HPS Health Physics News
-what's new and what's news in health physics-
September 2013 · Volume XLI · Number 9

In This Issue

The WARP Initiative
Where Are the Radiation Professionals?

Kathy Pryor, CHP, HPS Past President

In 2002 the Health Physics Society (HPS) recognized that a shift was occurring in our membership ranks. We were becoming an older society—graying—and it seemed as though fewer and fewer students and recent graduates were joining. Concerned with this apparent trend, then-President John Frazier appointed a task force to study the issue and make recommendations on how to respond to the growing need to fill the pipeline of radiation safety professionals. This task force, chaired by Kevin Nelson, published a white paper on the human capital crisis in 2004.

Fast forward 10 years, and we continue to be concerned that there is a human capital crisis in the radiation safety community. And we are not alone. The community of radiation and radioactive material users, researchers, educators, and regulators has expressed similar concerns regarding the dwindling numbers of professionals in all areas of radiation protection. There have been some individual efforts to address the issue by professional organizations and federal agencies, but they have been narrowly focused and not coordinated.

The National Council on Radiation Protection and Measurements (NCRP), as the congressionally chartered organization charged to advise the U.S. government on radiation protection issues, is uniquely positioned to bring the stakeholders together to formulate a comprehensive and coordinated strategy to define the situation and propose realistic and achievable solutions. And so, the WARP (Where Are the Radiation Professionals) initiative was born.

The NCRP held a workshop on 17 July 2013 for stakeholders from four affected sectors: federal agencies, professional societies, universities, and the private sector. The Oak Ridge Institute for Science and Education (ORISE) hosted the event at ORISE offices in Arlington, Virginia, and the workshop was cosponsored by the Department of Energy (DOE). Participants included 25 from government and federal agencies, 11 from professional societies, 7 from universities, 4 from the private sector, and 3 NCRP representatives. There was so much interest and enthusiasm for the topic that the workshop was nearly standing room only. Dick Toohey and John Crapo served as the facilitators for the day, as well as for the follow-on writing group that met on 18 July at the NCRP offices in Bethesda, Maryland.

NCRP President John Boice kicked off the event with a welcome and introductions. He explained that the goal of the WARP initiative was to kick off a "Manhattan Project" to replenish the dwindling supply of radiation professionals in the United States. A national effort is needed to address this problem, and the workshop was to gather input from stakeholders on their mission, resources, and needs. This would be used to create an NCRP statement that would have a wide distribution (in multiple journals and publications) and would form the basis for discussions with policy and decision makers for moving forward.

The first set of presentations was intended to provide a look back at what had been done to address the projected shortage of radiation professionals in the past. John Villforth, the former director of the Food and Drug Administration's (FDA) Center for

Devices and Radiological Health (CDRH), presented the very informative and entertaining talk, "Back to the Future: The Evolution of Radiological Health Manpower." He reviewed the activities and radiation professional staffing needs of the U.S. Public Health Service (USPHS) from the late 1940s through 1972, when the Environmental Protection Agency (EPA) was formed and the Bureau of Radiological Health's functions were split between the EPA and the FDA. At its height between the early 1960s and 1972, the USPHS provided training grants to universities, provided research grants, and conducted short training courses to address the need for trained radiation professionals. These resources are largely gone, and the CDRH has very limited staffing and resources in the radiological health area.

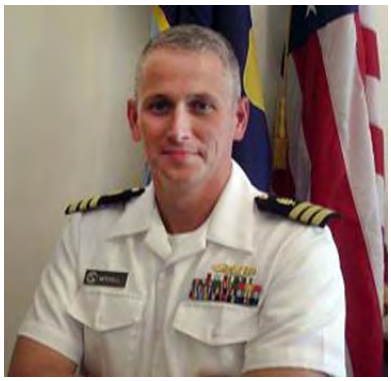
I presented a review of the work of the HPS task force to define and address the human capital crisis. The goals of the task force were to verify the current health physics manpower status, project the future needs, and identify ways to meet current and future needs. The task force published its work in 2004. The white paper identified the need for at least 6,700 new radiation safety professionals across all employment sectors in the near term. In order to educate those new professionals, the academic programs in health physics needed to be sustained and grown, and a stable source of academic funding was critical. The key elements of this white paper were included in HPS Position Statement 015, *Human Capital Crisis in Radiation Safety*. This position statement has been shared with Congress and the federal agencies on every HPS government relations visit since its publication, and it forms the basis for the Society's advocacy of the Nuclear Regulatory Commission's (NRC) Integrated University Programs scholarship, fellowship, and curriculum development program. This position statement is currently being updated by the Scientific and Public Issues Committee, but no new data have been collected on updated personnel needs.

