

# AAPM Joint Fall Meeting Symposium

Oh  ver Valley Chapter  
Penn-Ohio Chanter

*Building new facilities and Upgrading*



## PROGRAM



EMBASSY SUITES  
CLEVELAND  
3775 Park East



## Friday, October 11<sup>th</sup>, 2013

<b>11:00 – 12:00</b>	<b>Vendor Setup</b>
<b>12:00 – 12:50</b>	<b>Check-In / On-Site Registration – (Free WI-FI)</b>
12:50 –	<b>Welcome and Opening Remarks</b> <i>Keli Wilson, M.S., DABR, UPMC</i> <i>President Penn-Ohio Chapter</i> <i>Valdir Colussi, Ph.D., DABR, UH Case Medical Center – Seidman Cancer Center</i> <i>President-Elect Penn-Ohio Chapter</i>
	<b>Residents Presentation</b>
13:00 – 13:20	Diagnostic Quality CT with Soft Tissue Alignment for IGRT Can Safely Reduce Planning Margins for Prostate Cancer: Implication for SBRT. <i>Wen Li, Andrew Vassil, Lama Muhieddine Mossolly, Grace Shang, Ping Xia</i> <i>Cleveland Clinic, Cleveland, OH</i>
13:20 – 13:40	Residual Interfraction Errors for Prostate SBRT with 6-Dimension Couch Shifts using kV X-ray and Cone Beam CT. <i>Wen Li, Abigail Stockham, Ping Xia, Kevin Stephans, Toufik Djemil</i> <i>Cleveland Clinic, Cleveland OH</i>
13:40 – 14:00	Patient-specific quality assurance for Monte Carlo-calculated lung SBRT on Cyberknife – is it necessary? <i>J. Fabien, Y. Zhang, J. Brindle, D. Dobbins, T. Podder, B. Wessels.</i> <i>University Hospitals Case Medical Center, Cleveland, OH</i>
14:00 – 14:20	Customized patient-related measurements: no escape from non-standard special procedures <i>Charles Rhodes III, M.S.B.S., Yiran Zheng Ph.D., David Mansur M.D., Min Yao M.D., Valdir Colussi, Ph.D.</i> <i>University Hospitals Case Medical Center – Seidman Cancer Center, Cleveland, OH.</i>
14:20 – 14:40	Deformed planning CT as an electron density substitute for Cone-beam CT <i>Kapil Mishra B.S., Andrew Godley Ph.D.</i> <i>Cleveland Clinic, Cleveland, OH</i>
14:40 – 15:30	<b>Coffee Break / Vendor Exhibits</b>
	<b>Invited Presentation</b>
15:30 – 16:00	The Good, Bad and Ugly (including Pitfalls) of AAPM TG-142 <i>Andrew R Godley, Ph.D. – Associate Staff</i> <i>The Cleveland Clinic</i>
16:00 – 16:30	Safety is not an accident: Lessons to be learned from catastrophic event <i>Ray Louis Kaczur, M.S.</i> <i>RK Physics Services, LTD.</i>
	<b>Travel Grant Report &amp; Awards Ceremony</b>
16:30 – 16:33	<i>Anh Hong Tu Le - UPMC</i>
16:33 – 16:36	<i>David M. Albani – UH Case Medical Center – Seidman Cancer Center</i>
16:36 – 16:39	<i>David Hoeprich – Consulting Physicist (AMPR)</i>
16:39 – 16:42	<i>Wen Li – Medical Physics Resident (Cleveland Clinic)</i>
16:42 – 16:45	Q&A
16:45 – 17:00	<b>Penn-Ohio Business Meeting</b> <i>Keli Wilson, M.S., DABR, UPMC</i> <i>President Penn-Ohio Chapter</i> <i>Valdir Colussi, Ph.D., DABR, UH Case Seidman Cancer Center</i> <i>President-Elect Penn-Ohio Chapter</i>
17:00 – 17:30	<b>Vendor Exhibits / Poster Session/ Hotel Check-In</b>
18:30 –	<b>Cash Bar opens</b>
19:00 – 19:30	<b>NIGHT IN: Buffet Dinner</b>
19:30 – 21:30 (2 credits)	ABR Update: The Path to Certification and MOC Participation <i>David J. Laszakovits, M.B.A. – Co-Director of Certification Services,</i> <i>American Board of Radiology</i>



