

# **Self Study**

## **Residency Program in Diagnostic Radiologic Physics**

***Upstate Medical Physics-Diagnostic Radiology, Medical Nuclear, Medical Health and Therapeutic Radiological Physics, P.C.\****

1290 Blossom Road  
Victor, NY 14564

**Program Director**

***Robert J. Pizzutiello, Jr., M.S.***

*Revised 6/2/10*



# **UMP**

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**UPSTATE MEDICAL PHYSICS**

Diagnostic Radiology, Medical Nuclear, Medical Health and Therapeutic Radiological Physics, P.C.

\*The corporation, which is officially named Upstate Medical Physics-Diagnostic Radiology, Medical Nuclear, Medical Health and Therapeutic Radiological Physics, P.C., will be referred to in this document as "Upstate Medical Physics" or "UMP".

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## ***I. Program Goals and Objectives***

The Diagnostic Radiologic Residency Program at Upstate Medical Physics is a three-year program designed to provide the clinical experience necessary to develop clinical medical physics expertise and qualify for the American Board of Radiology (ABR) certification examination.

The goals and objectives are:

1. To provide supervised training and education in the full range of clinical Diagnostic Radiological Physics at a variety of institutions, encompassing a broad range of types of imaging facilities.
2. To assure Diagnostic Radiologic Physics residents understand the current state of Diagnostic Radiologic Physics practice and develop competency in performing routine professional services provided by Diagnostic Radiologic Physicists, including, but not limited to:
  - i. Performance evaluation of imaging systems
  - ii. Patient dosimetry related to diagnostic imaging examinations
  - iii. Personnel safety and dosimetry
  - iv. Application of standards of professional practice, e.g., MQSA, ACR Standards and Accreditation Programs, IAC (Intersociety Accreditation Commission), and forthcoming standards from the AAPM and ACMP.
  - v. Analysis of data and relevant, practical professional recommendations for quality improvement and regulatory compliance.
3. To encourage residents to carry out research and address Diagnostic Radiologic Physics issues associated with emerging technologies, or those for which standards have not yet been developed through:
  - i. Consultation with colleagues
  - ii. Literature search
  - iii. Interaction with scientists, engineers, and other support personnel from manufacturers and vendors.
4. To prepare individuals to practice Diagnostic Radiologic Physics independently including
  - i. Developing teaching and presentation skills for communications with medical physicists, radiologists, technologists, and other hospital staff
  - ii. Engendering appropriate ethical standards in all areas of practice and interactions with others

- iii. Fostering professionalism in all aspects of daily Diagnostic Radiologic Physics practice.
- iv. Statistical analysis of data and its application to evaluation of clinical issues

## ***II. Program Evolution and History***

Upstate Medical Physics (UMP) was incorporated in 1983 as a Diagnostic Radiologic Physics consulting practice by Robert J. Pizzutiello, who is the sole share holder. In 1989 Mr. Pizzutiello devoted his full-time efforts to UMP and the practice has grown steadily under his leadership.

In the past decade, UMP's growth became limited by the difficulty in attracting experienced diagnostic medical physicists to relocate to Upstate New York (where the pace of life is moderate, the natural surroundings beautiful but the winters are seen as formidable by some). In addition, we found that experienced medical physicists usually had family ties to other areas. Despite salary offerings well above the published norm, it was difficult to hire experienced individuals. In 2004 we hired Dustin Gress as he was completing his MS degree from the University of Michigan, on the strong personal recommendation of Dr. Joel Gray with whom he worked as a summer intern. We began to train him as a clinical medical physicist and to prepare him for the ABR examination process. In 2005 we hired Dr. Mark Ye Wu, after completing his Ph.D. in Medical Physics at the University of Buffalo (UB), with the strong recommendation of UB program director Dr. Stephen Rudin.

In 2008, we hired another of Dr. Rudin's graduates, Jason Sherman, who is now in his second year of training and already demonstrating competency in several areas of medical physics. In 2009 we created a new job classification "Medical Physics Resident." On the recommendation of our colleague, Dr. Kent Ogden, we hired Alphonso Magri, who was completing his Ph.D. from Syracuse University. We also hired a summer intern in 2009, Keri Omphroy, who has since started the MS program in Medical Physics at the Rosalind Franklin University medical School (RFUMS), formerly the Chicago Medical School. We have initiated steps to affiliate with RFUMS as a clinical rotation site, and to have Keri spend the summer of 2010 with us in a diagnostic medical physics rotation. We have discussed the potential for UMP to consider other summer students from RFUMS in the future. Our experience with each of these five individuals has been rewarding in many ways.

We expected the process of training these well educated but inexperienced medical physicists to be somewhat time consuming (especially on the part of Mr. Pizzutiello, the senior board-certified medical physicist). Indeed it was very much the case in the early years. We also found the process to be exceedingly rewarding to all members of the group, each of whom contributed their diverse expertise and also benefitted from the educational environment into which UMP had evolved. Our practice changed from one where questions were referred to the senior physicist (Mr. Pizzutiello) into one where scientific questioning and the Socratic-style method encouraged all members of the group to participate in thoughtful discussions about how and why we practice our profession. In the past few years, everyone in the group supported our two rising medical physicists (Dustin Gress and Mark Ye Wu) as they

prepared for their board exams. We all rejoiced in their successful completion of the Part III oral exams earlier this summer.

