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EDITORIAL

Update on Requirements for Medical Dosimetry Certification in the United States

Emilie Soisson, PhD, DABR, FCCPM,*,† Felicia Lembesis, BA, CAE,‡
Diana Baacke, BS, CMD,§ Mary Lou DeMarco, MS, CMD,‖
and Joseph M. Herman, MD, MSc, FACR¶

*Department of Radiology, University of Vermont, Burlington, Vermont; †Medical Physics Unit, McGill University, Montreal, Canada; ‡Medical Dosimetrist Certification Board, Mount Laurel, New Jersey; §University of Texas Health Science Center at San Antonio, San Antonio, Texas; ‖Moffitt Cancer Center, Tampa, Florida; and ¶Department of Radiation Oncology, University of Texas, MD Anderson Cancer Center, Houston, Texas

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The purpose of this editorial is to provide an update on the certification process for medical dosimetrists in the United States for the information of the greater radiation oncology community. Since the first administration of the Medical Dosimetrists Certification Board's (MDCB's) pen-and-paper certification examination in 1988, the examination has been evolving as a psychometrically sound computer-based examination for certifying competency in medical dosimetry. The examination is continuously updated to reflect current practice and knowledge, and it has been accredited by the National Commission for Certifying Agencies. The MDCB works in collaboration with Prometric (a subsidiary of the Educational Testing Service) to ensure the test's validity and reliability. There are currently more than 4,300 Certified Medical Dosimetrists (CMDs) working worldwide, with 93% working within the United States, 4% working in Canada, and 3% working outside the United States and Canada (mainly in Hong Kong, Singapore, and South Korea).

It has come to the attention of the MDCB's American Society for Radiation Oncology (ASTRO) and American Association of Physicists in Medicine (AAPM) liaisons that other professional groups within radiation oncology are not aware that there have been changes to the eligibility and examination requirements for dosimetrists; subsequently, some may not appreciate the value of the CMD credential to departmental practice. Because of the increasing complexity of our field and the evolving role of medical dosimetrists, we think it is important to remind the community of these increasingly stringent certification requirements and to provide some recent updates.

The first change that may be a surprise to some is that the eligibility requirements for the examination have been modified. Beginning in 2013, when the educational requirements were first made more stringent, there were 2 routes of eligibility for the examination. One path (route 1) involved graduation from a Joint Review Committee on Education in Radiologic Technology (JRCERT)−accredited dosimetry training program, and the other (route 2) required a bachelor's degree followed by 3 years of on-the-job training. In 2017, route 2 was eliminated, and formal training from an accredited program and a minimum of a bachelor's degree is now required for certification. At the time of writing, there were 19 JRCERT accredited programs in 15 states.

Reprint requests to: Emilie Soisson, PhD, DABR, FCCPM, Department of Radiology, University of Vermont Medical Center, 111 Colchester Ave, Burlington, VT 05410. Tel: (802)847-7807; E-mail: emilie.soisson@mcgill.ca

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Development of the examination itself follows a rigorous process that adheres to best practice standards outlined in the Standards for Educational and Psychological Testing developed jointly by the American Educational Research Association, American Psychological Association, and the National Council on Measurement in Education and which Prometric is devoted to maintaining. To ensure the validity of the examination, a job task analysis is performed every 5 years: More than 4,000 practicing dosimetrists are queried for their current job tasks and the skills, abilities, and knowledge required to perform those tasks. Using the survey results, test specifications are developed in consultation with a task force of subject-matter experts. The final test matrix is used by the board to assign topics for item writing. Questions are written by a body of volunteer dosimetrists, physicists, and oncologists in the main domains of treatment planning (38%), medical physics (17%), dose calculation methods (15%), quality assurance and standard of care (9%), brachytherapy (7%), localization (7%), and radiation protection (7%). Board members meet regularly to vet new questions and evaluate the statistical performance of administered questions with the help of Prometric. In addition to 10 to 12 CMDs, 2 board-certified oncologists and 2 board-certified medical physicists sit on the board to ensure the relevance and accuracy of the physics and oncology content of the examination.

Each year, approximately 300 individuals sit for the examination. After the job task analysis, a formal cut score study is performed to determine a passing score. In the cut score study, an outside group of board-certified dosimetrists is assembled to judge the questions and determine the minimum score for a qualified candidate. After each administration, collective data are reviewed and analyzed by a PhD psychometrician using several quantitative indicators to determine the reliability of the results. Each administered examination is statistically equated to the determined cut score.

After passing the examination, dosimetrists must fulfill maintenance of certification requirements. To keep the CMD credential, 50 continuing education credits must be obtained and recorded every 5 years. The board determines eligible activities, which can include courses, lectures, workshops, vendor activities, journal authorship and directed readings. In addition to continuing education credits, CMDs must adhere to ethical standards to ensure safe and competent medical care and must practice within scope and practice guidelines to maintain certification.

We believe there are many reasons why certification should be required for all practicing dosimetrists. Radiation therapy equipment and techniques have been evolving rapidly. The certification examination requires broad-based knowledge in dosimetry, and subsequent continuing education requirements necessitate that dosimetrists stay abreast of changes in technology and practice. More importantly, requiring certification meets a public demand for standards in medical practice and is referenced by the ASTRO, APEx, and American College of Radiology standards (1-3).

Does CMD certification lead to better plans and thus better outcomes? Not necessarily, but we do know that quality matters and that plan quality varies among planners and institutions. Nelms et al looked at variations in external beam plan quality among planners and planning systems and concluded that indeed plan quality varies among planners (4). In addition, plan quality in the context of cooperative group trials has been shown to affect patient outcomes. As often cited in this context, Ohri et al performed a meta-analysis of cooperative group trials to determine the association between quality assurance deviations and patient outcomes and found a link between protocol deviation and both disease control and overall survival in several studies (5). It is clear that dosimetrists' ability to evaluate plan quality and understand complex optimization techniques is essential to the delivery of quality radiation therapy. The MDCB strives to ensure that planners have the tools necessary to practice at the highest possible level.

One thing that we often discuss as a board is where the field of dosimetry is going and what knowledge will be required by the next generation of medical dosimetrists. Is the increased use of inverse optimization and autoplanning threatening the profession? Although some believe that automated planning may be a solution to variability in plan quality (6), these methods will not be usable without knowledgeable operators. Over the past few years, we have been phasing out classic questions based on systems of calculations and tabulated data and replacing them with questions about plan optimization and use of novel computer-based planning techniques for complex delivery systems. In addition, the physics and oncology content has greatly increased in scope and complexity. We hear anecdotal reports of dosimetrists performing tasks such as advanced contouring and intensity modulated radiation therapy quality assurance, thus blurring the line between the responsibilities of various disciplines. Although some of these changes are incorporated into the examination, we maintain that some are outside the scope of practice (ie, the MDCB recently released a joint statement with the American Association of Medical Dosimetrists reminding dosimetrists that contouring of gross tumor volume and clinical target volume is outside the scope of practice).

Although the dosimetrist's role is undoubtedly becoming more technical in nature, dosimetrists will still serve as important intermediaries between physicists, oncologists, and radiation therapists for the foreseeable future. We, as a board, feel a great responsibility to remain in step with changes in practice and strive to ensure consistent quality in radiation therapy treatment planning for all patients.

For those wanting to learn more about the MDCB's process for certification of medical dosimetrists, detailed information is provided on our website at mdcb.org.

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