VII. Resources

A. Staff

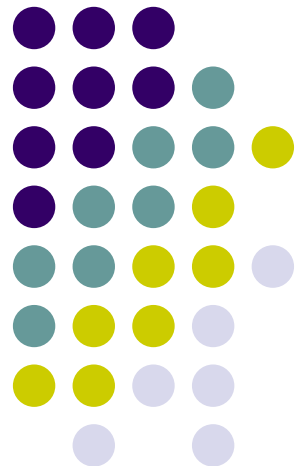
B. Finances

C. Facility

VIII. Future Plans

A. Summary of Strengths and Needs

B. Further Developments and Improvements



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A 15 Year History of the First Accredited Physics Residency Program: Lessons Learned

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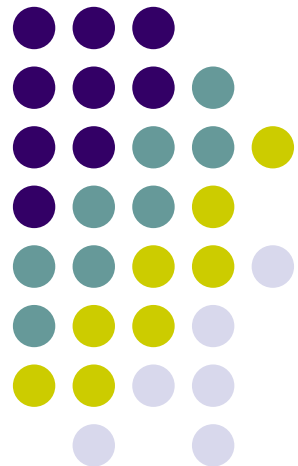


Methods and Materials

- In 1993, our institution formalized our training approach and established Radiation Oncology Physics Residencies.
- In 1997, the program became the first accredited by CAMPEP. The program was re-accredited in 2003.
- Over time we've tried to improve our program and modernize as technologies advance.
- We've tracked administrative aspects, particularly, the success of our graduates in terms of employment and board certification, and our applicant pool's background.

Results: Applicant Background (2003-2008): 352 applicants

- Over the past 5 years, there have been 352 applicants for the positions that were available.
- Of these, 49% have been newly graduating physicists with only a small minority (9% of total applicants) graduating from CAMPEP-accredited programs.
- Of the applicants 1/3 held post-docs, 12% were established in a career, and 6% were from overseas.

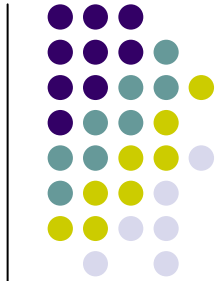
Post Doctoral Fellows	Recent Graduates from non-CAMPEP accredited programs	Accredited CAMPEP Program Graduates	Established in Physics Related Career	Outside North America
116	141	32	42	21

Results: Resident Backgrounds

- For the 29 individuals that have entered our program, 13 had been post-doctoral fellows, 7 had graduated non-CAMPEP programs, 4 graduated from CAMPEP accredited programs, and 4 had established careers.

Post Doctoral Fellows	Recent Graduates from non-CAMPEP accredited programs	Accredited CAMPEP Graduates	Established in Physics Related Career
13	8 (2 MS)	4 (2 MS)	4 (1 MS)

Results: Graduates



- 23 physicists have graduated (18 PhD, 5 MS), two failed to complete the program, and one departed due to medical issues.
- Of the graduates, 17 are at academic facilities and 6 are in non-academic practice.
- Every graduate that has taken the ABR/ABMP exam, written and oral have passed at every stage on their 1st attempt.

Results: Program Changes
1st Year Resident Rotation Evolution from 1999 to 2007

Month	***1999*** 1st Year Rotation	***2007*** 1st Year Rotation
July	Treatment Planning & Dosimetry	Imaging for Planning & Conventional Treatment Planning
Aug.	"	"
Sept.	"	"
Oct.	"	IMRT Planning
Nov.	"	"
Dec.	"	"
Jan.	Brachytherapy	"
Feb.	"	Brachytherapy
Mar.	"	"
Apr.	3D TP and Virtual Simulation	"
May	"	Specials & Patient QA
June	"	"

Results: 2nd Year Resident Rotation Evolution from 1999 to 2007

Month	***1999*** 2nd Year Rotation	***2007*** 2nd Year Rotation
July	External Beam and Brachytherapy	External Beam and Concentration
Aug.	"	"
Sept.	"	IMRT Concentration
Oct.	External Beam + IMRT	"
Nov.	"	
Dec.	"	IMRT (Tomotherapy)
Jan.	External Beam and Brachytherapy	Brachytherapy Concentration
Feb.	"	"
Mar.	"	External Beam, Brachytherapy, and Imaging (Simulation, Localization) Concentration
Apr.	External Beam + IMRT	Special Procedure (ESRT, Gamma Knife, Linac SRS) Concentration
May	"	"
June	"	External Beam and Brachytherapy Concentration

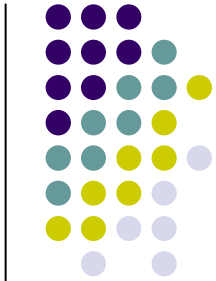
VII. Resources A. Staff

- The faculty of the Radiation Oncology Physics Residency Program represents the foundation and strength of our Program. **All of our faculty have appointments at Washington University and provide clinical support to the Barnes-Jewish Hospital radiation oncology clinic.** The faculty has a broad teaching expertise and access to a wealth of clinical physics equipment and training resources.
- The **faculty and staff interact regularly** through (1) physics faculty meetings, (2) seminars, (3) case conferences, (4) quarterly departmental faculty meetings, (5) hospital or medical school committee meetings, (6) Physics Residency Committee meetings, and (7) annual retreats of the Department's faculty.

