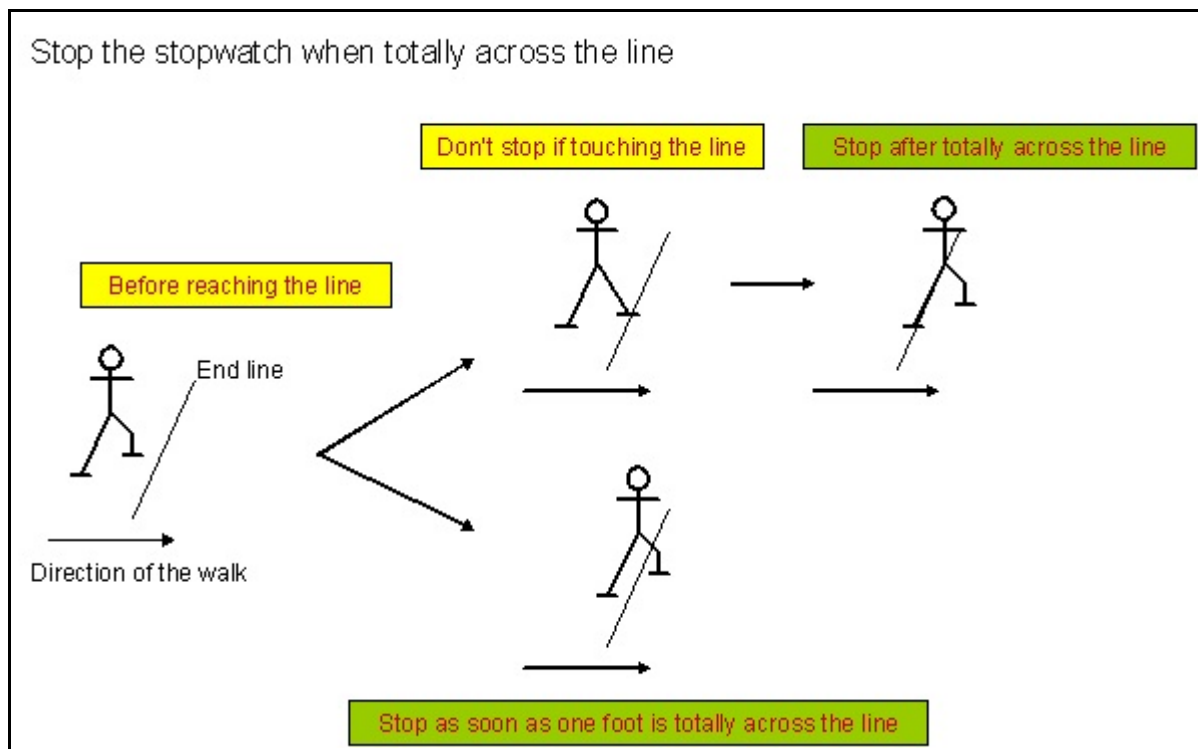
you think you could do that? Good. Can you see the tape? Good. Let me demonstrate what I want you to do.”

**Demonstration:** Walk from the position behind the first line (with toes starting at the line) at your usual pace to and crossing the line 4 meters from the first.

**Prompt Script:** “To do this test, place your feet with your toes behind, but touching, the start line where we start. I will time you. When I say, ‘Ready? Go!’ walk at your usual pace and continue walking past the line at the end of the hall until I tell you to stop.”

**Tester Instructions:**

The tester should be standing at the finish line. When the participant is properly at the start line, say, “Ready? Go!” and start the stopwatch as soon as you say “Go”. Timing begins when the tester says “GO”. Do not wait for the participant to begin walking to start timing. Stop the stopwatch when the participant’s first foot is completely across the finish line and then instruct the participant to stop walking after he has reached a few feet beyond the finish line. If the participant fails to cross the finish line, explain the procedure again and repeat the process.



- If unable to complete the first walk, document reason in A7 and/or A7a. Proceed to A9 to document same reasons for not completing walk 2.
- If able to complete the first walk, document “YES” in question A7 and indicate in A7b if an assistive device was used. Record the number of seconds in A8.

## MEASURED WALK ATTEMPT #2:

**Prompt Script:** “Now, I’d like you to try this test a second time. When I say, ‘Ready? Go!’ walk at your usual pace and continue walking past the line at the end of the hall until I tell you to stop.”

### Tester Instructions (same as for attempt #1):

The tester should be standing at the finish line. When the participant is properly at the start line, say, “Ready? Go!” and start the stopwatch as soon as you say “Go”. Timing begins when the tester says “GO”. Do not wait for the participant to begin walking to start timing. Stop the stopwatch when the participant’s first foot is completely across the finish line and then instruct the participant to stop walking after he has reached a few feet beyond the finish line. If the participant fails to cross the finish line, explain the procedure again and repeat the process.

