ZENO GAIT MAT FORM

ID NUMBER: ☐☐☐☐☐☐☐   FORM CODE: | Z | G | M |

ADMINISTRATIVE INFORMATION:

0a. Completion Date: ☐☐/☐☐/☐☐☐☐
                     Month   Day   Year

0b. Staff ID: ☐☐☐

1. Is the participant able to stand? .... ☐

    Yes .... Y

    No .... N **SAVE & CLOSE**

2. Was the gait mat used today?

    Yes   ☐₁ → **Go to item 3**

    No, participant refused   ☐₂ → **SAVE & CLOSE**

    No, technical/logistical problem with mat   ☐₃ → **SAVE & CLOSE**

    No, other   ☐₄

    2a. Specify other reason gait mat not used in exam:

    _____ **SAVE & CLOSE**

STATIC/QUIET STANCE and LIMITS OF STABILITY (QS and LOS administered as 1 task)

Technician Instructions: QS test moves directly into LOS without moving the feet; walking aids NOT permitted; no clicker; data file=QS and LOS

STATIC/QUIET STANCE (goes directly to the LOS without stopping)

Script:

"The next test will assess how you balance yourself. I will ask you to stand in place without moving for 30 seconds, and then to lean in four directions as far as you can comfortably and safely without lifting any part of your foot off the floor. It is important that you do not move your feet until I say it is time. If you feel unsteady, you should take a step to the side. Let me demonstrate." Feet should be approximately shoulder width apart and facing the end of the mat with the cables. "Please notice how I am not moving my feet as I go from standing quietly to rocking. Do you have any questions?" "To begin, I will ask you to stand facing me and march in place a few times." "Now stop, stand quietly in place for 30 seconds. After 30 seconds, I will tell you which way to lean without moving your feet. I will let you know when you can move your feet."

3. Did the PPT complete the STATIC/QUIET STANCE? .... ☐

Participant Refused	☐$_1$ →	**Go to item 5**
Not attempted, unable, or unsafe	☐$_2$ →	**Go to item 5**
Attempted, technical/other logistical difficulties	☐$_3$ →	**Go to item 5**
Completed	☐$_4$	

LIMITS OF STABILITY (continues directly from QS)

Script:

"Please don't move your feet. Keep all the parts of your feet on the floor at all times. Rock forward, now back to the middle. Now rock to the right, keeping your entire foot on the ground. Return to the middle. Now lean to the left, back to the middle. Now rock backwards, only to where you feel comfortable, without losing balance, and now come back to the center." The participant should be standing in the same position as was used for the QS and should not pick up their feet when transitioning to the LOS.

4. Did the PPT complete the LIMITS OF STABILITY? .... ☐

Participant Refused	☐$_1$	
Not attempted, unable, or unsafe	☐$_2$	
Attempted, technical/logistical difficulties with mat	☐$_3$ →	**SAVE & CLOSE FORM**
Completed, with examiner assistance (save QS & LOS)	☐$_4$	
Completed, without assistance (save QS & LOS)	☐$_5$	

USUAL PACE WALK

Technician Instructions: walking aids permitted (exclude crutches and casts); select Start Walk; press clicker on 'Go'; observe arm swing for unaided, completed trials; select End Walk when PPT walks off mat; data files=UP1, UP2, video recordings

Script:

"I'm going to ask you to walk all the way down and off the end of the mat, two times, with a short break in between. You will walk at your normal or usual pace for both trials. I will demonstrate. Please line up your feet with your toes touching the tape line, like this. Walk off the other end of the mat at your usual pace without slowing down. Do you have any questions?" "When I say 'Go', please walk at your normal pace. Remember to walk off the end of the mat without slowing down."

Trial 1

5.

Participant Refused	☐₁ →	**Go to item 8**
Not attempted, unable, or unsafe	☐₂ →	**Go to item 8**
Attempted, technical/logistical difficulties	☐₃ →	**Go to item 8**
Completed, with walking aid (save UP1)	☐₄	
Completed, without walking aid (save UP1)	☐₅	

Trial 2

6.		
	Participant Refused	☐₁
	Not attempted, unable, or unsafe	☐₂
	Attempted, technical/logistical difficulties	☐₃
	Completed, with walking aid (save UP2)	☐₄
	Completed, without walking aid (save UP2)	☐₅

7. Arm swing..☐

Walking aid used in all completed trials............	☐₀
Normal	☐₁
Absent left...	☐₂
Absent right..	☐₃
Absent both..	☐₄

SINGLE COGNITIVE TASK

Script:

"Now I'm going to ask you to do a thinking task. When I say "go", please count backwards from 100 by threes. I will tell you when to stop. Do you have any questions?" (Pause for questions.) "Ready, go."

