Hub and Spoke Webinar #2: Motivation, Economics, and Structure from the Satellite Perspective

Firas Mourtada, PhD, FAAPM
Christiana Care Hospital
Newark, DE

Michelle Verst, MS
Cancer Care Group
Terre Haute, IN
The First Hub and Spoke Webinar
entitled
General Structure, Basics & Responsibilities from a Main Site Perspective

with
Guest Speakers:

Joseph P. Dugas, PhD, Mary Bird Perkins Cancer Center

Robert J. Pizzutiello Jr., MS, Landauer Medical Physics

can be found at

http://www.aapm.org/meetings/webinars/
HubSpoke2015WebinarSeriesNo1.asp
AAPM Webinar Part II: Motivation, Economics, and Structure from the Spoke Perspective

Firas Mourtada, MSE, PhD, DABR, FAAPM

Chief of Clinical Physics, Christiana Care Health System, Newark, DE

Associate Medical Physics Residency Director
Adjunct Associate Professor
Thomas Jefferson University, Philadelphia, PA
Acknowledgments

- Amy S. Harrison M.S., CMD, DABR Residency Program Director, TJUH

- Virginia Lockamy, PhD, DABR Associate Residency Director, TJUH
Objectives

- Introduction to CCHS Radiation Oncology
- Motivation for us to be a spoke
- Basic Economics for partnership
- Residency Program Structure and Operations
Objectives

- Introduction to CCHS Radiation Oncology
- Motivation for us to be a spoke
- Basic Economics for partnership
- Residency Program Structure and Operations
HFGCC
Radiation
Oncology
Department
Radiation Oncology

- Helen F. Graham Cancer Center
  - Main operations: 3 LINACs, 1 CK
  - Outpatient

- Christiana Hospital
  - Across street from HFGCC
  - In patients EBRT & HDR

- Satellite 1:
  - Union Hospital, Elkton, MD

- Satellite 2:
  - Concord Site (new, opened Jan, 2014) in Chadds Ford, PA
RADIATION ONCOLOGY SERVICES

- 3 Siemens Linacs (Artiste, Oncor, Primus)
- 3 Elekta Linacs (Synergy, Infinity, Versa)
- 1 CyberKnife
- 3 Siemens CT Sim’s (2 Large Bore)
- 2 Nucletron HDR Afterloaders: Breast, Gyn, Skin, Sarcoma
- Prostate Seed Implants (LDR)
  - 3 sites: Surgi Center, DOCS, Union
Treatment Planning:

- Pinnacle TPS
- Ray Station TPS
- Oncentra TPS (HDR)
- Multiplan TPS (CK)

8 Rad. Oncs
7 Physicists
7 Dosimetrists
CyberKnife Program started in 2008
Radiation Oncology Statistics 2014

- >32,000 EBRT fractions
- >600 SBRT (Cyberknife) fractions
- >900 HDR fractions
- >200 LDR Prostate Implants (real-time)
US Real-time Planning for Prostate Seed Implants

234 PSI cases in 2012: About 4-5 cases per week!
Advanced 4D radiation treatment planning at Helen F. Graham Cancer Center

Christiana Care one of only 10 sites in U.S. with tumor-tracking software

The Helen F. Graham Cancer Center at Christiana Care is only the 10th institution in the United States to install RayStation, a 4D treatment planning software that provides precise radiation treatments for cancer patients with greater efficiency.

4D — the fourth dimension — is time. RayStation 4D software uses special adaptive techniques to adjust for anatomical changes that can occur in tumors and surrounding normal tissues during the course of treatment, allowing for greater control in tumor targeting while sparing normal tissue.

RayStation will be used to plan treatment of cancers of the head and neck, said Firas Mourtada, MSE, Ph.D, D. ABR, chief of Clinical Physics in Radiation Oncology at Christiana Care.

