

Guidelines and Rotation Schedule for Medical Physics Students
Radiation Oncology Physics
Department of Radiation Oncology
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This set of guidelines has been written in an effort to try and ease the transition between the didactic first year and the clinical second year. There are many differences between the two years but you will probably find that time is the most noticeable. In the clinic year you will be exposed to many things new to you and the clinic year is not long enough to teach you everything. You should spend as much of your time as possible learning the skills you will soon be relying on.

Students are expected to abide by the following schedule of rotations, and become very fluent in each of the following clinical areas.

The one year clinical clerkship is a full time year. You are expected to report to the clinic everyday at scheduled clinic hours, usually from 8 am to 5 pm. Students usually do not have allotted vacation time other than the official graduate school's holidays, but if you have any emergency or need to be off, please inform the director of the graduate program ahead of time if possible, or leave a message for me about your status if you have an emergency. In the absence of Dr. Parsai, please communicate your need with one of the staff physicists.

Your schedule in clinic is as follows:

1. One week shadowing therapists on SL-15 (including the warm-up procedures)
2. One week shadowing therapists on SL-25 (including the warm-up procedures)
3. One month in simulation room, attending to every simulation performed and making of the necessary masks, any other immobilization devices, cerrobend blocks, etc.
4. Attending simulation procedures should continue as we get new cases or cases that you have not observed before.
5. At about the second half of the second month, the students will start working in the dosimetry room employing treatment planning computers. Students are expected to learn CT transfers, treatment plans of simple and complex cases as they gain in-depth understanding of the processes involved. This process continues until the end of the clinical training period. Once you have mastered the basics you will be given opportunities to work on actual cases and complete plans. Your preliminary plan is then reviewed by a staff physicist prior to being shown to physicians for approval and clinical implementation. Staff physicists, physicians, and other clinical instructors will concentrate on helping you where necessary. Our aim would be to help you gain a thorough understanding of the process and be able to function independently in a clinical environment.
6. Learning the IMPAC system, especially its delivery, and record and verify components.
7. Quality assurance of the accelerators and simulation unit. (follow the scheduled times and see the notes below on QA)
8. Annual calibrations procedures and implications. (Around October-November of each year)
9. Superficial unit's annual calibration and quality assurance (temporarily out of commission).

10. QA of the CT-Sim unit located in Bryan hospital.
11. Three-dimensional treatment planning and implications
12. IMRT planning, QA and implementation
13. IORT
14. The student is also required to gain experience in the following areas of radiation therapy physics by observing and later performing treatment plans, and by participating in the whole procedure from the beginning to end.

Brachytherapy cases: Learning all aspects of patient care, NRC and State rules in radiation safety and protection, treatment planning issues and hand calculations:

Sr-89 or Sm-153 therapy.

I-131 ablation therapy.

Various types of intracavitary cases using Cs-137.

Interstitial implants I-125 or Pd-103.

15. HDR
16. Stereotactic radiosurgery
17. Acceptance testing of therapy X-ray & electron generating units.
18. Prior to completion of clinical training, the student is responsible to schedule a week with the UTMC diagnostic physicist, observing annual checks on diagnostic equipment, etc.
19. Spend a week in nuclear medicine, observing patient procedures, and radiation safety practices, as well as learning about quality assurance in nuclear medicine department.
20. Annual QA at UT and Bryan. This will require approximately three weekends to complete.