Lynne Fairobent, American Association of Physicists in Medicine (AAPM), provided an overview of a similar effort that was conducted by the Committee on Energy and Environment of the American Physical Society's Panel on Public Affairs. The report, *Readiness of the U.S. Nuclear Workforce for 21st Century Challenges*, was published in 2008 and focused primarily on nuclear scientists and engineers with a minimum of a bachelor's degree. The report recommended a series of actions to focus federal government action, including designating a single federal agency to act as the steward for an ongoing university-based nuclear science and engineering program, with long-term stable funding, use of distance-learning methods, retraining of displaced workers from other fields, and establishing a cross-cutting workforce initiative to address the needs of the various employment sectors that use radiation professionals.

The Infamous Gong

Following this retrospective look at the issue, Toohey explained the ground rules for the remainder of the presentations by the workshop participants. Toohey was equipped with a gong, courtesy of Boice (and wasn't afraid to use it). Participants were each allotted 5 minutes to present their "Quad Chart" and if they ran over, they would be "gonged" off the podium (with a very elegant and polite gong). The Quad Chart consisted of a single slide explaining "our organization's mission," "what we do," "how we do it," and "our needs."

First up were the federal agencies, with presentations from the Centers for Disease Control and Prevention (CDC), Department of Homeland Security, DOE, Uniformed Services University of the Health Sciences–Armed Forces Radiobiology Research Institute, EPA, FDA, National Cancer Institute, National Institutes of Health, NRC, and Office of Science and Technology Policy. While the missions of the federal agencies all differed, there was a recurring theme that radiation safety staffing was generally adequate at present, but the workforce was aging and would become an issue in a few years. The biggest staffing gaps existed in the ranks of mid-career radiation professionals. Bob Whitcomb, CDC, expressed concerns regarding loss of radiation professional staff through retirement and the ability of the agency to respond to emergencies without additional resources. This concern was echoed by a number of the other federal agencies as the need for a "surge capacity" for emergency response,



U.S. Navy Commander Chad Mitchell

with a need to break down the stovepipes and draw resources from across departments and agencies. Commander Chad Mitchell, U.S. Navy, explained that the situation in the military services is somewhat different in that there is a defined recruiting structure to identify qualified candidates and an ability to provide advanced education benefits to their personnel.

Next up were the professional organizations, with presentations from the AAPM, American Board of Radiology, American College of Radiology, American Society for Radiation Oncology, Conference of Radiation Control Program Directors (CRCPD), HPS, Nuclear Energy Institute (NEI), National Registry of Radiation Protection Technologists, and Radiation Research Society. Most of the professional organizations described similar situations of declining membership, initiatives to attract recent graduates and young professionals, tight resources, and the need to maintain adequate volunteer ranks in order to accomplish their missions. Dave Allard, reporting on behalf of both the CRCPD and the state radiation protection programs, noted that the ability to attract and retain radiation professionals in state programs was dependent upon stable health care and retirement benefits to offset lower salaries. There is a current trend to reduce those benefits, which may adversely impact the states' abilities to grow and retain radiation professionals. Ralph Andersen, NEI, reported that the commercial nuclear power utilities had recognized the issue of a radiation professional shortage and had taken steps to partner with local two-year and four-year academic programs to produce supplies of radiation protection technicians and health physicists. Staffing is generally adequate at present, and the "nuclear renaissance" has been delayed by concerns over the accident at Fukushima and several recent nuclear power plant shutdowns (e.g., San Onofre, Kewaunee, Crystal River).

