Imaging Rotations – Description of Activities

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The goal of the imaging rotations within MEDP 7260 is to learn some of the core activities of a clinical imaging physicist, especially quality assurance and safety. Here we will focus on three imaging modalities with relevance to radiation therapy: MRI, CT, and PET. Activities for the imaging rotations include written reports, QA data acquisition and analysis, and safety-related lectures/demos. Below is the list of activities grouped by modality. Also, you are expected to maintain your clinical notebook in the same manner as for the completed radiation therapy physics rotations. Oral exams will be held on Friday Dec. 6 or Monday Dec. 9 – schedule TBD.

CT
1. ACR accreditation
   a. (Individual) Write a synopsis about ACR accreditation in CT. Topics to address include the personnel requirements, implementation and equipment requirements, frequency, etc.
2. Daily QA and maintenance
   a. (Pairs) Discuss with the CT techs about the types of daily QA that they do and why. How often do they identify problems? What types of (regular or irregular) maintenance occur on the system?
3. Recommendations for QA tests and frequency
   a. (Individual) A number of organizations (e.g., AAPM, NEMA) provide guidelines for the types and frequency of quality assurance tests. Identify the current reports relevant to CT.
   b. Summarize these recommendations in terms of types of tests, frequency, etc.
4. CT QA measurements and analysis
   a. (Pairs) Using an available QA phantom as recommended by the instructors, acquire a suite of QA measurements.
   b. (Individual) Analyze the QA measurements; assess results.
   c. Measurements and analysis completed earlier in the semester as part of MEDP 7111. Please write a brief summary of this experience in your clinical notebook.
5. CTDI measurements
   a. (Pairs) Using the CTDI measurement phantom with appropriate ion chamber and electrometer, measure the CTDI for typical head and body protocols.
   b. (Individual) Calculate CTDI100, CTDIvol, and DLP. Compare to values reported in scanner acquisition setup; compare to ImPACT.
6. CT (x-ray) radiation safety
   a. (Lecture/demo) Your instructor will provide information about radiation safety in CT

MRI
1. ACR accreditation
   a. (Individual) Write a 1-page synopsis about ACR accreditation in MR. Topics to address include the personnel requirements, implementation and equipment requirements, frequency, etc.
2. Daily QA
   a. (Pairs) Discuss with the CT techs about the types of daily QA that they do and why. How often do they identify problems? What types of (regular or irregular) maintenance occur on the system?
3. Recommendations for QA tests and frequency
   a. (Individual) A number of organizations (e.g., AAPM, NEMA) provide guidelines for the types and frequency of quality assurance tests. Identify the current reports relevant to MR.
   b. Summarize these recommendations in terms of types of tests, frequency, etc.
4. MR QA measurements and analysis
   a. (Pairs) Using an available QA phantom as recommended by the instructors, acquire a suite of QA measurements.
   b. (Individual) Analyze the QA measurements; assess results.
   c. Document in your clinical notebook.
5. MR safety
   a. (Lecture/demo) Your instructor will provide information about safety (magnetic fields, RF, bioeffects) in MRI

PET
1. ACR accreditation
   a. (Individual) Write a 1-page synopsis about ACR accreditation in PET (especially PET/CT). Topics to address include the personnel requirements, implementation and equipment requirements, frequency, etc.
2. Daily QA
   a. (Pairs) Discuss with the PET techs about the types of daily QA that they do and why. How often do they identify problems? What types of (regular or irregular) maintenance occur on the system?
   b. Summarize the above in your clinical notebook
3. Recommendations for QA tests and frequency
   a. (Individual) A number of organizations (e.g., AAPM, NEMA) provide guidelines for the types and frequency of quality assurance tests. Identify the current reports relevant to PET.
   b. Summarize these recommendations in terms of types of tests, frequency, etc.
4. PET QA measurements and analysis
   a. (Group) Using an available QA phantom as recommended by the instructors, acquire a suite of QA measurements. Your instructors will do the primary handling of radioisotopes for this exercise.
   b. (Individual) Analyze the QA measurements; assess results.
   c. Document in your clinical notebook.
5. PET (nuclear medicine) radiation safety
   a. (Lecture/demo) Your instructor will provide information about radiation safety in PET