



National Health and Nutrition Examination Survey (NHANES)

National Youth Fitness Survey (NYFS)
Modified Pull-up Exercise Procedures Manual



April 2012

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1. OVERVIEW OF THE MODIFIED PULL-UP EXERCISE

1.1 Background

Upper body muscle strength will be measured through the modified pull-up. Used in over 50 percent of schools in the U.S., it is one of a battery of health-related fitness items scored using criterion-referenced standards. The Modified Pull-up component will provide the first nationally representative data against which schools can compare results from their districts. Lifting body weight against gravity is a test of strength, irrespective of size; the modified pull-up uses about 30 percent of body weight for resistance. The modified pull-up develops back, shoulder, forearm, and arm strength.

1.2 Overview of Protocol

Study participants, ages 5-15, who do not meet any of the exclusion criteria will be shown a video that demonstrates how to do the modified pull-up. The exam component will use a modified pull-up bar—a specially constructed horizontal bar that can be positioned at a height that allows the SP to clasp the bar with an overhand grasp when lying on the back on a flat surface. The bar will be positioned about 2 inches above the SP's outstretched arms. To get into position, the SP clasps the horizontal bar with palms facing away from the body and lifts his or her body off the mat so that only the heels are touching.

On hearing the signal "Go," the participant raises his or her body by flexing the arms until the chest touches a strap that hangs 8 inches down from the horizontal bar. The body should be kept straight with the hips up and only the heels touching the mat. Then the SP will lower back to the starting position.

The SP will be asked to complete as many pull-ups as possible. The test will stop when the SP breaks form, pauses for 2 or more seconds, or complains of discomfort. There is a slight risk of sprain or strain with this test.

The number of correctly completed pull-ups will be evaluated against the FitnessGram and reported to the SP.

2. EQUIPMENT AND SUPPLIES

The equipment (see Exhibit 2-1) and supplies used in the Modified Pull-up component are described below.

2.1 Equipment

Exhibit 2-1. Modified Pull-up bar apparatus



- Modified Pull-up Bar Model 2, Clovis Manufacturing Company LLC, dimensions: 44"W X 48"H X 24"D. A specially constructed horizontal bar can be positioned at a height that allows the participant to clasp the bar with an overhand grasp when lying on his or her back on a flat surface.
- Strap hanging 8 inches down from horizontal bar
- Tape measure attached to pull-up bar side bar
- Ribbon to secure hand bar locking pin

- Exercise mat
- Computer

Supplies

- Plastic container to hold participant's jewelry
- Plastic container to temporarily hold locking pin
- Measuring tape
- Mild, all-purpose cleaner cloths (Clorox wipes)
- Hand sanitizer
- Wall poster of modified pull-up showing start and up positions
- Laminated modified pull-up hand card with talking points in English and Spanish

2.2 Care and Maintenance

Follow the procedures below on a daily basis to ensure that the pull-up bar and equipment remain sanitary and safe.

- Ensure that the pull-up bar is standing on a firm, flat level surface and out of direct sunlight.
- When not in use, keep the exercise mat folded and leaning on the wall of the room.
- Wipe the pull-up bar surfaces and exercise mat with a mild, all-purpose cleaner and dry thoroughly.
- Make sure all three locking pins are in place and all fasteners are tight and secure.

3. PROTOCOL

3.1 Eligibility Criteria

All sample persons (SPs) ages 5-15 years who do not meet any of the following exclusion criteria (see Table 3-1) are eligible for the Modified Pull-up component.

Table 3-1. Modified Pull-up Exclusions

Exclusions for Modified Pull-up Component
<ul style="list-style-type: none">▪ Doctor told SP not to participate in sports or other activities because of a health condition.▪ Doctor told SP to do only sports or other physical activities recommended by a doctor.▪ SP has musculoskeletal or neurological problems involving the arms or shoulders.▪ SP has arm in cast or covered by bandages.▪ SP is missing arm or has arm paralysis.▪ SP had surgery on either arm, hand, or shoulder in the last 3 months.▪ SP is wheelchair-bound.▪ SP weighs more than 350 pounds.

3.2 Examination Procedures

Before introducing SPs ages 5 and older to this exam, make sure that they have completed the muscle strength (handgrip) component. While the SP is watching the video demonstration, you should be putting the pull-up bar in position and placing the exercise mat under it, aligned so that the SP's arm is next to the tape measure attached to the stand support. The suggested script is taken from the Modified Pull-up Hand Card in Appendix A.

1. Introduce yourself to the SP and his or her parent(s) or guardian if you have not yet met.
2. Open the Modified Pull-up component in the computer, confirm the SP's name and eligibility, and wand the SP into the system.

3. Check that the SP's shirt and pants are not so baggy that you can't discern movement out of position. If they are, use the clips to tighten the clothes.
4. If the SP is wearing jewelry such as bracelets that might interfere with arm and wrist placement on the mat, ask the SP to remove it.
5. Introduce the SP to the exercise.

SUGGESTED SCRIPT:

In this exam, we want to get some information about your muscle strength. I'd like you to watch the brief demonstration video of the exercise and then we can get started. (The video script is in Appendix B.)

6. While the SP is watching the video, put the equipment in place, remove the bar and lay it on the floor. Place the mat against the left support post and wipe it down with a Clorox wipe. After watching the video, ask the SP if he or she has any questions.
7. Guide the SP into position lying down with his or her left arm next to the vertical side bar with the tape measure; the shoulders should be directly beneath the hand bar. Ask the SP to raise his or her arm up along the measuring tape and note the number of inches on the tape that align with the top of the fleshy portion of the SP's middle fingertip. Make sure that the SP's shoulder remains on the mat when he or she stretches out the arm along the measuring tape. Add 2 inches and note the number posted next to the hole. The bar will be inserted back into these holes. If the hand bar height is between two holes, slide the hand bar into the lower hole.

SUGGESTED SCRIPT:

Lie on the left side of the mat with your shoulders under the bar and your legs straight. I am going to measure the length of your arm so I can adjust the bar for you. Now reach up and stretch your arm with your palm facing away from your body.

8. Ask the SP to stand up and then replace the hand bar, inserting it into the numbered hole that was measured with the SP. Make sure to insert the locking pin, finally checking to ensure the hand bar is securely in place by tapping it gently with both hands. Move the mat so that it is centered between the two support posts. Make sure the strap is in the middle of the bar.
9. Guide the SP into the correct starting position.

SUGGESTED SCRIPT:

Let me review what you are going to do. First, you will reach up and grab the bar with both hands so that only your heels are touching the mat. Hold your body straight and dig your heels in place. When I say "Go," bend your arms to pull yourself up so that the bottom of this strap touches your chest. Be sure to keep your back straight. Once you touch the strap, go back down but do not touch the mat. Go up and down again as many times as you can while I will count how many times you touch the strap until you can't do it anymore.

10. Allow one practice pull-up.

11. Help the SP get positioned correctly again for the actual exam.

SUGGESTED SCRIPT:

Okay, reach up and grab the bar. When I say “Go,” start the pull-up!

12. Assess the SP’s form while counting the number of pull-ups. Pull-ups should be smooth and rhythmic. In the “down” position, arms should be fully extended. Legs, back, and neck should be straight and only the heels should touch the floor. The SP’s chest should not be raised higher than the end of the strap.
13. Stop the test when the SP pauses for 2 or more seconds, if the SP can no longer maintain the correct position, or the SP complains of pain. Tell the SP to lower the body back to the mat and relax.
14. Enter the number of pull-ups correctly completed into the computer.

3.3 Comprehension or Language Difficulties

Some SPs may have difficulty understanding the examination instructions. Some SPs will not be able to do even one pull-up. Exam staff should use caution when attempting to conduct the pull-up component with these participants. If the SP cannot understand your instructions due to a developmental disability or other type of physical or mental impairment, ask if a family member who accompanied the SP to the MC can help explain your instructions to the SP. Regardless, if you believe the SP cannot comprehend well enough for you to safely and accurately carry out the examination protocol, then on the ISIS screen code the Modified Pull-up as Could Not Obtain (CNO) and select “Communication Problem” as the reason for the Not Done exam status. Do not use “0” to indicate that the exam could not be done because of comprehension difficulties.

If the SP speaks a language other than English or Spanish, arrangements should be made by the field office to identify an appropriate interpreter. If none is available and the SP does not comprehend instructions, click the “End” button at the bottom of the screen and code the reason for exam “Not Done” as Language Barrier on the ISIS screen. See the *NHANES Interpretation Guidelines* for procedures related to the interpretation of MC examination components and working with interpreters.

3.4 Report of Findings

The number of correctly completed pull-ups will be reported to the SP. The specific number of Healthy Fitness Zone pull-ups in FitnessGram is dependent upon age and gender. The following language will be used to report results.

