

ACCREDITATION OF MEDICAL PHYSICS EDUCATIONAL PROGRAMS IN NORTH AMERICA

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Abstract- The purpose of this paper is to provide the reader with a description of the accreditation process for medical physics educational programs in North America by the Commission on Accreditation of Medical Physics Educational Programs (CAMPEP). Forty graduate programs and 65 residency programs are currently accredited. Programs desiring accreditation must prepare a Self-Study document, which is reviewed by an appropriate CAMPEP Review Committee. Following approval of the Self-Study, a site visit team visits the program and prepares a recommendation to the Review Committee. After discussion and vote by the Review Committee, the documentation is forwarded to the Board of Directors for final approval. Accreditation is for up to five years and is renewable. The introduction of the accreditation process has resulted in an increase in the passing rate in the American Board of Radiology certification examinations for candidates completing accredited educational programs.

Running title - Accreditation of North American medical physics programs

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INTRODUCTION

Accreditation is defined as “a process whereby a professional association or nongovernmental agency grants recognition to a school or health care institution for demonstrated ability to meet predetermined criteria for established standards.” [1] In North America, medical physics graduate programs, residency programs, and continuing education programs are accredited by the Commission on Accreditation of Medical Physics Educational Programs (CAMPEP). The stated mission of CAMPEP is “to promote consistent quality education of medical physicists by evaluating and accrediting Graduate, Residency and Continuing Education programs that meet high standards established by CAMPEP in collaboration with its sponsoring organizations.” [2]

The purpose of this paper is to provide the reader with a description of accreditation of medical physics educational programs in North America. We shall begin with a brief history of the accreditation process for medical physics educational programs, and follow this

with a description of the process by which CAMPEP accredits both graduate programs and residency programs.

HISTORY OF THE ACCREDITATION PROCESS

Accreditation of medical physics educational programs in North America began in the 1970s as an informal process of educational review administered by the American Association of Physicists in Medicine (AAPM). The first programs accredited by this mechanism were the medical physics graduate programs at the University of Oklahoma and the University of Colorado. In the 1980s the accreditation process became more formalized as a “service” offered by the AAPM through an AAPM-controlled entity named the Commission on Accreditation of Educational Programs for Medical Physicists. The first graduate programs to gain accreditation through this more formal process were the programs in medical physics at Wayne State University (1988), The University of Wisconsin (1988), The University of Texas – Houston (1989) and McGill University (1993). At this time, concern over liability caused the AAPM to transfer the accreditation process to an independent body, and CAMPEP was officially formed and incorporated in Illinois in 1994. CAMPEP was initially sponsored by three organizations in the United States, the AAPM, the American College of Radiology (ACR), and the American College of Medical Physics (ACMP). The Canadian College of Physicists in Medicine (CCPM) joined the list of sponsors in 2001, and was replaced by the Canadian Organization of Medical Physics (COMP) in 2010. In 2012, after the ACMP was incorporated into the AAPM, the Radiological Society of North America (RSNA) and the American Society for Radiation Oncology (ASTRO) joined as sponsors. The first continuing education programs were accredited in 1995 and the first residency program accredited was the program at the Washington University School of Medicine (1997).

The need for medical physics educational programs to become accredited became more critical in 2002, when the American Board of Radiology (ABR) mandated that all medical physicists desiring to take the certification

examination in any of the branches of radiological (medical) physics on or after 2012 had to have completed a CAMPEP-accredited graduate or residency program. This requirement was amended at the request of the AAPM to require that medical physicists who wished to take the certification examination on or after 2014 must have completed a CAMPEP-accredited residency. Similarly the CCPM requires that after 2016 applicants for their radiation oncology physics certification examination will be admitted only if they have completed a CAMPEP-accredited graduate or residency program. These mandates have generated a significant increase in the number of graduate and residency programs seeking accreditation by CAMPEP. Figure 1 shows the increase in the number of accredited graduate and residency programs in recent years. As of January 1, 2013, there are 40 CAMPEP-accredited graduate programs and 65 CAMPEP-accredited residency programs, with 8 graduate programs and 12 residency programs in the process of initial accreditation.