The academic and accreditation programs reported next, including presentations from Harvard, Oak Ridge Associated Universities/ORISE, Oregon State University, the University of Pennsylvania, Idaho State University, ABET, and the Commission on Accreditation of Medical Physics Educational Programs. Kathryn Higley, Oregon State University, described the shift in academic program funding that has occurred in recent years from a heavily state-supported model to minimal state funding and costs being increasingly born by student tuition. The university business model does not favor small programs because of a low return on investment. Rich Brey, Idaho State University, discussed ABET accreditation status. There are currently seven university programs in health physics accredited by ABET through the HPS. The academic programs are reporting dwindling resources for student support and for research, which hampers the ability to retain faculty. Recent research support has resulted in an entirely new understanding of radiation effects at the cellular and subcellular levels that increases our understanding of radiation risk and has also led to improvements in radiation detection capabilities that have enhanced homeland security. There is a

WARP workshop participants **Photos by John Boice**

continuing need for research in radiobiology to better define the risk of secondary cancers following radiotherapy, develop radiation countermeasures in the event of radiation emergencies or terrorist attacks, improve medical diagnosis and therapy, and protect the environment. Continued government support for student fellowships and academic research is vital to the health of academic programs in health physics. In the medical sector, supply and demand appear to be balanced for the foreseeable future, even with anticipated growth in each.

Last up were the representatives of the private sector, with presentations from Radiation Safety and Control Services, Dade Moeller, Risk Assessment Corporation, and M.H. Chew and Associates. The representatives of these companies reported an adequate supply of radiation professionals at present and some challenges in a relatively tight economy. Similar concerns were expressed regarding maintaining capabilities and replacing senior and experienced radiation protection professionals as they retire out of their companies.

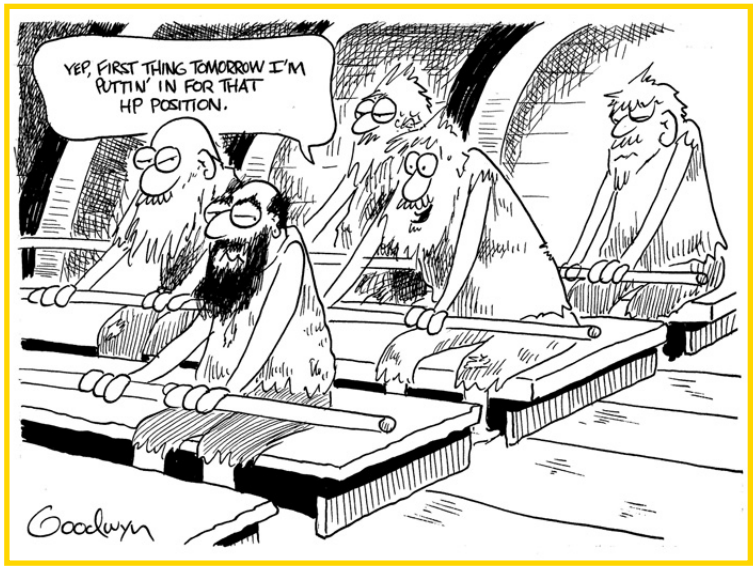
Following these presentations, each group of stakeholders convened for breakout sessions to discuss recommendations to correct the situation for the future. The participants were grouped into federal agencies, professional societies, academic and accreditation programs, and the private sector. Each group of stakeholders reported back to the whole group at the conclusion of the workshop. The input from each group was then used as the basis for the NCRP statement by the writing group the following day.

The basic needs and recommendations of the group were summarized as follows:

- We need to collect data on an ongoing basis to monitor current and future supply and demand.
- We need improved coordination among government, academia, and the private sector to ensure a national capability to manage radiological incidents and maintain the radiation sciences enterprise.
- We need continued federal support of academic education programs and basic research in radiobiology, medical countermeasures, improved detection capability, and nuclear forensics.
- We need radiation professionals who can develop the new science required for the future, ensure the safe use of radiation for the health and welfare of the U.S. population, and respond to radiological incidents.

WARP—What's Next?

The WARP writing committee is actively drafting an NCRP statement for review by the other workshop participants and the members of NCRP's council. The statement will discuss the topic: Where are the radiation professionals today, tomorrow, and in an emergency? The target audience for the statement will be decision makers within the federal and state agencies, universities, and the private sector who play a role in educating, training, and employing radiation professionals.



As the 2011 Fukushima nuclear reactor accident in Japan demonstrated, we must prepare at a national and international level to address in a coordinated way the scientific and societal challenges associated with exposures to ionizing radiation.

(Thank you to John Boice, David Schauer, and Dick Toohey, who provided material used in this report.)