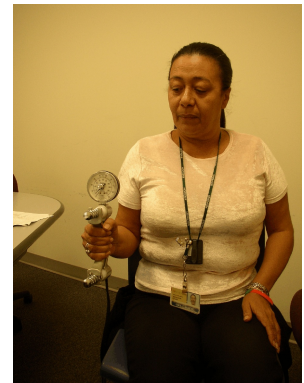
- If unable to complete the first walk, document reason in A9 and/or A9a. Go to Section B.
- If able to complete the second walk, document “YES” in question A9 and indicate in A9b if an assistive device was used. Record the number of seconds in A10.

## SECTION B: GRIP STRENGTH

**SPECIAL NOTE:** The grip strength examination is used to test how strong the participant’s hands are.

### Tester Instructions: The key points.

- The participant should be seated in an armless chair, see photograph.
- His elbow should be bent at a 90° angle
- The dynamometer should be set at “2” strength for testing of all participants. The computer default for this item is “2.”



- Do not allow the participant to squeeze the dynamometer before testing.
- The tester must coach the participant by saying “squeeze, squeeze, squeeze” while the participant is squeezing.
- Tell the participant to stop when you see the arrow starting to go down.
- Record the results of each trial before the next attempt.
- Repeat the examination three times in the dominant hand.

If the participant refuses to perform the grip strength test, fill in the “Refused” bubble at the beginning of Section B and ask questions B1 and B2 and go to end to record time ended.

**Prompt Script:** “In this exercise, I am going to use this instrument to measure the strength in your dominant hand.”

- B1. *“Have you had any recent pain in your wrist or any acute flare-up in your hand or wrist from conditions like arthritis, tendonitis or carpal tunnel syndrome?”* If participant responds “YES,” ask questions B1a and B1b. If he responds “NO,” go to question B2. **Please treat hand and wrist as the same for this question. For example, if a participant reports pain in his right hand, bubble yes for right wrist.**
- B2. *“Have you had any surgery on your hands or arms during the last 13 weeks?”* If participant responds “YES,” ask questions B2a and B2b. If participant responds “NO”, go to question B3.
- B3. *“Which hand is your dominant hand?”* The test should be performed by the participant using his dominant hand. Record the participant’s dominant hand as reported by the participant.
- B4. *“Do you think you could safely squeeze this instrument as hard as you can with your dominant hand?”* Record “YES” or “NO”. If “NO”, do not do grip strength test and go to question B5.
- B5. *“Did the participant attempt to perform the Grip Strength assessment?”* If “YES,” go to Prompt. If “NO,” indicate why he was unable to complete the Grip Strength test and **STOP TESTING**.

Perform the hand grip test only on the dominant hand that was established at his first test. Participants with one or more of the following conditions that affect their **DOMINANT HAND** should not be tested: **Do NOT switch to the other hand.**

- Acute flare-up of wrist/hand; for example, arthritis, tendonitis or carpal tunnel syndrome.

- Less than 13 weeks after surgery for fusion, arthroplasty, tendon repair or synovectomy of the upper extremity.
- If the technician has concerns that this test may exacerbate symptoms of heart disease (e.g., angina), the situation should be investigated. Ask the participant if he is currently having symptoms from heart problems. This does NOT exclude the participant from the grip strength test. Local procedures may be developed in this situation to assure safety for the participant.

### **GRIP STRENGTH TEST ATTEMPT #1 - #3:**

**Prompt Script:** “I’d like you to take your dominant arm, bend your elbow at a 90° angle, press your arm against your side and grab the two pieces of metal together like this.” Examiner should demonstrate at this point. “When I say ‘squeeze,’ squeeze as hard as you can. The two pieces of metal will not move but I will be able to read the force of your grip on the dial. I will ask you to do this three times. If you feel any pain or discomfort, tell me and we will stop.”

**Demonstration:** Face the participant and squeeze the dynamometer so that the participant can see the dial rotate.

**Prompt Script:** “Now you should bend your elbow at a 90° angle, press your arm against your side and grip the two pieces of metal with your dominant hand. Your wrist should be straight. “Ready? Go! Squeeze, squeeze, squeeze!” (Tell the participant to “stop” when the arrow starts going down.)

- B6. Completion is defined as having performed all 3 tests. For those men who attempted the grip strength test, indicate whether or not they were able to complete it. If “YES,” mark “YES”. If unable to complete the grip strength assessment (all 3 tests) due to a physical problem, mark, “Attempted, but unable physically”. If all three tests were not completed for some other reason, mark NO and go to Q6a to record reason.
- B7. Record the strength for each grip-strength test completed in kilograms. The Dynamometer should be read at eye level. Round down to the nearest line on the dynamometer (will always be an even number). Be sure to set the dynamometer dial to zero prior to each attempt. A minimum of three attempts with the dominant hand must be made.
- B8. Record the strength for the second attempt in kilograms.
- B9. Record the strength for the third attempt in kilograms.

**If the participant did not complete all three tests,  
go back to B6 to fill in outcome of testing.**