

Clinical Implementation of Pencil Beam Scanning (PBS) Proton Therapy

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Panel Discussion

- ☐ Implementation issues
- ☐ Practical issues
- ☐ Staffing issues
- ☐ Training issues

Panel Discussion – Upgrade vs. Acquire New

- ☐ What are the main obstacles to move to PBS if you have only double-scatter or uniform scanning technologies/experience?
 - ☐ Treatment planning (IMPT; Robustness evaluation; RBE)
 - ☐ TPS commissioning
 - ☐ Motion issues
 - ☐ QA
 - ☐ Availability of gantry or more beam angles
 - ☐ Others?

Panel Discussion – Upgrade vs. Acquire New

☐ **All PBS vs. mixed PBS & scatter-based treatment rooms?**

- ☐ Patients suitable for each type of treatment rooms
- ☐ Is there a risk to have all PBS treatment rooms?

☐ **Is it smart to upgrade existing treatment rooms or acquire new proton tx systems?**

- ☐ Beam time issues for upgrade situations

☐ **How many treatment rooms are ideal?**

- ☐ 1 vs. 2 vs. 3 vs. >3

Panel Discussion – Staffing

☐ **How do you staff physicists in a proton center? Is there a recommendation?**

- ☐ No. of rooms
- ☐ Patient load
- ☐ Facility maintenance time
- ☐ Ratios of physicists, physicist assistants, dosimetrists, therapists, physicians?
- ☐ Do we need to hire the full team at the beginning? If not, what is the recommended mixed at initial hiring?
- ☐ Should I hire everyone with prior proton therapy experience?

Panel Discussion – Staff Time

☐ **How is a typical workday for physicists in proton therapy?**

- ☐ Do you need two shifts?
- ☐ Is there something to consider in the staffing model?

☐ **Do you use Saturdays?**

- ☐ What do you do on Saturdays?

☐ **Do you still have a life if you choose to work in a proton therapy center?**

Proton Center Staffing Level Survey Results

Summarized by: Mark Pankuch, PhD
Director of Medical Physics and Dosimetry

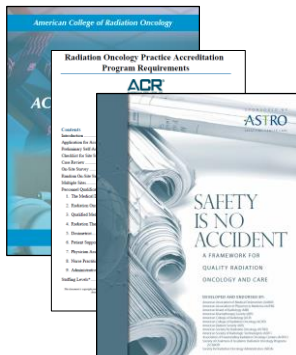
March 8, 2017



What are "Typical" Staffing Levels for Radiation Oncology??

- Three commonly used references

- Manual for American College of Radiation Oncology (ACRO) Accreditation
- Radiation Oncology Practice Accreditation Program Requirements for American College of Radiology (ACR)
- Safety Is No Accident, Sponsored by American Society of Radiation Oncology (ASTRO)



What are "Typical" Staffing Levels for Proton Therapy ?

- NAPT sent out anonymous surveys to all active Proton Therapy Centers

- Categorize the Proton Center
 - Academic / Free Standing / Community Hospital or Academic / Non-Academic
- Number of treatment rooms
 - Proton Rooms + Photon Rooms
- Staffing levels (# of FTE's) of
 - Radiation Oncologists / Medical Physicists / Dosimetrists / Radiation Therapists
- Are Assistants used and what is their role??
 - Physics / Dosimetry / Radiation Therapists
- Additional request for number of patients treated annually was made

What are “Typical” Staffing Levels for **Proton Therapy** ?

- 10 Centers responded
- All replied to additional request for patient numbers
- 3 Centers reported both Photon + Proton
 - Dedicated Proton and dedicated Photon staffing were NOT provided
 - Estimations for Proton Only Staff were made by subtracting photon staff calculated by the average of ACRO and ACR recommendations
- Some questions may not have been interpreted consistently
- Results are reported for informational purposes only with full disclosure of the limitation of the results.
- A more specific and detailed survey may be commissioned if additional interest exists within this community.



In Summary : A Quick Glance

		Academic Proton Center	Non-Academic Proton Center	All Proton Centers	ACR (Photon)	ACRO (Photon)	ASTRO (Photon)
Facility	Rooms per Center	2.3	3.3	3.0			
	Patients per Room	153	150	151	211		
Radiation Oncologist	Rad Onc per Room	2.8	1.8	2.1			
	Patients per Rad Onc	134	122	125	205	250	
Medical Physicist	Med Phys per Room	2.5	1.9	2.1			1.5
	Patients per Med Phys	72	81	79	258	250	95
Dosimetrist	Dosimetrist per Room	1.5	2.1	1.9			0.8
	Patients per Dosimetrist	113	74	83	263	250	186
Radiation Therapist	RTT per Room	5.3	5.9	5.7	2.9	>2.0	
	Patients per RTT	29	26	27	77	125	90



Panel Discussion – Staffing

- ☐ Do you believe the survey data?
- ☐ What is the percentage of PBS rooms in the survey?
- ☐ Do you think the staffing model would be different for PBS vs. DS?

Panel Discussion – Vendor Implementations

- ☐ Disclosure of employment by speakers
- ☐ Is synchrotron vs. cyclotron an important factor to consider?
 - ☐ PBS Beam quality; QA; motion management; maintenance;
 - ☐ Commissioning, gantry angle dependence, symmetry of spot size;
- ☐ How do you consider a treatment planning system?
- ☐ What do you consider for imaging?
 - ☐ Is DECT required for simulation?
 - ☐ CBCT or CT-on-rails required for in-room imaging?

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Panel Discussion – PBS Commissioning Time

- ☐ How long is expected after room handover to completion of commissioning?
- ☐ How many cases do I need to verify before I feel comfortable to release the machine?
- ☐ Are there criteria to be considered as “satisfactory commissioning”?
 - ☐ What about acceptance test?

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Panel Discussion – Adaptive

- ☐ It appears that adaptive is much more important for PBS, why?
- ☐ Practically, how many patients require repeat CT scans?
 - ☐ How many patients (%) actually receive new plans?
- ☐ Do we have an **accepted** guideline for replanning?
- ☐ Do I need to consider additional simulation capacity to accommodate adaptive patients?

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Panel Discussion – Downtime Management

☐ **How do you management machine downtime?**

- ☐ Accelerator issues vs. In-room Issues
- ☐ Are there more problems with PBS rooms compared to DS?

☐ **If my practice also has photon therapy with linacs, do I need to choose immobilization system to share with proton therapy?**

☐ **How often do I need to replan a patient for photon therapy?**

- ☐ What is the best approach to transfer a patient to photon therapy?
- ☐ What if the patient refuses to be treated on a linac?