For the past few years, Mark Wu and Dustin Gress have been willing, capable, and successful in participating in the training of our newest members. Jason Sherman was hired in a permanent position, and we expect him to assume a share of the teaching responsibilities, commensurate with his own growing level of experience.

Our current residents, Jason Sherman and Alphonso Magri, did not graduate from CAMPEP-accredited medical physics programs. The adequacy of their didactic training was based on the ABR requirements. Both residents took an anatomy and physiology, and a radiation biology course shortly after they started their residency programs. Our incoming resident, Rhett Lindsey, did not graduate from a CAMPEP-accredited program. However, when we compared his graduate program with the recommendations in AAPM Report 79, we found his coursework to be acceptable.

### **Summary of Recent Medical Physics Residency Experience**

1. Dustin A Gress
  - a. Hired September 2004 (Medical Physics Graduate Intern)
  - b. Master's thesis "Shielding Designs for Diagnostic X-ray Installations Using the NCRP 147 Methodology" completed March 2005 while employed at UMP under supervision of R Pizzutiello
  - c. Promoted to Medical Physics Resident, January, 2005
  - d. Received MS University of Michigan May 2005
  - e. Qualified as a Medical Physicist for Mammography (MQSA) January 2006
  - f. Promoted to Medical Physicist, January, 2007
  - g. Received ABR Certification in Diagnostic Radiologic Physics July 2009
  
2. Ye (Mark) Wu
  - a. Hired as Medical Physics Resident, May, 2005
  - b. Received Ph.D. degree from University of Buffalo in Medical Physics September 2005
  - c. Qualified as a Medical Physicist for Mammography (MQSA) January 2006
  - d. Promoted to Medical Physicist, May, 2007
  - e. Received ABR Certification in Diagnostic Radiologic Physics July 2009
  
3. Jason Sherman
  - a. Hired as Medical Physics Resident, May, 2008
  - b. Received M.S. degree in Medical Physics University of Buffalo, February 2009
  - c. Qualified as Medical Physicist for Mammography under MQSA (October, 2009)
  
4. Alphonso Magri
  - a. Hired as Medical Physics Resident, July, 2009

- b. Ph.D. completed, subject to dissertation defense in January 2010
- c. Currently gaining experience with medical physics support of radiographic, fluoroscopic, CR, and DR imaging systems

### **UMP Residency Program—Staff and Facilities**

UMP has 10 full-time faculty members, two adjunct faculty members, and essential support personnel, including:

- 3 Full-time Board-Certified diagnostic medical physicists
- 1 Adjunct diagnostic radiologic physicist
- 1 Adjunct, Board-Certified diagnostic medical physicist
- 1 Full-time Board-Certified health physicist (CHP)
- 1 Full-time New York Licensed Professional Medical Physicist (PMP)
- 1 Full-time Second-year Diagnostic Radiologic Physics Resident
- 1 Full-time First-year Diagnostic Radiologic Physics Resident
- 2 Full-time Diagnostic Radiologic Physics assistants (licensed radiologic technologists)
- 1 Full-time Operations manager
- 1 Part Time Education Coordinator

Upstate Medical Physics provides services from offices in Victor, and Buffalo, New York.

The UMP Victor, New York office has recently moved to a new 2,800 square-foot facility with state-of-the-art training, IT, and teleconferencing capability. The group meets in person

and via teleconferencing on a regular basis for both training and discussion of operational issues. (See Appendix A entitled “Facilities”.)

UMP has a full complement of testing equipment including dosimeters, phantoms, and other test equipment (details in Appendix B).

UMP provides Diagnostic Radiologic Physics services to over 150 radiology practices including large practices such as Yale New Haven Hospital and Windsong Radiology (Five locations, 300,000 examinations per year, state-of-the-art, private imaging practice based in Amherst, NY). UMP also serves approximately 40 smaller hospitals ranging in size from 20 to 500 beds; and approximately 100 private practice imaging facilities. This diversity provides the unique opportunity for our residents to gain experience in a complete cross section of radiology practices which they will encounter in the United States.

Upstate Medical Physics provides a complete range of medical imaging physics services including, but not limited to:

1. Acceptance testing of all diagnostic imaging equipment
2. Regular (annual or quarterly) performance testing of radiographic and fluoroscopic imaging systems
3. Annual Diagnostic Radiologic Physics surveys of:
  - a. Computed radiography (CR) and direct radiography (DR) imaging systems
  - b. Primary diagnostic displays and radiologist’s workstations
  - c. Breast imaging (screen-film and digital mammography, stereotactic breast biopsy, tomosynthesis) imaging systems
  - d. CT imaging systems
  - e. MR imaging systems
  - f. Ultrasound imaging systems
  - g. Nuclear imaging systems, and review of safety and regulatory issues
4. Establishment and oversight of facility quality control programs
5. Shielding designs for diagnostic imaging facilities
6. Radiation protection surveys

