

Medical Physicist Shortage

A speaker at the 2011 annual meeting of the European Society for Therapeutic Radiology and Oncology (ESTRO) in London in early May reported medical physicists are in increasingly short supply in the United States, in part because training slots are scarce and the training itself is unnecessarily prolonged. A summary of the findings was published on May 16 in the online news outlet AuntMinnie.com. Bhudatt Paliwal, PhD, a medical physicist in the Department of Human Oncology at the University of Wisconsin (Madison), added that this situation might cause concerns about patient safety. As academic programs have expanded along with the complexity of knowledge and skills required for many procedures, the requirements for completing basic courses have increased. The result could be a shortage of medical physicists available for other disciplines, including diagnostic radiology and nuclear medicine.

“Students find themselves having to go through a longer period of formal academic training, only to find a lack of available residency positions,” Paliwal said, referring to the residency programs required for physicists in radiation oncology. Changes in recent years have required that students earn a degree from an accredited medical physics program, not merely a degree in physics. They also must successfully complete a 24-mo residency program before qualifying to take the American Board of Radiology (ABR) examination.

Last year, only 51 students entered medical physics residency programs in the United States. “They can’t get the training and therefore the certification, so nobody hires them,” said Paliwal. “This is the effect of regulatory changes that were intended to improve the quality of care so people entering the field come with a strong background, but something needs to

change to meet the needs of the profession.”

Although almost 30 accredited residency programs are currently open in the United States and 40 programs offering medical physics residencies, most of these programs accept only 1 or 2 applicants. “The lack of residency positions is becoming a real issue. It will be even more critical in 2014 when the new requirements by the ABR go into effect,” Paliwal said.

The American Association of Physicists in Medicine (AAPM) has proposed an alternative credentialing process with coursework that can be completed in 18–24 mo and will overlap with residency so that training can be completed in 4 y after completing a bachelor’s degree in physics. Paliwal and others at the ESTRO meeting expressed reservations about whether such a process successfully addresses the current challenges, particularly the increasing need for subspecialization in the expanding range of physics skills required in the modern medical setting.

AuntMinnie.com

NRC Revises ALARA Guidance

On May 5 the U.S. Nuclear Regulatory Commission (NRC) issued a revision to an existing guide in the agency’s *Regulatory Guide* series. This series was developed to describe and make available to the public information such as methods that are acceptable to the NRC staff for implementing specific parts of the agency’s regulations, techniques that the staff uses in evaluating specific problems or postulated accidents, and data that staff needs in its review of applications for permits and licenses. Revision 2 of *Regulatory Guide 8.18, Information Relevant to Ensuring that Occupational Radiation Exposures at Medical Institutions Will Be as Low as is Reasonably Achievable [ALARA]*, was issued with a temporary identification as Draft Regulatory Guide, DG-8037. Regulatory guides

are not substitutes for regulations, and compliance with them is not required. The complete revision is available through the SNM at: http://interactive.snm.org/docs/RG_8.18_ALARA_at_Medical_April_2011.pdf.

U.S. Nuclear Regulatory Commission

Nuclear Specialist Pay Drops

Data released on May 19 from *AuntMinnie.com*’s 2011 SalaryScan survey indicated that although radiologists in the United States received somewhat higher average/base pay in 2010 than 2009, nuclear medicine technologists and nuclear medicine/PET physicians experienced drops in average pay. Radiologists in the United States had an average base salary of \$363,621 for all experience levels, organization types, and modality specializations in 2010, up from \$353,707 in 2009 and \$343,800 in 2008. Nuclear medicine/PET physicians averaged \$327,731 in 2010, compared with \$348,927 in 2009. Radiologic technologists saw their salaries decline slightly, reporting an average base salary of \$64,120 in 2010 (\$30.82 on an hourly basis), compared with \$65,272 in 2009 (\$31.38/h). Although technologists specializing in nuclear medicine/PET were the best compensated among radiologic technologists, with a 2010 average base salary of \$72,721 (\$34.96/h), this was down from the 2009 average of \$73,728 (\$35.47/h).

Radiologists and imaging physicians in the South Atlantic region were the best compensated, with an average base salary of \$377,871, followed by the West North Central zone (\$375,952) and the East North Central region (\$374,065). Radiologic and nuclear medicine technologists in the Pacific region were the most highly compensated, with an average base salary of \$80,613 (\$38.75/h), followed by the New England region \$74,056 (\$35.60/h).