	<b>Open Discussion Session</b> Building new facilities and Upgrading existing ones: <i>The good, the better and the possible!</i>
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<b>Saturday, October 12<sup>th</sup>, 2013</b>	
7:00 – 7:50	Continental Breakfast (Provided) & Vendor Setup/Exhibition
7:50 – 8:00	<b>Opening day Remarks</b> <i>Chris Allgower, Ph.D., DABR, IU Health Proton Therapy Center            President Ohio Valley Chapter            Valdir Colussi, Ph.D., DABR, UH Case Seidman Cancer Center            President-Elect Penn-Ohio Chapter</i>
8:00 – 9:00	<p style="text-align: center;"><b>Keynote Lecturer</b></p> From Portal Films to 4D MRgRT: Filling Conventional Spaces with Unconventional Technologies <i>Olga Green, Ph.D. – Instructor, Associate Residency Director            Washington University</i>
	<b>Invited Presentations</b>
9:00 – 9:30	Quality control (QC) concerns for the new generations of CT & MRI & PET <i>David W Jordan Ph.D. – Senior Medical Physicist            UH Case Medical Center</i>
9:30 – 10:00	Production and Use of PET Radiopharmaceuticals <i>Raymond F. Muzic, Jr, Ph.D. – Associate Professor of Radiology            Case Western Reserve University</i>
10:00 – 10:45	<b>Coffee Break/ Vendor Exhibits</b>
10:45 – 11:15	Electronic Medical Records (EMR) Streamline “Ch’i” Process <i>Ping Xia, Ph.D. – Professor, Head of Physics Division            The Cleveland Clinic</i>
11:15 – 11:45	Planning for the Installation of a Compact Superconducting Proton Therapy Unit in a busy hospital Environment <i>Barry Wessels, Ph.D. – Professor and Director, Division of Medical Physics and Dosimetry            UH Case Medical Center</i>
11:45 –	<b>LUNCH/ Vendor Presentation</b>
12:00 - 12:15	1
12:15 - 12:30	2
12:30 - 12:45	3
12:45 – 13:00	4
13:00 – 13:15	5
13:15 – 13:30	Q&A
13:20 – 14:00	<b>Short Coffee Boost/ Vendor Exhibits</b>
	<b>Invited Presentations</b>
14:00 – 14:30	Linac Or Non-Linac – Demystifying And Decoding The Physics Of SBRT/SAB <i>Indra J. Das, Ph.D. – Vice Chair, Professor and Director of Medical Physics            Indiana University School of Medicine</i>
14:30 – 15:00	Clinical Aspects of LINAC - Based SBRT <i>Simon S. Lo, M.D. – Associate Professor of Radiation Oncology            Director of Radiosurgery Services and Neurologic Radiation Oncology            Case Western Reserve University School of Medicine – UH Seidman Cancer Center</i>
15:00 – 15:15	<b>Coffee Available outside/Possible break (MONICA?)</b>
15:15 – 15:45	AAPM TG-100: A new paradigm for quality management in radiation therapy <i>M. Saiful Huq, Ph.D., FAAPM, FInstP – Professor and Director of Medical Physics            University of Pittsburgh Cancer Institute and UPMC Cancer Center, Pittsburgh, PA</i>
15:45 – 16:00	<b>Exit Meeting</b>



## Diagnostic Quality CT with Soft Tissue Alignment for IGRT Can Safely Reduce Planning Margins for Prostate Cancer: Implication For SBRT

Wen Li, Andrew Vassil, Lama Muhieddine Mossolly, Grace Shang, Ping Xia

Cleveland Clinic, Cleveland, OH.

### Purpose:

To evaluate whether the use of daily diagnostic quality CT for image-guided radiation therapy (IGRT) can safely reduce the planning margin using soft tissue alignment for prostate cancer treatment, which can be applied to SBRT.

### Methods:

Nine patients with prostate cancer, who underwent IMRT and daily IGRT using the CT-on-rails system, were selected for this study. For all patients, a planning margin of 8mm/5mm posterior was used in the clinically approved plans. For this study, three additional plans were generated with planning margins of 6mm/4mm posterior, 4mm/2mm posterior, and 2mm uniform, resulting a total of four plans for each patient. On the first seven and last seven daily CTs, the prostate, bladder, and rectum were delineated by the same radiation oncologist. Subsequently, for each plan, the corresponding dose distribution on these daily CTs was calculated. The endpoint dose of the prostate was defined as the percentage of the volume receiving prescription dose of 78Gy ( $V_{78}$ ).  $V_{65}$  and  $V_{70}$  were used for the bladder and rectum, respectively.