7. Pre-planning consultation, measurement of static magnetic fields, and acceptance testing of MR systems, as well as periodic MR image quality and safety evaluation
8. Consultation on image quality and patient dose
9. Consultation on department design and layout, and equipment purchasing and performance
10. Educational programs for radiology staff and others who work in the vicinity of radiation sources
11. Establishment and monitoring of quality control programs for radiology facilities
12. Clinical research and development regarding issues associated with image quality and patient dose
13. Presentation of clinical research and development at professional meetings
14. Consultation regarding regulatory compliance
15. Participation in radiation safety committee meetings and assistance with facility radiation safety issues

Upstate Medical Physics is incorporated as a Subchapter S corporation under the laws of the State of New York. UMP is a profitable organization and has been the leader in private practice Diagnostic Radiologic Physics for more than 25 years. (For additional financial see Section VII.B.)

### ***III. Program Structure and Governance***

#### ***A. Upstate Medical Physics Staff***

Robert J. Pizzutiello is President of Upstate Medical Physics and serves as the Residency Program Director. The Upstate Medical Physics staff will participate in mentoring the Diagnostic Radiologic Physics residents in all areas of Diagnostic Radiologic Physics. The following table lists the staff members with special emphasis placed on specific areas in which they excel. (Biographical sketches of the UMP staff members are in Appendix C).

#### ***B. Mentors and Residents***

Each resident in the Upstate Medical Physics Residency Program will be assigned two mentors: 1) A program mentor; and 2) a rotation mentor. The responsibility of these mentors is to provide guidance to the residents and assist them in any way that they can in their particular areas of responsibility.

The program mentor guides the resident throughout their three-year program. The rotation mentor works with the resident during a particular rotation and is the UMP individual with the most expertise and experience in a particular modality area, e.g., CT, MRI, or radiographic and fluoroscopic equipment.

The rotation mentors and their areas of expertise are shown in the following:

**UMP Staff Mentoring Responsibilities**

<b>Staff Member</b>	<i>Basic Medical Physics</i>	<i>Anatomy and Physiology</i>	<i>RF, CR, DR (1)</i>	<i>Interventional Radiology</i>	<i>CT</i>	<i>MRI</i>	<i>Mammography (2)</i>	<i>Ultrasound</i>	<i>Nuclear Medicine</i>	<i>Shielding Design</i>	<i>Patient Dosimetry</i>	<i>Professional Issues</i>	<i>Regulatory and Radiation Safety Committees</i>	<i>Quality Control</i>
Robert Pizzutiello, MS, DABMP, DABR, FAAPM, FACMP, PMP (3)	√	√			√	√		√		√	√	√	√	√
Dustin Gress, MS, DABR, PMP	√	√	√		√	√	√	√	√		√	√	√	
Mark Ye Wu, PhD, DABR, PMP	√	√	√	√	√	√	√	√		√				√
Joseph M. Greco, MS, CHP, PMP								√	√	√	√	√		
Nelson W. Jewell, BS, PMP			√	√				√				√	√	
Matthew Szudik, RT(R.)			√	√										√
Robert Marmat, RT(R.)			√											√
Mabelle B. Pizzutiello, BSRN		√												

1. Radiographic, fluoroscopic, computer radiography, and direct radiography operation, performance evaluations, and quality control
2. Mammography including screen-film, digital, and stereotactic breast biopsy
3. Professional Medical Physicist (PMP) is the title used by Licensed Medical Physicists in New York state

**C. Advisory Board for the UMP Diagnostic Radiologic Physics Residency Program**

The UMP Diagnostic Radiologic Physics Residency Program has enlisted the assistance of several experienced medical physicists to assist in establishing the Residency Program. These advisors will also provide oversight of the program during the first five years of the program. Two experienced radiologists have agreed to contribute the radiologist’s perspective to quarterly clinical Journal Club meetings. The advisors are listed in the following table and their biographical sketches are provided in Appendix C:

Advisor	Affiliation	Years Experience
Joel E. Gray, Ph.D.	Emeritus Professor, Mayo Clinic College of Medicine; President, DIQUAD, LLC (Initiated Diagnostic Radiology Medical Physics Residency Program at Mayo Clinic in 1989)	35
Beth A. Schueler, Ph.D.	Director, Diagnostic Medical Physics Residency Program, Mayo Clinic College of Medicine	19
Donna M. Stevens, M.S.	Chief Medical Physicist, Oregon Health and Science University; Former Director, Diagnostic Medical Physics Residency Program, M.D. Anderson Cancer Center	16
Christine Kurland, M.D. Medical Advisor	Radiologist and former President of New York State Radiological Society; Borg and Ide Imaging Partners, PC, Rochester, NY	27
Daniel Wopperer, MD Medical Advisor	Radiologist and former Chief Radiologist of Borg and Ide Imaging Partners, PC, Rochester, NY	27

## IV. Training Requirements

### A. Requirements for Successful Program Completion

The UMP Residency Program sets high expectations for Diagnostic Radiologic Physics Residents. The program has a strong focus on clinical Diagnostic Radiologic Physics including appropriate communications and interactions with diagnostic radiologists and technologists, as well as with other hospital staff.