8. Did the PPT attempt the SINGLE COGNITIVE TASK? .... ☐

    Participant Refused   ☐$_1$ → **Go to item 10**

    Not attempted, unable, or unsafe   ☐$_2$ → **Go to item 10**

    Attempted, technical/other logistical difficulties   ☐$_3$ → **Go to item 10**

    Attempted   ☐$_4$

8a. Subtraction by serial 3s (record the number said until the PPT gives 7 answers or passes 79):

☐	☐	☐	☐	☐	☐	☐
1	2	3	4	5	6	7

Traditional answers: 97 94 91 88 85 82   79. However, PPT may have an incorrect response. If subsequent responses are going down by 3, those responses are correct. For example, 98, 95, 92, 90, 87, 84, 81 has 2 incorrect responses (98, 90).

8b. Did the PPT complete the test?

    No, attempted, discontinued   ☐$_1$

    Yes, had <u>fewer</u> than 3 correct   ☐$_2$

    Yes, had 3 or <u>more</u> correct (test with 3s in item 9) ☐$_3$ → **Go to item 9**

Script:

"Let's try another task. When I say "go," please count backwards from 100 by twos. I will tell you when to stop. Do you have any questions?" (Pause for questions.) "Ready, go."

8c. Subtraction by serial 2s (record the number said until the PPT gives 7 answers or passes 86):

☐	☐	☐	☐	☐	☐	☐
1	2	3	4	5	6	7

Traditional answers: 98 96 94 92 90 88 86. However, PPT may have an incorrect response. If subsequent responses are going down by 2, those responses are correct. For example, 98, 95, 93, 90, 88, 84, 82 has 4 incorrect responses (95, 93, 90, 84).

8d. Did the PPT complete the test?

    No, participant refused   ☐$_1$ → **Go to item 10**

    No, attempted, discontinued   ☐$_2$ → **Go to item 10**

    Yes (test with 2s in item 9)   ☐$_3$

DUAL TASK

Technician Instructions: walking aids permitted (exclude crutches and casts); select Start Walk; press clicker on 'Go'; put clicker down and walk with PPT; record subtractions; select End Walk when PPT walks off mat; data files=DUAL1, DUAL2, video recordings.

Script:

"I'm going to ask you to walk over this mat while talking. "Please line up your feet with your toes touching the tape line on the mat, like this. When I say "Go", please walk at your normal pace while counting backwards by **[Examiner, say 'THREES' or 'TWOS,' whichever number was determined in the single cognitive task]**, starting with 100. Remember to walk off the end of the mat without slowing down. Do you have any questions?" (Pause for questions.) "Ready, go."

9. Did the PPT attempt the DUAL TASK? .... ☐

Participant Refused	☐₁ →	**Go to item 10**
Not attempted, unable, or unsafe	☐₂ →	**Go to item 10**
Attempted, technical/other logistical difficulties	☐₃ →	**Go to item 10**
Attempted	☐₄	

Trial 1

9a. Subtraction by serial 3s OR 2s: (record number said if heard and review instructions for scoring from item 8):

1	2	3	4	5	6	7	8
☐	☐	☐	☐	☐	☐	☐	☐

9	10	11	12	13	14	15	16
☐	☐	☐	☐	☐	☐	☐	☐

9b. Did the PPT complete the test?

No, attempted, discontinued	☐₁ →	**Go to item 10**
Attempted, technical/logistical difficulties	☐₂ →	**Go to item 10**
Attempted, responses unclear (save DUAL1)	☐₃	
Completed, with walking aid (save DUAL1)	☐₄	
Completed, without walking aid (save DUAL1)	☐₅	

Trial 2 (No clicker for Trial 2)

9c. Subtraction by serial 3s OR 2s: (record number said if heard and review instructions for scoring from item 8):

☐	☐	☐	☐	☐	☐	☐	☐
1	2	3	4	5	6	7	8

☐	☐	☐	☐	☐	☐	☐	☐
9	10	11	12	13	14	15	16

9d. Did the PPT complete the test?