### Results:

For 8.7% of the first seven and 13.5% of the last seven fractions ( $n=126$ ), the daily prostate volumes were 10% higher than those at simulation. Correspondingly, to achieve  $V_{78} > 95\%$ , the minimum margins of 4mm/2mm posterior and 6mm/4mm posterior were required for the first seven and last seven fractions, respectively. With margin reduced from 8mm/5mm posterior to 6mm/4mm posterior and 4mm/2mm posterior, the average bladder  $V_{65}$  decreased from  $17.0 \pm 10.6\%$  to  $15.2 \pm 10.9\%$  ( $p < 0.01$ ) and  $9.9 \pm 7.4\%$  ( $p < 0.01$ ), respectively. The average rectum  $V_{70}$  decreased from  $15.2 \pm 8.9\%$  to  $13.6 \pm 7.9\%$  ( $p < 0.01$ ) and  $10.5 \pm 6.5\%$  ( $p < 0.01$ ), respectively.

### Conclusion:

A planning margin of 4mm/2mm posterior is sufficient for prostate SBRT with daily IGRT using soft tissue alignment with diagnostic quality CT. Drastic change in daily prostate volumes may increase the planning margin to 6mm/4mm posterior, requiring daily offline dose monitoring.



## Residual Interfraction Errors for Prostate SBRT with 6-Dimension Couch Shifts using kV X-ray and Cone Beam CT

Wen Li, Abigail Stockham, Ping Xia, Kevin Stephans, Toufik Djemil

Cleveland Clinic, Cleveland, OH.

### **Purpose:**

To evaluate residual interfraction alignment errors following prostate SBRT patient setup with stereoscopic kV-X-ray (Exactrac), kV-CBCT, and a 6-D robotic treatment couch (RTC).

### **Methods:**

Data was reviewed from seven prostate cancer patients undergoing five-fraction SBRT with pre-and daily-treatment endorectal balloon placement. Setup protocol, using stereoscopic X-ray images, consisted of an initial RTC displacement based on bony registration (3 shifts, 3 rotations) followed by a RTC displacement based on implanted gold seeds (3 shifts only). Final image verification of the prostate position was performed with kV-CBCT, upon which additional shifts prior to treatment delivery were permitted. The prostate (CTV), rectum wall and bladder were delineated on each daily CBCT and planning CT by the same physician. Shifts recorded at the time of treatment (X-ray and X-ray plus CBCT) were applied. Planning CT and CBCT contours were then superimposed and evaluated with dice similarity coefficient (DSC). Daily CTVs were also compared with the PTV (simulation CTV+3mm). Paired student t test was used for statistical comparison.

### **Results:**

The average of 96 stereoscopic X-ray shifts were  $0.96 \pm 4.08$ cm,  $0.72 \pm 3.42$ cm and  $0.58 \pm 3.64$ cm in the lateral, vertical and longitudinal directions, and  $0.78 \pm 2.42^\circ$ ,  $0.55 \pm 1.60^\circ$  and  $0.21 \pm 1.09^\circ$  for the pitch, roll and yaw angles, respectively. CBCT-guided shifts were performed in 25.7% of the fractions, with an average of  $0.01 \pm 0.03$ cm,  $0.23 \pm 0.21$ cm, and  $0.14 \pm 0.26$ cm in the lateral, vertical, and longitudinal directions, respectively. With X-ray only and X-ray plus CBCT shifts,  $95.1 \pm 3.7\%$  and  $96.2 \pm 3.2\%$  ( $p=0.01$ ) of daily CTVs were covered by PTV, respectively. The DSC were  $77.1 \pm 5.8\%$  and  $79.2 \pm 4.6\%$  for CTV ( $p<0.01$ ),  $40.1 \pm 12.8\%$  and  $42.1 \pm 12.7\%$  for rectal wall ( $p=0.03$ ), and  $65.2 \pm 17.5\%$  and  $64.5 \pm 18.0\%$  for bladder ( $p=0.34$ ), respectively.