“Head and neck tumors and surrounding normal organs from the original CT scans are used to create a treatment plan,” he said. “However, they move around during the course of radiotherapy, and thus might require adjustments.”

With standard systems, it can take two or three days to review the progress of a tumor and establish a plan to deliver the precise dose of radiation required to attack the cancer. RayStation condenses that process to about half a day.

Head and neck cancers account for about 3 percent of cancers in the U.S., according to the American Cancer Society. These cancers are difficult to treat unless they are detected in their earliest stages.

Intensity-modulated radiation therapy or IMRT is highly conformal that even minor changes in the patient’s anatomy can have profound effects on outcomes, said Adam Raben, M.D., radiation oncologist.

“This technology is revolutionary in that it allows rapid adaptation of our original IMRT treatment plan to re-conform to changes in the patient contour due to weight loss and tumor response,” Dr. Raben said. “Rapid adaptive IMRT is the next wave of technology that can be applied with immediate clinical benefit of additional accuracy and side effect reduction.”
Objectives

- Introduction to CCHS Radiation Oncology
- Motivation for us to be a spoke
- Basic Economics for partnership
- Residency Program Structure and Operations
Motivation #1: Why Reinvent the Wheel?

How Does It Work Again?
Solo vs Affiliated

- Sometimes Less is More
- Not clear how long the application process will take for CAMPEP.
- Unclear administrative resources to start and maintain a residency program.
- It was prime time to get residents on board at CCHS.
Hub-and-spoke model (TG-133)

- TJU (hub) responsible for initial accreditation, curriculum development, resident performance tracking, scheduling exams, clinical training, etc.
- CCHS (spoke) responsible for clinical training
- Founded in 1888.
- Delaware’s largest private employer – more than 10,400 employees.
- Major Teaching Hospital – more than 250 Medical-Dental Residents and Fellows.
- More than $2.1 billion in total patient revenue in FY 2011.
- Provided $27.1 million in charity care.
Motivation #2: Jefferson’s Reputation

Residency Statistics

The Medical Physics Residency Program has been directed by Amy Harrison, MS since 2007. In that same year the residency program received accreditation through CAMPEP (Commission on Accreditation of Medical Physics Education Program).

Resident Alumni – Post-CAMPEP Accreditation

<table>
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<tr>
<th>Graduation Year</th>
<th>Number of Applicants</th>
<th>Number Accepted to the Program</th>
<th>Number of Graduates per Year</th>
<th>Number of Residents ABR Certified</th>
<th>Graduates Currently in a Clinical Position</th>
<th>Graduates Currently in an Academic/ Clinical Position</th>
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<td>2011</td>
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Motivation #3:
Education is part of my mission

Radiation Oncology launches first allied health residency in medical physics

The Christiana Care Department of Radiation Oncology at the Helen F. Graham Cancer Center offers its first residency program in medical physics. The program is in collaboration with the Thomas Jefferson University Radiation Oncology Department Division of Medical Physics at the Kimmel Cancer Center in Philadelphia.

Dr. Murtada and Davee Jacob, senior medical physicists, work on a brachytherapy treatment plan.
Clinical Physics Mission

- Since my arrival to CCHS in Sept. 2011,
  - Establish a CAMPEP approved residency program, which is in line with CCHS’ overall mission
- Excellent clinical environment
  - My initial assessment was positive from both equipment available, and staff willingness to have residents
Motivation #4
Cancer Center Mission

Helen F. Graham Cancer Center & Research Institute
NATIONAL CANCER INSTITUTE
COMMUNITY ONCOLOGY RESEARCH PROGRAM

Exceptional cancer care. Exceptionally close.