The AuntMinnie SalaryScan data were collected from surveys filled out

between January and March 2011. The complete results are available to *AuntMinnie.com* members (membership is free) by going to the SalaryScan data query tool on AuntMinnie's Career Center home page, at jobs.auntminnie.com.
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Gates Funds RIT Researchers

Arturo Casadevall, MD, PhD, and Ekaterina Dadachova, PhD, of Albert Einstein College of Medicine of Yeshiva University (New York, NY) were named on April 28 as winners of a Grand Challenges Explorations award, an initiative funded by the Bill & Melinda Gates Foundation, for their project, "Radioimmunotherapy [RIT] in patients on antiretroviral therapy for HIV cure." Launched in 2008, the Grand Challenge Explorations grants have already been awarded to nearly 500 researchers from more than 40 countries. Casadevall and Dadachova's project is among more than 85 Grand Challenges Explorations Round 6 grants. Casadevall is the Leo and Julia Forchheimer Chair in Microbiology and Immunology and professor and chair of the department. Dadachova is the Sylvia and Robert S. Olnick Faculty Scholar in Cancer Research and associate professor of nuclear medicine and of microbiology and immunology. They "are expanding the pipeline of ideas for serious global health and development challenges where creative thinking is most urgently needed. These grants are meant to spur on new discoveries that could ultimately save millions of lives," said Chris Wilson, director of Global Health Discovery at the Bill & Melinda Gates Foundation.

Casadevall and Dadachova's winning project is based on a 2006 paper, "Targeted killing of virally infected cells by radiolabeled antibodies to viral proteins," published with colleagues in the online journal *PLoS Medicine* (2006;3:e427). They showed that RIT could successfully target and destroy human immune cells infected with HIV. This project is only 1 of many successful investigations the 2 Einstein scientists have undertaken during their 10-y collaboration. Other prom-

ising efforts include using RIT to treat metastatic melanoma and coating nanoparticles with melanin pigment to protect bone marrow from the damaging effects of radiation.

*Albert Einstein College of
Medicine*

Top 10 Recent Public Health Achievements

A report from the Centers for Disease Control and Prevention (CDC) released on May 19 identified what center staff believe to be the major public health achievements of the first 10 y of the 21st century. These ranged from improvements in vaccine-preventable and infectious diseases and reductions in deaths from certain chronic diseases to declines in deaths and injuries from motor vehicle crashes, according to the report, published in the CDC's *Morbidity and Mortality Weekly Report*. One of the major findings in the report was that the United States has saved billions of dollars in health care costs as a result of these achievements.

The areas of accomplishment, explained in detail in the report, included: vaccine-preventable disease, prevention and control of infectious diseases (including central line-associated bloodstream infections), tobacco control, maternal and infant health, motor vehicle safety, cardiovascular disease prevention, occupational safety, cancer prevention, childhood lead poisoning prevention, and improved public health preparedness and response. For more information about these achievements, see www.cdc.gov/mmwr/preview/mmwrhtml/mm6019a5.htm?s_cid=mm6019a5_w.

*Centers for Disease Control and
Prevention*

SPECT in TBI Highlighted

In a story carried in more than 200 newspapers and other media outlets in late May, the utility of SPECT in providing important diagnostic information during the challenging and sometimes prolonged recovery after traumatic brain injury (TBI) was highlighted. The original feature, written

by reporter Kristen Hall for the Associated Press, focused on the use of SPECT at Fort Campbell, KY, in the Blanchfield Army Community Hospital. Physicians at the hospital turned to SPECT, more often used to study dementia, to look at perfusion changes in the brains of soldiers experiencing unexplained symptoms as much as 1–2 y after initial injury. "What's interesting here is that we are seeing things here that we can't see in their standard CT scan or MR imaging," said Maj. Andrew Fong, chief of radiology.

Since 2000, the military estimates more than 200,000 service personnel have experienced mild TBIs, which have become the "signature wound" from improvised explosive devices. The need for diagnostic approaches that can determine more subtle changes, particularly as these occur over the recovery period, is growing. Fong told the reporter that SPECT is currently underused in the military, and that Fort Campbell is 1 of only 2 military installations to use the scan to study TBI. He added that among initial findings of decreased perfusion in many of the soldiers recovering from TBI, he and colleagues have noted marked decreases in the temporal lobes.

Newsline spoke with several Veterans Administration and Department of Defense experts who noted that these promising results deserve further study and related research may merit special funding in the coming year.