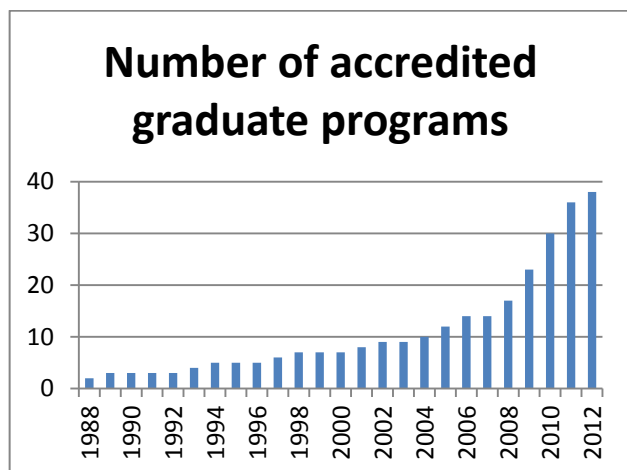


Figure 1. Growth in number of CAMPEP-accredited graduate programs (1988-2012)

Although the overwhelming majority of educational programs accredited by CAMPEP are in the United States or Canada, a few programs in other countries have recognized the potential advantages of CAMPEP accreditation, and have sought and achieved accredited status.

CAMPEP is currently in the process of acquiring accreditation itself from the United States-based Council for Higher Education Accreditation (CHEA). Recognition by CHEA affirms that the standards and processes of the accrediting organization are consistent with the academic quality, improvement and accountability expectations that CHEA has established [3]. Among the criteria for CHEA recognition that CAMPEP must satisfy are that CAMPEP has written procedures that publicly describe the accreditation

process, and has policies that include a self-evaluation of the program along with an on-site review by a visiting team. CAMPEP's Policies and Procedures Manual is available on the CAMPEP website [2], and a written Self-Study and Site Visit constitute a major portion of CAMPEP's process for accrediting an educational program.

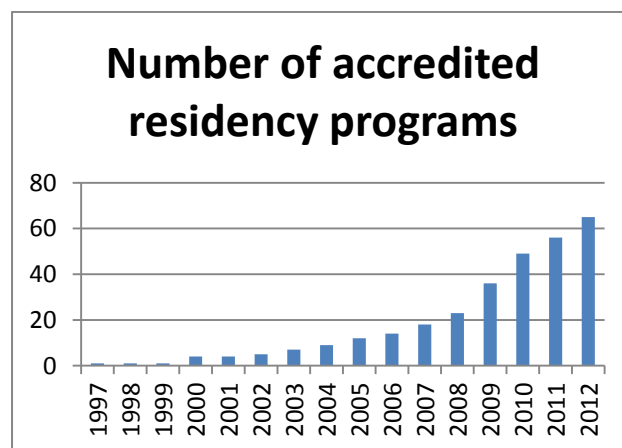


Figure 2. Growth in number of CAMPEP-accredited residency programs (1997-2012)

Presently, the CAMPEP application for CHEA recognition is under review; we anticipate CAMPEP's application will be reviewed at the next CHEA Board meeting, which will take place in November 2013, with a decision announced in January 2014. In August, 2013, representatives of CHEA will attend a meeting of the CAMPEP Board of Directors.

THE CAMPEP ACCREDITATION PROCESS

The process by which an educational program becomes accredited begins when a Program Director (PD) submits a Self-Study document. Templates for the Self-Study are available to the PD on the CAMPEP website [2]. The template for graduate programs is somewhat different from that for residency programs, although there are substantial similarities between them. The Self-Study consists of several parts (seven for graduate programs, eight for residency programs) and five appendices. The first part, the Program Goal and Objectives, simply requires that the educational program state its objectives. The second part is the Program Evolution and History. In this section, the PD provides a brief history of the program's history, including faculty, staff, and students. An institution preparing a Self-Study to renew its accreditation is also required to list in this section all significant changes in the program since the previous Self-Study. These changes are described in more detail in the appropriate section of the Self-Study guidelines.

