

## **DXA Operator Guidelines**

### **Introduction**

The purpose of a Dual X-ray Absorptiometry (DXA) procedure is to provide research scientists with information about human or small animal body composition (lean versus adipose tissue) and bone density.

The following operator guidelines have been developed by the Department of Kinesiology DXA Oversight Committee. The guidelines are intended to assist DXA operators in maintaining standardized procedures for safe and consistent equipment operation.

The DXA Oversight Committee must approve all DXA scans performed on the Department of Kinesiology scanner. Approval is necessary to assure safe and effective use of the machine. Protocols should be submitted to the committee using a standard form (<http://www.coe.uga.edu/kinesiology/facstaff/index.html>). Institutional review board documents should accompany the request.

### **DXA Operator Requirements**

A key component in assuring safe and effective use of the DXA machine is to have all scans performed by a trained DXA operator.

DXA operators will:

- Have undergone formal UGA radiation training and have certification documentation.
- Have a current dosimeter badge from the Environmental Safety Division of UGA.
- Complete a Department of Kinesiology DXA training session before operating the DXA scanner.
- Be familiar with Ramsey Center Building emergency procedures (See Appendix A).
- Be employed by the University of Georgia.
- Be approved by the DXA Oversight Committee

A DXA operator must be aware of and follow all operator guidelines, Environmental Health and Safety guidelines, and departmental and university policies that apply to research and to DXA scanning.

### **Care for DXA Participants-Operator Roles**

DXA operators should follow policy guidelines to ensure participant comfort and safety during the examination. The policy guidelines include the following:

- Follow all Department of Kinesiology DXA Operating Guidelines while working in the Kinesiology DXA facility.
  - This includes preparation of scanning room prior to any DXA scans.
  - Confirming the participant can be scanned safely and appropriately.
    - Acknowledgement of risk form completion (Appendix B). Each participant should get a complete explanation of the procedure prior to participant examination
    - Pregnancy test, if required
    - Follow any other guidelines as required by the IRB for research scan
    - Ensure that each participant is appropriately prepared for the DXA scan. This includes physical preparation such as ensuring the participant has not undergone any examinations using barium or any other contrast agents that may influence results. Remove jewelry.
    - Perform scan and monitor the subject.
- Operator's name should be noted on all appropriate documents.
- Appropriate participant records, images and examination details should be kept in accordance with the least minimum requirements set forth by the University.
- Operator is responsible to report any observed violation of DXA Departmental or IRB policy.
- Maintain optimum standards of cleanliness, hygiene, comfort and privacy at all times.
- **Do not provide participants with any medical or diagnostic information unless approved by the faculty member who is supporting the study.**

**DXA staff should understand all emergency procedures**

## **Performing DXA Scans**

### **QUICK CHECK**

- You must wear your dosimeter badge, at all times, while scanning.
- Make sure the DXA Oversight Committee has approved the scans you will be performing.
- Make sure the DXA room is clean and neat.
- Make sure warning signs are prominently displayed as shown in Appendix C.

### **GETTING STARTED (CAN BE PERFORMED PRIOR TO MEETING THE SUBJECT)**

1. Turn on computer
2. Log in with your Novell password and the GE password (lunar)
3. Select iDXA
4. Select and run Quality Assessment (QA)
  - a. Select icon on the screen
  - b. Select start button
  - c. Follow computer prompts for block placement
  - d. After block is placed on the table step out of room (approx. 8 minutes)
  - e. Results will print, place them in the white binder

For an existing subject in the database

- a. Select directory icon
- b. Check to be sure you are in the appropriate directory
- c. Double click on subject's code/name

Selecting scans

- a. See exam tab listings in the upper left portion of the computer screen, or from the pictorials.
- b. Select appropriate test.

### **PREPARING THE SUBJECT FOR SCANNING**

1. Meet with the participant and provide them with a complete explanation of the procedures to be used during the DXA exam.
2. Have the subject complete the Acknowledgement of Risk form. This includes ensuring the participant has not undergone any examinations using barium or any other contrast agents that may influence results.
3. Have the subject perform a urine pregnancy test, if required.
4. Follow any other guidelines as required by IRB for research scans.
5. Be sure the participant is appropriately prepared for each DXA scan including wearing appropriate clothing, removing jewelry and metal objects. Scrubs are available DXA room drawer.
6. Access to the room should be limited to designated personnel and participants only.
7. Perform scan and monitor the subject.
8. Scanning a new subject
  - a. Select measure icon
  - b. Select new patient icon
  - c. Record demographic information and select okay button

<p><b>DOUBLE CHECK PARTICIPANT HEIGHT &amp; WEIGHT AS RADIATION DOSE DURING TESTING IS BASED ON BODY SIZE</b></p>
---

## OVERVIEW OF SCANNING PROCEDURES

Three main types of scans can be performed with the departmental DXA machine. For other types of scans, refer to the DXA manual provided by the manufacturer.