Nicholas J. Petrelli, M.D., FACS
Christopher D. Koprowski, M.D.
Motivation #5:
Need for more residency programs in the US


Future trends in the supply and demand for radiation oncology physicists

Michael D. Mills 1a, Judah Thornewill 2, Robert J. Esterhay 2
Department of Radiation Oncology, University of Louisville School of Medicine, Louisville, KY, USA, 1 Department of Health Management and Systems Sciences, University of Louisville School of Public Health and System Sciences, Louisville, KY, USA 2
Mdmill03@gwise.louisville.edu
Objectives

- Introduction to CCHS Radiation Oncology
- Motivation for us to be a spoke
- **Basic Economics for partnership**
- Residency Program Structure and Operations
Why we complement each other?

- TJU has
  - Has excellent track record teaching residents
  - Equipment: Gamma knife, Varian LINACS, Prostate HDR, Ra-223, TSET, Monaco, Eclips
  - Didactic courses: Radiobiology, Ethics

- CCHS has
  - Two approved residency slots
  - New RayStation TPS
  - Cyberknife and PSI LDR
Financial Considerations

- Share CAMPEP application fees
- Determine increased administrative cost on the hub due to spoke residents
  - Interview phase
  - Tracking resident progress
- Commute expenses and faculty time should be estimated
Webinar #3

RESIDENT TRAINING AGREEMENT
BETWEEN
THOMAS JEFFERSON UNIVERSITY HOSPITALS, INC.
AND
CHRISTIANA CARE HEALTH SERVICES, INC.

This Resident Training Agreement (hereinafter "Agreement"), made effective on the 1st day of July 2013, by and between Thomas Jefferson University Hospitals, Inc. (hereinafter "JEFFERSON") and Christiana Care Health Services, Inc. (hereinafter "AFFILIATE") sets forth the parameters and administrative provisions of the rotating residency program, (hereinafter "Program") entered into mutually by the parties.

WITNESSETH

WHEREAS, JEFFERSON and AFFILIATE have an interest in supporting medical physics training and in working cooperatively with other institutions dedicated to public service and medical educational endeavors; and

WHEREAS, JEFFERSON and AFFILIATE agree that patient care can be best achieved and facilitated when a stimulating and positive educational and clinical environment is maintained; and

WHEREAS, JEFFERSON and AFFILIATE desire to establish and maintain a relationship in order to provide a range of relevant clinical services and facilities as part of a radiation oncology physics residency training program; and

WHEREAS, JEFFERSON and AFFILIATE agree that it is in their mutual interest and to their mutual advantage to provide residents participating in the training program the opportunity to work at AFFILIATE as part of their clinical training program;

NOW, THEREFORE, in consideration of the mutual covenants contained herein and intending to be legally bound hereby, the parties agree as follows:
Objectives

- Motivation for us to be a spoke
- Basic Economics for partnership
- Residency Program Structure and Operations
TJU Hub & CCHS Spoke Structure

■ TJU (Hub):
  ● Owns program in general sense
  ● Program administration
    ◆ Advisory committees for Hub and Spoke
    ◆ Resident evaluation and oversees compliance

■ CCHS (Spoke)
  ◆ Interview residents w Hub
  ◆ Directly employs residents (resident salary, benefits, PTO, funds meetings)
  ◆ Provide resources including office space for resident
Program Governance

- Residency Program Steering Committee (Spoke)
  - Amy Harrison, TJU
  - Virginia Lockamy, TJU
  - Firas Mourtada, CCHS
  - Henry Yu, CCHS
  - Avi Sarkar, CCHS
  - Hank Chen, CCHS
  - Kelly Andreau, CCHS

- Meets on annual basis

- I also serve on TJU residency steering committee (Hub)
CCHS Physics Staff Involved in Teaching Residents 3:1

- Hank Chen, M.S., DABR
- Henry Yu, Ph.D.
- Avi Sarkar, M.S., DABR
- Dayee Jacob, M.S., DABR
- David Huang, M.S.
- Kai Yang, M.S., DABR
- Kelly Andreau, B.S., Chief Dosimetrist
• Similar Structure between Spoke and Hub
• Only difference is equipment and staff
• This insures per CAMPEP that the CCHS residents receive clinical training comparable to TJU residents
Helen F. Graham
Cancer Center

