Human Capital Crisis Report

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The term "crisis" evokes concern wherever the term is used. A crisis can occur over a short period of time such as happened during the tragic events of 9/11. However, a crisis can also unfold over a longer period of time. In the medical arena, we face these crises on a daily basis. The HIV-positive epidemic, the decline in lifestyle associated with Alzheimer's disease, or patients discovering that they have just been diagnosed with a terrible disease are all examples of crises. Within the Health Physics Society (HPS), we have identified our own "crisis." This crisis not only affects health physics but also most science and engineering programs in this country. Have you noticed how many of your colleagues are approaching retirement age or how many attendees at HPS meetings have gray hair? Many of us probably assume that we will easily be able to replace retirees with other qualified radiation protection professionals at the appropriate time. But will this actually occur? Will our replacements be able to answer the challenging questions we face on a daily basis? A human capital crisis can occur whenever one of the four Rs is not addressed:

- Recruitment
- Resources
- Retention
- Retirement

Without successfully Recruiting high school students and undergraduates into health physics and other science and engineering programs, the supply of properly trained individuals able to fill vacated positions will decrease. Without Resources to help support the academic programs or fellowships, the number of individuals entering the field will decrease. Without competitive salaries compared to alternative programs and a challenging and interesting work environment, it will be difficult to Retain educated people. When large numbers of individuals in the field are anticipated to Retire in the near future, who will replace them?

During his term as HPS president, John Frazier requested that a task force be created to provide more definitive information on this topic. The task force members chosen were HPS members and represented a broad cross section of radiation protection activities. These members included:

- Kevin Nelson, PhD, Mayo Clinic Jacksonville, Chair
- Ralph Andersen, Nuclear Energy Institute, Member of the HPS Power Reactor Section
- Richard Brey, PhD, Idaho State University, Chair of the HPS Academic Education Committee
- Cynthia Jones, PhD, Nuclear Regulatory Commission, HPS Board of Directors
- Thomas Laiche, Sandia, Energy Facilities Contractors Group
- Richard Morin, PhD, Mayo Clinic Jacksonville, Past President of the American Association of Physicists in Medicine
- Pearce OKelley, South Carolina Bureau of Radiological Health, Chair-elect of the Organization of Agreement States
- HPS President, President-elect, Secretariat—Ex-officio members

The primary goals of the assessment were to:
- verify the current health physics manpower status,
- project future needs for radiation safety personnel, and
- identify ways to meet current and future manpower needs.

It was important that the data collected be verifiable.

After two years of compiling data from the various employment sectors, the task force has recently completed its work. The report was approved by the Board of Directors at the annual HPS meeting in Washington, DC, and is available for review on the HPS Web site (www.hps.org). I would encourage all HPS members to look at this document. The document provides an overview of the types of jobs held by radiation protection professionals to help serve the energy, medical, and security/regulatory needs of this country, as well as a manpower assessment. This document is intended to be a living document, to be updated and improved as additional information is obtained. This document will be used to revise the current HPS Position Statement "Human Capital Crisis in Radiation Safety."

For all employment sectors combined, a conservative total of approximately 6,700 radiation protection professionals was identified in this survey (see Table 1). This number may disappoint some within our Society but it is important to point out that this is a very conservative estimate. This value does not include, for example, part-time radiation protection professionals, individuals working for federal agencies who did not respond to our Freedom of Information Act request for information, radiation protection professionals in the armed forces, or individuals working for companies affiliated with radiopharmaceuticals or providing radiation protection

Task Force Results, 2004			
Employment Sector		*# of Radiation Protection Professionals*	*% of Respondents*
Energy		4193	62.6
	Commercial Reactors	3790 (2940 permanent; 850 temporary)	56.5
	DOE Contractors	403	6.0
Regulatory/Security		1535	22.5
	Federal Agencies	488	7.0
	State Programs	1047	15.5
Medical		580	9
Private Consultants		399	6
		6707	100%

Table 1

services. Also, it is felt that these numbers only reflect a small portion of individuals providing consultative radiation protection services.

Clearly, strong, healthy academic programs are necessary in order to continue to fill the pipeline of radiation protection professionals working in these critical employment sectors. The number of students graduating with either a bachelor's, master's, or PhD degree in health physics has declined 55% from 270 students in 1995 to 122 in 2002 (see Figure 1).

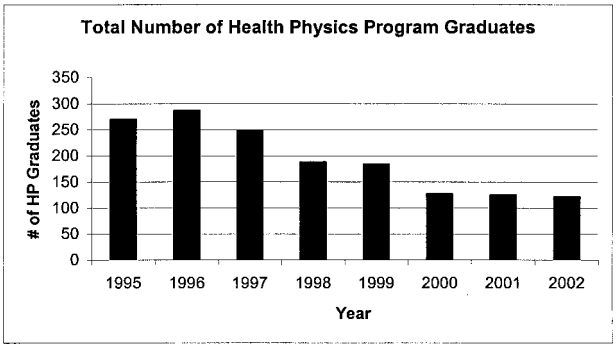

Fig. 1

In addition, the number of health physics programs graduating at least five students annually decreased from 20 programs in 1995 to seven programs in 2002.

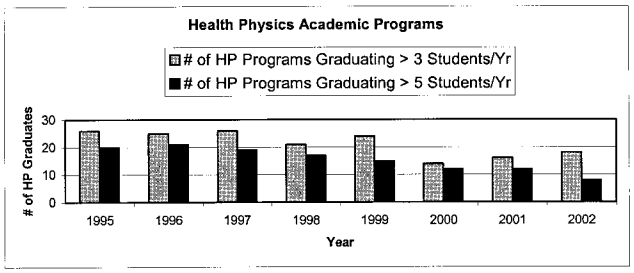

Fig. 2

Even if it is assumed that an equal percentage of individuals will retire each year over a 40-year working lifetime, the number of existing health physics program graduates, that is, 122 per year, does not meet or exceed the demand based on a conservative estimated retirement rate of 167 per year.

Recommendations to the HPS from the Human Capital Crisis Task Force include:

- Continue to work with the Department of Energy and other federal agencies in exploring opportunities to secure funding for health physics academic programs.
- Continue to explore private sources of funding for health physics academic programs.
- Continue to strongly encourage Accreditation Board for Engineering Technology, Inc., accreditation for four-year and advanced-degree health physics programs. Standardization of a core curriculum is essential for providing a consistent, good-quality educational program. Centers of excellence should be formed to address specific programmatic needs.
- Promote standardization or accreditation of technician-level training through the National Registry of Radiation Protection Technologists or similar organizations. Although training programs are already available through commercial organizations and private companies, and are often provided in-house by the employer, establishment of core curriculum would provide consistent background for more-advanced training.
- Commit to developing methods to encourage students to become interested in health physics programs.

So, are we facing a human capital crisis in health physics? Certainly, for certain employment sectors, such as energy, the numbers are compelling. For other employment sectors, the conclusion is less clear because we have not been able to capture all individuals involved in radiation protection activities. Variables such as a declining need for experienced radiation safety professionals in some sectors, shifting economic priorities, and competition for available students all play important roles in the final equation. It is hoped that this document will serve as an important tool for decision makers as these issues are discussed.