ABR Exams Preparation: Vanderbilt DMP Approach

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ABR Exams Preparation Outline

- Vanderbilt DMP Program (Timeline and Overview)
- DMP Didactic Education Curriculum
- DMP Clinical Training
- ABR Exams Scheduling during the 4-Year DMP Program
- Results and Conclusions

Vanderbilt DMP Program (Timeline & Outline)

- Program Approval
- Faculty & Chairman of Radiation Oncology and Radiology
- SOM Dean & Chairman's Committee
- Vanderbilt Board of Trust
- CAMPEP Accreditation
- 3rd Year Class begins, July, 2009
- 1st Graduating Class, June, 2011 (3 graduates)
- Alternate Pathway (2 graduates)
- 2nd Graduating Class, June, 2012 (4 graduates)
- Total Students in Program (2012-2013): 4-4th Year
  5-2nd Year
  5-1st Year
  4-3rd Year
  3-1st Year
Vanderbilt DMP Program

- Program Length – 46 Months (August 20, 2012 – June 30, 2016)
- Continuous Program, Three Terms per Year: Fall, Spring & Summer
- Didactics – August 20, 2012 – May 10, 2014
- Pre-Rotation/Orientation – May 20, 2014 – June 30, 2014
- Therapy Track
- Diagnostic Track
- Student campus visit/interview is required (Oct – Jan)
- Application deadline (Jan 30th)
- Student must commit to Therapy Track or Diagnostic Track prior to Feb 15th
- Applicant Selection Committee meets approximately Feb 20th
- Better prepared students become the Best Students
- Selection Notices sent March 15th
- Student Response to Selection due April 15th
- Target Class Size: 4 – Therapy and 1 – Diagnostic
- Expectations, Responsibilities, Goals

ABR Certification is an Expected Outcome of a Medical Physics Professional Doctorate Program

Vanderbilt DMP Didactic Education Curriculum

- Didactic Hours – 50 credit hrs
  - Years 1 & 2
    - Clinical Practicum* Hours & credit hrs (300 hrs) (substitutes for Dosimetry training during Year 3)
    - Research Problem Hours & credit hrs (2-4 months FTE)
  - Summer Year 1 & Spring Year 2
  - Research Problem Hours & credit hrs (2-4 months FTE)
  - Summer Year 2 & Year 4
  - Clinical Rotation Hours 30 credit hrs (24 months)
  - Years 3 & 4
- Prerequisites:
  1. Clinical observation/participation without formal didactic is less than optimal
  2. Didactics only during Years 1 & 2 is less than optimal (didactics need reinforcement with clinical application)

Didactic Curriculum

- Didactic (50 credit hrs)
  - Therapy
    - Anatomy & Physiology 8hrs
    - Health Physics & Detectors Lab 3hrs
    - Introduction to Rad with Matter 3hrs
    - Radiation Biology 3hrs
    - Therapy Physic Lab 12hrs
    - Therapy I & II (Year 2)
    - Lab (Year 2) & Lab II (Year 3)
    - Diagnostic Imaging & Lab 8hrs
    - Radiation Oncology 2hrs
  - Diagnostic
    - Anatomy & Physiology 8hrs
    - Health Physics & Detectors Lab 3hrs
    - Introduction to Rad with Matter 3hrs
    - Radiation Biology 3hrs
    - Diagnostic Imaging & Lab 8hrs
    - Intro to Imaging (Year 1)
    - Diagnostic & Lab (Year 2)
    - Seminar 4hrs (AAPM TG Reports)
    - Elective 6hrs*

- Final Oral Examination over Core Curriculum Subject Matter
- Research Project hours
  - Research Project hours

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## Didactic Curriculum

### Electives
- **Therapy**
  - Cancer Biology
  - Quantitative and Functional Imaging
  - Cancer Imaging
  - Biological Basis of Imaging
  - Signal/Noise Analysis
  - Neuroimaging
- **Diagnostic**
  - Math and Computational Methods
  - Statistics
  - Ethics
  - Health Care Delivery Systems
  - Finance and Economics

## Research Project

### Example Projects
- Energy Response and Dosimetry of OSLs for Ir-192 HDR Applications
- 3D Electron Compensators for Radiotherapy
- Small Field Dosimetry/Beam Parameterization for Radiosurgery
- Retrospective Study: Potential of IGRT for Ophthalmic Brachytherapy
- IMRT vs 3DCRT for Left Breast Radiotherapy
- Predicting Table/Patient/Gantry Collisions in Radiosurgery
- IMRT vs. RapidArc for Cranial Radiotherapy
- RapidArc for SBRT Lung Treatment
- Patient Organ Doses from KV-CBCT Acquisitions as Function of Patient Size and Scan Protocols
Clinical Practicum

- Clinical Practicum Begins in Year 1 and Continues in Year 2
  
  Therapy Track:
  - Summer Y1: Clinical Brachytherapy Course and Brachy Practicum (120hrs)
  - Fall Y2: Clinical Therapy Course
  - Spring Y2: Therapy Lab and External Beam Practicum (180hrs)

  Diagnostic Track:
  - Summer Y1: Diagnostic Practicum (Observation) (80hrs)
  - Fall Y2: Diagnostic Physics Course & Diagnostic Lab
  - Spring Y2: Diagnostic Practicum (180hrs)

  Reports and Treatment Plans Required for Grade

How Do Didactic Years Prepare for ABR Exams?