Thomas Jefferson University Hospital
Medical Physics Residency Program
And Christiana Care Health System Affiliated TJUH Residency Program
In Radiation Oncology Physics
Self-Study Program
For
CAMPEP Re-Accreditation Review

Amy S. Harrison M.S., CMD, DABR
Residency Program Director
Virginia Lockamy, PhD, DABR
Associate Residency Director, TJUH
Firas Mourad, PhD, DABR
Associate Residency Director, CCHS
Thomas Jefferson University Hospital
Medical Physics Residency Program in Radiation Oncology Physics

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Physics Residents are CCHS Employees and as such have the benefits of staff and should read the Employee Handbook

Adheres to CCHS Mission and Core Values
Recruitment

- Both Hub and Spoke participate in the national Med. Phys. Match
- Applicants submit a single application to TJU-CCHS Program
- TJU select top 50 applicants
- TJU and CCHS pick the top 20 to invite for interview
- TJU and CCHS interview candidates at TJU
  - Open House at Spoke, 45min drive to Newark from Philly
CCHS/TJU 1st resident
Allison Mitchell, MS
Duke University

Graduated in June 2015

CCHS/TJU 2nd resident (PGY2)
Melissa Lamberto, MS
Louisiana State University

Our 3rd resident (PGY1)
Nick Peterson, MS
Louisiana State University
Resident Evaluations

- After each rotation (1-3 months)
  - Standarized questions for both TJU & CCHS
  - Rotation faculty, Program director, and Associate director
- 2-3 oral exams to mock ABR exam
  - Program and Associate directors with invited faculty
- On-going at physics staff meetings (pop-quizzes)
  - Any faculty
Requirements for program completion

- Demonstration of adequate medical physics education (equivalent to a graduate degree in medical physics).
- Demonstration of clinical competency in all clinical training rotations.
- Competency and shared responsibility of clinical physics duties: initial calculation checks, chart checks, and weekly chart checks.
Requirements for program completion

- Demonstration of adequate medical physics education (equivalent to a graduate degree in medical physics).
- Demonstration of clinical competency in all clinical training rotations.
- Competency and shared responsibility of clinical physics duties: initial calculation checks, chart checks, and weekly chart checks.
Requirements for program completion

- Presentation of at least one medical physics presentation during each rotation block.
- Attendance at required clinical and medical physics seminars and conferences, morning chart rounds/QA conferences.
- Satisfactory assessment of progress
  - oral examination at the end of each rotation
Conclusions

- A hub/spoke residency program has been successfully launched with TJU and CCHS
- A hub/spoke governance should insure consistency and uniformity of resident training
- A hub/spoke model should be synergistic to provide more resources to residents from both sides
Conclusions

- Benefit to residents
  - See academic hospital setting (TJU as Hub)
  - See community cancer center setting (CCHS as Spoke)
  - More collegial interactions; more equipment; more mentors from combined institutions
Helen F Graham Cancer Center

One of only 30 National Cancer Institute National Community Cancer Centers (NCCCP) since 2007

http://christianacare.org/ncccp
Hub and Spoke Residency Model
A Spoke’s Prospective

Michele Verst, MS, DABR
Chief of Medical Physics
Hux Cancer Center, Terre Haute, IN
Associate Director of Medical Physics Residency
University of Kentucky
Objectives

- Introduction to the Hux Cancer Center
- Medical Physics Residency – Why?
- Affiliation process
- Challenges with distance learning
- CAMPEP Accreditation
Hux Cancer Center
Hux Cancer Center - Staffing

- 2 Physicians
- 2 Certified Physicists
- 2 Certified Dosimetrists
- 3 Oncology Nurses
- 7 Therapists

- 1 Administrative Director
- 2 Administrative Assistants
- 1 Dietician
- 1 Pastoral Counselor

