

## Nuclear Imaging Acquisition and Presentation Guidelines

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| <b>Date Reviewed:</b><br>27Aug2025 | <b>RANT<br/>NUCLEAR MEDICINE</b> | <b>Date Implemented:</b><br>27Aug2025 |
| <b>Date Revised:</b><br>27Aug2025  |                                  | <b>Patrick Barr, MD</b>               |

### ACQUISITION GUIDELINES:

At the conclusion of every exam, **ALL acquired series will be sent as DICOM image objects to PACs**. This includes but may not be limited to dynamic imaging, gated datasets, SPECT reconstruction, and SPECT projection (raw) date.

In dynamic acquisitions with a dual-headed camera, the data from each camera face must be **extracted into a single series**, so that the series can be watched in a continuous cine loop (ANT > ANT > ANT > ANT..., *not* ANT > POST > ANT > POST > ANT > POST...). The same is true for an exam such as a gated blood pool acquisition, when a 90° head orientation is used to acquire ANT and LtLAT simultaneously. These series should be extracted so that the loop displays a single projection only (ANT > ANT > ANT > ANT..., *not* ANT > LtLAT > ANT > LtLAT > ANT > LtLAT...). ***If you do not know how to perform this extraction, your option is to acquire the series with one head at a time.***

Saved SPECT reconstruction datasets will include DICOM formatted transverse, sagittal, and coronal image reconstructions; this is true for the SPECT subset of SPECT/CT acquisitions as well.

If SPECT/CT is acquired, a FUSED SPECT+CT series in transverse, sagittal, and coronal orientations will be generated and sent to PACs as well. For the SPECT overlay, select a monotonic color lookup table (ie, uniformly increasing in relative intensity) such as “Hot Iron”.

If SPECT imaging is acquired, a maximum intensity projection (MIP) series will be generated and saved to PACs. A MIP of fused SPECT/CT data is not required.

If scanned paperwork is not available at your institution for transmission to PACs, it is mandatory that sufficient historical information be included as text on a screen captured image.

If you make an error while filling out your paperwork, overwriting the error multiple times to make the correction is ***not*** permissible, and can be completely illegible on faxed or scanned pages. **The only**

**medico-legally appropriate way** to make the change is to place a **single line** through the error (do not scratch out), write the correct data just above, and place your initials alongside your correction.

Required patient history typically depends on the diagnosis. A few examples:

- In patients with a diagnosis cancer, the **date of diagnosis** is required, along with dates of recurrences. For diagnoses such as lung, breast, or ovarian cancers, the **side** of the tumor must be documented. Any surgical history related to the cancer must be described. The use of chemotherapy or radiation therapy must be described.
- For patients with pain related to the presence of a prosthetic implant, the date of the prosthesis implantation is required, along with dates of any revision implants. How long have they been experiencing this pain? Was the onset of this pain related to an injury?

If imaging a patient to evaluate a “lump”, “mass”, “ulcer”, “tumor”, etc., and the specific anatomic region cannot be defined precisely (i.e., “neck/ throat area” rather than “right sternoclavicular joint”, “arm” rather than “proximal humerus”, or “low back” rather than “sacrum”), draw a picture of the area of interest on the inject sheet, or note the region on a screen capture with an arrow.

ALL static images shall have a radioactive marker held in the field of view during acquisition, so as to unmistakably identify the patient’s RIGHT SIDE. A right side marker shall also be placed in dynamic image acquisitions, to be visible on at least one frame. Such markers should not be placed during SPECT acquisitions.

Never inject gallium67 through a venous access port or catheter without a) discussing with, then b) obtaining explicit approval from, the nuclear medicine physician on service. The catheter may be the source of infection, and injecting through it will preclude the possibility of identifying the source.

Never delete an image, even if you think it is ‘bad’.

If you’re taking a picture of one extremity, you must take another image of the other extremity in a comparable orientation with a comparable technique, to be used for comparison.

If looking at a hip prosthesis, take blood pool and delayed images from the pelvic crest to just below the knee, with a region of overlap at the mid femur. Hip prostheses can extend all the way to the knee. For a knee prosthesis, imaging from hip to ankle is required.

If asked to perform a triple phase bone scan of the hand, place a butterfly in a vein in the opposite arm, and remove the tourniquet for a full five minutes before injection for the arterial phase of flow imaging. This permits time for that opposite arm to recover from the ischemia produced by placement of the tourniquet, and gives a normal baseline against which to compare the side of interest. And don’t forget to image both hands during the flow phase

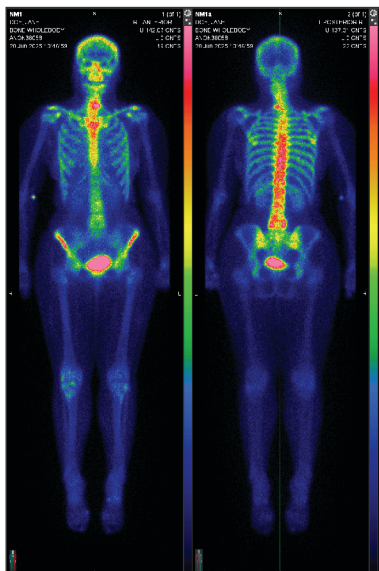
In bone scans of the feet, in patients with more blood pool than bone uptake in delayed images, consider obtaining delayed imaging first thing the next morning. These patients frequently have cardiovascular disease, renal disease, or diabetes and will benefit from the additional uptake time and soft tissue clearance.