In order to assure that our standards are met, we assign one mentor with whom each resident works during their three-year training program. Other individuals will be assigned as mentors for specific rotations.

The competency status of all Diagnostic Radiologic Physics residents will be reviewed on a quarterly basis using the Allied Health Student Tracking software system by the Typhon Group (<http://www.typhongroup.com/products/ahst.htm>). Competencies will be rated as follows (IAEA, 2009):

Level	Competency	Date*
1a.	Observation	
1b.	Didactic understanding**	
2a.	Assist primary medical physicist	
2b.	Perform with assistance from primary medical physicist	
3a.	Independent performance with observation by primary medical physicist	
3b.	Independent performance with reports reviewed by primary medical physicist	

\*Date indicates competency at this level has been attained and the individual is ready for the next step

\*\*Didactic understanding is based on satisfactory completion of a CAMPEP Accredited Graduate Program, or equivalent. (See Appendix D, Sections IV and V)

Each Rotation Mentor will evaluate the resident's competency based on performance at client facilities, and analysis and follow-up. In order to be considered as meeting the appropriate competency level, the resident must have a clear understanding of the technology involved, be able to explain the technology to the satisfaction of the mentor, and demonstrate the ability to complete all aspects of the competency.

The Typhon Group software allows for the logging, tracking, and reporting of clinical experiences, as well as both didactic and clinical competencies. It allows the staff medical physicists, mentors, and Program Director to follow the progress of each resident, and determine if the resident is satisfactorily progressing and meeting the objectives of the program. The software assists the Program Director in two ways: 1) Provides tools to assess the quality of the residency program and assure that it meets the objectives; and 2) Helps to evaluate the progress of the residents and provides feedback regarding specific strengths and weaknesses.

If a resident does not meet the expected competency level, additional time will be spent with a mentor in that area, along with studying appropriate written material, e.g., diagnostic radiologic physics texts, directed reading of the medical physics literature, and the AAPM Virtual Library and Online Continuing Education Program materials. There is sufficient time built into the three year program to allow for additional training.

The residents' progress will be closely and frequently monitored throughout the program. Consequently, any weaknesses should be evident to the mentors and residency committee in sufficient time to allow for additional training or experience, or both. Any and all issues will be addressed before each module is complete. If need be, the resident will utilize his or her own time for remedial review.

The semi-annual review of each resident will formally address the strengths and weaknesses of the resident, and will show if the resident has fallen behind in his or her progress. With this on-going evaluation process, there should be little need for extending the length of a resident's program. If, by the end of the program, the resident has not achieved the appropriate competencies, he or she will leave the program without a certificate of completion.

Diagnostic Radiologic Physics resident applicants will be expected to have a strong academic background in Diagnostic Radiologic Physics as demonstrated by obtaining their Masters or Doctoral degree from a CAMPEP accredited medical physics graduate program, or equivalent.

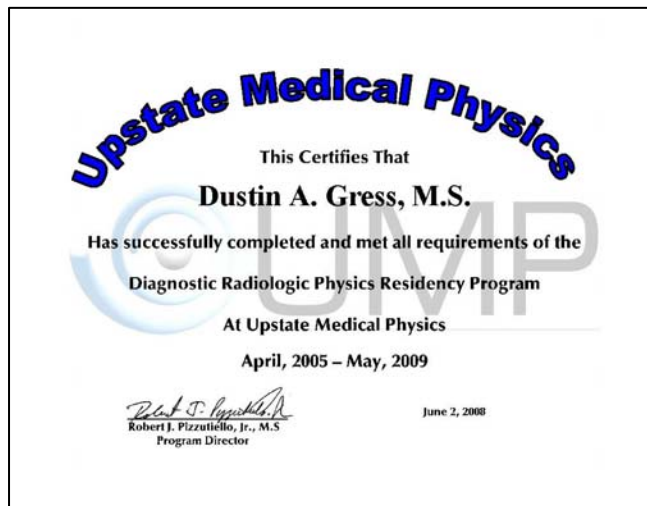
UMP maintains its own library consisting of medical physics text books, reports, proceedings, and relevant medical imaging journals. (Appendix E) This includes a selection of hard-copy materials as well as many publications in PDF format. UMP maintains electronic subscriptions to key journals and has access to other material through interlibrary loan.

UMP will reimburse Diagnostic Radiologic Physics Residents for attendance at AAPM refresher courses in preparation for their ABR Board Examinations. In addition, UMP will cover the costs for specialized courses, e.g., MTMI courses in mammography, computed tomography, and magnetic resonance imaging. The educational budget allocation is \$1,500 per year, per resident.

UMP Diagnostic Radiologic Physics Residents will actively participate in a quarterly Clinical Journal Club, consisting of discussions of various journal articles selected from *Radiographics* or *Radiology* containing a significant amount of clinical radiological material (in addition to medical physics). These discussions will include the quality of the images, how the images provide the necessary information for the radiologist, and how this information is used in obtaining a diagnosis. These discussions will include participation of the radiologist Medical Advisor(s), either physically present in the UMP conference room or via the high-definition video teleconferencing system designed for this purpose.