“The fitness level of muscles is important for injury prevention and overall body functions. A minimum level of fitness for the modified pull-up, based on your child’s age and gender, begins at _____. Your child completed ___ pull-ups. To be healthy and fit, it is important that your child do some physical activity every day.”

Table 3-2 indicates the minimum number of modified pull-ups required to reach the Healthy Fitness Zone.

Table 3-2. Modified Pull-up standardized scores

Gender	Age (years)	Number of modified pull-ups completed in order to reach the Healthy Fitness Zone
Boys		
	5 – 6	≥ 2
	7	≥ 3
	8	≥ 4
	9 – 10	≥ 5
	11	≥ 6
	12	≥ 7
	13	≥ 8
	14	≥ 9
	15	≥ 10
Girls		
	5-6	≥ 2
	7	≥ 3
	8 - 15	≥ 4

4. ISIS DATA ENTRY

4.1 General Screen Information

Open the Modified Pull-up application and log the SP into the exam by finding his or her ID number from the drop-down box, or scan the SPID barcode from the Study Participant Information sheet for that scheduled session. Confirm the SP's name and eligibility from the above screen and log the SP into the system (Exhibit 4-1). Click on OK to continue.

Exhibit 4-1. Modified Pull-up screen after scanning SP ID

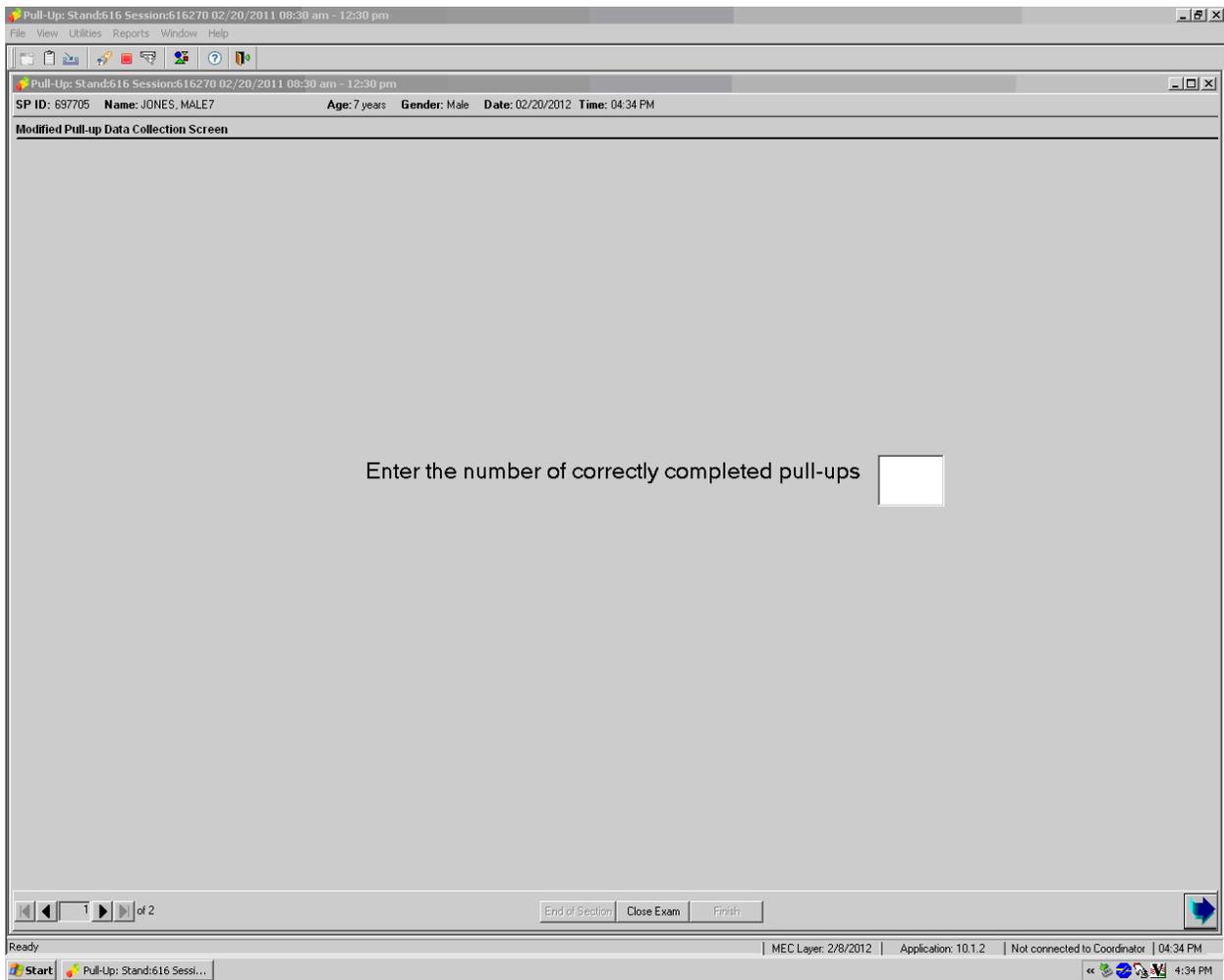
The screenshot shows a Windows application window titled "Pull-Up: Stand:616 Session:616270 02/20/2011 08:30 am - 12:30 pm". The main window is mostly greyed out. A modal dialog box titled "SP Login" is open in the center. The dialog box contains the following fields and controls:

Sample Person ID:		Sample Person Name:	
<input type="text" value="758671"/>		<input type="text" value="758671 - Jones"/>	
Last Name:	<input type="text" value="JONES"/>	Suffix:	<input type="text"/>
First Name:	<input type="text" value="MALE9"/>	Middle Name:	<input type="text"/>
Date of Birth:	<input type="text" value="10/01/2001"/>		
Gender:	<input type="text" value="Male"/>	Age at Interview:	<input type="text" value="9 years"/>
Special Considerations:	<input type="text"/>		
Retrieve		OK	Cancel

At the bottom of the application window, there is a status bar with the following text: "Apply changes and close window | MEC Layer: 2/8/2012 | Application: 10.1.2 | Not connected to Coordinator | 12:18 PM". The Windows taskbar at the very bottom shows the Start button, the application icon, and the system tray with the time "12:18 PM".

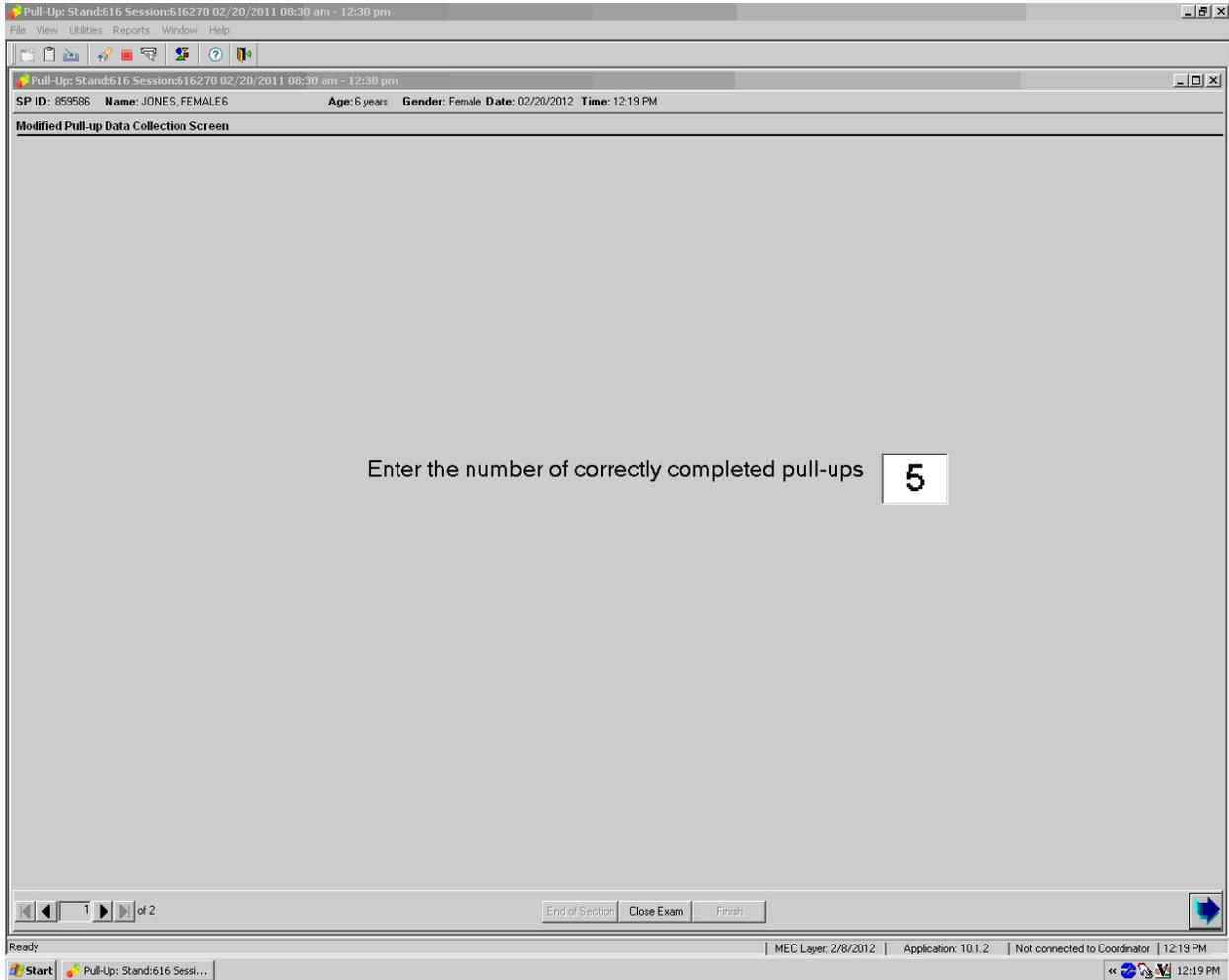
After clicking OK, the following screen (Exhibit 4-2) will appear in which results from this component will be entered.