Table 1: Membership of the CAMPEP Board of Directors and CAMPEP officers, Officers: **President**, **Vice-President**, **Secretary/Treasurer**

Sponsoring Organization								
Year	AAPM		ACMP		ACR		COMP (CCPM prior to 2010)	
1994	B Paliwal	RL Tanner	L Rothenberg	ES Sternick	-	-	-	-
1995	B Paliwal	RL Tanner	L Rothenberg	ES Sternick	GD Frey	J Trueblood	-	-
1996	B Paliwal	RL Tanner	L Rothenberg	ES Sternick	GD Frey	J Trueblood	-	-
1997	B Paliwal	CA Kelsey	L Rothenberg	ES Sternick	GD Frey	J Trueblood	-	-
1998	B Paliwal	CA Kelsey	L Rothenberg	ES Sternick	GD Frey	J Trueblood	-	-
1999	B Paliwal	CA Kelsey	L Rothenberg	ES Sternick	GD Frey	J Trueblood	-	-
2000	B Paliwal	CA Kelsey	L Rothenberg	E McCullough	GD Frey	J Trueblood	-	-
2001	PJ Biggs	CA Kelsey	JB Smathers	E McCullough	GD Frey	M McKetty	BG Clark	P Dunscombe
2002	PJ Biggs	P Steward	JB Smathers	E McCullough	RA Geise	M McKetty	BG Clark	P Dunscombe
2003	PJ Biggs	P Steward	JB Smathers	E McCullough	RA Geise	M McKetty	BG Clark	P Dunscombe
2004	PJ Biggs	P Steward	JB Smathers	JCH Chu	RA Geise	M McKetty	BG Clark	P Dunscombe
2005	PJ Biggs	P Steward	JB Smathers	JCH Chu	RA Geise	M McKetty	BG Clark	P Dunscombe
2006	PJ Biggs	P Steward	JB Smathers	JD Hazle	RA Geise	M McKetty	BG Clark	P Dunscombe
2007	R Maughan	P Steward	TD Solberg	JD Hazle	GD Clarke	M McKetty	E Podgorsak	P Dunscombe
2008	R Maughan	W Hendee	TD Solberg	JD Hazle	GD Clarke	M McKetty	E Podgorsak	P Dunscombe
2009	R Maughan	W Hendee	TD Solberg	JD Hazle	GD Clarke	C Coffey	E Podgorsak	BG Fallone
2010	R Maughan	W Hendee	TD Solberg	JD Hazle	GD Clarke	C Coffey	W Beckham	BG Fallone
2011	R Maughan	W Hendee	TD Solberg	JD Hazle	GD Clarke	C Coffey	W Beckham	BG Fallone

Year	AAPM		ACR		ASTRO		COMP		RSNA	
2012	R Maughan	W Hendee	GD Clarke	C Coffey	TD Solberg	J Buatti	W Beckham	BG Fallone	M Giger	D Balfe
2013	J Prisciandaro	W Hendee	EF Jackson	C Coffey	J Antolak	J Buatti	W Beckham	BG Fallone	M Giger	D Balfe

