**DMP Program Implementation and Financial Models**

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**DMP Program Implementation and Financial Models Outline**

- 2014 Residency Requirements
- Professional Doctorate (DMP) White Paper
- Evolution of DMP Program at Vanderbilt
- DMP Program Current Status
- Issues Remaining
- Financial Models for Graduate Education
- DMP HUB and SPOKE Model
- Conclusions

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**2014 Residency Requirements**

- Newly Entering Medical Physics Graduate Students for Fall, 2013
- Required to complete a CAMPEP-accredited (24 Month) Medical Physics Residency prior to sitting for Part II of the ABR Exam

- Estimated 175-225 medical physics graduates per year
- Guesstimation: 80% desire to enter clinical workforce
- 140-180 medical physics graduates desire to enter clinical workforce per year
- Estimated 85 medical physics residency slots per year

- Math Doesn’t Work...
- DMP offers a potential, yet partial solution to the Above Math Problem
DMP White Paper

- Prepared by AAPM Working Group on DMP
- Ralph Christensen, Terrance Harms, John Hazle, Bill Hendee, Ken Hogstrom, Melissa Martin, Bruce Thomadsen, and Charles Coffey, Chair

- Report included Positive and Negative Implications/Impact on students, education programs and the profession of medical physics.

- Report Presented and Received by AAPM BoD on July 31, 2008

- Much discussion has taken place among AAPM Members, Educators, and Students with regards to the +/- need/implementation of the DMP Concept

- Vanderbilt has the only DMP Program in the nation, to date

- Several other programs are considering the concept at their institutions

Evolution of DMP Program at Vanderbilt

- Faculty Approval: Depts of Radiation Oncology and Diagnostic Radiology
- SOM Dean and Chairman’s Committee Approval
- Vanderbilt Board of Trust Approval – 2009
- CAMPEP-accreditation – Fall, 2009
- Student Interest – Fall, 2007 (3 students express willingness to be Pioneers)
- Getting “Ducks in a Row”
  a. Credit hours & Tuition rates
  b. Medical Physics courses added & Electives sought
  c. Alternate Pathway
- Three students enter 3rd Year of DMP Program in Fall, 2009
- Four students complete graduation requirements in Summer, 2011

- Present Student Numbers:
  Four – 4th Year DMPs
  Four – 3rd Year DMPs
  Five – 2nd Year DMPs
  Five – 1st Year DMPs

DMP Program Pillars

- Quality
  - More than MS Degree + 2-Yr Residency

- Alternate Pathway for Vanderbilt MS Medical Physics Graduates
  a. ABR Board Certified
  b. Return to Campus and Take the Extra Didactic Class Hours (12 – 15)
  c. Complete the Required Research Project (could be off-site)

- Professional Degree
  a. May Allow Graduates to Pursue an Academic Clinical Appointment
  b. May Allow Employer More Leverage for Salary Negotiations within HR
  c. May Result in Additional Employee Perks (ie, travel, dues, etc)
  d. CAVEAT: Will Not Allow Graduates to Pursue a Primary Research PhD Academic Appointment
Current Status of Vanderbilt DMP Program

- Continuous Program
- Start August, 2008...Completion June, 2012
  July 1, 2010 to June 30, 2012 (Twenty four months of clinical training)
- Three Terms per Year: Fall, Spring, & Summer
- DMP: Professional Degree
  50 Didactic credit hrs + 6 Practicum credit hrs
  + 6 Research Project credit hrs + 30 Clinical Rotation credit hrs
- MS: Basic Science Degree
  32 Didactic credit hrs + 6 Practicum credit hrs

Curriculum

- Core Curriculum from Basic Science MS Medical Physics Degree (32 credit hrs)
- Clinical Practicum (pre-Residency training)
  a. Begins in Summer Term of Year 1*
  b. Concludes in Spring Term of Year 2
- Eighteen Additional Credit Hours Required
  a. Electives in Medical Physics Topics
  Expanded Lab Opportunities (Therapy Lab I, Lab II, and Special Problems)
  Expanded HP Series (HP I, HP II, and Radiation Detectors)
  Expanded Seminar Series (AAPM TG Reports)
  Expanded Imaging Series (Signal Processing, Quantitative Imaging, Tumor Imaging)
  b. Other Electives
  Statistics, Mathematical Methods, Finance
* Observation and Participation before the student is didactically prepared may not be the optimal clinical training environment

Research/Problem Solving Experience

- Six Credit Hours (Approximately Equal to 3-4 Months FTE)
- NOT a Thesis or Dissertation
- Under the Direction/Supervision of a Medical Physics Mentor
- Results/Conclusions Worthy of Submission as Abstract and/or Manuscript
- Sample Topics (2011-2012):
  - Eye Plaque Optimization/Tumor Localization via Fundus Photography
  - VMAT As a Solution for SBRT Lung
  - IMRT/Rapid Arc for Brain Patients: A Dosimetric Comparison
  - SRS Cone, Gantry, Table Collision Check Software
  - IMRT Versus 3DConformal Radiotherapy for Left Breast Cancer Patients following Mastectomy
  - Use of Portal Imager for Winston-Lutz Analysis (Full Rotation Data Acquisition)
Clinical 2-Yr Residency