No, participant refused ☐₁

No, attempted, discontinued ☐₂

Attempted, technical/logistical difficulties ☐₃

Attempted, responses unclear (save DUAL2) ☐₄

Completed, with walking aid (save DUAL2) ☐₅

Completed, without walking aid (save DUAL2) ☐₆

SHORT FAST PACE WALK

Technician Instructions: walking aids permitted (exclude crutches and casts); select Start Walk; press clicker on 'Go'; select End Walk when PPT walks off mat; data files=FP1, FP2, video recordings

Script:

"I'm going to ask you to do a fast walk down the mat two separate times. You will walk down the mat as fast as you can without running or hurting yourself. Please line up your feet with your toes touching the tape line on the mat, like this. Do you have any questions?" "When I say "Go", please walk at your fast pace. Remember to walk off the end of the mat without slowing down."

Trial 1

10.   Participant Refused   ☐₁ → **SAVE & CLOSE**

       Not attempted, unable or unsafe   ☐₂ → **SAVE & CLOSE**

       Attempted, technical/logistical difficulties ☐₃ → **SAVE & CLOSE**

       Completed, with walking aid (save FP1) ☐₄

       Completed, without walking aid (save FP1) ☐₅

Trial 2

11.   Participant Refused   ☐₁ → **SAVE & CLOSE**

       Not attempted, unable or unsafe   ☐₂ → **SAVE & CLOSE**

       Attempted, technical/logistical difficulties ☐₃ → **SAVE & CLOSE**

       Completed, with walking aid (save FP2) ☐₄ → **SAVE & CLOSE**

       Completed, without walking aid (save FP2) ☐₅ → **SAVE & CLOSE**

INSTRUCTIONS FOR THE ZENO GAIT MAT (ZGM) FORM

I.   General Instructions

Complete the form for each participant who comes into the clinic for the visit. The form is completed by the interviewer, not asked of the participant. This form is collected for all ARIC participants, including the ARIC/ACHIEVE shared cohort.

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

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.

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.

Question 1: Record participant's ability to stand. If the participant cannot stand, then save and close the form.
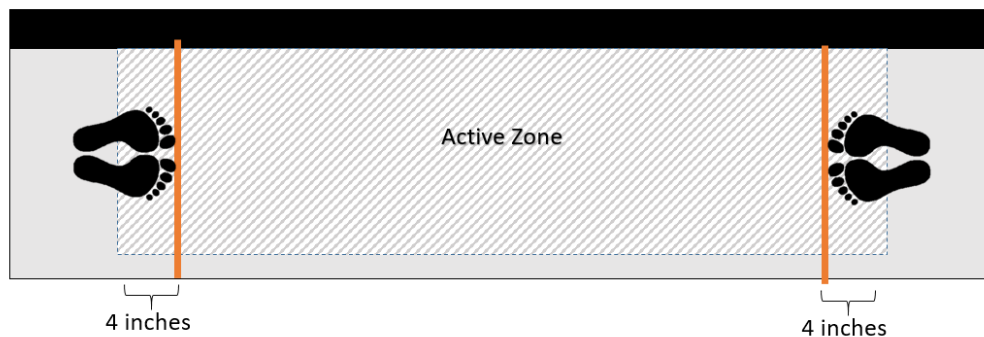
Question 2, 2a: Record use of gait mat. If participant used gait mat today, record 'Yes', then go to question 3. If participant refused to use the gait mat, save and close the form. If there was a technical/logistical problem with the mat, then save and close the form. Logistical problems include situations where the participant would use the gait mat if possible, but using it isn't feasible for the site's work flow. For example, a participant might be in the ACHIEVE clinic and cannot be transported to the ARIC clinic. If another reason for not using the gait mat exists besides refusal or technical/logistical problems, record the reason in question 2a, then save and close the form.

Note on refusals:
- If the participant refuses to use the gait mat because they don't want to be video recorded during any task, offer the tasks without the use of the camera.

- Generally, if a participant does not do a task because they or an examiner feels the task will be unsafe or participant does not think they will be able to do a task, these are recorded as "Not attempted, unable, or unsafe" rather than as refusals.

- Crutches, casts or other immobilizing devices alter the participant's usual mobility; if present, do not test the participant and note the reason the test was not performed.