Associated Press

Selective Reporting Criticized

In an article e-published on May 10 ahead of print in the *British Medical Journal*, Gøtzsche and Jørgensen from the Rigshospitalet and University of Copenhagen (Denmark) described challenges in accessing unpublished clinical and pharmaceutical trial results from the European Medical Agency (EMA) and criticized current practices of selective reporting of research results. The authors cited research indicating that comparisons of published drug trial results with unpublished data available through drug regulatory agencies "have shown

that the benefits of drugs have been much overrated and the harms underrated.” They also cited research indicating that comparisons of trial protocols with published papers have also shown “widespread selective reporting of favorable results.” These criticisms extend beyond Europe, with the example of unnecessary cardiac deaths among individuals taking Vioxx in the United States cited as an example. Complete access to all early trial results with Vioxx, the authors suggested, might have forced regulators to give additional scrutiny to the drug and/or influenced physicians in prescribing it.

The authors detailed their own 3-y effort to secure access to unpublished reports held by the EMA on clinical trials conducted on 2 antiobesity drugs, rimonabant and orlistat. In enumerating their difficulties in accessing this information, the authors also detailed the basic principles governing citizens’ access to European Union documents. Among the arguments set forth by the EMA for not releasing the documents in the 3 y during which the authors attempted to access the unpublished results were: protection of commercial interests, no overriding public interest, the administrative burden involved, and the lack of value the data would have after

the EMA redacted selected documents. The EMA reversed its stance in 2010 only after a press release from an ombudsperson in the case accused the agency of “maladministration.” The authors as well as the ombudsperson concluded that “the EMA put protecting the profits of the drug companies ahead of protecting the lives and welfare of patients.” On November 30, 2010, the EMA announced it would widen public access to documents including trial reports and protocols.

British Medical Journal

FROM THE LITERATURE

Each month the editor of Newsline selects articles on diagnostic, therapeutic, research, and practice issues from a range of international publications. Most selections come from outside the standard canon of nuclear medicine and radiology journals. These briefs are offered as a monthly window on the broad arena of medical and scientific endeavor in which nuclear medicine now plays an essential role. We have added a special section on molecular imaging, including both radionuclide-based and other molecular imaging efforts, in recognition of the extraordinary activity and promise of diagnostic and therapeutic progress in this area. The lines between diagnosis and therapy are sometimes blurred, as radiolabels are increasingly used as adjuncts to therapy and/or as active agents in therapeutic regimens, and these shifting lines are reflected in the briefs presented here. We have also added a small section on noteworthy reviews of the literature.

THERAPY

Long-Term Toxicity and Myeloablative RIT

In an article e-published on May 12 ahead of print in *Cancer*, Giudetti et al.

from the National Cancer Institute (Milan, Italy) reported on a study evaluating hematopoietic damage and incidence of secondary myelodysplastic syndrome and acute myelogenous leukemia in patients who received myeloablative doses of the radioimmunotherapeutic ^{90}Y -ibritumomab tiuxetan. The study included 53 elderly patients with non-Hodgkin lymphoma (NHL). All patients underwent autograft after high-dose radioimmunotherapy (RIT) myeloablative conditioning with ^{90}Y -ibritumomab tiuxetan. At 49-mo follow-up after RIT, 4 patients had developed secondary myelodysplastic syndrome and/or acute myelogenous leukemia (at 6, 12, 27, and 36 mo). The 5-y cumulative incidence was 8.29%. Results from these patients were compared in a matched-pair analysis with those from 55 NHL patients who had undergone autografts after chemotherapy-based myeloablative conditioning but did not receive RIT, where the latter group was found to have an 8.05% overall incidence of secondary myelodysplastic syndrome and/or acute myelogenous leukemia. The RIT group was found to have a significant but transient decrease in bone marrow granulocyte-macrophage progenitors and a significant and persistent shortening of

bone marrow telomere length. The authors concluded that the limited toxicity noted in the study patients, as well as the comparative results, indicated that “the development of secondary myelodysplastic syndrome/acute myelogenous leukemia was not influenced substantially by high-dose RIT.”

Cancer

^{90}Y -hPAM4 and Pancreatic Cancer

Gulec and colleagues from the Goshen Center for Cancer Care (IN) and the Garden State Cancer Center (Belleville, NJ) reported on April 28 ahead of print in *Clinical Cancer Research* on the results of a phase 1 single-dose escalation trial assessing the utility of ^{90}Y -clivatuzumab tetraxetan (radiolabeled human antibody hPAM4, which binds a mucin glycoprotein expressed in pancreatic adenocarcinomas) in individuals with advanced pancreatic carcinoma. The study included 20 patients (4, stage 3; 16 stage 4) who underwent ^{111}In -hPAM4 imaging and serum sampling before receiving varied doses of ^{90}Y -hPAM4 (15 mCi/m², 7 patients; 20 mCi/m², 9 patients; 25 mCi/m², 4 patients). Among the factors assessed as part of phase 1 data were adverse events, safety, CT results, bio-