

Associate Medical Physicists: Our bridge towards fulfilling national demand of Clinically Qualified Medical Physicists

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According to the International Organization for Medical Physics (IOMP), medical physicists are professionals with education and specialist training in the concepts and techniques of applying physics in medicine. It is well-understood worldwide that individuals eligible to be a medical physicist are those having (1) a master's degree in medical physics or any relevant field, (2) completed a formal, structured clinical training, and (3) passed an official certification examination under formal mechanism. This scheme has been agreed worldwide, with several version of recognitive titles specified for the individuals; e.g. 'Certified Medical Physicist' as stated by IOMP, or 'Clinically Qualified Medical Physicist (CQMP)' to which the International Atomic Energy Agency (IAEA) refers in their published documents. In some countries, this has been easily adopted. Some others even improved the game by pushing up into a certain degree of above-standard expertise. Countries within the European Union, for example, went further by having an advanced level of professionals called the 'Medical Physics Expert (MPE)' with highly specific tasks and leadership challenges. In the United States, a subspecialty level is available for those having reached a certain depth of expertise for a given subfield. It is unfortunate that this does not occur in every countries. Many countries are currently still struggling with various obstacles present in their countries. The nature of the challenges in their ways to establish a formal scheme to ensure the presence of CQMP varies from bureaucratic to manpower.

As a member of IOMP, Indonesia, through the Indonesian Association of Physicists in Medicine is committed to fulfill the great nation demand of CQMP. With 38 radiotherapy centers, 13 nuclear medicine centers, and more than 6800 diagnostic x-rays to serve over 261 million people (2015 census), constructing the scheme to cover all these medical radiation devices with CQMPs is a proved challenge—if not to mention impossible for the moment. The availability of educational institutions, manpower, and measurement tools has hindered the realization of such grand proposal. Currently, only five universities are enlisted as members of the Indonesian Alliance of Medical Physics Educational Institutions, a body that serves as the national colleague for medical physics and medical physicists. Although this number will continue to grow, a huge amount of time is required for academic staff candidacy since most universities are not having staffs who specifically had medical physics as formal educational background. A lengthy time will also be needed to harmonize the curricula to align with international recommendations. Moreover, it requires a CQMP to provide clinical training on the first place—which currently are not widely available. Measurement devices, in contrast to radiotherapy and nuclear medicine, are extremely lacking in diagnostic and interventional facilities despite their abundant need of medical physics practice. Other than such tools being expensive, the distribution of diagnostic x-ray devices among Indonesia's 17,500 islands made it a great challenge to provide the tools evenly. The situation has been made even more pressing with the Indonesian Nuclear Energy Regulatory Agency explicitly stating that employing a medical physicist is mandatory for hospitals using medical radiation to be licensed.

To initially respond to the urgent demand, the colleague has reached an agreement with the professional society to make available an additional level as entry level of medical physicists while maintaining international standard of CQMP. The Associate Medical Physicist (AMP) is an individual holding a bachelor's degree in physics with additional one year of certification course. Those having physics bachelor degree with medical physics concentration are entitled to a reduced certification course of only six months in duration. The full-length certification course provides basic knowledge on radiation physics, radiotherapy physics, diagnostic and interventional radiology physics, radiation dosimetry, and anatomy-physiology. Application courses, e.g. patient dosimetry procedures, setting up QC programs, dose audit step-by-step, commissioning techniques, radiation protection and shielding design among other modules are taught on the second-half of the course. Towards the end of the course, participants will be placed in clinical setting on the three fields on medical physics. The reduced course offers only the second half of the program

for those deemed already having the core knowledge. Meanwhile, a formal clinical training course or residency is in place (although very limited) to produce CQMP. The program is a structured, formal, in-the-clinic practice with modules to complete. Currently, 12 residents in radiotherapy and 1 resident in diagnostic and interventional radiology (all are having master's degree in physics with medical physics concentration) are enrolled in the program and are on their second year. They are to be the first CQMPs with obligations to train subsequent ones.

The tasks and responsibilities of AMP and CQMP are clearly defined. Basic services are to be served by AMPs, while advanced measurements are to be covered by CQMPs. The responsibility of teaching and research is also laid on the CQMPs. Detailed lists of competence for both levels are regulated on separate documents prepared by the professional body and the colleague and is signed by the Minister of Health, Republic of Indonesia. Stakeholders are invited and involved in the preparation of these documents. Licensing requirements will also be adjusted to enlist employment of CQMP for devices with a certain degree of sophistication.

The entire scheme is a momentary response to an urgent need. With a projected production of 50 AMPs per year, it is expected to fulfill the need of trained medical physicists within a few years. In time, with more responsibility and different payment scheme, an increase of number of CQMPs are expected. It is at that moment that the AMPs has served its purpose as it is originally intended: a bridge from nothing to meeting international recommendations.

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Chief Editor
Journal of Medical Physics and Biophysics

President (2015-2020)
Indonesian Association of Physicists in Medicine