### **Conclusion:**

Interfraction error following Exactrac-guided RTC shifts was  $<3$ mm, resulting in protocol-appropriate CTV coverage at treatment based on a 3mm PTV margin. Further CBCT-based shifts improve prostate alignment, but not significantly.



## Patient-specific quality assurance for Monte Carlo-calculated lung SBRT on Cyberknife – is it necessary?

J. Fabien, Y. Zhang, J. Brindle, D. Dobbins, T. Podder, B. Wessels.

University Hospitals Case Medical Center, Cleveland, OH

**Objectives:** To highlight the significant planning differences that can occur between a simpler ray-tracing dose calculation algorithm and a more complex Monte Carlo algorithm.

### **Outlines:**

- Ray tracing issue with lung SBRT
- Differences between ray tracing & Monte Carlo
- Method of QA for Monte Carlo on Cyberknife
- Discussion of results
- Clinical implementation

**Introduction:** In the transition from ray-tracing (RT) to Monte Carlo (MC) dose computation algorithm for Cyberknife lung stereotactic body radiotherapy (SBRT), we realized a large difference (10-20%) in PTV coverage to heterogeneous target regions which required dosimetric confirmation. Currently, our practice requires an independent second calculation for all plans. MuCheck software (Oncology Data Systems) is used in lieu of physical measurements for RT plans; however, there exists no commercial software for verifying MC plans. We determined all lung SBRT plans should utilize the MC algorithm and initially be subject to direct measurements.

**Material and Methods:** Lung treatment plans were first optimized with RT then recalculated using MC for final optimization and high-resolution dose computation. The MC plan was superimposed on a heterogeneous thorax phantom CT (Standard Imaging 91230) using the phantom overlay tool of the MultiPlan 3.5.2 software. Isodose distributions were manually shifted to place the ion chamber (0.053cc Exradin-A1SL) in a suitably homogenous region within the CTV. The plan was then delivered to the thorax phantom with the ion chamber placed in the mediastinum insert location.

**Results:** This methodology was used for 33 consecutive lung patients receiving Cyberknife SBRT with PTVs ranging from 10.7-185.9cm<sup>3</sup>. The mean deviation between measured and MC calculated doses was -2.31%±1.66%. The maximum deviation was -4.69%. Acceptable tolerance for patient-specific QA was considered ±5%.

**Discussion and Conclusion:** The MC algorithm provides improved accuracy over RT for heterogenous dose calculation, confirmed by direct point measurements. Patient-specific QA using a heterogeneous lung phantom provided an acceptable anthropomorphic approximation of patient plans calculated with MC. Since the QA results establish satisfactory delivery of MC doses, patient-specific plans calculated on a homogenous phantom comparing RT and MC algorithms may provide a suitable second check without direct measurement. Conversely, many users may continue direct measurement as a second check until commercial MC verification software becomes available.



### Customized patient-related measurements: no escape from non-standard special procedures

Charles Rhodes III, M.S.B.S., Yiran Zheng Ph.D.,  
David Mansur M.D., Min Yao M.D., Valdir C. Colussi, Ph.D.

University Hospitals Case Medical Center – Seidman Cancer Center, Cleveland, OH.

**Purpose:** To apply customized measurements and establish protection to areas at risk during non-standard cases of Total Skin Electron Irradiation (TSEI). As standard of practice, TSEI is used to treat patients with mycosis fungoides, a cutaneous T-cell lymphoma (Stanford Technique using 6-MeV or 3-MeV), however, for these patients, one had received prior full skull irradiation and the other has a pacemaker. In this work we compare several dosimetric methods applied to these patients.

**Methods:** Lead shielding apparatuses are used to limit the dose to areas of risk such as previous treated areas, cardiac-resynchronizers, and extremities. To determine the transmitted dose behind the customized shielding, an ion chamber is set at  $d_{max}$  and varied thicknesses of lead are added until a tolerable dose is reached. To simulate patient setup, the actual treatment distance is used.

To block the radiation to at risk anatomy, a large Cerrobend<sup>®</sup> block is poured 1-cm thick. To verify the behavior of the electron beam after introducing this block, Gafchromic<sup>®</sup> film dosimetry is performed by positioning half of the film behind the block and the other half receiving full exposure. Data is collected for one angled beam and an angled pair. The film is analyzed with RIT<sup>®</sup> software.