Table 2: Review Committee Leadership

Year	Graduate	Residency	Continuing Education
1994	Gary T Barnes	Kenneth R Hogstrom	-
1995	Gary T Barnes	Kenneth R Hogstrom	-
1996	Gary T Barnes	Kenneth R Hogstrom	Perry Sprawls
1997	Richard L Morin	Kenneth R Hogstrom	Perry Sprawls
1998	Richard L Morin	Kenneth R Hogstrom	E Russell Ritenour
1999	Paul M DeLuca	Richard G Lane	E Russell Ritenour
2000	Paul M DeLuca	Richard G Lane	E Russell Ritenour
2001	Paul M DeLuca	Richard G Lane	E Russell Ritenour
2002	Paul M DeLuca	Richard G Lane	E Russell Ritenour
2003	Richard L Maughan	Eric E Klein	Bruce R Thomadsen
2004	Richard L Maughan	Eric E Klein	Bruce R Thomadsen
2005	Richard L Maughan	Eric E Klein	Bruce R Thomadsen
2006	Richard L Maughan	Bruce J Gerbi	Bruce R Thomadsen
2007	Edward F Jackson	Bruce J Gerbi	Bruce R Thomadsen
2008	Edward F Jackson	Bruce J Gerbi	Bruce R Thomadsen
2009	Edward F Jackson	Bruce J Gerbi	Bruce R Thomadsen
2010	Edward F Jackson	Bruce J Gerbi	Bruce R Thomadsen
2011	Edward F Jackson	Bruce J Gerbi	Bruce R Thomadsen
2012	Edward F Jackson	Bruce J Gerbi	Steven J Goetsch
2013	Brenda G Clark	Chester Reft	Steven J Goetsch

The next part of the Self-Study is the Program Structure and Governance. This part allows the CAMPEP reviewers to assess the stability and continuity of the organizational structure in which the training program is conducted.

The fourth section of the Self-Study describes the educational requirements for the program. In the case of graduate programs, this would be the program's curriculum. The curriculum for graduate programs must be consistent at a minimum with the recommendations presented in AAPM Report 197 "Academic Program Recommendations for Graduate Degrees in Medical Physics." [4] Sample academic plans also must be provided along with the process by which the institution approves the curriculum and course content. For residency programs, this section includes a listing of the clinical rotations that constitute the training schedule, along with the didactic prerequisites required for a candidate to enter a residency program. The elements of clinical training should be consistent at a minimum with recommendations presented in AAPM Report 90, "Essentials and Guidelines for Hospital-Based Medical Physics Residency Training Programs." [5]

The fifth section of the Self-Study addresses the trainees in the educational program, the students and residents. Application materials need to be described along with admission requirements. CAMPEP requires that students entering a medical physics graduate program have either an undergraduate degree in physics or a degree in physical science or engineering with a physics minor (three upper-level undergraduate courses in physics or their equivalent), while individuals entering a residency program after January 1, 2014, have either a degree from a CAMPEP-accredited graduate program or a PhD in physics, physical sciences, or engineering, together with successful completion of the didactic courses identified in AAPM Report 197S, "The Essential Medical Physics Didactic Elements for Physicists Entering the Profession through an Alternative Pathway." [6]

The sixth section of the Self-Study for residency programs addresses program administration. The administrative structure of the program must be well-defined, with a clear description of the responsibilities of the Program Director and the Residency Program Committee. Sometimes residency programs span multiple institutions and departments, in which case the roles of each component institution must be clearly explained. Extensive record keeping is required of residency programs, and the applicant institution must identify these records and how they may be accessed.

The next section of the Self-Study asks the applying institution to identify its resources. Resources include faculty and staff and their roles in the educational program, availability and extent of funding for students

and residents, and a description of the facilities available to the students and residents.

The final section of the Self-Study asks the applicant program to summarize the program's strengths and needs as perceived by the program staff, and to elucidate the goals that, if achieved, would improve the program by capitalizing on its strengths and addressing its needs.

The main body of text of the Self-Study is followed by a series of Appendices, including letters of invitation and institutional commitments, documentation of institutional accreditation, summaries of the various components of the educational curriculum (course summaries for graduate programs and clinical rotation summaries for residency programs), lists of program graduates for the past 10 years if the program has been in existence for a while, and biographical sketches of faculty and staff along with identification of their roles in the educational program.

Once the Self-Study and the application fee are received by CAMPEP, the Chair of the appropriate review committee, the Graduate Education Program Review Committee (GEPRC) or the Residency Education Program Review Committee (REPRC), assigns two reviewers to review the Self-Study. In some cases the review is accepted by the reviewers, while in other cases the reviewers require further clarification of the Self-Study, sometimes necessitating several rounds of review.

