- The authors did not seem to employ the remainder of the body residence time correction (*5*) in their dose calculations.

We are concerned, as we have been in the past, that dosimetry articles are not always receiving a sufficiently rigorous review process. The problems described here do not seriously affect the validity of the paper, but involve very well known procedures and literature and should have been addressed during the review process.

Evelyn Watson
Michael Stabin
James Stubbs
Radiation Internal Dose Information Center
Oak Ridge Institute for Science and Education
Oak Ridge, Tennessee

REFERENCES

1. Nickles R, Nunn A, Stone C, Christian B. Technetium-94m-teboroxime: synthesis, dosimetry, and initial PET imaging studies. *J Nucl Med* 1993;34: 1058–1066.
2. Weber D, Eckerman K, Dillman LT, Ryman J. *MIRD: radionuclide data and decay schemes*. New York: Society of Nuclear Medicine; 1989.
3. Cristy M, Eckerman K. Specific absorbed fractions of energy at various ages from internal photons sources. In: *ORNL/TM-8381 V1–V7*. Oak Ridge, TN: Oak Ridge National Laboratory; 1987.
4. International Commission on Radiological Protection. *Limits for intakes of radionuclides by workers*. ICRP Publication 30, Part 1, New York: Pergamon Press; 1979.
5. Cloutier R, Watson E, Rohrer R, Smith E. Calculating the radiation dose to an organ. *J Nucl Med* 1973;14:53–55.

REPLY: We appreciate the thoughtful comments by the ORISE group concerning dosimetry corrections to our recent paper (*1*). The dosimetry calculations were a small, but necessary, aspect of that paper and faced the following obstacles:

1. At the time of publication, no S-factors or absorbed dose fractions were available for any of the cyclotron-produced technetium isotopes, forcing us to do a first-order ("mock-Tc") estimation based on simple continuity arguments. Comparison of our S-values to those kindly provided by the ORISE group last month show very good agreement, to within 10%.

2. The origin of the dosimetry differences arise from differing approaches to the kinetics of the technetium agents. As stated in the paper, the ICRP gastrointestinal model was run as a STELLA (High Performance Software, Lyme, NH) program, directly resulting in the time course of the activity a(t), and its direct numerical integral A(t), the cumulative activity of each technetium isotope in each source organ. With this approach, we can avoid the use of "residence time," $\tau = \int A(t)dt/A_0$, that suggests instantaneous delivery to downstream gastrointestinal compartments.

With conservative first-order dose estimates in hand, IRB approval was granted, and our initial PET imaging studies provided quantitative human data for the transport kinetics of Tc-teboroxime. In particular, the liver acts as a major node point, filtering the bloodborne agent and releasing it into the gastrointestinal tract through the gallbladder, which briefly peaks at about 30 min in the lower slices of some studies.

3. The dosimetry becomes straightforward when pure ^{94m}Tc + ^{94}Tc is made from enriched ^{94}Mo, as we are doing now (*1-4*). This makes our published labors an historical anecdote.

Our first-order approximations, and the second-order corrections, properly pointed out by the ORISE group, serve to stress the importance of using real, data-driven kinetics as the basis for any dosimetry calculation. Now with whole-body PET and pure ^{94m}Tc agents at hand, a voxel-by-voxel "dose image"(*5*) is almost within reach. By using the transmission images for density and attenuation and the quantitative emission images of the actual biodistribution as the source kernel, a realistic photon transport calculation would result in an adsorbed dose distribution image without the need of any approximations. Such an advance will be welcome, particularly in the area of radionuclide therapy, where tracer ^{82}Sr could follow the deposition of ^{89}Sr (Metastron) to provide a rational strategy for the administration of that promising agent.

R.J. Nickles
A.D. Nunn
C.K. Stone
B.T. Christian
University of Wisconsin
Madison, Wisconsin

REFERENCES

1. Nickles RJ, Christian BT, Nunn AD, Stone CK. Cyclotron production of high-purity Tc-94 by *in situ* sublimation. *J Lab Compd Radiopharm* 1993: 32;447–449.
2. Christian BT, Nickles RJ, Stone CK. Producing Tc-94m from isotopically enriched [Mo-94] MoO_3 [Abstract]. *J Nucl Med* 1993:34:248P.
3. Nickles RJ, Christian BT, Mulnix TL, Stone CK. Quantitating technetium pharmacokinetics with PET, SPECT and β-spectroscopy. *J Lab Compd Radipharm* 1994: in press.
4. Rosch F, Qaim SM, Stocklin G. High purity production of the positron emitting technetium isotope Tc-94m. *J Lab Compd Radiopharm* 1994: in press.
5. Nickles RJ, Hutchins GD, Daube ME, Rosenthal MS. A functional PCT scan: the absorbed dose image [Abstract]. *J Nucl Med* 1983:139.

Mickey Mouse Sign in Paget's Disease

TO THE EDITOR: The authors of the clinicopathological conference on Paget's disease in a patient with breast cancer (*J Nucl Med* 1993;34:1214–1216) described the finding of the "Mickey Mouse sign" in the vertebrae on bone scintigraphy of patients with Paget's disease. They mention that this sign has not been described previously.

I wish to draw your attention to the fact that my group has already described this finding in 1989 in an article appearing in the *South African Medical Journal* (*S Afr Med J* 1989;75:280–283). An illustration of the finding can be found on page 283 of our article. We informally dubbed this sign, caused by increased uptake of the radiopharmaceutical in the vertebral body and spinous process, the "T-sign" or "champagne glass" sign.

Our study was performed to investigate the value of pinhole scintigraphy in the evaluation of vertebral pathology of diverse etiology. Of the 58 patients in our study group, four had Paget's disease, all of whom exhibited this sign. We have subsequently noticed this sign in numerous patients with this disease.

The finding of the Philadelphia group supports our own conclusion that this sign appears to be very specific for Paget's disease of the vertebrae.

B.B. Van Heerden
University of Stellenbosch and Tygerberg Hospital
Tygerberg,
South Africa