Exhibit 4-2. Modified Pull-up screen when ready to begin the exercise



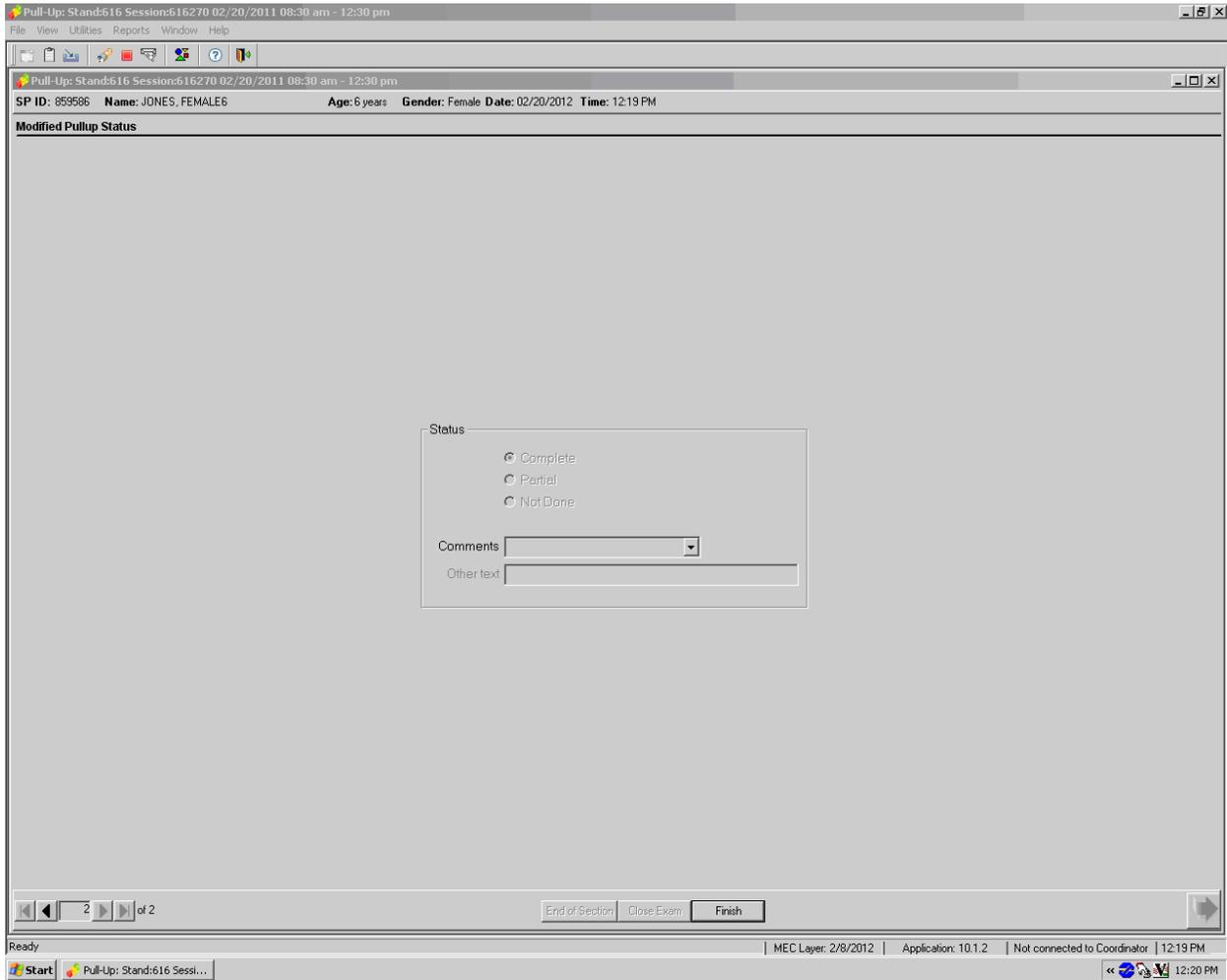
After entering the results of the exam, click the blue arrow in the lower right corner (Exhibit 4-3).

Exhibit 4-3. Modified Pull-up screen after entering the correct number of completed pull-ups



The next screen, Exhibit 4-4, shows that the exam is complete. The component status for the Pull-up component is considered “Complete” if the SP correctly completes the component. Click the “Finish” button to close out the SP.

Exhibit 4-4. Modified Pull-up screen after clicking blue arrow button on the lower right screen



4.2 Post-Exam Procedures

4.2.1 Component Status

The component status for the Modified Pull-up component is considered “Not Done” if the SP does not complete any part of the exercise. Table 4-1 explains when to use each comment code for exams with a status of “Not Done.”

Table 4-1. Comment code descriptions

Comment code	Use when:
Communication problem	SP did not appear to understand or follow instructions; cognitive deficit; other communication impairment.
Equipment failure	Problem with test equipment or the ISIS system.
Interrupted	Exam was interrupted, usually for a MEC-wide emergency, and cannot be completed by the SP.
Language barrier	Exam could not be accomplished because of a language barrier; SP does not speak English and interpreter unavailable.
No time	Session ended.
Other, specify	Reason cannot be coded under any other category; reason is a safety type issue; issue is a physical limitation not covered in the pretest questions. A brief explanation in the comment field is required.
Physical limitation	ISIS will preselect this code if the SP was excluded based on responses to the pretest questions. If there is a physical limitation not covered in the pretest questions, code it under “Other, specify” and indicate the specific limitation.
Safety exclusion	This code should <u>not</u> be used. Code any safety type issues under “Other, specify” and indicate the specific issue.
SP ill/emergency	SP had to leave abruptly due to a serious, unforeseen circumstance.
SP refusal	SP physically able to undertake the component, but refused or was uncooperative.

4.2.2 Directions to the SP

When the entire test is complete and the SP has been closed out of the component, return any items that the examinee may have removed at the beginning of the exam (rings, watch, bracelets, etc.). Thank the examinee and direct him or her to the next exam. If the SP inquires about the results of the exam, explain that you simply conduct the tests and that the results will be given to him or her with some explanatory materials at the end of the MC exam. Never interpret the results of the exam for the SP.

4.3 Report of Findings

A Report of Findings will be provided to the participants at the end of the MC exam.

5. QUALITY CONTROL

5.1 Quality Control for Modified Pull-up

Quality control procedures ensure the collection and documentation of accurate, reliable data. In addition to the standardized examination protocol, the Modified Pull-up component incorporates specific quality control procedures at the start of each stand, as well as on a daily basis.

The examiner will record the results of the quality control checks on the ISIS screen titled, “Pull-Up Quality Control Checks.” To access this screen, select the Quality Control option from the main Utilities menu. The Pull-up Quality Control Checks dialog box (Exhibit 5-1) contains individual tabs designated for the Stand of Stand and the Daily procedures. Exhibit 5-1 displays the Start of Stand quality control check boxes. There are five checks that need to be completed. You will need to scroll down the screen to see each one as in the following exhibits.

Exhibits 5-1 through 5-4 illustrate that the Start of Stand quality control check boxes were all checked. If any required procedures are not checked as “Done,” ISIS will present a pop-up reminder window to indicate that the QC items were not all completed as shown in Exhibit 5-5. After all of the quality checks are completed and the boxes are checked off, click on the Daily tab to review those procedures.

