

Medical Physicist Education in P.R.China

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Present Status of Medical Physics in China: There are about 3,300 physicists involved in research, teaching and working in different areas relating to medicine. Over 1,500 of them are working in medical universities and colleges teaching physics to medical students and doing research in medicinal-oriented research projects. Approximately 400 are involved in universities and colleges doing project-based research related to medicine. The remaining 1400 of them are working in hospitals and clinics as clinical physicists in radiology, nuclear medicine, and radiation oncology. Some of these 1400 are involved in clinical-oriented project research & manufacturer-sponsored project development. The research subjects include medical radiation physics, medical imaging physics (radiology and nuclear medicine), medical laser physics, medical biological physics, bio-medical information physics, computer applications to medicine, clinical engineering, and medical physicist's education, etc. The professional organization of medical physicists in mainland China is called Chinese Society of Medical Physics, which was founded in 1981, and became an IOMP member in 1986.

Present Status of Hospital Physicist Training in China: There is so far no systematic training program for medical physicists recognised by the Educational Ministry of the central government. However, clinically oriented medical radiation physicist training courses are available, like post-graduated students on-site training programs being carried out in major hospitals for a length of 6~12 months; four-year under-graduate medical physics student training programs; short-term intensive workshops and training courses running for a length of 2~4 weeks on specific therapeutic and diagnostic techniques and physics, such as CT/MRI/PET courses, 3DCRT & IMRT courses, TBI technique, SRS(SRT) technique, etc. since late 1970, because of urgent needs in hospitals and clinics. In recent years, programs of training medical physicists for B.S., M.S., and Ph.D. degrees have been established in following universities: Peking Union Medical College in Beijing, Qinghua & Beijing University in Beijing, Wuhan University in Hubei Province, Sichuan University in Sichuan Province, Nanjing Aeronautics & Astronautics University, Taian Medical College in Shandong Province.

Big Demands of Medical Physicists in Chinese Radiation Oncology Community: In contrast with only 80 medical radiation physicists working in fewer than 264 radiation oncology centers in the fall of 1986, there were 1181 medical radiation physicists scattered over in 951 radiation oncology centers by the end of 2006. The gap between market demands and number of available qualified medical physicists is still huge. Based on the number of radiotherapy units (LA, Cobalt, Afterloader), the number of radiation physicists needed/actual increased from 363/80 (283 deficit) in 1986 to 2308/1181(1127 deficit) in 2006. The demand becomes even larger if one therapy unit needs at least one radiation physicist as recommended by WHO and IAEA as China is still a developing country.

Problems and Solutions: The big gap between the market demands and the number of qualified medical physicists is due to the following reasons: there are not enough number of

graduate programs for training medical physicists, the current programs do not meet common standards as lacking qualified lecturers and clinical practice opportunities, and few of the programs have a complete set of courses. Among the medical physicists who have already been working in the clinics, the professional competency for some is questionable because of poor educational background and training. This is because on the one hand there is no medical physics residency program, and on the other the title of Medical Physicist has not been officially recognized, that discourages greatly their work and impacts on their promotion. In order to solve the above mentioned problems, we are trying to seek policy support and to get professional recognition of medical physicist from authorities. At the same time a lot of efforts should be done to enhance education and training by setting up Medical Physics residency programs and more graduate programs in big centers, and for that a strict accreditation system needs to be set up.

Accreditation: There is a Shang Gang examination system administered by the Public Health Ministry since 1996 and executed yearly by the academic societies like Radiology, Radiation Oncology, Ultra-Sonic, Nuclear Medicine, etc. which are affiliated with the Chinese Medical Association. This examination system is designed only for those people including physicians, medical physicists, technologists, medical engineers who are involved in using and operating LA (Linear Accelerator), CT/MRI, PET, etc.. All levels of personals, no matter what academic background they possess, have to take this examination for license. This system is not at all related to academic accreditations for medical physicists and for other professionals. In Xiangshan meeting held in 2004 in Beijing, we intended to set up in China a profession system for medical physicist working in hospitals and clinical-oriented research institutes as a four-level system in parallel to physicians: Assistant Medical Physicist; Medical Physicist; Associate Professor of Medical Physics; and Professor of Medical Physics. To qualify, one has to meet certain entrance academic requirements like BS, MS, PhD degrees of physics or related science, and to have a minimum period of time working in clinics, and to get a minimum score by paper examinations before promotion to one of the four qualified professional levels of medical physicist.