### Whole Body Composition

*Purpose:* Body composition provides information about body fat distribution providing both total body and regional results (trunk, arms, legs, pelvis, and android/gynoid regions). Bone density and lean mass information is also generated.

- a. Select total body button then select the position button on the top left portion of the screen.
- b. Have the subject lie on their back with the center of the table bisecting their body.
- c. The top of the subjects head must be **3cm below the line on the top of the table**.
- d. Instruct the subject to place their hands along their sides, but make sure not to have their arms touching the sides of their body, keeping their arms within the outlines on the table.
- e. Place velcro straps around their knees and ankles while ensuring their body fits inside the outline on the table.
- f. You do not need to move the laser manually for this scan.
- g. Once the subject is positioned correctly, press the **START** button.
- h. You must see the bottom of their skull in the third sweep.
- i. If you see the top of their skull is seen during the first three sweeps the scan will take 6-12 minutes depending upon the subject's weight. The heavier the subject the longer the scan will take.
- j. If you do not see the bottom of their skull during the first three sweeps select the ABORT key.
- k. Allow the scan to stop, you will see a greenish box appear on the screen, used the shift and control keys to move the box up or down to make sure the crest is seen in the first sweep.
- l. Select start again to continue the scan.
- m. The whole scan will take approximately 6-12 minutes depending upon the subject's weight.

### Posterior-anterior or AP Spine (Lower back)

*Purpose:* The AP Spine is an ideal site for measuring a patient's bone mineral density. The AP spine is a weight bearing area that is prone to osteoporotic fractures. The spine's high concentration of metabolically active trabecular (soft, spongy) bone makes it the most sensitive site for monitoring response to therapy.

- a. Select AP spine button then select the position button on the top left portion of the screen.
- b. Have the subject lie on their back with the center of the table bisecting their body.
- c. Ask the subject to point out their navel, and use the arrow keys on the head of the DXA to **place laser light 5 cm below their navel**.
- d. Instruct the subject to place their hands above their sternum.
- e. Place the metal triangle between their feet making sure to rotate their legs inward.
- f. Once the subject is positioned correctly, press the **START** button.
- g. You must see the crest of the pelvis in the first sweep.
  - If you see the crest of the pelvis the scan will take less than one minute.
  - If you do not see the crests of the pelvis select the ABORT key
  - Allow the scan to stop. You will see a greenish box appear on the screen. Use the shift and control keys to move the box up or down to make sure the iliac crest can be seen in the first sweep. Select start again to continue the scan. The whole scan will take approximately **one minute**.

### Dual Femur

*Purpose:* BMD of the proximal femur is an important indicator of the risk of hip fracture, and other osteoporotic fractures.

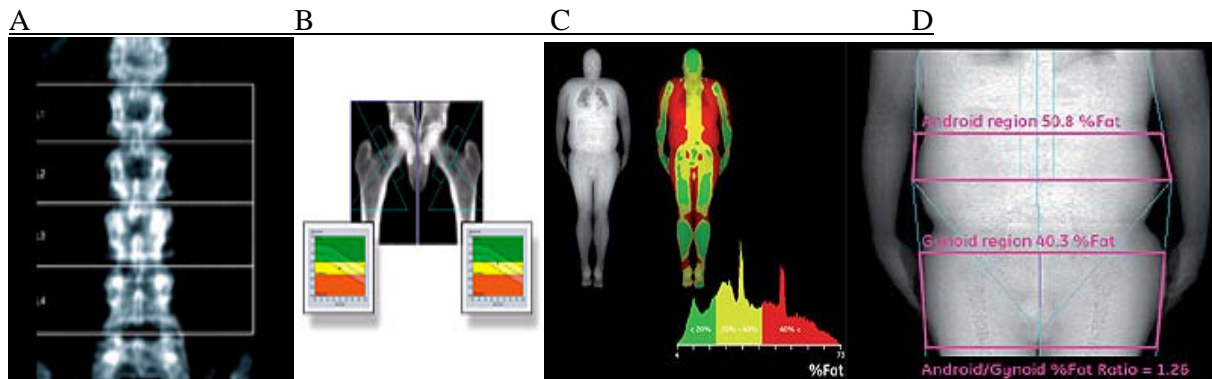
- a. Select dual femur button then select the position button on the top left portion of the screen.
- b. Have the subject lie on their back with the center of the table bisecting their body.
- c. Instruct the subject to place their hands across their chest.
- d. Move the laser light that is located on the head of the scanner to the mid thigh, just below the pubic symphysis.
- e. Have the subjects point their knees inward.
- f. Place the metal triangle between their feet making sure to rotate their legs inward.
- g. Once the subject is positioned correctly, press the START button.
- h. You must see the bottom of the pelvis in the third sweep of the scanner
  - If you see the bottom of the pelvis the scan will take less than one minute, the scanner will automatically switch and scan the other leg.
  - If you do not see the bottom of the pelvis, select the ABORT key.
    1. Allow the scan to stop, you will see a greenish box appear on the screen, use the shift and control keys to move the box up or down to make sure the iliac crest is seen in the first sweep.
    2. Select Start again to continue the scan.