Thermoluminescent Dosimeters (TLDs) were used to measure dose received by the patient at specific sites. One set of TLDs were placed on the patient's surface anterior to the implanted pacemaker and posterior to the lead shielding. For the other patient, the physician was concerned about dose delivered to the gluteal cleft and vaginal introitus. Several sets of TLDs were placed along the patients gluteal cleft, vaginal introitus, and perineum.

**Results:** It was determined that 2-mm lead provides the most efficient reduction of exposure, reducing dose by 90%. Additional lead does not provide additional protection. The addition of wax, to protect patient skin, affords no further protection. The Cerrobend<sup>®</sup> block attenuated 87% and 94% of radiation from a single angled beam for 3-MeV and 6-MeV electrons respectively. During an angled pair of beams resembling treatment, the Cerrobend<sup>®</sup> block attenuated 93% and 99% of radiation for 3-MeV and 6-MeV electrons respectively. In both trials, a 5-cm dose gradient is observed near the block edge.

The analysis of the TLDs revealed that the patient's pacemaker received a total of 101.3 cGy over the course of treatment. This was well below the allowable limit of 500 cGy. Further, the results of the ion chamber measurement are confirmed as the dose measured by the TLDs demonstrated a 97% reduction in dose under the shield. The TLD measurements performed on the other patient show that the areas in question received a dose much lower than prescription (maximum of 43cGy) and would require an additional boost field.

**Conclusion:** For small areas, 2-mm of lead provides adequate shielding. The remaining 10% of radiation is due to bremsstrahlung. For large areas, Cerrobend<sup>®</sup> block is more feasible to shield areas of risk. The block should be placed on per patient basis confirmed by dosimetry measurements. In order to effectively use these shielding devices, a variety of dosimetric measurements and techniques must be utilized prior to and during treatment.



## Deformed planning CT as an electron density substitute for Cone-beam CT

Kapil Mishra B.S., Andrew Godley Ph.D.

Cleveland Clinic, Cleveland, OH

**Objective:** To determine the dosimetric difference between plans calculated on CT-on-rails images and a deformed planning CT.

**Introduction:** Image Guided Radiation Therapy (IGRT) shifts patients to best align the target with the treatment beams. IGRT however is unable to correct for change in target shape, or position of organs at risk relative to the target. Adaptive re-planning (ART) is necessary to recover these differences. ART uses the daily pre-treatment IGRT image to adapt the original treatment plan to match the current anatomy. The most common form of IGRT is kV cone-beam CT (CBCT), which lacks accurate electron density information, meaning that dose for re-planning cannot be correctly calculated from the image. To remedy this, we propose to deform the planning CT to match the anatomy of the CBCT and hence provide the electron density. We will test our proposal by using CT-on-rails (CTOR) images as these have correct electron density.

**Materials and methods:** Five prostate only IMRT patients treated with CTOR image guidance were selected. These patients were re-planned on Panther (Prowess Inc.) with a uniform 5 mm PTV expansion, prescribed 78 Gy. For each patient, five CTORs images were also chosen. The planning CT was deformed to match each CTOR using ABAS (Elekta Inc.) Both the deformed planning CT (DPCT) and CTOR were then imported into Panther. Contours were drawn on the CTOR, and copied to the DPCT. The original treatment plan was copied to both the CTOR and DPCT, keeping the center of the prostate as the isocenter. The plans were then calculated using the collapsed cone heterogeneous dose engine of Prowess. The following DVH parameters are compared to judge the equivalence of the dose calculation: prostate D100, D98 and D95; PTV D98, D95 and mean dose; bladder V70, V60 and mean dose; and rectum mean dose. (D100 is the dose covering 100% of the target; V70 is the volume of the organ receiving 70 Gy).

**Results:** Each DPCT was visually compared to its CTOR with acceptable results. The agreement of the copied contours with the DPCT further demonstrated the deformation accuracy. The average difference in dose calculated on DPCT and CTOR is: 1.5, 0.3 and 0.3% for the prostate D100, D98 and D95; 0.6, 0.5 and 0.8% for the PTV D98, D95 and mean; 1.1, 0.3 and 0.3 for the bladder V70, V60 and mean; and 0.3% for the mean rectum dose.