1 Medical Physics Resident
Hux Cancer Center - Equipment

2 Varian TrueBeams

Philips BigBore CT

Varian Ximatron

Monaco TPS and Mosaiq R&V
Hux Cancer Center - Services

- Convention XBRT (3D, IMRT, VMAT, 4DCT)
- MLC based SRS/SBRT (coming Jan 2016)
- LDR (prostate, GYN, interstitial)
- Radiopharmaceuticals (Xofigo, Zevalin, I-131)

- Treat approximately 550 patients per year, servicing Terre Haute, IN and the surrounding rural areas
Hux Cancer Center
Objectives

- Introduction to the Hux Cancer Center
- **Medical Physics Residency – Why?**
- Affiliation process
- Challenges with distance learning
- CAMPEP Accreditation
Why a Medical Physics Residency?

- Junior Physicists (fresh from school) are no longer available
  - Hired 4 Junior Physicists in last 15 years prior to residency position
  - Mutually beneficial: lower staffing costs while providing invaluable training/experience
  - ABR requirement for CAMPEP residency eliminates staffing pool
Why a Medical Physics Residency?

Students and Residents offer new perspectives
Why a Medical Physics Residency?

Proficiency Retention for Staff

“I forgot to make a back-up copy of my brain, so everything I learned last semester was lost.”
Objectives

- Introduction to the Hux Cancer Center
- Medical Physics Residency – Why?
- Affiliation process
- Challenges with distance learning
- CAMPEP Accreditation
Establishing an Affiliation

- Find the right fit for both Hub and Spoke
  - Similar philosophy to patient care
  - UK has established CAMPEP accredited Graduate and Residency Programs
    - Dedicated to MS level clinical medical physics
    - Preference given to UK graduate students
    - Need for additional residency slots through affiliated sites
Establishing an Affiliation

Maintaining integrity and continuity of the program

- Determine reporting structure and responsibilities
- “Equivalent” but not identical training
- Breathe of Modalities
- Teaching opportunities for Residents
- Competency tracking
Establishing an Affiliation

Reporting Structure
Establishing an Affiliation - Responsibilities

• **Lexington**
  - Employ Resident
    - Salary
    - Benefits
    - Liability
  - Maintain program documentation
  - Participate in Oral Exams
  - CAMPEP Application

• **Terre Haute**
  - Contract Resident
  - Maintain site documentation
  - Clinical experience
  - Participate in Oral Exams
  - Semiannual Evaluations
  - Participate in Residency review board
Establishing the Affiliation

“Equivalent” but not Identical

- No two sites are the same
  - must accommodate for process differences

- Start with the basic structure of the Hub and tweak as necessary
  - Find common ground
  - Determine how to manage deficiencies
  - Determine how the Residents and Program will be evaluated
Establishing an Affiliation

Rotations
- Brachytherapy
- Dosimetry Systems
- Machine QA
- Radiation Safety
- Special Procedures
- Treatment Planning
- Information Management
- Clinical Research
Establishing the Affiliation

- Most competencies can be complete at Hux
- SRS/SBRT is not available at Hux until 2016
- Tomotherapy will not be available at Hux
- Alternatives
  - Sister hospital in Indianapolis
  - Complete in Lexington
Establishing an Affiliation

- Resident Evaluations
  - Oral Exams
    - At the conclusion of each rotation, except Research and IMS
    - both Lexington and Terre Haute staff participate in resident oral exams for each site
  - Mentor Evaluation: Rotation Mentor(s)
- Semiannual Evaluations: Site Director
- 360° annual evaluations
- Program evaluations: Residents
Establishing an Affiliation

- Breathe of Modalities
  - Detail how each modality is offered
    - Conventional IMRT, 3D, VMAT covered at Hux
    - SRS/SBRT, Tomotherapy, HDR covered at UK or Indianapolis hospital
    - IORT, TBI, TSE, eye plaques are not available
      - Self study/practice plans
      - Alternate site – UK, another facility
      - Meeting or seminar
Establishing an Affiliation