Interactions with personnel at clinical facilities (radiologists, radiologic technologists, radiology managers, nursing personnel, service engineers) will be overseen by faculty members during regularly scheduled visits to client facilities for annual medical physics surveys, radiation safety committee meetings, and other professional consultations. Residents will also participate in telephone consultations and conference calls (audio and video).

Upon successful completion of the UMP Diagnostic Radiologic Physics Program the resident will be awarded a certificate of completion (below).



### **B. Design and Content**

The clinical training program will follow the principles described in AAPM Report Number 90, “Essentials and Guidelines for Hospital-Based Diagnostic Radiologic Physics Residency Training Programs.”

The competencies for the Diagnostic Radiologic Physics Residents will be based on the IAEA publication (in press) entitled Competencies for Diagnostic Radiologic Physics Residents. (Appendix D, Section IV) Part of this publication includes an evaluation tool covering the relevant competencies. (Appendix D, Section V)

In addition to attaining these competencies, each resident will be expected to complete a minimum number of equipment evaluations from a variety of facility types (large hospital, small hospital, private imaging center, and private non-radiologist office). These equipment evaluations will include acceptance testing at least one of each type of equipment and setting up a quality control program for that equipment. (See Appendix F for the number of evaluations required.)

The above will be accomplished during clinical rotations (Appendix G). During each rotation the resident will work closely, on a daily basis, with the rotation mentor. The mentor will determine the level of competency for each of the competencies (Appendix D, Section V).

Attendance at staff (training) meetings is expected to be at least 90%. These meetings are held monthly for six hours (three hours in the morning, a working lunch, and three hours in the afternoon). Operational and clinical medical physics are covered, presentations are made by staff members on new technology or techniques, and issues impacting consulting medical physicists are discussed. The Diagnostic Radiologic Physics Residents will be expected to actively participate in these meetings and present a 15 minute PowerPoint presentation at least every quarter.

Attendance at quarterly journal clubs (clinical and technical) is expected to be at least 75%. Periodic seminars presented by UMP staff members and Diagnostic Radiologic Physics residents, or invited speakers, also offer an opportunity to obtain up-to-date information regarding Diagnostic Radiologic Physics.

Minutes of staff meetings and presentations have been maintained since 1994. Minutes of journal club meetings and seminars will be maintained henceforth. A sample of minutes from 2009 is provided in Appendix H.

The residents will be expected to complete a minimum of 12 hours per year from the AAPM Online Continuing Education Programs and Virtual Library on their own time, and to satisfactorily complete the questions associated with these courses.

In addition, the resident will keep a log of relevant journal articles which they have read including the date the article was read and a brief (one paragraph) synopsis of the article. The residents must read a minimum of four journal articles per month during the residency program and prepare a brief written summary of the articles. The articles may be selected from *Medical Physics*, *Physics in Medicine and Biology*, *Radiology*, *AJR*, *Academic Radiology*, and *European Journal of Radiology*. The synopses will be reviewed by the Program Director, or designated staff physicist, on a quarterly basis. One journal article per month must be a self-directed continuing education article which includes an examination. The resident must pass the associated examination. All articles will be retained on the UMP server for future reference and use.

In order for the residents to appreciate the type and quality of information required in diagnostic images by the radiologist, the residents are required to read at least one article per

month from *RadioGraphics* or *Radiology*, and participate in the Quarterly Clinical Journal Club. These articles will be selected by the Program Director so that the residents cover all organ-based and modality areas. These articles will be discussed with the faculty on a monthly basis. At least quarterly, the medical advisor will participate in these discussions either in-person or via a high-definition teleconference link.

Arrangements are being discussed to allow residents to attend, via video teleconferences, the radiology resident conferences at one or more major teaching hospitals in the New York and New England area.

Starting in the second quarter of the Diagnostic Radiologic Physics residency program, the resident will be required to present a 15 minute presentation each quarter to the UMP staff at our regularly scheduled meetings. The topics of these presentations will be timely and selected in consultation with the Program Director and the mentor with whom the resident is working at that time. The presentation will cover topics of practical clinical medical physics relevance.

UMP provides its clients with on-going radiation safety training. In addition, we are often asked to provide educational programs of specific topics, e.g., use of Excel spreadsheets. In addition, UMP staff participates in our clients' radiation safety committee meetings to provide educational services. Faculty and residents also provide presentations for the Rochester Mammography Association and the Rochester Society of Radiologic Technologists. We are in the process of developing a partnership with Monroe Community College so that our residents will have an opportunity to present lectures on diagnostic imaging, radiation protection, and quality control to radiological technology students.

The residents also have opportunities to give presentations at our monthly journal club meetings on current articles and topics. They will provide one PowerPoint presentation a quarter to the staff on relevant topics.