Additional General Guidelines to Remember

- Take good notes. You will see some special procedures performed only once or twice. For more typical procedures the staff physicists will demonstrate the techniques for you and you will be expected to become familiar with them using your notes as a guide.
- Medical physicists are professionals and do not have fixed working hours. Clinic hours start at 8am so we need to be in clinic to sort out any problems that could occur during the normal working day. A great deal of the work can only be carried out after the clinic has closed for the day. Physicians often come back to physics at the end of the day so if you are waiting for a physician's input on a plan, then you should be here. QA often requires time on the machines that can only be obtained at the end of the day and you are expected to be here if there is an activity requiring the physicist's involvement.
- Clinic comes first; this is a credo you will hear often. You are being trained to be a clinical medical physicist and that means that the clinic must have priority over all other tasks. If a task has to be completed by a given date then please see it as your responsibility to make sure everything is ready in time.
- When a task is assigned to you, make sure you follow it through to the end. Take pride in any task you do and be available to answer questions and help the radiation therapists carry out your instructions.
- Get involved in as many of the clinical activities as you can. One year is not enough time to learn everything but you should try to gain at least a basic knowledge of every aspect of the clinic so that you start to understand the big picture.
- Being both a student and a physicist who gives instruction to radiation therapists can be difficult. The radiation therapists will carry out your instructions, but be open to any advice they give you from their experience. Try to be authoritative but not over-bearing. You do not have anything to prove, except maybe to your instructors. Now is the time to ask questions, as it is better to admit you don't know than pretend you understand.
- It is everybody's responsibility to make sure that the work is distributed evenly among the students. If a fellow student is having a more difficult time learning a concept, then please see it as your responsibility to help. Friendly competition between students is encouraged but it should not be taken too far. Work as a team to get the tasks done whenever possible. The staff physicists are instructed to give the students as much learning experience as possible. This may mean that the students are assigned tasks when the instructors appear to be idle. Do not misinterpret this as laziness.
- Attendance and punctuality will not normally be recorded. As a professional it is your responsibility to manage your time wisely. However, if you show tendencies to be late or absent on a regular basis then your instructors may feel that closer observation is required. Please do not put your instructors in this position; they are here to teach and not to keep track of your whereabouts.

Some Guidelines on QA and Treatment Planning

QA

Student residents will work in pairs on the machine QA if possible, each checking the others work to ensure the tests are carried out correctly. Both accelerators, the simulator and the HDR each have a monthly checklist that must be completed before the end of the month. The printed reports should be placed in the correct binder with the correct dates as a record that each test has passed within the listed tolerance. Any test that does not fall within tolerance should be reported to a staff physicist before the report is printed. Your instructors make sure you gain competency in performing all QA tests and you should ask for help any time you have any question or any difficulty in performing a QA test. Morning warm up logs for the accelerators should be reviewed and signed by a physicist every day. A schedule for all the above items will be provided by the clinical medical physicist. Additional responsibilities include performing IMRT and SRS QA's as needed, I-125 and I-131 assays and all other aspects of the physicist's job. Don't hesitate to follow the clinical physicist as they perform clinical duties such as electron treatment set-ups and I-131 patient surveys.

Annual QA is usually performed in or around September or October and QA due to machine maintenance will be periodical.

Treatment Planning

You will be shown how to create treatment plans using the treatment planning computers. It is strongly recommended that you take your own thorough notes that can be used to complete the plans on your own. Initially you will be shown many different types of plans and then asked to recreate the plans on a copy of the patients CT. This is referred to as practice planning. You will have to prove to the instructors that you are capable of completing each type of treatment on your own to an acceptable standard before you can work on patients under treatment. This will help you gain confidence that the plans you are creating are highly optimized.

Ultimately you will be given opportunities to work on actual treatment plans used for patient treatment but this will happen only when both you and your instructors feel you are ready. At this time you will follow your patient's treatment from beginning to end. When you are assigned a patients plan you should be there at the time the blocks or target are defined by the physician. You should take notes of the physician's instructions. It is our policy that no more than one physician and one student work on any patients plan. This is to help with communication and information consistency but it will not work in all circumstances and other people may need to complete a plan. If you complete a plan that was started by someone else then it is safest to assume nothing. The person that completed the plan will be ultimately responsible for the quality of that plan. No plan is shown to a physician for approval or implemented in clinic prior to detail review and approval by a staff physicist.

Listed below are some general policies that we have in place regarding treatment planning.

When a new patient is placed on the board it should be picked up by a student physicist and they will complete the planning process from beginning to end. During the first few months of your residency these plans will be worked in close consultation with a staff physicist. As you become more fluent the staff will try and limit the amount of input they provide, unless they are asked to help. If you do need help or information regarding a plan, please bring to the attention of a staff physicist before you approach a physician. Ultimately you will be able to complete a plan on your own with only a final review and check by a staff physicist.