- Exclusion from any performance test may be based on examiner assessment or participant concerns that the test would be unsafe. In the latter case, the examiner should describe the test and discuss with the participant their specific concerns about attempting the test, including physical problems and known disabilities. The reason for not attempting a test, or inability to perform a test are recorded on the data form.

General Instructions for Walking Tasks:

- Walking aids are allowed for the Usual Pace Walk Test, Dual Task, and Short Fast Pace Walk; however, ask participants with walking aids if they are comfortable performing the tasks without the use of walking aid over the short distance of the mat.

- Both feet should be partially on the active sensor area of the mat, with their toes lined up behind the tape line (see diagram).

- If the participant steps outside the active sensor zone during the length of the walk, do not save the trial. Ask the participant to re-do the test.

- In walking tasks, inclusive of the dual task walk, a total of 3 attempts is allowed, including the two saved/usable trials. For example, if a participant veers off the mat or the examiner cannot hear serial subtractions during the dual task, stop the test. Do not save the data, and repeat the test. Repeat the instructions as needed and emphasize information to address the issue resulting in the repeat.

- Collect video recordings of the usual pace walk, dual task, and fast pace walk. There should be a recording for each trial. If the PPT refused to be recorded, point the camera down to the floor.
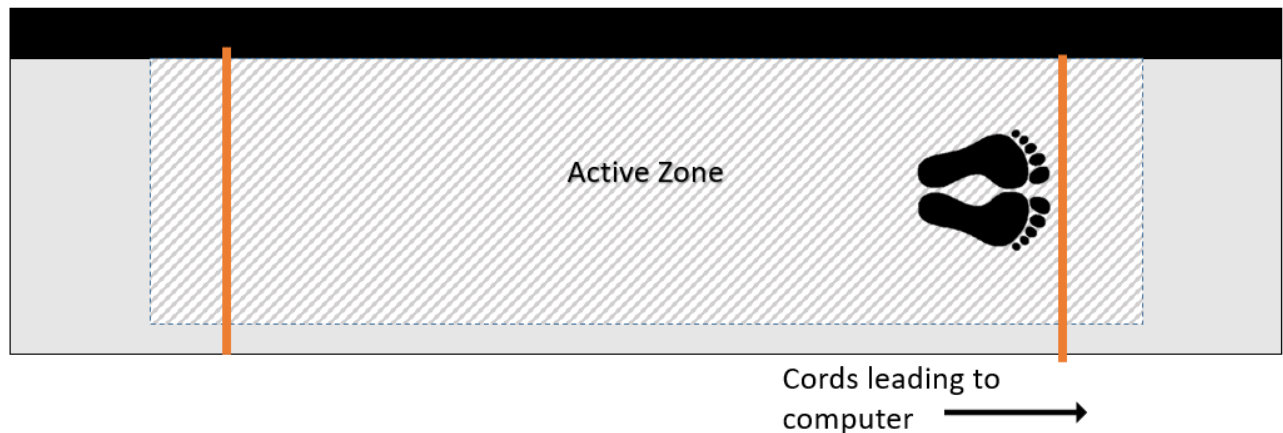

Tape lines are 4" from the active sensor layer. Feet are partially on the hidden active zone of the mat. The PKmas software correctly marks starting footprints as "other" (yellow).

Static/Quiet Stance and Limits of Stability

Static/Quiet Stance

Read the Static/Quiet stance script. Demonstrate both the Static/Quiet Stance and the Limits of Stability as these two tasks are administered as a single continuous protocol.

Question 3: Record completion status of the static/quiet stance. Feet should be approximately shoulder width apart, fully on the sensor area of the mat (within the two tape lines), and facing the end of the mat with the cables. When the participant is positioned, click on "Start Walk" on the software. When the PKMAS timer starts, say "Ready? Time starts now."

No completion: If the participant refuses, go to question 5. 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 "Not attempted, unable, or unsafe" (whichever is appropriate) for this and then go to question 5.

Completion: If the participant completed the task and stood for at least 30 seconds, do not stop recording on the gait mat PKMAS system, and continue to the next test, the Limits of Stability (LOS). If the participant completes the quiet stance, but refuses the LOS, stop recording on the gait mat. You would still select the filename, "QS and LOS", on the PKMAS software and save. Go to question 4 to record the LOS refusal (see next section).