The whole scan will take approximately **one minute per leg (2 minutes total)**

**SPECIAL NOTE REGARDING BODY COMPOSITION: IF THE SUBJECT 'S LIMBS FALL OUTSIDE THE SCANNING AREA (THE OUTLINED BOX ON THE TABLE) MAKE SURE ONE SIDE OF THEIR BODY FITS IN THE SCANNING AREA. THE COMPUTER WILL THEN BE ABLE TO ESTIMATE THE SUBJECTS BODY COMPOSITION USING A MIRRORED IMAGE**

### Scan Analysis

1. When the scan has finished, select the **Home** icon to move the scanner arm back to the start position. Be careful not to hit your subject in the head as the arm return to the start position.
2. Select the **Analyze Icon** (computer will perform a self analysis)
3. Possible custom analysis
  - a. Select ROI's and move the box lines accordingly
  - b. Select results for new analysis



The figures above represent AP spine (A), dual femur (B) and body composition scans (C and D)

**APPENDIX A  
EMERGENCY RESPONSE PLAN  
RAMSEY CENTER-DXA FACILITY**

1. **For weather-related emergencies.** The Department of Recreational Sports will make announcements on the public address system that has speakers throughout the building. ***Turn off the DXA scanner, leave the room and follow instructions.*** You **MUST EVACUATE** to the locker rooms or to the first floor of the academic wing when directed to do so. Take the subject with you.
2. **For fire emergencies.** ***Turn off the DXA scanner, leave the room and follow instructions.*** Please note the location of the fire alarm pull switch nearest your classroom. On the third floor, there is an alarm switch near each stairway. The entire building **MUST BE EVACUATED** whenever a fire alarm is activated, even if class is in session. Please be responsible for stewarding students towards the exits. Wait outside until we receive an official notification that the building is safe to re-enter. If you were the one who pulled the switch or if you saw the source of the fire, find a building staff person outside who has a walkie-talkie and ask for instructions on how to report your information.
3. **For medical emergencies.** Turn off the DXA scanner and follow the procedures below to notify (a) emergency first responders and (b) the Rec Sports front desk. The Recreational Sports personnel will meet and direct the EMT to your location; their staff is also trained in first aid and CPR and they have portable cardiac equipment.
  - a. **Call 9-911 from a campus phone** (or just 911 from a cell phone) to report a medical emergency. Give the location and stay on the line until the dispatcher tells you to hang up. For 2<sup>nd</sup> and 3<sup>rd</sup> floor of Ramsey, direct the EMT to enter through the main lobby at the 2<sup>nd</sup> floor entrance to the building.
  - b. **Also, call 542-1454** to inform Rec Sports that an ambulance will be arriving. Give the location and the nature of the emergency. They will meet the ambulance and will also notify campus police of the situation
4. **For a bomb threat or other emergency,** Turn off the DXA scanner and leave the room.
  - a. **Call University Police at 542-2200** and give them the information. Follow their instructions.
  - b. **Also, call Rec Sports at 542-1454** to let them know the situation.

**When to call 911 for a medical emergency**

The victim is or becomes unconscious  
Has trouble breathing or is breathing in a strange manner  
Has chest pain or pressure  
Is bleeding severely  
Has pressure in the abdomen that does not go away  
Is vomiting or passing blood  
Has seizures, a severe headache or slurred speech  
Appears to have been poisoned  
Has injuries to the head, neck, or back  
Has possible broken bones

A victim who is conscious, alert, and over the age 18 has the right to refuse medical care. If someone refuses medical care who you believe should be seen by a medical technician, try to get a third party to witness that refusal.