VII. Resources A. Staff

- The faculty-resident interactions occur at (1) clinical rotations, (2) classroom environment, (3) seminars, (4) private appointments to discuss comprehensions, clinical rotation, or personal problems, and (5) social activities (Division parties, etc.).
- In addition to the routine meetings, the residents also have access to the Program Director and Division Director to discuss sensitive personal or training problems. We feel there is relatively open communications between residents, faculty, Program Director, and the Division Director.
- For a Program capacity of 6 residents and a planned 14 radiation oncology physics faculty, our resident to faculty ratio is ~ 1:2. In addition, there are 12 dosimetrists and 3 brachytherapists who play an active role in resident training during their 1st year. We have chosen to limit our program to four residents (therefore a ratio of 1:3, resident to faculty) to maintain quality.

VII. Resources B. Finances
Residents Financial Burden



The typical financial burden of a physics resident based on actual data provided by the residents are as follows:

	Resident A	Resident B
Rent	$700/mth	$700/mth
Car Insurance	$1,000/year	$800/year
Health Insurance	$45/mth	$45/mth
Utilities	$50/mth	$75/mth
Books	$120	$0
Food	$60/week	$75/week
Gas	$15/week	$30/week
Parking	$50/mth	$42/mth

VII. Resources B. Finances
Resident Funding

- 1st year Physics Resident: $45,000
- 2nd year Physics Resident: $46,350

•The support for the program comes from the clinical hospital contract. The hospital receives funding from CMS as part of the GME pool of funding, by the paramedical education pathway. (see http://campep.org/summary.asp)

• Physics residents are afforded benefits including medical and dental insurance, paid vacation and holiday benefits (3 weeks), 5 paid meeting and/or interview days in their second year, sick pay benefits, and disability insurance.

• The residents are funded up to $1,200 so each attends a national meeting in their second year.

• At the beginning of the second year, the resident receives a book allowance of $500 to be spent within 90 days.

VII. Resources B. Finances Resident Funding

- http://campep.org/summary.asp

REVIEW OF 42 CFR Part 413.85, REGARDING MEDICAL PHYSICS RESIDENCY PROGRAM FUNDING FROM MEDICARE
Prepared by Angela Lee, AAPM
Originally Submitted By Eric Klein, Chair of CAMPEP REPRC

The Centers for Medicare and Medicaid Services-CMS evaluated materials sent by CAMPEP and believes "that medical physics residency programs are formally organized, planned programs of study engaged by hospitals to improve patient care in an institution. If state licensure is not required [HCFA] will consider the program an approved educational activity if it is accredited by CAMPEP."

Our institution's GME Office receives ~ $92,000 per year (based on half the salary of 4 residents. This is negotiated between the hospitals CMS intermediary and CMS.

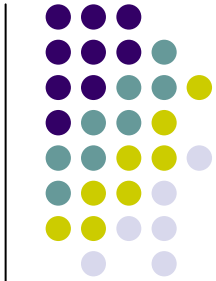
VII. Resources C. Facility

Resident Offices, Classrooms, and Conference Rooms

- The Resident Office, for medical and physics residents, is currently located in the Radiation Oncology Department. The room is allocated for 4 physics residents. Residents are provided a cubicle including a desk, file cabinet and bookcase, computer terminal connected to LAN, telephone access, and standard office supplies.
- The Physics residents are also provided with a library account for electronic access to journals and journal searches (Medline, OVID).
- Ample space is available for resident advisory meetings, didactic lectures, exams, seminars, and oral examinations. Three meeting rooms/classrooms are in the department. They each contain whiteboards, LCD video projectors.

VII. Resources C. Facility

Clinical Facilities, Laboratories, and Shops



- The residents have access to laboratory and shop facilities including: (1) a **dosimetry instrumentation lab** in the physics research area; (2) a brachytherapy lab in the Brachytherapy Suite; and (3) other research labs and offices. The availability of dosimetry and clinical treatment areas and equipment is more than adequate to serve the needs of the program.
- Procedures are in place that (1) allow the resident reasonable access time to clinical equipment, (2) provide residents sufficient training and technical support to ensure safe and proper use of equipment, and (3) to ensure equipment is left in the proper state for clinical use.