Limits of Stability

The Limits of Stability (LOS) test is a continuation of the Quiet Stance without the participant moving their feet. If they move their feet, repeat the test starting with the Quiet Stance. Read the LOS script; you should have already demonstrated the task immediately following the Quiet Stance demonstration. The participant should be standing in the same position as was used for the Static/Quiet Stance and should not pick up their feet when transitioning from QS to the LOS.

Question 4: If the participant completed the quiet stance, PKMAS will continue running.

No completion: If the participant attempted the test but there were technical/logistical difficulties with the mat, then save and close the form. 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 "Not attempted, unable, or unsafe" (whichever is appropriate) for this and then go to question 5.

Completion: If the participant completed the task with or without the help of the examiner, select the filename, QS and LOS, on the PKMAS software and save. Go to question 5.

Usual Pace Walk

Read the script and demonstrate the task. Participant's feet should be lined up with their toes touching the marked tape line. Click on "Start Walk" on the software. When the timer starts, say "Ready? Go." Depress the clicker on the word, 'Go'. The clicker is used for <u>both</u> trials. Observe arm swing in both trials if completing task **without walking aid** and report after trial 2 in question 7. After the participant completes the walk on the gait mat, stop the trial in PKMAS by clicking "End Walk".

Question 5: Record completion status of the Usual Pace Walk (Trial 1).

<u>No completion:</u> If the participant refused the task, ask if the camera is the reason they refused. If yes, offer the usual pace walk without the camera for both trials. If the participant refuses again, or if the participant attempted or would have attempted the test, but there were technical/logistical difficulties with the mat, skip to question 8.

<u>Completion:</u> If the participant completed the task with or without a walking aid, select the filename, UP1, on the PKMAS software and save. Continue with question 6.

Question 6: Record completion status of the Usual Pace Walk (Trial 2). Trial 2 on the ZGM Form is only completed for participants who completed Trial 1 with the gait mat.

<u>No completion:</u> If the participant attempted or would have attempted the test, but there were technical/logistical difficulties with the mat, go to question 7 to record arm swing based on Trial 1.

<u>Completion:</u> If the participant completed the task with or without a walking aid, select the filename, UP2, on the PKMAS software and save. Go to question 7.

Question 7: If participant used a walking aid in all completed trials, mark on the form. Record arm swing after Trial 2 if participant completed task without walking aid in at least one trial. An arm swing is considered normal when the arms swing forward and back as the participant walks, where the arms go beyond the front and back of the participant's trunk, across an imaginary coronal plane; an example of a coronal plane at the back of a person is shown in the figure.
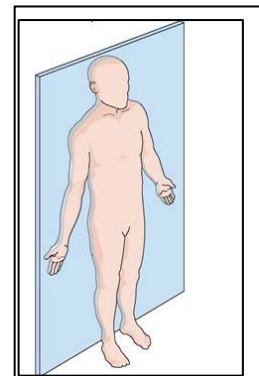

Figure. Coronal plane behind participant

Single and Dual Cognitive Tasks

Single Cognitive Task

Read the script. The participant may sit during the Single Cognitive Task. Stop the participant after seven answers or when they pass 79, whichever happens last.

Question 8: Record if the participant attempted the Single Cognitive Task. Continue with question 8a only if the participant attempted the Single Cognitive Task; if the participant refused or did not complete the task due to safety, ability, or technical/logistical difficulties, then skip to question 10.

Question 8a: Record the numbers said by participant.

Question 8b: Record completion status of the task. A correct answer is 3 less than the previous answer, regardless of whether the previous answer was correct itself (e.g. "97, 91, 88" is "correct, incorrect, correct"). If the participant attempted then discontinued with question 8a, continue to question 8c. If the participant completed question 8a but had fewer than 3 correct, continue to question 8c. If the participant completed question 8a and had 3 or more correct, skip to question 9 and complete test with subtraction by 3s.

Read the script. The participant may sit during the Single Cognitive Task. Stop the participant after seven answers or when they pass 86, whichever happens last.

Question 8c: Record numbers said by participant.

Question 8d: Record completion status of the task. If the participant attempted then discontinued the test, record and then skip to question 10. If the participant completed the test regardless of how many were correct, continue to question 9 with subtraction by 2s.