Before each plan is shown to a physician it must be reviewed by a staff physicist. This is a policy that has been implemented to protect you and maintain consistency with the quality of the treatments. Once the plan has been approved by the physician the chart, IMPAC and the paperwork needs to be prepared for treatment. This should be done immediately after the plan is approved, or, if the plan was approved in the evening then it should be ready by noon the next day. You will need a second student to verify the plan in the form of a second check calculation. It is the responsibility of the person who did the plan to ask a colleague to verify the second check. This should not be a problem as all members of physics need to work as a team and check each others work for potential problems both big and small. Prior to the plan being taken to the techs for treatment, the plan paper work and IMPAC information is to be reviewed by a staff physicist. To facilitate this review please complete the purple laminated checklist, and place this on the front of the chart and place it on the staff physicists 'to be reviewed pile'. At this point inform the staff physicist that the chart is ready for review. If the patient has an assigned start date that is approaching it is best to inform everybody in the review process that the chart review must be completed by this date. Once the chart has been reviewed the staff physicist will initial the chart and return it to you to be placed in the work room.

When you are working on a plan, please be aware that they must be completed in a timely manner. Typically we allow 7-10 working days for a plan to be completed from beginning to end but this should be considered as a maximum limit. The plans should be completed as quickly as is safely achievable without compromising the quality of the treatment. When a new patient is placed on the board, the CT should be imported immediately and the critical structures contoured. The chart should be obtained and left next to the computer where the plan is open. If the treatment beams that will be used are known, these should be set up on the patient ready for blocks to be drawn before the physician comes to work on that patient.

The planning process should be carried out by a single student physicist (with the aid of the staff physicists) for the whole course of the patient's treatment. The student should be present at all times during the plan process. When the physician draws a target or designs the field blocks, the student physicist should be present and make notes of any instructions. You should always be keen on taking advantage of opportunities provided when sitting with a physician, to learn medically related information, the physician's approach in treating different disease sites, and their specific technique. Reading information in patient's treatment chart, physician's reports and other diagnostic notes is always helpful to better understand the case.

Upon completing your plan and prior to getting a second check, have your plan reviewed by a staff physicist and make optimal optimizations. The next step is to have your plan presented to a physician. In doing so, you should know everything you have done and be ready to answer any question the Doctor may have. You should be ready with the patient's chart in hand to show the physician your plan and seek his approval. The physician's review of the plan is often done after the clinic has closed. It is important that you are available whenever physician input is required on a treatment plan you are working on. At the time of the physician review a staff physicist will be present to aid the student physicist. When a boost plan is required it should be completed by that same student physicist. Where ever possible it should be completed prior to physician review of the primary plan. It is our policy that for IMRT plans the boost be completed prior to the start of treatment but there will be cases where this is not possible.

When a plan has been reviewed and approved by both a staff physicist and physician it should be printed, placed on the front of the chart and taken to the work room to be signed. The physician

should be informed and advised of the time treatment is expected to begin. The radiation therapists should be notified that the plan is complete and that they should call the patient and schedule a treatment appointment. Please remember that it is your responsibility to ensure these tasks are completed well before the patient is due to arrive. Patients should not arrive for treatment on the same day that the plan is being signed. This is to ensure that undue stress is not placed on the staff to get things ready in a rush.

Student's Clinical Rotation Checklist

Student's Name: _____

Date: _____

Item	Clinical Coordinator	Program Coordinator	Date Completed
Accelerator's Treatment Procedures			
Simulation Procedures: 4fld breast, pelvis, abdomen, brain, head & neck			
Block Room, and Use of Treatment Devices			
Simulator Quality Assurance			
Superficial Calibration and Quality Assurance			
Accelerators Monthly Calibrations & Quality Assurance			
Accelerators Annual Calibrations			
HDR Quality Assurance			
HDR Source Exchange & Physics Related Issues			
HDR Treatment Planning			
2D External Beam Treatment Planning & Related Matters			
3-D Treatment Planning and Implications			
IMRT planning and QA. Implementation of Plans			
Sr-89 and Sm-153 Radiotherapy			
Thyroid Ablation Therapy (I-131)			
LDR Vaginal/Fletcher Cylinder (Cs-137)			
Endobronchial HDR (I-192)			
HRD Interstitial Implants (Ir-192)			
Stereotactic Radiosurgery			
Acceptance Testing of Therapy Units			
IORT and Related Matters			

Student's Clinical Rotation Checklist (Cont...)

Item	Clinical Coordinator	Program Coordinator	Date Completed
Interstitial seed implants (I-125 or Pd-103)			
Hyperthermia Treatment			
One Week of Rotation in Diagnostic Radiology			
One Week of Rotation in Nuclear Medicine			
Use of BAT ultrasound and prostate positioning			

On items such as acceptance testing, where the student may not find opportunity to participate during his/her clinical rotation, he/she must present a seminar to the physics staff.