Exhibit 5-1. Modified Pull-up Quality Control Checks dialog box for Start of Stand Checks 1 and 2

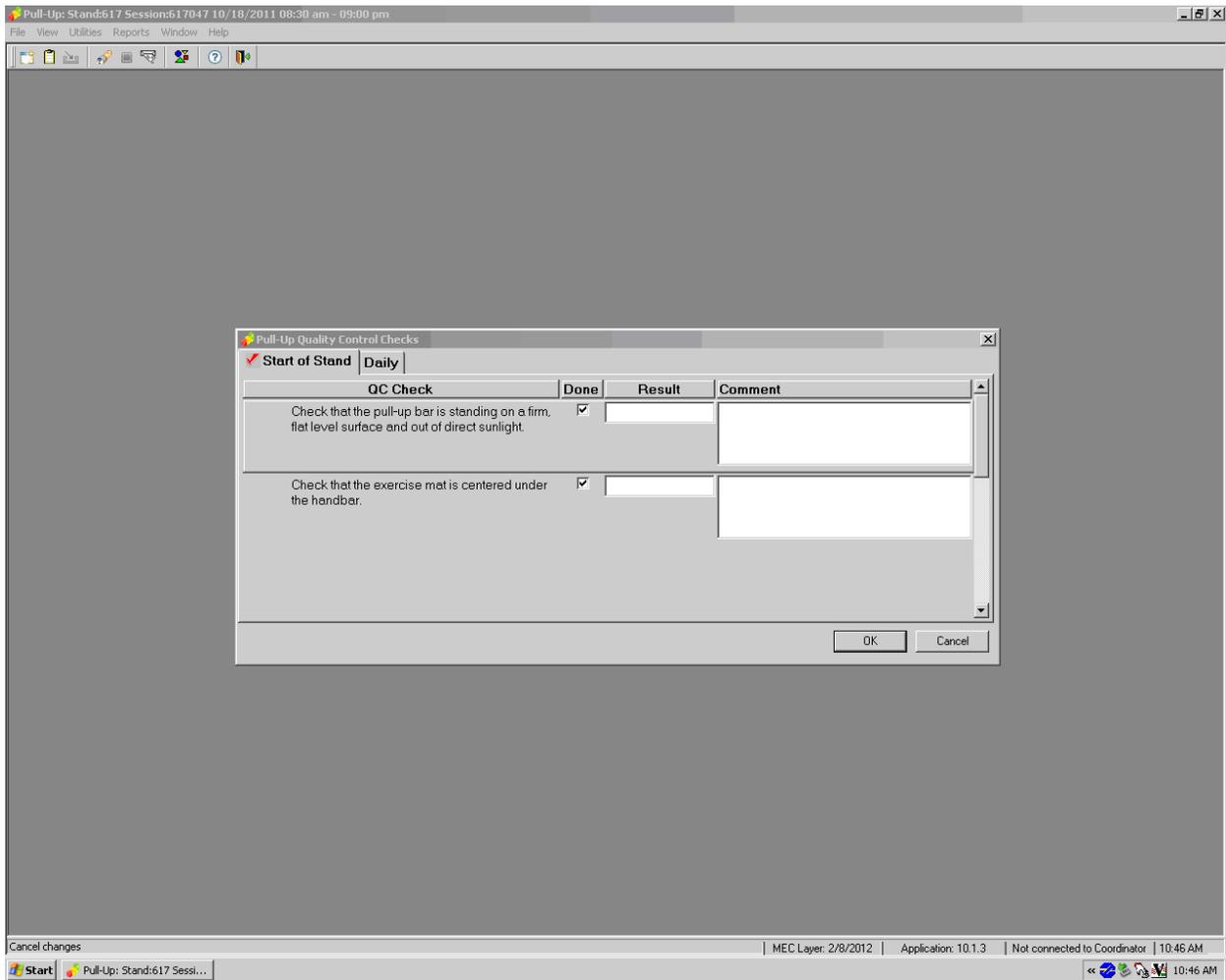


Exhibit 5-2. Modified Pull-up Quality Control Checks dialog box for Start of Stand Checks 2 and 3

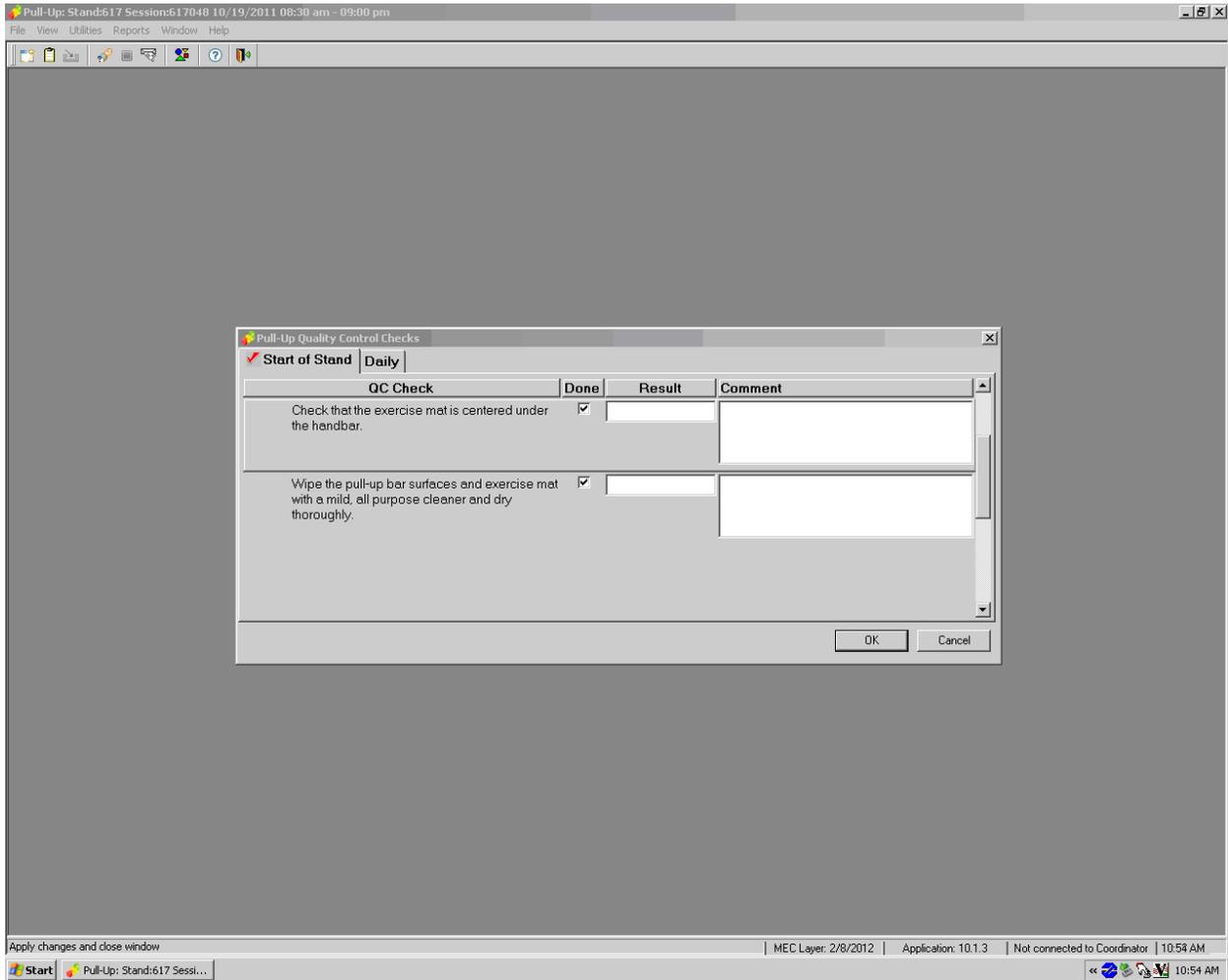


Exhibit 5-3. Modified Pull-up Quality Control Checks dialog box for Start of Stand Checks 3 and 4