Dual Task

Read the script. If the participant was able to complete question 8b with 3 or more correct answers, use "THREES" for serial subtraction from 100. If the participant did not get at least 3 correct responses on 8b but was able to complete question 8c, then use "TWOS" for serial subtraction from 100. Both feet should be lined up with their toes touching the tape line on the mat. Select Start Walk on the PKMAS software, depress clicker on GO, then put clicker down and walk with participant for both trials. Note: the clicker is not required for the 2nd walk. Select End Walk at the end of both trials.

If participants veer off the sensor area or the examiner cannot hear responses during the dual task, the examiner should stop the test. As soon as the first cognitive response is not heard, the test should be stopped. End the walk on the software but don't save this file. Ask the participant to repeat the walking task and to speak up. The examiner should try to remain in close proximity to hear responses if possible. Do not repeat the first dual task more than once. A maximum of three walks can be completed: one partial that can be repeated so that there are two full length trials. If answers cannot be heard during the repeat walk, record as "Attempted, responses unclear". Save the data file (DUAL1, DUAL2 as appropriate). Data are saved if the participant continues with calculations even if the responses cannot be recorded.

If participants stop walking or stop attempting subtractions during the dual task, stop the test and review the instructions but do not save the interrupted test in the software. This counts as a partial test that can be repeated once. If the participant cannot complete walking and serial subtractions simultaneously, mark "No, attempted, discontinued" for 9b, 9d.

Question 9: Record if the participant attempted the Dual Task. Continue with question 9a only if the participant attempted the Dual Task; if the participant refused, did not attempt the task due to safety/ability, or attempted and had technical/logistical difficulties, then skip to question 10.

Question 9a: Record numbers said by participant. Write responses in boxes on paper form (or wherever convenient), then transcribe to form (or CDART when available) to free up examiner during test. If the response was "…responses unclear", go to the 2nd trial. Ask the participant to try to speak up.

Question 9b: If the participant did not complete the task, skip to question 10. If completed, select the filename, DUAL1, on the PKMAS software and save. Go to Trial 2 (9c).

Question 9c: This is a second attempt at the Dual Task. The clicker is not required. Record numbers said by participant. Write responses on margin of paper form (or wherever convenient) then transcribe to form (or CDART when available) to free up examiner during test.

Question 9d: If the participant did not complete the task, skip to question 10. If completed, select the filename, DUAL2, on the PKMAS software and save.

G. Short Fast Pace Walk

Read the script and demonstrate the task. Participant's feet should be lined up with their toes touching the tape line. Click on "Start Walk" on the software. When the timer starts, say "Ready? Go." Depress the clicker on the word, 'Go'. The clicker will be used for <u>both</u> trials. After the participant completes the walk on the gait mat, stop the trial in PKMAS by clicking "End Walk".

Question 10: Record completion status of the Short Fast Pace Walk (Trial 1).

<u>No completion:</u> If the participant refused the task, ask if the camera is the reason they refused. If yes, offer the short fast pace walk without the camera. If participant continues to refuse, mark as participant refused. If the participant attempted the test but there were technical/logistical difficulties with the mat, then save and close the form. If the reason for not completing the task is related to mobility problems or safety, mark as "Not attempted, unable or unsafe". In all instances of the participant not completing the task, save and close the form.

<u>Completion:</u> If the participant completed the task with or without a walking aid, select the filename, FP1, on the PKMAS software and save. Go to question 11.

Question 11: Record completion status of the Short Fast Pace Walk (Trial 2).

<u>No completion:</u> If the participant refused the task, ask if the camera is the reason they refused. If yes, offer to do the walk without the camera. If participant continues to refuse, mark as participant refused. If the participant attempted the test but there were technical/logistical difficulties with the mat, then save and close the form. If the reason for not completing the task is related to mobility problems or safety, mark as "Not attempted, unable or unsafe".

<u>Completion:</u> If the participant completed the task with or without a walking aid, select the filename, FP2, on the PKMAS software, save and close the form.

SEE MANUAL 32 FOR DETAILED, TECHNICAL INSTRUCTIONS ON:

1. Data Collection, Processing, and Transfer

    a. Starting and stopping tests on the ZGM
    b. Setting up exporting preferences (only done once per site)
    c. Processing tests
    d. Analyzing and exporting the walks in batches via Test List feature
    e. Video file exporting for the walk tests
    f. Uploading txt and video files to the Hopkins OneDrive folder "GaitQC"

2. Report Generation