- Teaching Opportunities
  - Presentations: remote or on-site
    - Medical residents
    - Graduate students
  - Projects
    - Implementing new software or functionality
    - Developing process improvements
  - Daily knowledge sharing with dosimetrists/therapists
Establishing an Affiliation

Competency Tracking

MedHub
Establishing an Affiliation

- Financials
  - Salary and Benefits
    - PGY1/PGY2 designation with GME
  - Expenses
    - Travel, Meetings, Books, Exams
    - Program incidentals
  - CAMPEP fees
    - Additional fee for spoke site
- Faculty Status
  - Provided Volunteer Faculty appointments for Hux physicists
Establishing and Affiliation

Example: Residents, 2012-2014

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<th>Expense</th>
<th>Year 1</th>
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<td>PGY Salary</td>
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<td>CCG through UK</td>
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<td>PGY Malpractice</td>
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<td>Mileage to Secondary Affiliate</td>
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<td>(140 miles round trip x $0.55)</td>
<td>(40 trips)</td>
<td>(20 trips)</td>
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<td>Total Financial Package</td>
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Establishing an Affiliation

- Legal
  - Liability – carried by employer
  - Letter of Intent from spoke site: documents structure and processes
  - Affiliation Contract: legal departments and administration for both entities
Objectives

- Introduction to the Hux Cancer Center
- Medical Physics Residency – Why?
- Affiliation process

**Challenges with distance learning**

- CAMPEP Accreditation
Challenges for Distance Learning

- TECHNOLOGY!!!!
  - Videoconferencing with audio, video and desktop sharing
  - Two IT departments with different security rules
- Cohesive Program
  - Sharing teaching materials
  - Single message and program focus for residents
- Financials
  - Who pays for the unexpected costs
Objectives

- Introduction to the Hux Cancer Center
- Medical Physics Residency – Why?
- Affiliation process
- Challenges with distance learning
- CAMPEP Accreditation
CAMPEP Accreditation

In our experience...

- Hub and Spoke models are still a “works-in-progress” for CAMPEP accreditation
  - Submitted affiliate application in July 2014
  - Review of application took about 9 months

- Can be challenging to coordinate site visits
  - Our 1st site visit: tentatively scheduled for Nov. 2015
Thank You

mverst@cancercaregroup.com 812-238-7504
Hub and Spoke Webinar #2: Motivation, Economics, and Structure from the Satellite Perspective

Question/Answer Session

- To send questions to the speaker, please enter them into the question box in the Go-To-Meeting toolbar.
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<th>Webinar Title</th>
<th>Speakers</th>
<th>Date/Time</th>
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<td><strong>Webinar #2 - Motivation, Economics, and Structure from the Satellite Perspective</strong></td>
<td><strong>Firas Mourtada, PhD, Christiana Care Hospital</strong>&lt;br&gt;<strong>Michele Verst, MS Cancer Care Group</strong></td>
<td><strong>Monday, Sept 21, 2015 11 – 12 pm, eastern</strong></td>
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<td><strong>Webinar #3 - Economics and Negotiations</strong></td>
<td><strong>Firas Mourtada, PhD, Christiana Care Hospital</strong>&lt;br&gt;<strong>Robert J. Pizzutiello Jr., MS Landauer Medical Physics</strong></td>
<td><strong>Thursday, Oct 8, 2015 12 – 1 pm, eastern</strong></td>
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<td><strong>Webinar #4 - CAMPEP Perspective</strong></td>
<td><strong>Chester Reft, PhD, University of Chicago</strong>&lt;br&gt;<strong>John Antolak, PhD, Mayo Clinic</strong></td>
<td><strong>Thursday, Oct 15, 2015 1 – 2 pm, eastern</strong></td>
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