VII. Resources C. Facility

Clinical Facilities, Laboratories, and Shops

- **Treatment planning and external beam delivery equipment include 4 Varian linear accelerators (including 2 Trilogy units), 2 Elekta Precise linear accelerators, 2 Tomotherapy planning -delivery Units, a Gamma Knife planning and delivery system, a 50 kVp contact therapeutic x-ray unit, 2 Philips Brilliance CT-simulators (16-slice-large and 64-slice-small "bore"), a 1.5T MRI simulator, 26 Pinnacle TP workstations, 8 Varian Eclipse/Helios workstations, and a conventional x-ray simulator.**

VII. Resources C. Facility

Clinical Facilities, Laboratories, and Shops

- **Treatment planning and external beam delivery equipment Specialized equipment and features include the DMLC-IMRT delivery, Helical Tomotherapy Planning, linac and Gamma Knife stereotactic radio-surgery/therapy, and IGRT provided by on-board x-ray imaging, portal photon imaging, video surface imaging, internal transponders, and kV-CT systems. Clinical rotations are also provided within our HDR, LDR, prostate seed, and radiopharmaceutical program, etc.**

VII. Resources D. Libraries

- The major libraries available to students are the Washington University Medical School Library and the Washington University Main Campus Library.
- Students also have access to the Division of Radiation Physics' Library which maintains bound volumes of Medical Physics, Physics in Medicine and Biology, and International Journal Radiation Oncology, Biology, and Physics.
- **Medline accounts** are available for the residents for manuscript keyword/author searches.

VIII. Future Plans
Summary of Strengths and Needs

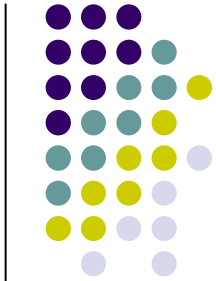
- The Physics Residency program has thus far met our faculty and trainees expectations. Particular strengths include the following:
- **Strengths**
- Clinical training facilities are excellent.
- Funding for four resident positions is firm.
- Adequate number of well-qualified and dedicated faculty.
- Strong support for program from the Medical Director and BJH Administration
- The quality of potential residents seeking admission into the program remains high.
- The Physics Residency Program has now established a reputation for producing well-trained clinical physicists. Upon graduation, our graduates are in great demand.

VIII. Future Plans
Summary of Strengths and Needs

Strengths

- State-of-the-art imaging and delivery equipment
- Outstanding clinical physicists, many former residents
- The new Siteman Cancer Center radiation oncology facility is an all inclusive single floor facility. The Cancer Center has designation as a NCI Comprehensive Cancer Center.
- These developments have made a significant impact on our Physics Residency Program by providing a more cohesive training environment, by providing a consolidated radiation oncology clinic, more modern clinical facilities, etc.

VIII. Future Plans
Summary of Strengths and Needs



Needs (2002)

- We have been able to supply travel funds for a physics resident to attend 1 national meeting (AAPM or ASTRO) due to the acquisition of yearly funds provided by the AAPM. We are currently negotiating with the hospital to match this funding in order to send 2 residents per year to an annual meeting or summer school.
- Result – starting in 2006, sending 2nd year residents to meetings.

VIII. Future Plans
Summary of Strengths and Needs

Goals (2002)

- 1. To enhance recruitment efforts to increase the number of qualified applicants. √
- 2. To secure a budget for travel to AAPM, ASTRO Meetings (1 meeting per year per resident). √
- 3. To obtain extramural funding for a 3rd year research fellowship for those residents seeking radiation oncology physics research opportunities.

  (decided not to pursue)
- 4. To increase the salaries of the residents to be compatible with those of physician residents. X

VIII. Future Plans
Summary of Strengths and Needs

Needs (2009)

- **SPACE:** Currently, first-year residents share space with the physician residents while 2nd year residents share a faculty office. This works well in terms of interaction with physician residents for first-year residents and physics faculty for second-year residents. The most ideal scenario would be that they are all in one large office sharing a room and resources together.
- **IMAGING EDUCATION:** We still have some voids regarding physics applied to nuclear medicine, particularly PET scanning, image registration, and fusion.
- **OUTREACH PROGRAM:** Residents could reside part-time at an outside facility to allow their independence to be tested.

VIII. Future Plans
Further Developments and Improvements

- **SELECTION PROCESS:** We are never assured we are getting the best candidates for our program. We need to develop a mechanism for being able to interview and better forecast on whether a resident will be successful or not. We have not had the resident candidate lecture.
- **UNIFORM TESTING:** We need to formalize testing to avoid any grey areas in interpretation. We need to develop ways of making the exam process more consistent and clear cut as to what is deemed a failure of a subject, or an overall outright failure.
- **FACULTY PARTICIPATION:** We need to improve our faculty participation, particularly in manner of consistency. There are still faculty who routinely teach and enjoy the interaction immensely, while others see residents as simply aids in the work force.