**Discussion and Conclusion:** Initial results indicate that there is negligible difference between the dose calculated on the DPCT and the CTOR, implying that deformed planning CTs are a suitable substitute for electron density. Further comparisons such as gamma index between the doses could be performed, but the DVH planning parameters are the most clinically relevant. The next question is whether the deformation accuracy when deforming to lower contrast CBCTs will be sufficient to get an accurate electron density.



Andrew R GODLEY, Ph.D.  
Associate Staff  
The Cleveland Clinic



Title:

**The Good, Bad and Ugly (including Pitfalls) of AAPM TG-142**

Objectives: After the session, participants will be able to:

1. Understand the updated tolerances and frequencies of TG-142
2. Understand the imaging tests of TG-142

Outline:

1. Brief overview of the changes from TG-40 to 142
2. Open discussion of how to implement these updates to your QA procedures
3. Open discussion of imaging tests, frequencies and implementation
4. Overview of imaging phantoms and analysis software available

Dr. Godley does NOT have any relevant financial relationships with the commercial interests related to the content of this activity.

Application for half credit hour has been made to CAMPEP and MDCB for approval of this educational activity.



Ray Louis KACZUR, M.S.  
RK Physics Services, LTD.



Title:

**Safety is not an accident: Lessons to be learned from catastrophic events**

Objectives: After the session, participants will be able to:

1. Learn of various accidents that have occurred.
2. Understand causes of historic radiation catastrophes.
3. Understand prevention methods
4. Understand regulatory ramifications of such events

Outlines:

- I. Radiation Therapy accidents: Specific examples of historical accidents in radiation therapy
- II. Causes
- III. Error Detection methods
- IV. Most common error types
- V. Factors contributing to accidents
- VI. What can we do.
- VII. Ongoing QA process
- VIII. Combination of failures
- IX. Regulatory response
- X. Questions/Comments

Mr. Kaczur does NOT have any relevant financial relationships with the commercial interests related to the content of this activity.

Application for half credit hour has been made to CAMPEP and MDCB for approval of this educational activity.



David J. Laszakovits, M.B.A.  
Co-Director of Certification Services  
The American Board of Radiology



Title:

**ABR Update: The Path to Certification and MOC Participation**

Learning Objectives: Attendees will:

- understand the basic requirements for ABR initial certification eligibility and board eligibility
- understand the CAMPEP residency requirements as they relate to ABR initial certification eligibility
- understand basic elements of ABR initial certification exams (Part 1, Part 2 and oral)
- understand the basic elements of the ABR Maintenance of Certification (MOC) program
- understand the MOC participation guidelines and how to record participation in myABR

Presentation Outline

I. Initial Certification

- a. Medical Physics training
  - i. Part I
  - ii. Part II
  - iii. Oral exam
- b. CAMPEP
- c. Exams
  - i. Nature of exams
  - ii. Changes in the exams
- d. Time limits and board eligibility

II. Maintenance of Certification(MOC)

- a. Brief history of recertification and MOC
- b. MOC Component Details
  - i. Part I: Professional Standing – State Licensure
  - ii. Part II: Lifelong Learning and Self-Assessment – CME and SAMs
  - iii. Part III: Cognitive Expertise – Practice-profiled, case-based exam
  - iv. Part IV: Performance in Practice – Practice Quality Improvement Projects (PQI)
- c. Public Reporting
  - i. ABMS
  - ii. CRCPD
- d. Public Reporting Details
  - i. ABMS website content
  - ii. ABR website content
  - iii. CRCPD website content
- e. Continuous Certification
  - i. Certificate changes
  - ii. Look-back approach
  - iii. Impact on current and new certificates

