

EDUCATION AND CLINICAL TRAINING OF MEDICAL PHYSICS IN THAILAND

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Abstract— Medical Physics started in Thailand in 1959 at Siriraj Hospital. The education and training was established in 1971. Currently there are 5 programs, one offers the program for international students and Ph.D. in Medical Physics. As IAEA developed the Advanced Medical Physics in e-Learning and Enhancement (AMPLE) using MOODLE platform, Thailand piloted with Thai, Myanmar, Vietnamese and Nepalese residents and Thai Supervisors in diagnostic radiology, radiation oncology and nuclear medicine under the cooperation of Thai Medical Physicist Society (TMPS). Tutorials class and progress in training are set monthly for each program. The completion of competency training will be in 2018.

Keywords— education and training, medical physics, e-learning, assessment, assignment.

I. INTRODUCTION

Medical physics is a profession classified by the International Labor Organization in 2011 [1]. The role and responsibility of the medical physicist refer to medical exposure, patient protection and safety. Specialized education, clinical training and competencies are required for the clinically qualified medical physicist [2]. The recognition of medical physicists remains a challenge [3].

II. EDUCATION AND CLINICAL TRAINING

The academic education program in medical physics provides the student the basic knowledge on a career in the regulatory, metrology, research and development. Further post graduate studies would be necessary to pursue for academic career in medical physics. In Thailand, the education program runs by 5 university hospitals capable of awarding M.Sc. and one for Ph.D. post graduate degree to remain sustainable by offering academic career development pathways. It is ensure the proper access to equipment for clinical practice and research in medical physics. Those university hospitals are listed in table 1.

Table 1 Five university hospitals offered education program

University Name	Hospital	Year	Program
Mahidol	Ramathibodi	1972	M.Sc.(Medical Physics)
Mahidol	Siriraj	1991	M.Sc.(Radiol.Science)
Chiang Mai	Chiang Mai	2001	M.Sc.(Medical Physics)
Chulalongkorn	KCMH	2002	M.Sc.(Medical Imaging)
		2016	Ph.D.(Medical Physics)
Naresuan	Chulabhorn	2015	M.Sc.(Medical Physics)

The need for medical physicists is according to the growth in technology and health care. Number of cancer centers, university hospitals and private hospitals with advanced radiology are increasing with standard facilities as detail in table 2.

Table 2 Facilities of radiotherapy and nuclear medicine in Thailand

Center	Bangkok	Suburb	Equipment			
			MP	Co-60	Linac	Brachy
Radiotherapy	17	19	98	14	66	28

Center	Bangkok	Suburb	Equipment				
			MP	PET	SPECT	DC	TU
Nuclear Medicine	14	8	20	10	50	50	25

MP – Medical Physicists, DC- Dose Calibrator, TU – Thyroid uptake

The facilities in diagnostic radiology are very large but the number of medical physics in diagnostic radiology is limited only in university hospitals and private hospitals of about 30 all over Thailand.

III. THAI MEDICAL PHYSICIST SOCIETY, TMPS

In 1979 Medical Physics Club of Thailand was set up from the alumni of medical physics program. The number of members was 30 and increasing every year. Thai Medical Physicist Society, TMPS, was established on June 12, 2001. The first annual meeting was co-hosted by Lopburi Cancer Center, Lopburi Province in February 2007. The Society becomes member of SEAFOMP, AFOMP and IOMP. TMPS hosted the first Asia- Oceania Congress of Medical Physics successfully in 2001 in Bangkok. Further from the annual meeting, TMPS hosted SEACOMP in 2004, AOCMP in 2009 and 2012 and ICMP in 2016. Currently, the number of active members is 150.

IV. CLINICAL TRAINING OF MEDICAL PHYSICIST

International Atomic Energy Agency (IAEA) Technical Cooperation (TC) had planned for the education and clinical training of medical physicist since 1991. Training materials for clinical training was prepared by Australian medical physicists. The regional project in Asia and Pacific RAS 6038 title ‘Strengthening of Medical Physics through Education and Clinical Training’ was approved. The first meeting on ‘Regional Meeting for National Trainers to Initiate Trialing the Programme for Radiotherapy Specialty was hosted by TMPS and Chulalongkorn University in June 26-27, 2007 in Bangkok. Follow by the national workshop

on Radiation Oncology Medical Physics [4] (ROMP) clinical training on 28-29 June, 2007 for 5 training centers in Thailand as in Table 3. The 8 modules were arranged in clinical training guide. Minimum competency levels were agreeable among clinical supervisors. The 3 assignments were set for the month of 8, 16 and 24.