- Preparation Begins in Year 1 and Continues in Year 2 (Clinical Practicum)
  - Therapy Track
    - Summer Y1: Clinical Brachytherapy Course & Brachytherapy Practicum (240 hrs)
    - Fall Y2: Clinical Therapy Course
    - Spring Y2: Therapy Lab and External Beam Practicum (180 hrs)
    - Fall/Spring Y2: Linac Monthly QA (30 hrs)
  - Diagnostic Track
    - Summer Y1: Diagnostic Practicum (Observation) (80 hrs)
    - Fall Y2: Diagnostic Physics Course & Diagnostic Lab
    - Spring Y2: Diagnostic Practicum (180 hrs)
  - Concludes with Years 3 & 4 (Clinical Residency)
  - Clinical Therapy Physics Rotations (4 per Year)
  - Diagnostic Physics Residency (Caveat: Our 1st Year 3 Diagnostic DMP begins July 1, 2013)

Clinical 2-Yr Residency (cont)

- Diagnostic Physics Residency
  (Caveat: Our 1st Year 3 Diagnostic DMP begins July 1, 2013)
  - Clinical Rotations in Year 3:
    - General Radiology
    - Angiography and Fluoroscopy
    - Mammography
    - Computed Tomography
    - Nuclear Medicine and PET
    - Ultrasound
    - Magnetic Resonance Imaging
  - Repeat Rotations in Year 4

Things Learned

- Program Director’s Effort Increases (0.25 – 0.5 FTE) Teaching/Mentoring & (evaluations, grades, accreditation, recruiting, correspondence & letters)

- Education Coordinator/Administrative Assistant Is Necessary (0.5 FTE) (application review process, evaluations, grades, Registrar’s office concerns)

- Mentors Must Be Clinical (larger commitment than teaching a class/semester)
  - “Come do this procedure with me.” Desirable Response
  - “Go do the procedure and I’ll check it later.” Less than Desirable Response

- Multiple Quarterly Evaluations Are a Burden

- Registrar’s Office Wants Grades ON TIME
  - Some classes (Lab II and Research Problem) may extend past the last day of a Term and hence In Progress (IP) grades will happen.
  - Grades are needed at end of Term, clinical rotations often cross Terms
Things Learned (cont)

- Webinars Are a Special Opportunity for Learning
  - treatment & QA techniques and equipment specifications and applications
- Allow a Class or Two in Years 3 & 4
  - CAMPEP allows three (3) class-time credit hours per year
  - TG Report Seminar Series experience is enhanced in Years 3 & 4

Things Learned (cont)

- Lab II incorporates clinical problems into a data taking, data analysis, and conclusion learning exercise, ie., beam commissioning, end gap, and IMRT QA equipment and methodology
- Completion of research problem

Things Learned (cont)

- Improved Learning Environment
  - Continuous learning
  - Four years instead of 2 x two years
  - Problem solving skills improve with experience and repetition

Issues Yet to Resolve

- MS Program (To Be or Not To Be?)
  - We desire our MS graduates to be competitive in the Residency Market
  - Vanderbilt has taken a “wait and see” approach to 2014 & the MS Degree

Issues Yet to Resolve

- Modifications of the DPM Program Continue
  - a. We just didn’t consider that early on
  - b. Limited resources (staffing and space) at the departmental level
  - c. Limited dollars at the University level
  - d. Changing patient #’s/mix and workload requirements

Issues Yet to Resolve

- Mentoring and Quarterly Evaluations
  - #’s of plans/task, oral examination, and evaluation form
  - Grading of plans/procedures/reports cannot wait until WK 11 of a rotation
  - Evaluation of the resident only at end of rotation exam is unfair
Financial Models

- Current Financial Models
  - Basic Sciences: Graduate students receive tuition & stipend
  - Professional: Graduate students do not receive tuition & stipend
  - PhD Medical Physics: Graduate students receive tuition & stipend
  - MS Medical Physics: Graduate students do not receive tuition & stipend

- This financial matter of bearing one’s own educational costs for a professional degree becomes more of an issue when considering/comparing the new 4-yr DMP Degree versus the 2-yr MS Degree. This dollar issue is a hard sell for both students and those institutions considering implementation of DMP graduate programs.