Resources

1. ABR initial certification program information, ABR Website, <http://www.theabr.org/ic-rp-landing>
2. CAMPEP Requirements, ABR Website, <http://www.theabr.org/ic-rp-newcampep>
3. ABR Medical Physics Exam Registration Process, ABR Website, <http://www.theabr.org/ic-rp-process>
4. ABR MOC program information, ABR Website, <http://www.theabr.org/moc-rp-landing>
5. ABR Guide to Practice Quality Improvement (PQI), ABR Website, [http://www.theabr.org/sites/all/themes/abr-media/pdf/PQI\\_2012.pdf](http://www.theabr.org/sites/all/themes/abr-media/pdf/PQI_2012.pdf)
6. ABR PQI Templates, ABR Website:
  - Individual: [http://www.theabr.org/sites/all/themes/abr-media/doc/PQI\\_Recording\\_Template\\_Individual.doc](http://www.theabr.org/sites/all/themes/abr-media/doc/PQI_Recording_Template_Individual.doc)
  - Group: [http://www.theabr.org/sites/all/themes/abr-media/doc/PQI\\_Recording\\_Template\\_Group.doc](http://www.theabr.org/sites/all/themes/abr-media/doc/PQI_Recording_Template_Group.doc)
7. List of Available Society-Based PQI Templates and Projects, ABR Website, <http://www.theabr.org/moc-rp-pqi-projects>



**Ohio River Valley Chapter**  
**Penn-Ohio Chapter**

Olga Green, Ph.D.  
Instructor, Associate Residency Director  
Washington University



Title:

**From Portal Films to 4D MRgRT: Filling Conventional Spaces with Unconventional Technologies**

Objectives: After the session, participants will be able to:

1. Understand the processes involved in refitting an existing space with new modalities
2. Understand the challenges involved in fitting an MRI system into a linac room

Outlines:

1. Overview of planning and redesign of existing spaces when upgrading to new modalities
2. Discuss installing a high-dose rate TrueBeam machine in a standard Elekta vault
3. Discuss switching from a typical 6MV linac delivery to a helical one (from Varian to Tomotherapy)
4. Discuss installation and shielding of an MR-guided radiotherapy machine in an existing vault that previously housed an 18MV Varian linac.

Dr. Green does NOT have any relevant financial relationships with the commercial interests related to the content of this activity.

Application for half credit hours has been made to CAMPEP and MDCB for approval of this educational activity.



Ohio River Valley Chapter  
Penn-Ohio Chapter

David W Jordan Ph.D.  
Senior Medical Physicist  
UH Case Medical Center



Title:

**Quality control (QC) concerns for the new generations of CT & MRI & PET**

Objectives: After the session, participants will be able to:

1. Understand the typical elements of a QC program for CT, MRI, and PET equipment.
2. Anticipate the QC challenges created by new imaging technology advances.

Outlines:

1. Overview of current QC procedures for CT, MRI, and PET.
2. Discuss new CT technology : wide/cone beams and iterative reconstruction
3. Discuss new MRI technology: parallel imaging and massively multichannel coils
4. Discuss new PET technology: time of flight and alternatives to PMT detectors

Dr. Jordan does NOT have any relevant financial relationships with the commercial interests related to the content of this activity.

Application for half credit hour has been made to CAMPEP and MDCB for approval of this educational activity.



Raymond F. Muzic, Jr, Ph.D.  
Associate Professor of Radiology  
Case Western Reserve University



Title:

**Production and Use of PET Radiopharmaceuticals**

Objectives: After the session, participants will be able to:

1. Identify radiologic properties of and nuclides suitable for PET imaging
2. Describe how a cyclotron works
3. Discuss operation and performance of PET scanners
4. Understand practicalities of radiation safety related to PET

Outline:

1. Radionuclides for PET
2. Cyclotron principles
3. PET scanners
4. Radiation safety considerations

Dr. Muzic does NOT have any relevant financial relationships with the commercial interests related to the content of this activity.

Application for half credit hour has been made to CAMPEP and MDCB for approval of this educational activity.



Ping Xia, Ph.D.  
Professor, Head of Physics Division  
The Cleveland Clinic



Title:

**Electronic Medical Records (EMR) Streamline “Ch’i” Process**

Objectives: The use of Electronic Medical Records (EMR) is a government mandate. The treatment record-verify (RV) system in Radiotherapy has significantly improved our operation’s safety and treatment accuracy. The use of the RV system as an EMR system for radiation oncology is a natural extension. Many radiation oncology departments have implemented the “paperless” process. This process also brought many new challenges in the management of clinical workflow, particularly for departments with multiple-vendor treatment machines and high clinical volumes.

The outline of this presentation includes:

1. Overview of “paperless” operation.
2. Discussion of the development of new communication pathway.
3. Discussion of new challenges in the “paperless” environment.