- Accumulation of Knowledge Base in Core Courses
- Accumulation of Ancillary Skills in Elective Courses
- Labs Provide Results Reconcilable with Expected Dosimetric/Clinical Results
- Clinical Practicum Allows Introductory Training/Experience During Years 1&2
- ‘Friday’ Seminars: Mock ABR Orals Preparation During Years 1&2
- Final Orals Examination at the End of Didactics (Year2)

DMP Clinical Training

- Clinical Practicum in Years 1&2 sets-up the Rotations
- Clinical Rotations: 13 weeks each, taken in both Year 3&4
  - 3DCT Treatment Planning
  - Brachytherapy
  - IMRT/RapidArc
  - Radiosurgery (SRS/SBRT)
Successful Conclusion to Proposed Gardening Rotation

Acquire Practical Skills

Successful Outcomes

Peer Review (Quality and Quantity)
DMP Clinical Training (cont)

- Observation, Participation & Competence
- Activity Log Kept by Individual Student using Typhon Documentation Software
- Competence Evaluated on Submitted Reports & Completed Plans
- Rotation Evaluations
  - End of Rotation Evaluation by Primary Mentor(s)
  - End of Rotation Oral Examination
  - End of Rotation Evaluation of Mentor(s) by Student

End of Rotation Evaluation

- General knowledge of subject material specific to rotation
- Student's attitude toward subject material
- Student's clinical skills
- Student's availability during rotation
- Student's written and oral communication skills with attendings, physicists & staff
- Student's interpersonal skills in interactions with patients
- Student's knowledge/application of Federal, State, or Institutional Standards/Policies
- Student's ability to understand and operate the equipment and perform QA appropriately
- Student's understanding and correct use of RTP algorithms and alternate calculations
- Rate student's accuracy and quality of work during this rotation
- Rate student's quantity of work (number of competency plans completed)
- Evaluate student's attitude and ability to perform manual tasks
- Evaluate the student's overall professionalism during this rotation

Fail  Minimal Pass (C-)  Satisfactory (C)  Good (B)  Excellent (A)

End of Rotation Orals Examination

- Student demonstrated confidence and poise during the exam session
- Student answered the general (1st tier) questions concerning the subject matter
- Student answered the specific (2nd tier) questions concerning the subject matter
- Student showed willingness to pursue discussion of a question even if he/she did not immediately know the answer
- Rank the student's overall performance on the specific questions asked and follow-up discussion
- Rank the student’s overall knowledge and understanding of the subject material
- The student’s overall performance indicated the level appropriate of his/her graduate class
- Does the student need additional remedial assignments over the subject material Y/N

Not Satisfactory (1)  Satisfactory (2)  Above Average (Good) (3)  Excellent (4)
Other Preparation

- Encourage AAPM Summer Meeting Attendance
- Encourage Submission of Abstract/Manuscript from Research Project Results
- Participation in AAPM TG Reports Seminar Series
- Participation and Completion of Therapy Lab II during Year 3/4
- Conference Attendance
- Weekly Patient Conference  Tumor Board Conferences
- Resident Case Presentations  Ethics Seminars
- Vendor Webinars
- Discussion/Decision Time with Attendings/Residents Concerning
  Patient Specific Variables Pertinent to the Patient's Treatment Plan
- Availability is the Best Ability
- Appropriate Use of "Downtime"

ABR Exams Scheduling During the 4-Year DMP Program

- ABR Part I
  - Taken at the completion of the Year 2; corresponds with end of didactics
    program oral examination
- ABR Part II
  - Taken in Aug/Sept of the same year as completion of Year 4 (June 30th)
- ABR Part III
  - Taken in May of the year following completion of Year 4 and
    successful completion of ABR Part II

Conclusions

- Student Selection
- Continuum (no breaks)
- Core Course Curriculum
- Elective Course Selection
- 'Friday' Seminars (practice of concepts learned and communication skills)
- Practicum in Years 1&2
- Clinical Rotations x 2 in Years 3&4
- Two tier Therapy Physics Laboratory Experience
- AAPM TG Reports Seminar
- Similar Experience(s) as in a 4-Year Medical Residency (4th Y teaches 3rd Y etc)
- Environment of Learning (Attendings, Medical Residents, Physicists & Staff)
- Mentor Experience and Enthusiasm toward Teaching