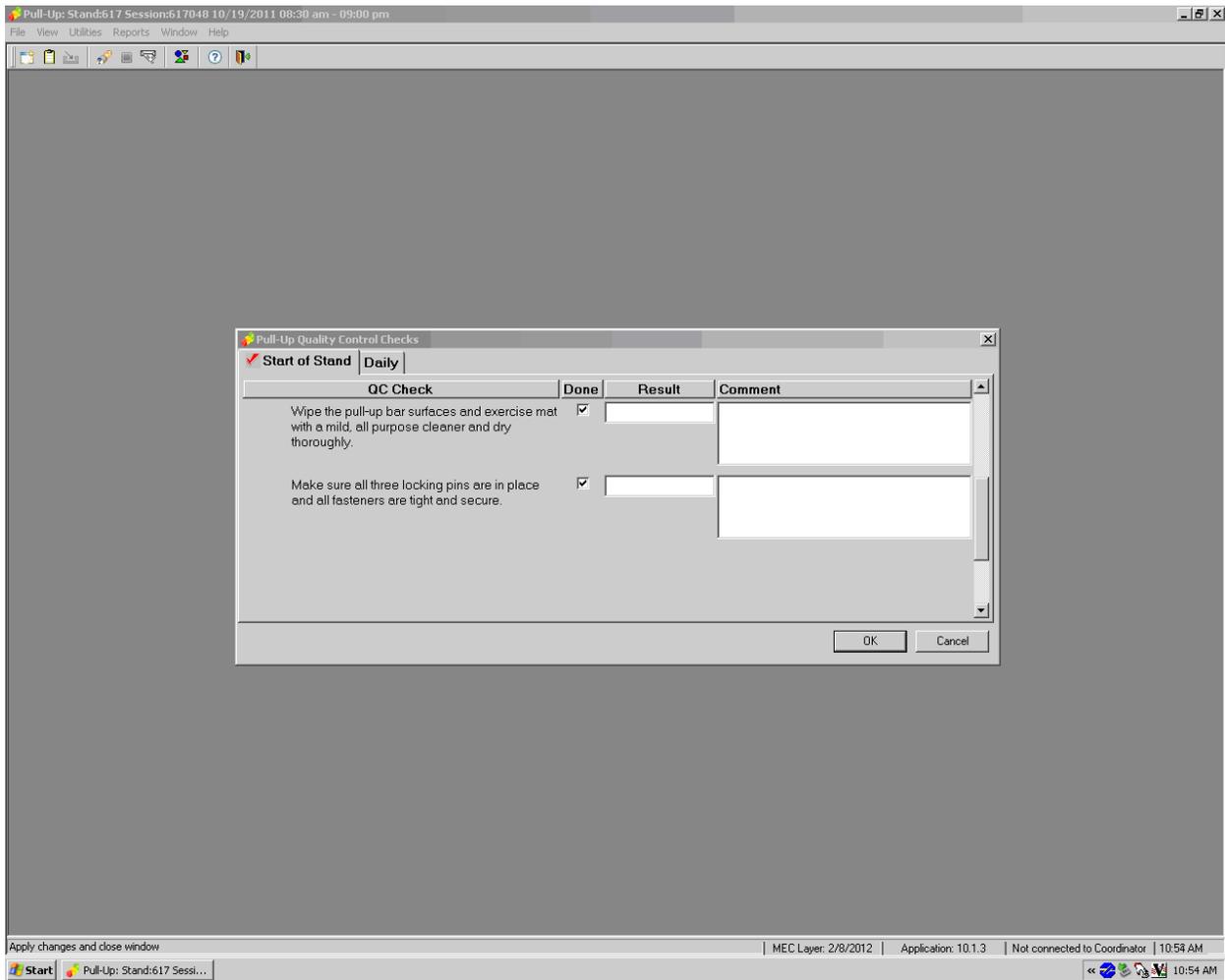


Exhibit 5-4. Modified Pull-up Quality Control Checks dialog box for Start of Stand Checks 4 and 5

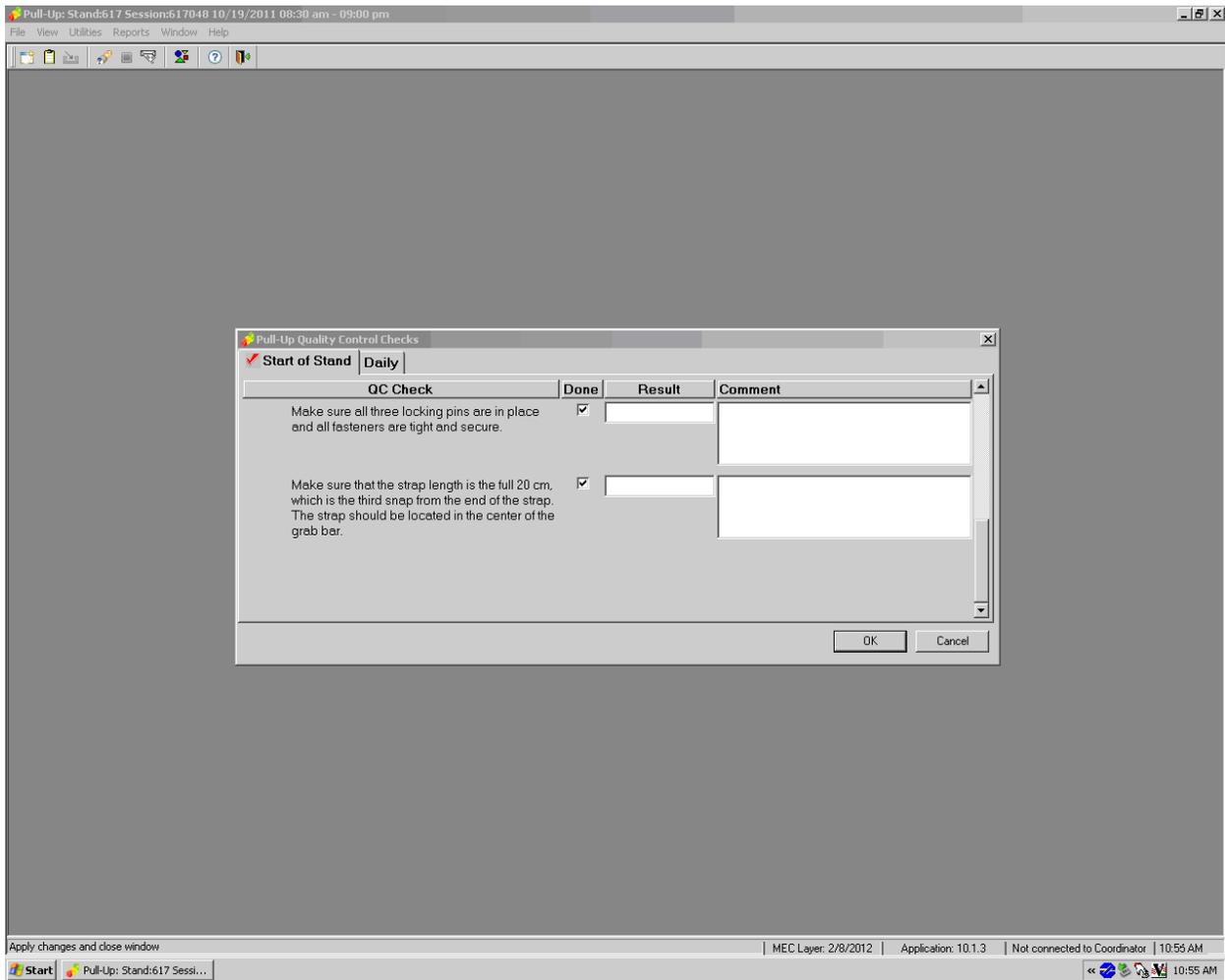
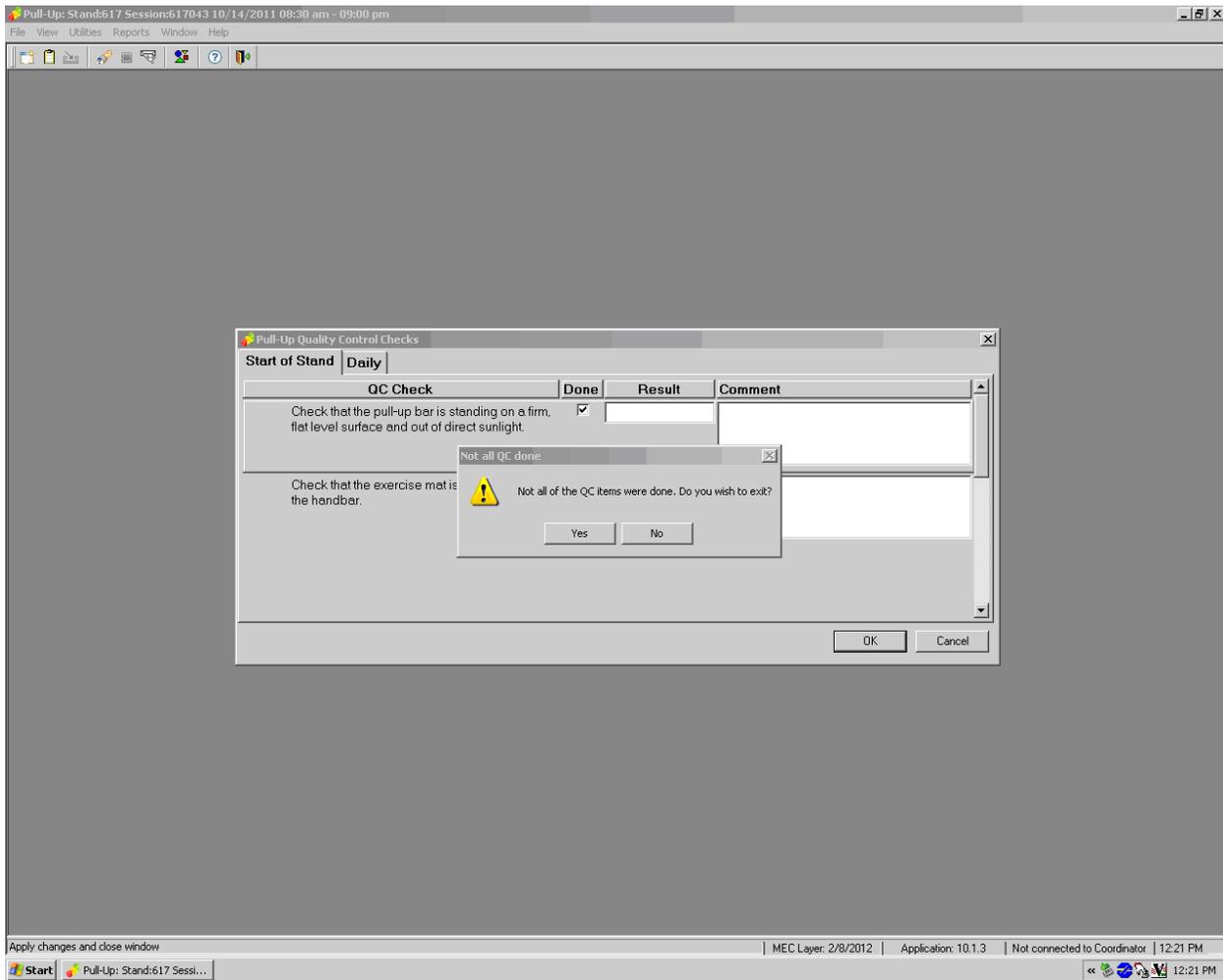


