COMP
Canadian Organization of Medical Physicists

OCPM
Organisation canadienne des physiciens médicaux

IMAGING MEDICAL PHYSICS IN CANADA

Participation of Medical Physicists in the clinical application of medical imaging is essential for providing the best possible patient care, realizing potential operational efficiencies and cost savings, and ensuring optimal radiation safety for patients and health care workers.

Executive Summary

While Canadian contributions to research and development in medical imaging physics are well recognized and highly regarded internationally, there is a notable deficiency in the recognition for the contributions that Imaging Medical Physicists bring to the clinical arena. The number of positions for clinically certified Imaging Medical Physicists is significantly lower than values recommended by the European Commission and the American Association of Physicists in Medicine. The importance of Medical Physicists in the realm of radiation oncology is appreciated in Canada; there is a need to achieve a similar level of recognition for the various diagnostic Imaging Medical Physics sub-specialties. Increasing the number of certified Imaging Medical Physicists and their role in patient care would positively impact a significant portion of the Canadian patient population. The recently published guidelines from Health Canada, Safety Code 35 (SC35) - *Radiation Protection in Radiology – Large Facilities*, underscores the need for Medical Physicist participation in diagnostic radiology and introduces a platform upon which to build a national strategy for optimal participation of Medical Physicists in Canadian medical imaging. Creation of analogous guidelines for nuclear medicine, magnetic resonance imaging and ultrasound is necessary to ensure optimal medical imaging in Canada.

Background

Since the discovery of x-rays and radioactivity at the end of the 19th century, many significant advancements in diagnostic medicine are attributable to advances in physics. Devices and techniques considered essential to appropriate patient care, ranging from x-ray, computed tomography (CT), magnetic resonance imaging (MRI), ultrasound (US), and diagnostic nuclear medicine (NM) imaging to internal radiotherapies where radiolabeled molecules are employed in cancer treatment, are a direct result of contributions of physics to medicine. Canadian Imaging Medical Physicists have a rich history of such contributions, and significant advances continue to be made. The European Commission presently has a report in draft suggesting staffing levels for imaging medical physics, that are in agreement with the 1991 AAPM guidelines for diagnostic radiology. Using guidelines proposed by the European Commission, Canada requires at least 8.5 clinical Imaging Medical Physicists per million population. Presently, we have fewer than 50 Imaging Medical Physicists registered as members of the CCPM, many of whom perform research and are not largely involved clinically. It is clear that there are very few certified Imaging Medical Physicists participating in the clinical application of imaging physics.

There is further evidence of the benefits that can be realized by increasing the presence of Medical Physicists within the practice of diagnostic imaging. Two Canadian examples of the positive impact are the Mammography Accreditation Program currently sponsored by the Canadian Association of Radiologists, and a recent trial initiative with Bone Mineral Densitometry undertaken by the Ontario Association of Radiologists. In both instances significant improvement in the diagnostic quality and clinical reliability of these techniques were realized. Further evidence that current practice can be improved is found in the disparity of image quality and associated patient dose in computed tomography across the country; regional surveys continue to demonstrate significant inconsistencies. Other positive examples can be found in nuclear medicine, as pointed out by the Image Wisely initiative, where recent improvements in hardware and software protocols permit a reduction in the use of radiopharmaceuticals and associated patient dose and costs while still enhancing image quality. However, if these advancements are not used or are incorrectly implemented into clinical practice, then a portion of the population will be either (i) receiving an unnecessarily high radiation dose or (ii) the full clinical benefit of a delivered dose will not be realized – precisely the type of deficiencies that medical physicists can mitigate or resolve.

Strategy

Given the magnitude of the challenges facing the imaging physics community, a multi-year, multi-pronged strategy needs to be implemented. Principal components of this strategy include:

Promote Adoption of SC35

Safety Code 35 represents a significant advancement of the national guidelines as they relate to diagnostic radiology. The document delineates roles appropriate for Medical Physicists within the subspecialty. COMP promotes provincial adoption of these guidelines in whole or in part and strongly endorses adherence to the roles of Medical Physicists outlined therein.

Establish a Plan to Address SC35 Human Resource Requirements

Given the current situation, should Safety Code 35 be generally adopted, there will be a significant gap between the existing number of certified Imaging Medical Physicists and the number that would be required. Means for producing and maintaining a sufficient number of certified Imaging Medical Physicists will need to be established. Both the expansion of existing and introduction of new CAMPEP accredited graduate programs and residencies will be necessary. Clearly the ability to fulfill SC35 recommendations will be limited by the rate at which the requisite human resources can be established. Having an appropriate plan in place will assist in addressing the potential perception that this challenge is an impediment to progress.

Pursue Development of Guidelines for NM, US, and MRI Analogous to SC35

The development of a federal guideline such as SC35 is a significant cornerstone in establishing consistency of patient care throughout the nation. The inherent advantage of such a document immediately suggests the development of similar documents for the other imaging subspecialties recognized by the Canadian College of Physicists in Medicine: NM, US and MRI.

Delineate Prospective Human Resource Requirements for NM, US and MRI

Success with establishing and adopting appropriate safety guidelines for NM, US, and MRI will create a demand for additional certified Imaging Medical Physicists in these areas. As with diagnostic radiology, consideration will need to be given to establishing the necessary and appropriate educational and training capacity so that appropriate human resource levels can be realized.

The ability to pursue each of these strategic components is completely contingent upon the expert resources available to provide direction. Moreover, establishing a commonality of approach will lead to efficiencies in realizing the objectives for the imaging physics subspecialties.

References

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About the Canadian Organization of Medical Physicists

The Canadian Organization of Medical Physicists is the recognized leader and primary resource for medical physics in Canada. There are over 500 members consisting of professional physicists that work in health care, scientists, academics located at universities, hospitals, cancer centres, government research facilities (such as the National Research Council), as well as graduate students and post-doctoral fellows. COMPs mission is to champion medical physicists' efforts for patient care excellence through education, knowledge transfer, advocacy and partnerships. COMPs activities include the promotion and development of standards, policies, guidelines and research related to physics in medicine. To learn more about COMP, visit www.medphys.ca or contact Nancy Barrett, Executive Director at 613-599-1948, nancy@medphys.ca/