**IN CASE OF CARDIAC EMERGENCY**

**DIAL 9-911 AND READ THIS STATEMENT:**

**WE HAVE A CARDIAC EMERGENCY IN ROOM 107 AT THE RAMSEY CENTER AT THE UNIVERSITY OF GEORGIA. PLEASE SEND AN AMBULANCE TO 330 RIVER ROAD, OFF COLLEGE STATION NEAR THE BYPASS. ENTER THE RAMSEY CENTER FROM THE NORTHEAST PARKING LOT. SOMEONE WILL MEET YOU OUTSIDE THE BUILDING.**

**IN CASE OF HEAT STROKE EMERGENCY**

**DIAL 9-911 AND READ THIS STATEMENT:**

**WE HAVE A HEAT STROKE EMERGENCY IN ROOM 107 AT THE RAMSEY CENTER AT THE UNIVERSITY OF GEORGIA. PLEASE SEND AN AMBULANCE TO 330 RIVER ROAD, RAMSEY CENTER, OFF COLLEGE STATION ROAD NEAR THE BYPASS. ENTER THE RAMSEY CENTER FROM THE NORTHEAST PARKING LOT. SOMEONE WILL MEET YOU OUTSIDE THE BUILDING.**

## APPENDIX B

### DEPARTMENT OF KINESIOLOGY Acknowledgement of risk from DXA exam

#### **Background on DXA**

DXA (or DEXA) stands for dual energy x-ray absorptiometry. It is a method by which two intensities of x-rays are scanned across the body. The resulting image is analyzed to provide estimates of body composition. These include total body fat, lean tissue, and bone. DXA can be used to determine bone density in various parts of the body. The advantages of DXA are that it provides very reproducible and accurate measures of body composition and bone density. It also causes very little radiation exposure.

#### **Benefits**

The DXA exam provides an accurate measurement of body composition. It can also be used to measure bone density, although the Kinesiology DXA is not set up to provide a medical diagnosis of bone density.

#### **Risks**

DXA is considered to provide a healthy adult with low risk of an adverse event. However, the use of X-Rays, even in low amounts, does present some risk. This is particularly true if you are pregnant, as the X-Rays could harm your unborn child. There is a risk of radiation sickness if you have undergone frequent X-Ray exams.

#### **Questions**

The Kinesiology Department has a special committee set up to oversee the operations of the DXA facility. If you have any questions concerning your test or the DXA facility, you can contact the DXA committee. Current members are Drs. Lesley White ([ljwhite@uga.edu](mailto:ljwhite@uga.edu), 706-542-4378) Elaine Cress ([mecress@uga.edu](mailto:mecress@uga.edu), 706-542-2202), and Kevin McCully ([mccully@uga.edu](mailto:mccully@uga.edu), 706-542-1129).

#### **Voluntary Participation**

Your participation in this DXA exam is voluntary. You can decide, at any time, not to perform the exam.

#### **Waiver**

By signing this Waiver form, females of childbearing potential are certifying to the best of their knowledge that they are not pregnant and agree to utilize adequate birth control methods during their participation in this study. If you should become pregnant, you should immediately inform the Kinesiology DXA committee.

I certify that I am not pregnant, or trying to become pregnant

I certify that I have not had frequency or high dose X-ray testing or treatment in the last year.

If I have any doubts regarding my pregnancy status, a free pregnancy test will be provided to me that I may complete in a private location prior to undergoing DXA. If the pregnancy test is positive, I may maintain confidentiality by electing not to disclose any information to the research group, but I must voluntarily decline to take the DXA test. My refusal to take the pregnancy test will be documented below.

I was given the opportunity to complete a simple urine test for pregnancy.

(Please check one): YES  NO

I refuse to take the pregnancy test.

(Please check one): YES  NO

\_\_\_\_\_  
Subject's Name (print)