DMP HUB and SPOKE Model

- Assumptions:
  - 4 Yr-DMP Programs Will Rise (or Fall) with respect to an Appropriate Model
  - Finances Have to Work for Both Institution and the Student
  - Clinics are limited as to the maximum of Students in Years 3 & 4 (Funnel-1 theory)
  - Shared Financial Model Concept (DMP HUB and SPOKE Model)
  - Tuition/living expenses Years 1 & 2 (student)
  - Potential teaching, lab-assistants opportunities (through the institution)
  - Tuition/living expenses Year 3 (student)
  - Reduced tuition Year 4 (similar to research hours during dissertation years)
  - Student serves in community physics practice Year 4
  - Community/Teaching Institution enters financial agreement for DMP 4 with part of Finances returned to DMP 4 as a salary
  - With fewer DMP 4 students on site, the teaching institution has less overhead costs and could perhaps further reduce cost of degree

DMP HUB and SPOKE Model (cont)

- Years 1 & 2: at HUB Institution
  - Completes didactic classroom and laboratory requirements
  - Completes an equivalent 300-hr Practicum experience

- Year 3: at HUB Institution
  - Completes 1-yr of Clinical Rotation Training including observation, participation, and competency tasks

- Year 4: at SPOKE Institution (lower tuition costs & include student salary)
  - Completes 1-yr of Clinical Rotation Experience (same rotations as Year 3) including participation and competency
Benefits of the DMP HUB and SPOKE Model

- Education Institution may be able to reduce tuition costs during Year 4.
- Education Institution may be able to admit more professional students in Years 1, 2, & 3 in that institutional resources are not required in Year 4.
- Student gets the opportunity to participate in a SPOKE non-academic physics practice, acquire skills, and share in assignments and problem solving perhaps not as readily available at the HUB.
- Financial and Relational Contracts between the HUB and SPOKE may allow dollars for student salary.
- SPOKE physics practice gains a 1-yr trained student resident without the organizational difficulty of administering a residency program and the 2-yr commitment of significant financial resources.
- A shared financial model resulting in a net reduction of out-of-pocket student expenses may assist in allowing sufficient numbers of students to choose non-PhD clinical careers in medical physics.

Negotiations Issues HUB and SPOKE

- Quality
  - Faculty/Staff
  - Equipment and Technology
  - Methodology/Procedures/Patient #'s
- Legal/Administrative/Financial Issues
  - Responsibility: Indemnification/Malpractice/Student Conduct/HIPPA
  - "Whereas" and "Therefore"
  - Payment & Where are dollars going?
  - Yearly contract
- HUB is the CAMPEP-accredited Entity
  - SPOKE(s) reported to CAMPEP; possible SPOKE(s) site visits
  - Ultimate responsibility resides with Program Director
  - Day to Day assignments/duties resides with Community Physicist
- DMP Student Remains Vanderbilt Student
  - Clinical Evaluation resides with Community Physicist
  - Ultimate responsibility resides with Program Director
  - CAMPEP will hold HUB accountable for DMP Training

Negotiation Issues (cont)

- Logistics (local, area, and regional)
- Any “Additional” Travel to extra sites would be responsibility of SPOKE.
- Oversight by HUB
  - 2-4 Visits per year by Program Director to observe student progress
  - 2 meetings per year with Program Director and SPOKE faculty and staff.
- Student Selection Process
  - Student and SPOKE faculty and staff must be willing participants
Advantages to STUDENT

- Reduced Tuition
- Salary in Year 4 of DMP
- Opportunity to Participate in Community Physics Practice at SPOKE
- Potential Opportunity to be More "Hands On" at SPOKE
- Show Work Quality, Dependability and Character to Potential Employer(s)
- Permits Easier Transition to that 1st Job

Advantages to SPOKE

- Residency Positions Requirements
  - No CAMPEP application to complete
  - Minimum paperwork and administrative overhead
  - A one-year commitment, NOT a two-year commitment
  - CAMPEP would prefer two residents in alternate years
- Quality, Trained Worker for Fewer Salary Dollars
  - DMP 4 student will have one-full year of clinical training
- Recognition as Partner in Education with HUB
- Potential Opportunity to Assist with CME/MOC Requirements
- Use DMP Position as “Trial” Employment for Future Hires

Advantages to HUB

- There is a Maximum # of DMP Students that a Single Clinic Can Support
- Maintain a Viable Program with Sufficient Student Numbers
- Reduce Education/Training Overhead (Year 4)
- Establish and Cultivate Education Partners within the Community
- Maintain Recruiting Edge for Students
  - Offer Students Opportunity for Salary (Year 4)
  - Offer Students Opportunity for Experience in Community Practice
- Graduate Students with Enhanced Training & Experience Who
  - Rank & Compete Well in the Job Market
Conclusions

- Worthy Goals of the DMP Clinical Medical Physics Education Process
- Graduate Quality, Trained and Experienced Student Residents
- Meet the Man Power Needs
- Contain Costs within Attainable ALARA Limits
- Keep the Program/Organization Flexible to Meet New Challenges