### **C. Sample Training Plans**

This IAEA publication entitled *Competencies for Diagnostic Radiologic Physics Residents* will be used as the training plan. (Appendix D) This is being developed by an internationally known group of senior medical physicists, including Joel Gray, Ph.D., representing the United States, and is in its final draft stage. The publication has undergone peer review and is presently undergoing editorial revisions. Consequently, no technical changes are anticipated. It is anticipated that the final document will be available by the end of 2010. In the mean time, we will use the draft version for our program.

This document will provide guidance to Diagnostic Radiologic Physics Residency Programs throughout the world to assure that the same educational and experiential goals are included in residency programs. Time allocations and tools for evaluation of the competencies of the residents are also provided. (Appendices I and D, Section V) This IAEA publication is in its final draft stage and should be published in 2009. The pre-publication copies of this material

will serve as the guiding document for the UMP Diagnostic Radiologic Physics Residency Program.

#### ***D. Evaluation of the Curriculum***

The curriculum will be evaluated by the faculty, residents, and Advisory Board.

Faculty members are encouraged to make modifications in rotation objectives as needed to respond to advances in imaging technology, changes in clinical practice, or assessments made by past residents. These modifications are reviewed by the Program Director prior to implementation.

The resident is asked to provide an assessment of each rotation immediately following completion. Appendix K contains the evaluation forms to be used in the program. In addition, an overall program assessment at the end of the three-year program is required. An evaluation of the mentors' performance, the rotation activities, and independent reading, etc. is included. The Program Director provides these assessments to the faculty.

In order to provide as much anonymity as possible, the Operations Manager or Education Coordinator will review the residents' written comments and summarize these for the Program Director and distribution to the faculty. In addition, the Operations Manager or Education Coordinator will conduct personal interviews annually with each resident to critique the Medical Physics Residency Program. The results of these interviews will be summarized and distributed to the Program Director and faculty.

Evaluations of the residency program with all faculty members are scheduled once a year as a discussion topic during a monthly meeting. All program modifications suggested by the Program Director or other faculty are discussed and considered before implementation.

A major factor in determining the success of the program and curriculum is the ability of the residents to pass the ABR Board Examinations. Any weaknesses detected in the results of their Board Examinations will be addressed by the faculty at the monthly meeting immediately after obtaining their Board results. The Program Director will decide, based on the discussion among faculty, what particular areas of the program should be modified and how to proceed.

The Advisory Board will be provided with annual updates of the curriculum as well as the progress of the residents. Their input will be discussed with the faculty at a monthly meeting and the Program Director will take appropriate action as decided by the faculty.

## **V. Residents**

### **A. Admissions**

All applicants must have obtained a Masters or Doctoral Degree from a CAMPEP accredited graduate medical physics program. Well qualified candidates whom the Program Director has determined to have completed or exceeded *all* of the requirements of AAPM Report #79 will also be considered.

Prospective candidates will be provided information about Upstate Medical Physics, the medical physics residency program, the application procedure, and an application form (Appendix J).

At the application deadline, all applications are reviewed by the Operations Manager or Education Coordinator to assure all necessary materials are included.

The applications are then reviewed by the Assistant Program Director and two medical physics faculty. This group ranks the applications by consensus and selects the top candidates to invite for telephone and personal interviews. The selected candidates are expected to interview at their own expense.

During their visits the selected candidates will meet with the Program Director, Assistant Program Director, and two medical physics faculty. In addition, they will be asked to provide a 30 minute PowerPoint presentation on a technical topic of their choice, e.g., their thesis or dissertation topic. Evaluation forms are attached in Appendix K.

The interview grades are discussed and analyzed at a special meeting of the four previously noted individuals. The residency position is offered to the top ranked candidate or the next in line.

### **B. Recruitment Efforts**

Upstate Medical Physics advertises the residency positions in the AAPM Placement Service, the Medical Physics list server, the Diagnostic Imaging Medical Physics list server (DxImgMedPhys@Hermes.GWU.edu), with direct mail advertising to all CAMPEP accredited diagnostic medical physics programs, and, occasionally, in *Physics Today*. A typical posting is provided in Appendix L.

### **C. Enrollment**

Presently, we have two residents in our program. The projected number of residency positions for the next five academic years is provided in the following table:

<i>Academic Year</i>	<i>Number of Residents</i>
2010-2011	3
2011-2012	4
2012-2013	4
2013-2014	5
2014-2015	5

### **D. Evaluation of Resident Progress**

Resident evaluations will be carried out semi-annually. This evaluation will include review of the Evaluation Tool for Competencies for Diagnostic Radiologic Physics Residents (Appendix M), and a review of meeting attendance and participation, as well as journal articles and online courses completed. This evaluation will be carried out by the Program Director or Assistant Director and the Staff Medical Physicists with whom the resident is working at that time.

Each faculty member will be required to complete an evaluation form (Appendix K) covering questions such as:

Is the program meeting its stated goals?

Are the residents doing their part in support of the program goals?

Are sufficient time and resources available for the program?

Provide personal comments about the program and each resident.