Exhibit 5-5. Modified Pull-up Quality Control Boxes not checked properly for Start of Stand



Exhibits 5-6 through 5-9 illustrate that the Daily quality control check boxes were all checked. If any required procedures are not checked as “Done,” ISIS will present a pop-up reminder window to indicate that the QC items were not all completed as shown in Exhibit 5-10 below. After completing the QC on these items, and checking the “Done” boxes, you can exit the dialog box. The application is now ready for SP data entry.

Quality control checks must also be done daily. Clicking on the Daily tab will present the following screens that display the checks that must be done every day. There are five checks that need to be completed. You will need to scroll down the screen to see each one as in the following exhibits.

Exhibit 5-6. Modified Pull-up Quality Control Checks dialog box for Daily Checks 1 and 2

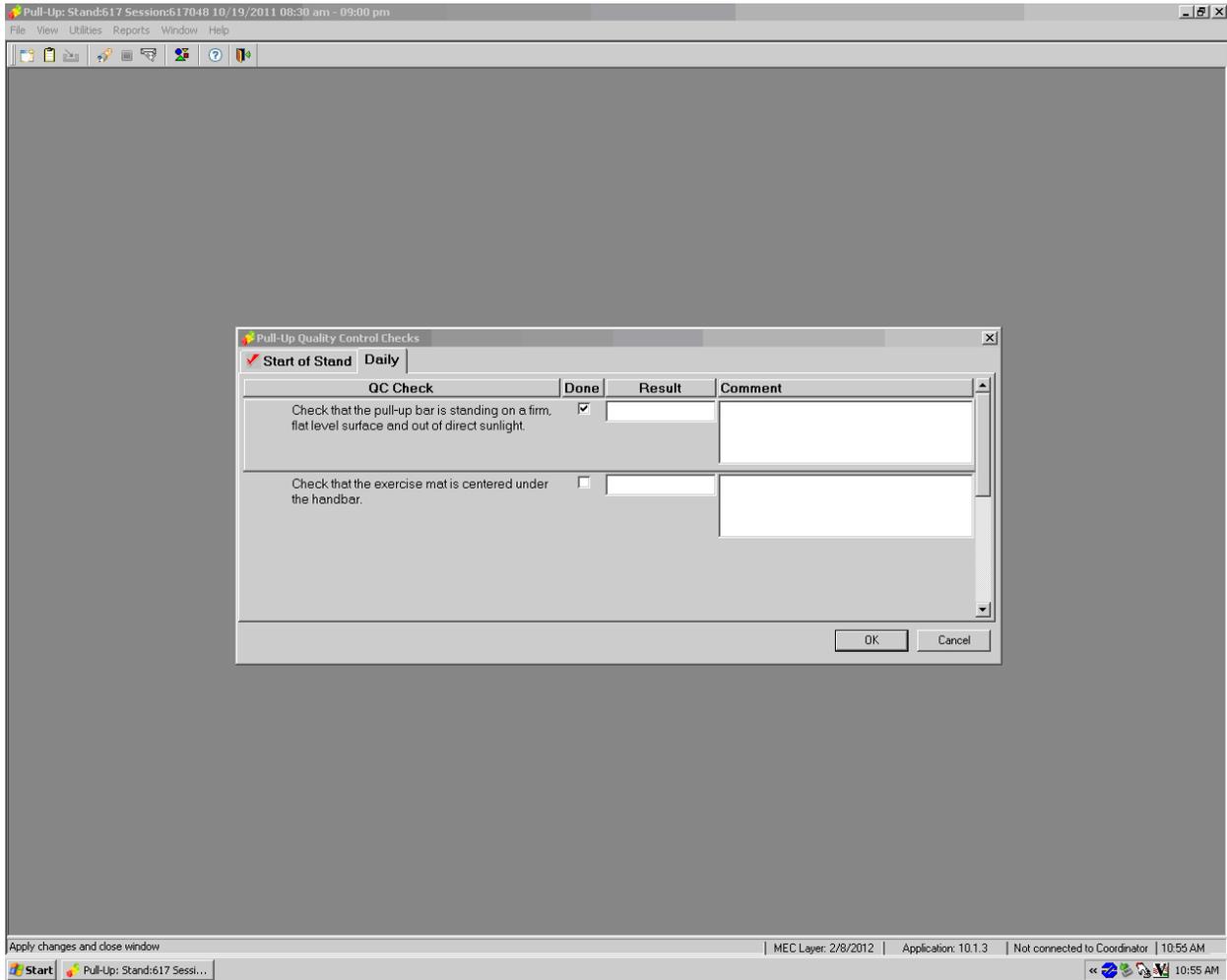


Exhibit 5-7. Modified Pull-up Quality Control Checks dialog box for Daily Checks 2 and 3

