



The radiation oncology workforce: A focus on medical dosimetry



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ABSTRACT

The 2012 Radiation Oncology Workforce survey was conducted to assess the current state of the entire workforce, predict its future needs and concerns, and evaluate quality improvement and safety within the field. This article describes the dosimetrist segment results. The American Society for Radiation Oncology (ASTRO) Workforce Subcommittee, in conjunction with other specialty societies, conducted an online survey targeting all segments of the radiation oncology treatment team. The data from the dosimetrist respondents are presented in this article. Of the 2573 dosimetrists who were surveyed, 890 responded, which resulted in a 35% segment response rate. Most respondents were women (67%), whereas only a third were men (33%). More than half of the medical dosimetrists were older than 45 years (69.2%), whereas the 45 to 54 years age group represented the highest percentage of respondents (37%). Most medical dosimetrists stated that their workload was appropriate (52%), with respondents working a reported average of 41.7 ± 4 hours per week. Overall, 86% of medical dosimetrists indicated that they were satisfied with their career, and 69% were satisfied in their current position. Overall, 61% of respondents felt that there was an oversupply of medical dosimetrists in the field, 14% reported that supply and demand was balanced, and the remaining 25% felt that there was an undersupply. The medical dosimetrists' greatest concerns included documentation/paperwork (78%), uninsured patients (80%), and insufficient reimbursement rates (87%). This survey provided an insight into the dosimetrist perspective of the radiation oncology workforce. Though an overwhelming majority has conveyed satisfaction concerning their career, the study allowed a spotlight to be placed on the profession's current concerns, such as insufficient reimbursement rates and possible oversupply of dosimetrists within the field.

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Justification/Rationale for Study

The purpose for this article is to provide an overview of the results of the ASTRO 2012 Workforce Study and highlight important study findings as they relate to the practice of medical dosimetry within the radiation oncology workforce.

Introduction

Radiation therapy (RT) has been in existence since the beginning of the 20th century and serves as a major option in the treatment of cancer. In 2012, the American Society for Radiation Oncology (ASTRO) surveyed the overall radiation oncology

workforce through the 2012 ASTRO Workforce Study. ASTRO is the largest professional society in radiation oncology and is dedicated to improving patient care through education, clinical practice, advancement of science, and advocacy. The delivery of safe RT requires a clinical care team of radiation oncologists, medical physicists, medical dosimetrists, radiation therapists, physician assistants, nurse practitioners, radiation oncology nurses, and radiation oncology administrators.¹ Medical dosimetry serves as an integral part of the radiation oncology workforce and although being a relatively new field, it has gained significant recognition and position among the radiation oncology community. Medical dosimetry involves the designing of a treatment plan by means of computer or manual computation or both that will deliver a prescribed radiation dose and field placement technique in accordance with the radiation oncologist's prescription to a defined tumor volume. Initially the treatment planning process was commonly performed as part of the medical physics department through a medical physicist or a radiation therapist. As the

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demands associated with technological advances and patient treatments increased, the use of the medical dosimetrist was introduced. Today the medical dosimetrist works directly with the radiation oncologist and medical physicist in the development of quality and effective treatment plans used for RT treatments.

In 1975, the American Association of Medical Dosimetrists (AAMD) was established and serves as the professional organization for medical dosimetry. In 1988, the Medical Dosimetry Certification Board (MDCB) was established as the credentialing body of the medical dosimetry profession. Today, many radiation oncology departments employ medical dosimetrist(s) as the responsible party to develop and run isodose treatment plans. Many individuals practicing medical dosimetry enter the profession through their participation as a radiation therapist. Their familiarity with medical physics and exposure to treatment planning has provided a traditional pathway into medical dosimetry. Approximately, 75% to 80% of practicing medical dosimetrists hold an American Registry of Radiologic Technologists RT (T) (radiation therapy technology) certification. The ASTRO Workforce Study supports this figure with 77% of the dosimetry respondents indicating that they hold an American Registry of Radiologic Technologists certification and 82% hold the MDCB Certified Medical Dosimetrist (CMD) certification. Similar figures are also found in the studies by American Society of Radiologic Technologists (ASRT) and AAMD.^{2,6} Today there are more than 3700 CMDs throughout the world. There are 3448 CMDs in the United States, 150 CMDs in Canada, and the remaining 116 CMDs are dispersed throughout the world.³ The AAMD and the MDCB recognize the Qualified Medical Dosimetrist (QMD) as the individual who is competent to practice under the supervision of a qualified physician and qualified medical physicists. An individual shall be considered eligible to practice if he/she is certified by the MDCB.