Each resident will take an oral examination at the end of each year of the program and the appropriate form will be completed by the faculty. (Appendix K) Participants in this program will include the Program Director, Assistant Program Director, and the resident's Mentor. Each will have the opportunity to ask questions of the resident and each will grade the resident on didactic knowledge and clinical understanding. The grades as well as the personal comments of each examiner will be documented and retained on file. The results will be discussed with the resident along with suggestions as to areas which may need additional efforts in the future.

In the case of sub-standard progress, a remedial plan, including a time table, will be developed by the Program Director. This plan will be conveyed to the resident in writing, and overseen by the Program Director, the resident's Mentor, and the Staff Medical Physicist with whom the Resident is working. If the remedial plan is not successful, further action will be taken up to and including termination from the program.

Evaluations will be documented and, along with progress reports, retained on file.

A written evaluation of each resident will be prepared semi-annually to document the individual's progress. These evaluations will be shared with the resident by the Program Director.

The focus of the resident evaluation will be the Typhon software which will be used by all staff for monitoring resident performance. (Appendix M) The Program Director and Assistant Program Director meet monthly to review the status of the residents' progress as indicated in the Typhon software.

### ***E. New Resident Orientation***

The new resident goes through an orientation program which includes coverage of the Upstate Medical Physics Team Member Handbook (Appendix N). Issues such as radiation safety, appropriate dress, and formal address of clients are discussed. The use of the Team Member Handbook as a basis for conflict resolution will be emphasized.

Each resident will be provided with a copy of this self-study document which clearly states the goals and objectives of the program, as well as the responsibilities of the faculty and residents. The residents will be asked to sign a statement indicating that they have read and understand their responsibilities.

Other issues will be discussed including the need for immunizations, universal precautions, TB tests, and an understanding of HIPPA. The need to maintain a safe driving record will be emphasized.

Introductory training relative to radiation safety and protection, and the proper use of personnel monitors will also be covered during the new resident orientation. The outline of these topics and the appropriate competencies are provided in the IAEA document (Appendix D).

## **VI. Program Administration**

### **A. Structure in a Private Practice Diagnostic Radiologic Physics Consulting Group**

The structure of a Diagnostic Radiologic Physics Residency Program in a private practice Diagnostic Radiologic Physics consulting group is unique as there is no direct oversight by a hospital or medical center. The resident has the opportunity to experience Diagnostic Radiologic Physics consulting in a variety and diverse group of hospital and medical center settings.

A recent privately commissioned market research study reported that 85% of the diagnostic medical physics services currently performed in the U.S. are performed by medical physicists in private practice. Clearly, with the large proportion of jobs shifting to the private practice service model, a residency program based in a private practice group will be highly valuable to the residents and to the medical physics community.

The role of the hospitals or medical centers in the residency program is similar to that experienced by the consulting medical physicist. The medical physicist is an independent contractor, not falling under the jurisdiction of the hospital's or medical center's governance, except that the medical physicists must assure professional and ethical interactions with members of the facility's staff. Consequently, the roles and responsibilities of the hospital or medical center have little impact on the Diagnostic Radiologic Physics Residency Program directly. In the past year, however, a number of UMP client facilities have begun to require that medical physicists be credentialed through Vendormate® or Reprax®. These programs assure that all non-employees who work at hospitals have received the required immunizations, background checks and are familiar with hospital policies regarding safety and confidentiality. Residents will be required to participate in all such programs required by institutions they are likely to visit.

Ultimately, the Program Director and mentor take full responsibility for the Diagnostic Radiologic Physics Residency Program and its relationship to the facilities to which they provide services.

There are two mentors in this program: 1) the mentor assigned to the resident for the length of the resident's three-year program; and 2) the mentor assigned for specific rotations. The role of the first mentor is to assist the resident in all aspects of training and experience, and assure consistency and quality of the residents' efforts throughout the program. The role of the second mentor is to work directly with the resident on a day-to-day basis and assure that the resident clearly understands the practical clinical aspects of imaging and medical physics.

The role of the medical advisors is to provide input to the Program Director relative to the Diagnostic Radiologic Physics Residency Program. One of these individuals will also serve as the "radiologist-mentor" to the resident. The medical advisor will meet with the Program Director and the resident(s) at least twice a year and be available for consultation via phone at other times.

## ***B. Role of the Program Director***

As with the structure of a Diagnostic Radiologic Physics Residency Program in a private practice Diagnostic Radiologic Physics consulting group, the role of the Program Director is unique relative to the staff of the hospitals and medical centers serviced by the group.

The Program Director of the Upstate Medical Physics Residency Program is Robert J. Pizzutiello, MS, DABR, DABMP, FAAPM, FACMP (and recently elected Fellow of ACR) who is the President of the practice. As such, all UMP staff members are responsible to him and he serves as mentor to all of the staff. Mr. Pizzutiello is board certified by the ABR in radiation oncology physics, by the ABMP in diagnostic radiologic physics, and has over 30 years experience in Diagnostic Radiologic Physics (see biographical sketch in Appendix C). In addition, he is very active in professional societies, presenting courses and participating in committees, and consulting for regulatory agencies (FDA, New York State Department of Health, and CRCPD).