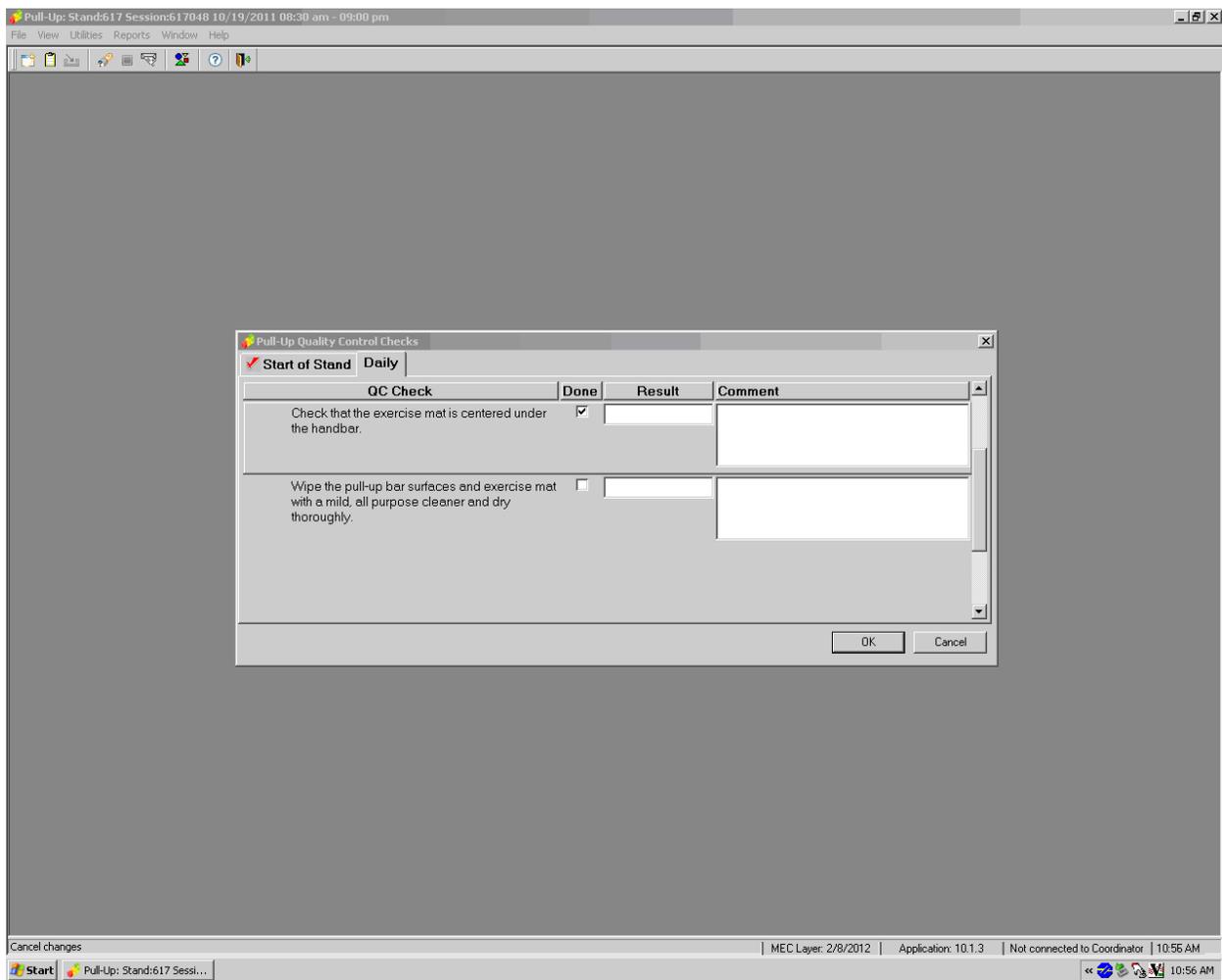


Exhibit 5-8. Modified Pull-up Quality Control Checks dialog box for Daily Checks 3 and 4

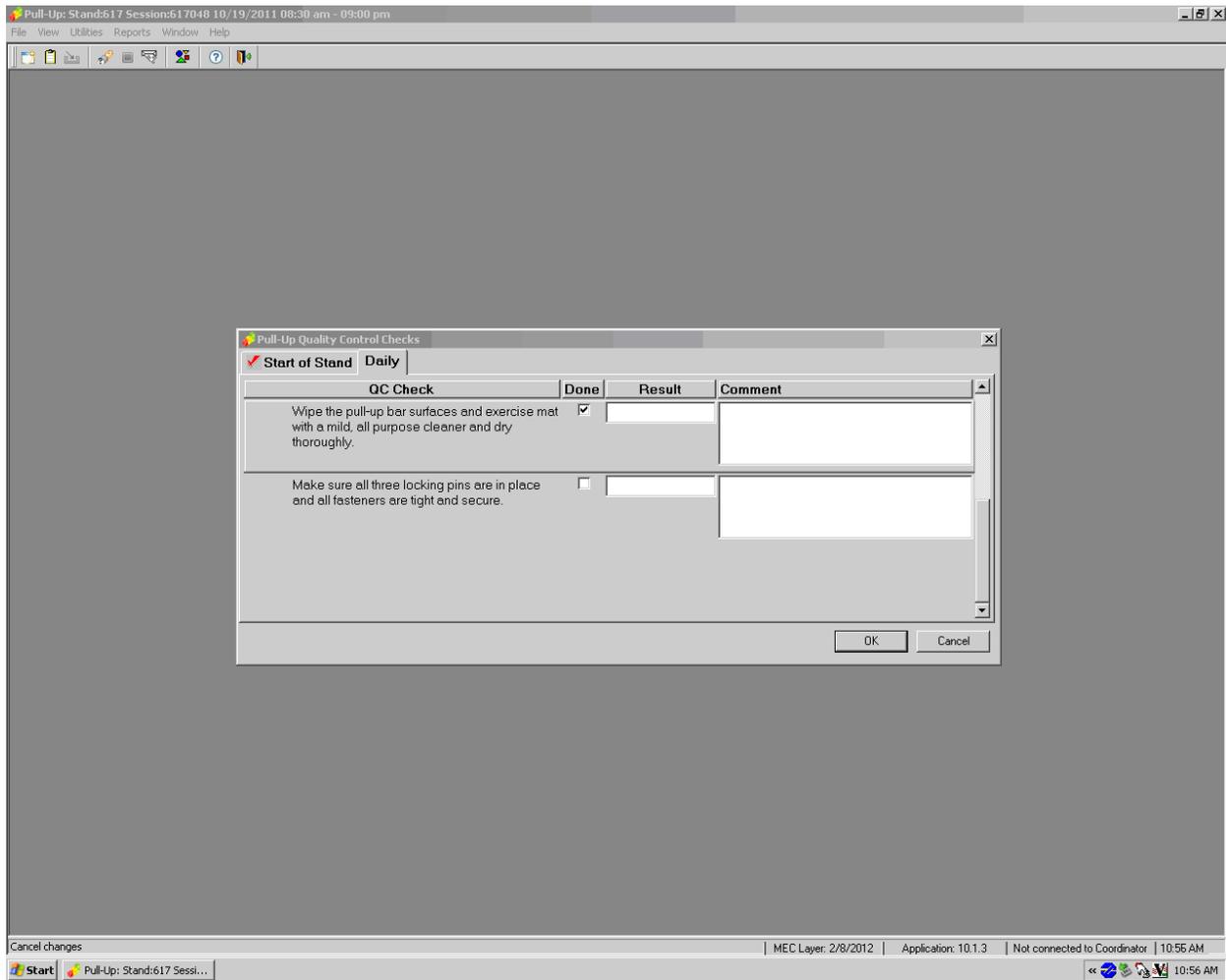


Exhibit 5-9. Modified Pull-up Quality Control Checks dialog box for Daily Checks 4 and 5