When processing a myocardial perfusion, if there is excessive bowel activity just below the heart, resist the temptation to process the images with a circular mask. a) It wastes your time, b) we don't use them, c) it takes time to select the images we *do* want to look at, and d) we want to see what amount of diaphragmatic surface cardiac activity should be attributed to adjacent bowel activity.

### **PRESENTATION GUIDELINES:**

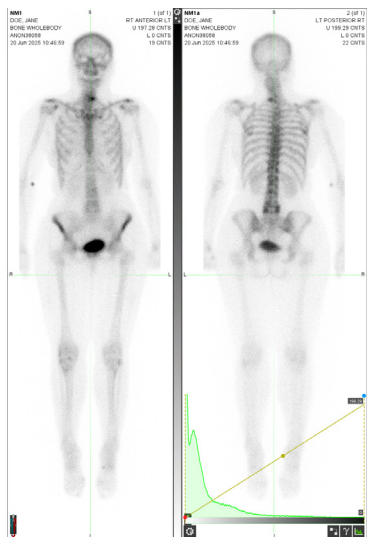
Screen captures depicting patient anatomy will be saved as BLACK on WHITE BACKGROUND. Screen captures of curves for gastric emptying, GBEF, renal function, etc, should be on a black background to maximize contrast of generated curves.

Screen capture image intensities should be adjusted in the following manner. Select a color lookup table (CLUT) which contains a short band of contrasting color at the top end of the scale. An example is a version of the "Rainbow" CLUT which contains a small band of light pink at its upper limit, as shown below.

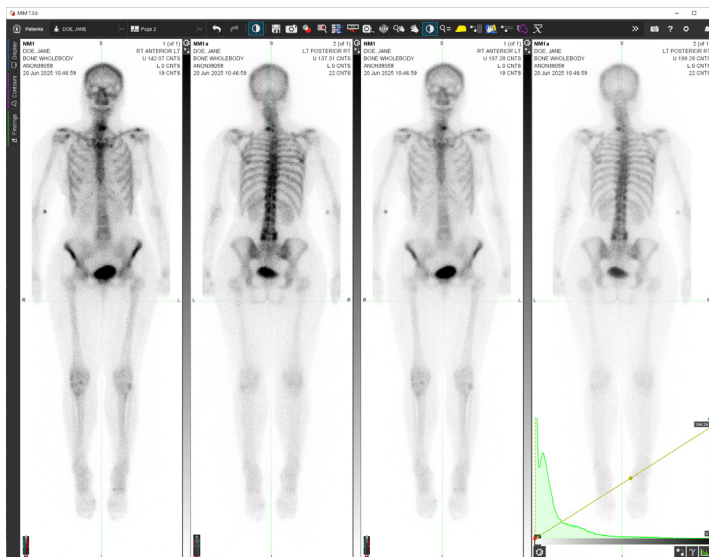


Adjust the intensity of the image such that the brightest element in the image (excluding bladder and injection site activity) just begins to show the color at the top of the scale. In this example, the low anterior cervical spine is the brightest region in the anterior image. Make note of the VALUE of the top

of the intensity scale; in this case, it's 142 counts per pixel. Now **MULTIPLY** this top intensity by approximately 140% ( $142 \times 1.40 = 199$ ) and reset the the top of the color scale to that intensity. Switch the CLUT to **BLACK** on **WHITE** background and the image is ready to save:



For screen captures of whole body images, the screen capture shall be 2 image pairs arranged ANT, POST, ANT, POST. The **first pair will be set to an intensity equal to the brightest target pixel**; the **second pair is adjusted to 140% of the first pair intensity**:



**Never subtract background** from the image when preparing a screen capture.

In colloid/ labeled WBC examinations, prepare the WBC screen capture images in the very same format as the colloid series, such that like views are located in like positions on their respective pages.

For screen captures of a dynamic series (triple phase flow, one hour biliary, one hour CCK challenge, one hour GI bleed, etc), **compress the dataset** such that the entire series is reduced to a **single page of images**, typically 3 rows, 4 columns.

For screen captures of static images, format the data as 4 images per screen capture page.

Do NOT make screen captures of SPECT or SPECT/CT data. That's what the DICOM image series are for.

NEVER mask a region on an image. This is an unnecessary carryover from analog days of nuclear medicine imaging, when hard copy images were made on an oscilloscope -type persistence scope fitted with a Polaroid camera; If the bladder was in the field of view, the image would be over-exposed unless the bladder was occluded with a lead shield. This is no longer necessary with the dynamic range available from modern gamma cameras. Also, the mask can often obscure important findings, in addition to bladder activity. "One man's trash is another man's treasure."