The role of the Program Director is to oversee the Diagnostic Radiologic Physics Residency Program and the staff medical physicists relative to the program and residents. The Program Director is also the owner of UMP and as such the residents are employed by him. He will closely monitor the progress of the residents throughout the residency program. The Program Director assumes overall responsibility for the residents in the program and for assuring that all training requirements are met.

The Assistant Director of the UMP Diagnostic Radiologic Physics Residency Program is Dustin A. Gress, M.S., DABR. (His biographical sketch is provided in Appendix C.) His role is to assist the Program Director and be a role model for the medical physics residents as he is closer in experience and professional development to the residents than the Program Director.

## ***C. Committees and Meetings***

Committees for management of various functions are not necessary due to the small number of the professionals involved in clinical medical physics at UMP. Most decisions are made by consensus of the faculty and staff at the monthly staff meetings.

The UMP Residency Program Committee consists of three staff members, including the Program Director, Assistant Director, and Educational Program Coordinator. It meets monthly to assess the progress and quality of the program. The performance of the residents is discussed at this time and changes are made in the content and direction of the program, as necessary.

#### ***D. Records Available for Review***

The following is an exemplary list of records which are available for review by the CAMPEP team during their visit to the UMP facilities:

Minutes of UMP faculty and staff meetings, including attendance

Minutes of the Residency Program Committee covering topics such as administrative activities, and selection of applicants for residency positions

Faculty evaluations of residents including semi-annual performance reviews

Records of individual residents' participation in Journal Club, independent reading, etc.

Resident applications including applications forms, resumes, transcripts, interview evaluations, evaluations of completion of requirements noted in AAPM Report #79

Resident progress reviews including remedial training plans and results, if applicable

Resident training schedules, rotation objectives and evaluations

Resident clinical research or development results, including materials suitable for publication in peer-reviewed journals

Resident presentations

Log of all pertinent clinical medical physics activities for each resident

MQSA documentation

ABR examination results

And all other records to which the site-visit team has legal access

### ***VII. Resources***

#### ***A. Staff***

As noted previously, the UMP staff consists of 12 including four board-certified, staff physicists, and one professional with PMP certification. Their biographical sketches are provided in Appendix C. The areas of responsibility of the staff relative to mentoring the

Diagnostic Radiologic Physics residents are provided in Section III, Program Structure and Governance.

The UMP Diagnostic Radiologic Physics Residency Program has five licensed professional medical physicists. We anticipate having a maximum of two to three residents so the staff physicist-to-resident ratio will be 5:2 or 5:3.

### ***B. Finances***

UMP has been a financially profitable organization, with income exceeding expenses for more than 15 years. Financial records are available upon request. The organizational commitment to the residency program is described in Appendix O.

Residents are members of the Upstate Medical Physics Staff and will be paid an annual salary of \$41,600 (G1, 2010-2011). Staff member benefits include full medical insurance coverage, comprehensive eye coverage, comprehensive dental insurance, a company sponsored 401(k) plan (with company contributions), and an incentive based bonus. In addition, the residents will be provided with a computer and office space. The resident will be provided with a car after becoming capable of working independently.

### ***C. Facilities***

UMP has recently relocated to a spacious (2,800 sq ft), modern headquarters in Victor NY, and maintains a smaller satellite office in Buffalo, NY. The headquarters contains a state-of-the-art conference room with high-definition video teleconferencing, and a library of hard-copy and electronic references to support the practice and residency program. The headquarters contains sufficient space for two to three residents and another faculty medical physicist, should the need arise. Photographs of the facility are provided in Appendix A.

Each resident is provided with modular office space, phone, and laptop. Basic reference texts are available about 30 feet from the resident offices in the UMP library. In addition, the residents have access to electronic subscriptions to radiology and medical physics journals (Appendix E).

## **VIII. Future Plans**

### **A. Summary of Strengths and Needs**

Among UMP's greatest strengths are the wide variety of facilities, personnel, professional and management styles, and imaging systems to which its residents will be exposed: from small specialty medical clinics, through mediums sized community hospitals (150 – 350 beds) and including large university medical centers (Yale New Haven Hospital) and private practice imaging centers (including Windsong Radiology which was named the busiest private imaging center in the country). (Smith 2006)

The faculty is similarly diverse, lead by one senior member of the diagnostic medical physics community. Other faculty members include two recently board certified diagnostic medical physicists, a medical health physicist, two medical physics residents (the more senior of whom is a permanent employee of UMP), as well as two very experienced radiologic technologists, and a consultant, board-certified medical physicist. Two radiologist medical advisors provide essential clinical support.

UMP has been training medical physicists steadily for the past five years, and has a demonstrated track record of success as measured by ABR board certification, and employee and client retention that exceed 95% over the past five years.

### **B. Further Developments and Improvements**

The most significant change to UMP's Medical Physics Training program will be the increased level of documentation appropriate to a CAMPEP accredited residency. We plan to maintain our organizational policy of continuous quality improvement, applying it to the residency program. We will utilize the Advisory Board to evaluate the strengths and weaknesses of the program annually, and implement changes as needed to assure that our residents complete the program with the requisite training and experience to support their ongoing professional development.

## References

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