A study by Smith *et al.*⁴ has predicted an increase in cancer incidence among the elderly and minority groups, which will lead to a 22% increase by 2020 in the number of people using radiation therapy during the initial course of cancer treatment. The study predicted that the supply of radiation oncologists will not be able to keep pace with the predicted increase and demand for radiation therapy. Medical dosimetry shortages have also been reported in the 2002 ASTRO Workforce Study, where it found the dosimetry shortage to be 0.5 Full Time Equivalent (FTE) for all practices, totaling an undersupply of 700 dosimetrists.⁵ The AAMD 2010 Workforce Study showed that the practicing number of QMD will fall short of the demand unless the number of accredited training slots are doubled by 2020.⁶ As reported by Kresl and Drummond in 2004, there were 8 Joint Review Committee on Education in Radiologic Technology–accredited programs.⁵ In 2012, there were 17 Joint Review Committee on Education in Radiologic Technology–accredited medical dosimetry programs that accepted 184 students into their programs. In 2012, the MDCB reported 407 students that attempted the CMD exam with a pass rate of 60%.⁷

The 2012 ASTRO workforce study is unique as it attempts to provide a comprehensive assessment of the entire radiation oncology workforce through an unbiased approach. The study was carried out by the ASTRO Workforce Subcommittee, in collaboration with the following medical specialty societies: American Academy of Physician Assistants, AAMD, American Association of Physicists in Medicine, Association of Physician Assistants in Oncology, ASRT, and Society for Radiation Oncology Administrators.¹

The study aimed to answer 4 main research questions: (1) What are the characteristics of the current radiation oncology workforce? (2) What are the needs and concerns of the current workforce? (3) What are the current best practices and opportunities for improving quality and safety in patient care? (4) What can we predict about the characteristics and needs of the future?

The study findings will be reported on separately by each participating professional organization and published within their journal of choice. The main focus of this article is the medical dosimetry workforce.

Methods and Materials

An expert panel, made up of volunteers from the medical dosimetry workforce segment and representatives of the collaborating society—AAMD—was assembled to evaluate the survey questions. Through a series of conference calls, questions relevant and specific to the dosimetry workforce segment were developed. The draft survey was also reviewed by the ASTRO Workforce Subcommittee and the ASTRO Board of Directors. The questions were then pilot tested using cognitive response testing to ensure that respondents consistently understood the questions in the way in which they were intended. The final survey questions were compiled in Qualtrics, an online survey software program. IBM SPSS Statistics version 20 was used to analyze the data.

The survey participants were members of ASTRO or AAMD or both. The survey began in January 2012. Reminders were sent at 1, 2, and 3 weeks postlaunch, and at the end of the survey period. AAMD sent reminders in addition to ASTRO. The data collection period was approximately 3 months, and the survey closed in April 2012.

Results

A total of 35,204 surveys were sent out to segments of the radiation oncology community. These segments included radiation oncologists, residents, medical dosimetrists, practice managers/administrators, radiation therapists, physicists, nurses, nurse practitioners, and physician assistants. A total of 6765 surveys were returned for a response rate of 19%. For the medical dosimetry segment, 2573 surveys were sent out, and 890 surveys were returned. This resulted in a response rate of 35%.

Within the medical dosimetry community, 56% stated they worked in a hospital-based setting, and 24% stated that they worked in a freestanding or satellite clinic. Overall, 16% worked in a freestanding hospital-owned satellite clinic. This differs slightly from the 2010 AAMD Workforce Study, which reported 46% of respondents being community hospital based and 24% being freestanding of satellite based.⁶ Community demographics consisted of 51% reporting working in an urban setting, 16% working in a suburban setting, and 33% working in a rural setting.

Approximately 37% of the medical dosimetrists were in the 45 to 54 years age groups, and 26% were in the 35 to 44 years age groups. Greater than 50% of all medical dosimetrists were older than 45 years. This corresponds to the AAMD Workforce Study, where the median age was 46.5 years for all respondents.⁶ Overall, 67% of medical dosimetrists were women and 33% men.

Academic centers reported a mean number of dosimetrists as 4.2 ± 0.6 . In the hospital setting, a mean number of 2.6 ± 0.4 and in private settings a mean of 3.1 ± 0.5 were reported. Practice managers stated that it took an average of 74.8 days to fill a vacant medical dosimetry position with a variable of ± 77.5 days across all respondents.

Radiation oncologists, practice managers/administrators, and medical dosimetrists were asked how they felt the current supply of medical dosimetrists in their area compared with the demand for medical dosimetrists. Sixty-one percent of medical dosimetrists felt there were more medical dosimetrists than needed, whereas only 11% of radiation oncologists and 17% of practice managers/administrators felt there was an oversupply of dosimetrists. Overall, 14% of medical dosimetrists felt that the number was balanced with the demand, whereas 64% of radiation oncologists and 57% of practice managers/administrators felt the supply was balanced. One-quarter of medical dosimetrists (25%), radiation oncologists (24%), and practice managers/administrators (27%) perceived a shortage of medical dosimetrists compared with demand.

Medical dosimetrists reported working an average of 41.7 ± 4 hours per week. Most medical dosimetrists' time (51%) was spent

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