Table 3 ROMP Clinical Training in 2007

Hospital	Resident	Supervisor
King Chulalongkorn Memorial Hospital	3	2
Siriraj Hospital	2	2
Ramathibodi Hospital	3	2
Rajavithi Hospital	2	-
Chiang Mai University Hospital	2	1

The clinical training was supported by IAEA for mid-term and final assessments. Ten from twelve residents were successfully passed the assessment. The certification was organized at the 9th Asia Oceania Congress of Medical Physics held in Chiang Mai, Thailand (Fig. 1)



Fig. 1 ROMP Certification at the 9th AOCMP, Chiang Mai, Thailand. Prof. Rethy Chhem, Director of NAHU offered the Chairman at this event,

Diagnostic Radiology Medical Physics (DRMP) clinical training [5] was started in June 2010 with 6 residents from 3 centers as shown in Table 4. The 10 Modules and 45 Sub-modules with competency level on core knowledge and practical skill were agreeable among supervisors and residents. The training was completed in 2012 and the certification was arranged at the 12th AOCMP Chiang Mai Thailand.

Nuclear Medicine Medical Physics (NMMP) clinical training[6] started in June 2011 with 10 residents 5 clinical supervisors. (Fig. 2)

Table 4 DRMP Clinical Training in 2010

Hospital	Resident	Supervisor
King Chulalongkorn Memorial Hospital	4	1
Bumrungrad International Hospital	1	1
Phya Thai Hospital	1	-



Fig. 2 Orientation of 10 residents, 5 supervisors and 2 IAEA Experts on NMMP Clinical Training at Faculty of Medicine Chulalongkorn University in June 2011 (Table 5).

Table 5 NMMP Clinical Training in 2011

Hospital	Resident	Supervisor
King Chulalongkorn Memorial Hospital	3	1
Siriraj Hospital	2	2
Ramathibodi Hospital	1	-
Rajavithi Hospital	1	-
Chiang Mai University Hospital	1	1
Bumrungrad Hospital	1	-
Bangkok General Hospital	1	-
Chulabhorn Hospital	1	-

The NMMP Clinical Guide arranged 11 Modules and 57 Sub-modules. The final assessment supported by IAEA Expert and certification to 8 residents were arranged at the annual meeting of TMPS in 2014.

In February 24-26, 2016, IAEA National Workshop on ‘Piloting e-learning in clinical training of medical physicists in diagnostic radiology, radiation oncology and nuclear medicine’ was held to train AMPLE Moodle Platform. (Fig. 3)



Fig. 3 IAEA orientation on e-Learning in clinical training of ROMP, DRMP and NMMP at Chulalongkorn University Bangkok, Thailand

The 30 residents from 16 hospitals and 15 Clinical Supervisors from 8 hospitals applied for clinical training as shown in Table 6. There are 2 residents from Myanmar, 1 ROMP and 1 NMMP, 1 ROMP from Vietnam and 1 NMMP from Nepal participate in this training. The on line meetings were arranged for ROMP and DRMP in February and March 2017 to clarify the training methodology.

Table 6 ROMP Clinical Training in 2016

Clinical Training	Resident	Supervisor
Radiation Oncology	19	10
Diagnostic Radiology	7	2
Nuclear Medicine	4	3

CONCLUSIONS

In Thailand, the education and clinical training had been developed since 1972 until now for the 2 year graduated program, M.Sc. in medical physics and related fields. The clinical training in medical physics for sub specialty in radiation oncology, diagnostic radiology and nuclear medicine was started one by one in 2007 and completed in 2014. E-Learning in clinical training of medical physics started in Feb 2016 for ROMP, DRMP and NMMP simultaneously. The program is progressing as planned at

the orientation. Residents are competence in several topics they had no experienced earlier. At the end of clinical training, the successful residents will work as clinically qualified medical physicists independently. They can train other young medical physicists and be able to strengthen medical physics in Thailand.

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