After the session, participants will be able to:

3. Understand how to apply EMR to enhance clinical workflow.
4. Understand new pitfalls of “missing charts” under the “paperless” environment.

Dr. Xia does NOT have any relevant financial relationships with the commercial interests related to the content of this activity.

Application for half credit hour has been made to CAMPEP and MDCB for approval of this educational activity.



Barry W. Wessels, Ph.D.  
Professor and Director, Division of Medical Physics and Dosimetry  
UH Case Medical Center



Title:

**Planning for the Installation of a Compact Superconducting Proton Therapy Unit in a busy hospital Environment**

Objectives: After the session, participants will be able to:

1. Understand the basic principles superconducting cyclotron proton beam production
2. Understand the potential limitations and shielding requirements for RF, magnetic and high energy radiation fields associated with Proton therapy

Outlines:

1. Overview of the evolution of Proton Therapy machines used in a clinical setting
2. Discuss the selection of double scattering and scanning beam modalities
3. Present the challenges of site selection in terms space, accessibility and location in a regulated environment
4. Review the necessity and availability of IGRT options for Proton therapy

Dr. Wessels does NOT have any relevant financial relationships with the commercial interests related to the content of this activity.  
COI. Have no cost collaboration agreement with Philips regards Proton RTP.

Application for half credit hour has been made to CAMPEP and MDCB for approval of this educational activity.



Indra J. Das, Ph.D.  
 Vice Chair, Professor and Director of Medical Physics  
 Indiana University School of Medicine



Title:

**Linac or Non-Linac – Demystifying and Decoding the Physics of SBRT/SABR**

Objectives:

To provide an overview of SBRT/SABR for hypofractionated treatments, physical requirements and equipments.

Outlines:

1. Provide historical perspective of hypo-fractionation of extra cranial lesions (lung, liver, spine, prostate etc).
2. Physical requirements for SBRT/SABR
  - a. Immobilizations
  - b. Machine criterion
    - i. Linac based; FF and FFF
    - ii. Cyberknife
    - iii. Other (proton)
3. Treatment Planning
  - a. Collision avoidance
  - b. 3DCRT; Coplanar v.s. non-coplanar
  - c. IMRT
  - d. Algorithms
  - e. Dosimetric accuracy
4. Treatment
  - a. Collision
  - b. Treatment
  - c. Patient comfort
5. Outcome

COI: Does not have any financial relationships with the commercial interests related to the content of this activity.

Application for half credit hour has been made to CAMPEP and MDCB for approval of this educational activity.



Simon S. Lo, M.D.  
Associate Professor of Radiation Oncology - Case Western Reserve University School of Medicine  
Director of Radiosurgery Services and Neurologic Radiation Oncology - UH Seidman Cancer Center



Title:

**Clinical Aspects of LINAC-Based SBRT**

Objectives:

1. To know the clinical applications of LINAC-based SBRT.
2. To understand the technical aspects of LINAC-based SBRT from a physician's perspective.
3. To understand the clinical aspects of LINAC-based SBRT.

Outlines:

1. Overview of clinical applications of LINAC-based SBRT
2. Technical issues pertaining to LINAC-based SBRT- A physician's perspective and comparison to CyberKnife-based SBRT (pros and cons)
3. Clinical outcomes
4. Toxicities

COI: Does not have any financial relationships with the commercial interests related to the content of this activity.

Application for half credit hour has been made to CAMPEP and MDCB for approval of this educational activity.



M. Saiful Huq, PhD., FAAPM, FInstP  
Professor and Director of Medical Physics  
University of Pittsburgh Cancer Institute and UPMC Cancer Center, Pittsburgh, PA



Title:

**AAPM TG-100: A new paradigm for quality management in radiation therapy**

Objectives: After the session, participants will be able to:

1. Understand how risk assessment can be performed for radiation therapy processes
2. Understand how a quality management program can be developed for radiation therapy processes based upon prospective risk assessment

Outlines: Overview of:

1. Risk assessment
2. Process mapping
3. Failure Mode and Effects Analysis (FMEA)
4. Fault Tree Analysis
5. Development of a Quality Management Program

Dr. Huq does NOT have any relevant financial relationships with the commercial interests related to the content of this activity.

Application for half credit hour has been made to CAMPEP and MDCB for approval of this educational activity.



## **Exhibitor Acknowledgements**

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