\_\_\_\_\_  
Subject's Signature

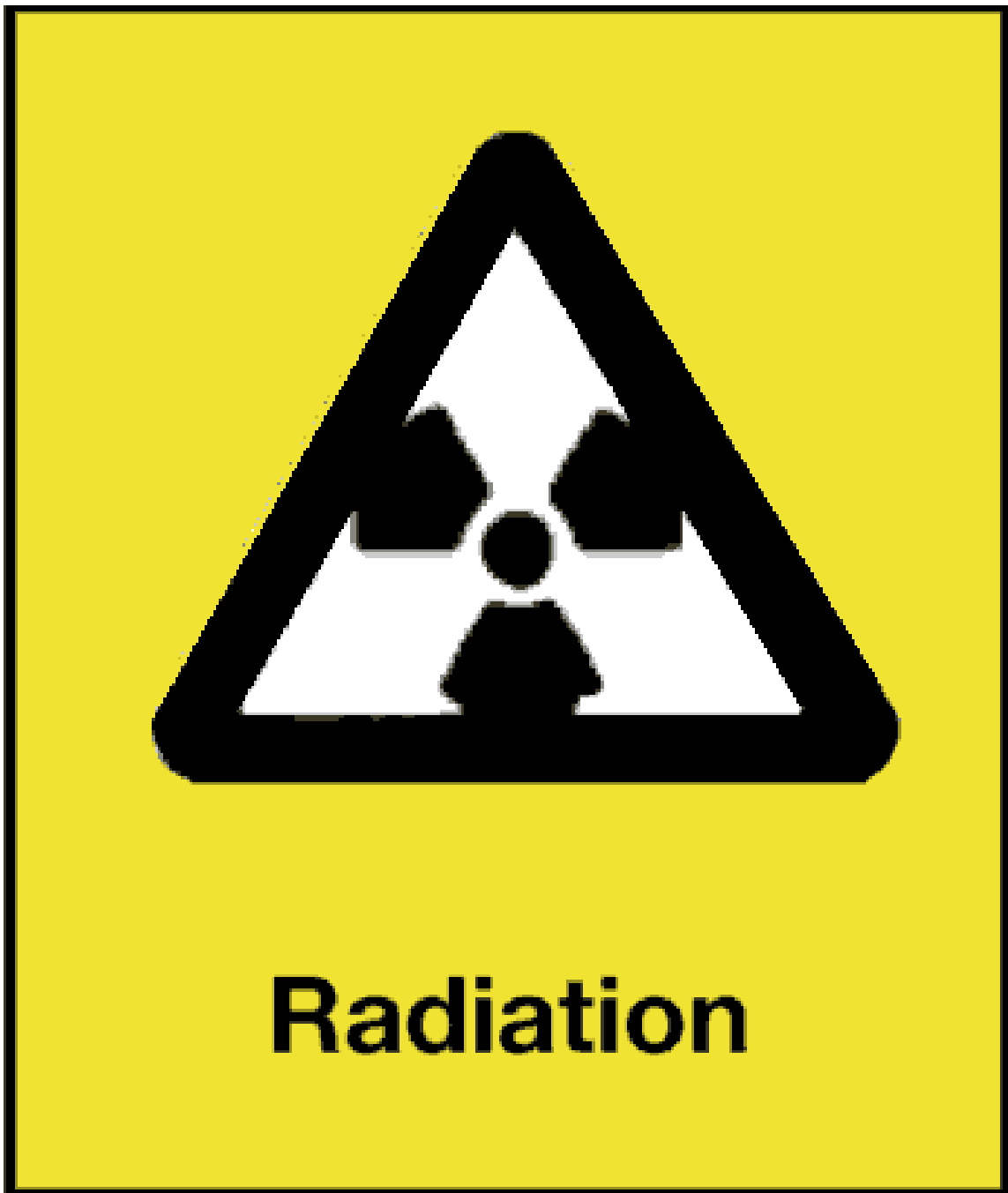
\_\_\_\_\_  
Date

\_\_\_\_\_  
Printed name of DXA Operator

\_\_\_\_\_  
Signature of DXA Operator

\_\_\_\_\_  
Date

APPENDIX C



## APPENDIX D

### MONTHLY RADIATION SURVEY

1. Remove **Geiger counter** from the cabinet above the sink.
2. Turn on computer
3. Put in your **Novell password** and the GE password (*Lunar*)
4. Select iDXA
5. Run Quality Assessment (QA)
  - a. Select the icon on the screen
  - b. Select START button
  - c. Follow computer prompts for block placement
6. During QA you will record readings from the Geiger counter in various places around the room and in other rooms (**7 DIFFERENT LOCATIONS**)

**NOTE:** There are always background readings. Make sure readings are being measured when the DXA is active. Look for the radiation signal on the machine or computer to be “active” (yellow color). You will also notice the DXA will make a different sound when it is emitting radiation.

7. Turn the Geiger counter “on” you will be recording values from the middle bar (**mR/hr**)
  - a. The first location to be measured is at the table head (DXA arm). Turn the dial on the Geiger counter to X1. Take the Geiger counter and stand near the lever arm. When the DXA is emitting a radiation signal watch for the deflection and measure the most constant reading. **This number is multiplied by 1.**
  - b. Turn the dial to X0.1 for the remaining 6 locations. These are the following locations:
    1. near the computer screen,
    2. outside the room in the hallway,
    3. two locations in the neuromuscular physiology lab, room 107B
    4. directly above the room in the hallway.**Each reading is multiplied by 0.1 and recorded on excel.**