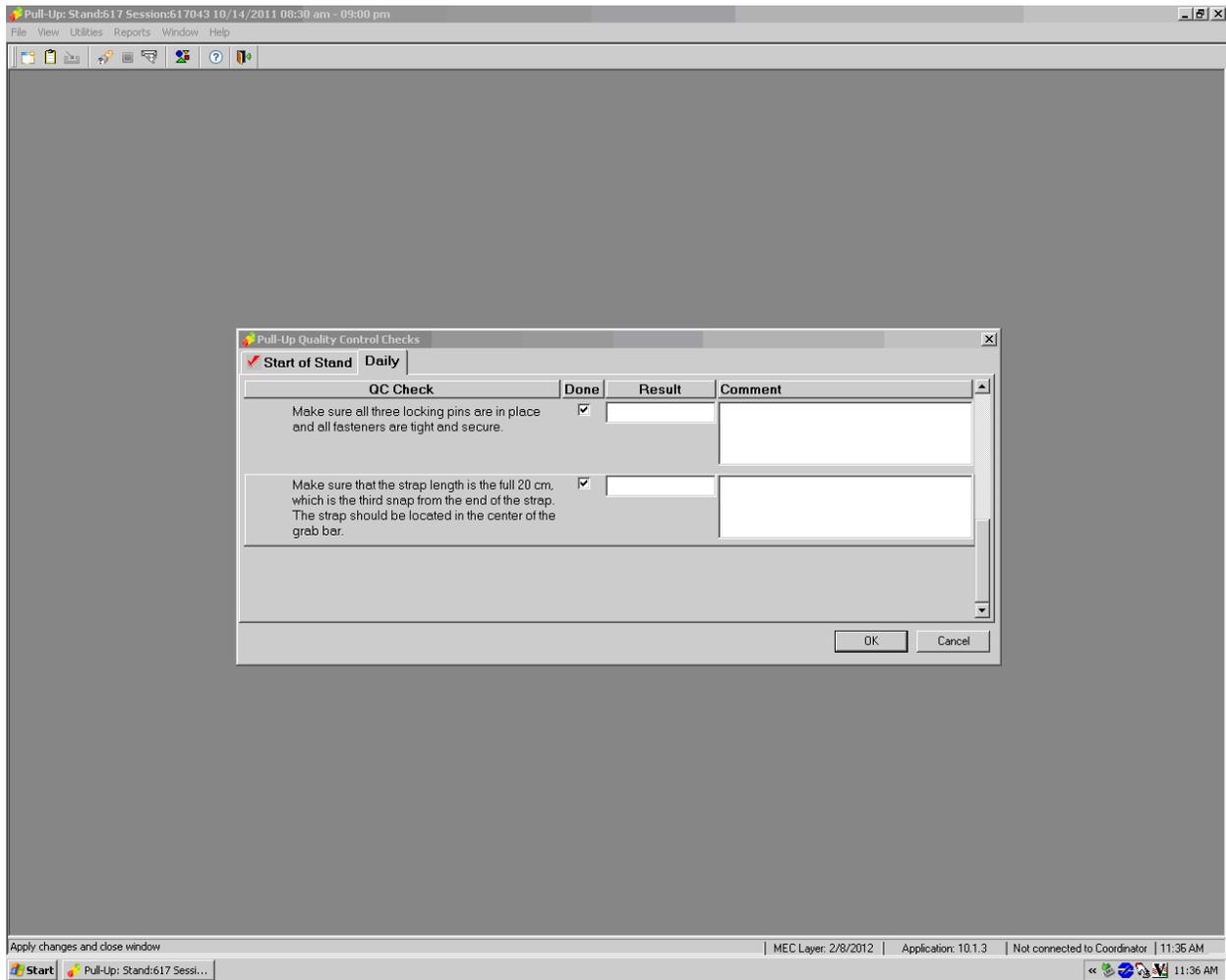
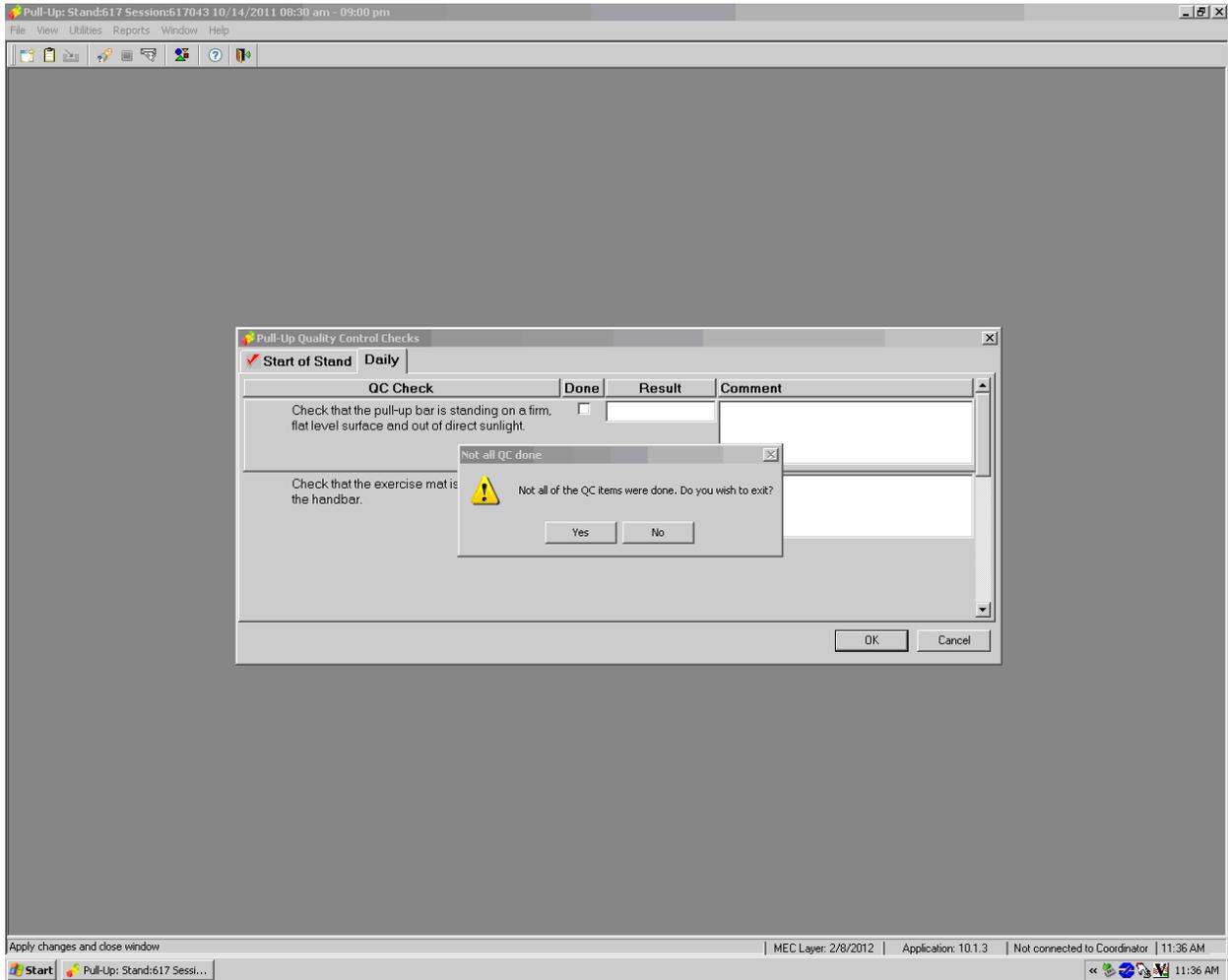


Exhibit 5-10. Modified Pull-up Quality Control Boxes not checked properly for Daily Check



APPENDIX A

NHANES NYFS
MODIFIED PULL-UP HAND CARD
(ENGLISH AND SPANISH)

Appendix A

NHANES NYFS MODIFIED PULL-UP HAND CARD

VERSION: JANUARY 9, 2012

LOGON TO THE PULL-UP APPLICATION.

SHOW THE PULL-UP VIDEO.

CLEAN THE MAT IF THIS IS THE FIRST TIME THIS SP USED THE MAT.

SAY...

- Lie on the mat with your shoulders under the bar and your legs straight.
- Now, I will measure the length of your arm so I can adjust the bar for you.

MEASURE THE ARM AND ADJUST THE BAR 2 INCHES ABOVE THE TOP OF THE SP'S FINGER TIPS.

MOVE THE SP BACK INTO POSITION AND SAY....

- Let me review what you are going to do.
- First, you will reach up and grab the bar with both hands so that only your heels are touching the mat.
- Hold your body straight and dig your heels in place.
- When I say "Go," bend your arms to pull yourself up so that the bottom of this strap touches your chest.
- Be sure to keep your back straight.
- Once you touch the strap, go back down but do not touch the mat.
- Go up and down again as many times as you can while I will count how many times you touch the strap until you can't do anymore.

MAKE SURE THE STRAP IS IN THE MIDDLE OF THE BAR.

HELP SP GET POSITIONED CORRECTLY AND HAVE HIM OR HER DO A PRACTICE PULL-UP FIRST.

- Ok, reach up to grab the bar.
- Ready and go.

COUNT THE NUMBER OF CORRECT PULL-UPS.

ENTER THE RESULTS.

Appendix A (continued)
NHANES NYFS MODIFIED PULL-UP HAND CARD
VERSION: JANUARY 9, 2012

LOGON TO THE PULL-UP APPLICATION.

SHOW THE PULL-UP VIDEO.

CLEAN THE MAT IF THIS IS THE FIRST TIME THIS SP USED THE MAT.

SAY...

- Acuéstate sobre la colchoneta con los hombros bajo la barra y las piernas derechitas.
- Ahora, te mediré el largo de un brazo para poder ajustar la barra para ti.

MEASURE THE ARM AND ADJUST THE BAR 2 INCHES ABOVE THE TOP OF THE SP'S FINGER TIPS.

MOVE THE SP BACK INTO POSITION AND SAY....

- Esto es lo que vamos a hacer.
- Primero, vas a alcanzar y a agarrar la barra con las dos manos de modo que únicamente los talones toquen la colchoneta.
- Mantén el cuerpo derecho y hunde los talones en la colchoneta.
- Cuando yo diga “Ya” dobla los brazos y levanta el cuerpo de modo que la parte de abajo de esta banda te toque el pecho.
- Asegúrate de mantener la espalda derecha.
- Cuando toques la banda, baja pero no toques la colchoneta.
- Sube y baja nuevamente tantas veces como puedas mientras yo cuento cuántas veces tocas la banda hasta que ya no lo puedas hacer más.

MAKE SURE THE STRAP IS IN THE MIDDLE OF THE BAR.

HELP SP GET POSITIONED CORRECTLY AND HAVE HIM OR HER DO A PRACTICE PULL-UP FIRST.

- Está bien, estírate para alcanzar la barra. HELP SP GET POSITIONED CORRECTLY.
- Listo(a). Ya.

COUNT THE NUMBER OF CORRECT PULL-UPS.

ENTER THE RESULTS.

APPENDIX B

NHANES NYFS
MODIFIED PULL-UP VIDEO SCRIPT

Appendix B

NHANES NYFS MODIFIED PULL-UP VIDEO SCRIPT

VERSION: MARCH 8, 2012

- The next activity is called a modified pull-up.
- To do the pull-up you will reach up and grab the bar with both hands. This will raise your body off the mat with only your heels touching the mat. You need to hold your body straight. Try to dig your heels in so your feet stay in the same place.
- When we say "Go" bend your arms to pull yourself up as far as you can. Pull yourself up so that the bottom of the black strap touches your chest. Keep your back as straight as possible and remember that only your heels should be touching the floor.
- When you touch the strap you can go back down. Your body should not touch the mat.
- Try to keep going as long as you can without stopping or slowing down.
- Are you ready to begin? Great, let's get started!

APPENDIX C

NHANES NYFS
ILLUSTRATION OF PULL-UPS

PULL - UPS