After the Self-Study has been accepted by the reviewers, a site visit is scheduled. The purpose of the site visit is to examine selected areas of the program identified in the self-study review where questions may exist; to meet and talk personally with faculty members, students, and administrative officials; to observe the adequacy of facilities; to assess the aptitude and commitment of students and faculty; to observe the general educational and scientific environment at the institution; and to obtain any additional data required for evaluation. The site visit typically takes 1½ to 2 days. During this time, the review team meets with the Program Director, faculty and staff, trainees, and administrative officials.

At the conclusion of the site visit, the review team prepares a final report and makes a recommendation for or against accreditation to the appropriate review committee. The possible actions are as follows:

Initial accreditation: A program may be granted initial accreditation for a period of three years. If the program submits acceptable annual reports during the first three years of accreditation, the program accreditation may be extended to five years on the recommendation of the appropriate review committee and granted by the President upon recommendation by the Chair of the review committee.

Provisional accreditation: New educational programs that have yet to graduate one student or resident may be granted provisional accreditation for a period less than

three years. These programs are required to provide evidence of graduation of their first student or resident, or remediation as appropriate in which case Initial Accreditation will be granted.

Deferred accreditation: This action may be appropriate for programs that are found to be non-compliant with CAMPEP standards for accreditation, in order to allow an adequate period of time for the institution to implement planned or suggested improvements in the program. This action postpones a final decision until specific additional information is provided which brings the program into compliance with CAMPEP standards.

Withheld accreditation: This action is appropriate for programs that are found to be non-compliant to CAMPEP standards for accreditation, and it does not appear that program changes could be achieved within a reasonable period of time to qualify for accreditation. After this decision, should accreditation be pursued, a new application would be required including the appropriate fee.

The final report with an appropriate accreditation recommendation is distributed to all members of the review committee for consideration. After agreement is reached by the review committee, a recommendation on accreditation is submitted to the Board of Directors. If the Board concurs in a recommendation for accreditation, the accreditation status is conferred on the program.

Programs are required to submit annual reports. In the report, the program is required to identify any changes in the program or key personnel. Programs are asked to identify actively enrolled students or residents, those who have completed the program and those who have left the program prior to completion. Sometimes additional data are requested for statistical purposes.

At the beginning of the last year of a program's accreditation, the program is requested to submit an updated Self-Study to CAMPEP along with the renewal fee. The renewal Self-Study is reviewed in the same manner as the initial application for accreditation. If the application is for reaccreditation following an initial accreditation, or if a site visit was performed for the previous reaccreditation, a site visit is not necessary. If a site visit is required, it is conducted in the same manner as the site visit associated with the initial application for accreditation. After the appropriate review committee has approved the application for reaccreditation, the Chair of the review committee forwards the recommendation to the Board.

Examination statistics for the 2012 oral ABR certification examination for medical physicists have demonstrated that completion of a CAMPEP-accredited residency program significantly increases the passing rate. In 2012, 390 individuals took the Oral ABR

Examination in one of the three branches of medical physics, with a passing rate of 56%. Of these individuals taking the examination, 47 had completed a CAMPEP-accredited residency program. The passing rate for these individuals was 87%. [7] Clearly, successfully completing a CAMPEP-accredited residency program substantially increases the probability that an individual will pass the ABR examination.

CONCLUSION

Accreditation of medical physics educational programs in North America is provided by the Commission on Accreditation of Medical Physics Educational Programs (CAMPEP). CAMPEP has a well-defined process for programs that wish to undergo accreditation. If programs that are currently under review successfully achieve accreditation, there will be almost 50 graduate programs and 80 residency programs holding CAMPEP accreditation. Successful completion of an accredited educational program has been shown to increase the probability that a medical physicist will pass the American Board of Radiology certification examination in medical physics.

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