# Radical Views...

## from the Department of Radiology

Volume 7, Number 1

JULY 2014

Beth Israel Deaconess Medical Center

A teaching hospital of Harvard Medical School



**FROM THE CHIEF**

Jonathan B. Kruskal, MD PhD


## Welcome to the new Academic Year

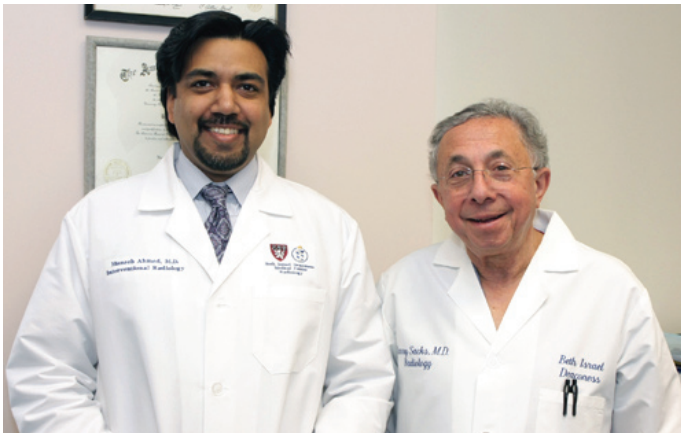
*"The older order changeth, yielding place to new"*

Having bid farewell to a truly great group of residents and fellows, we now look forward to welcoming a large group of very impressive new trainees to our family on July 1. Please join me in making them all feel very welcome and at home in our department. I'd also like to acknowledge all of the award winners at our Fleischner Graduation dinner, and to recognize the many excellent contributions that are being made by so many people each day to teaching, mentoring and research.

Our imaging field is undergoing an exciting transformation and you should all expect to see more changes brought about by healthcare reform legislation in the near future. We will maintain out intense focus on providing the highest quality of safe, timely and appropriate clinical services to all our customers, and will supplement this with IT improvements, and improved service coverage. We expect to develop closer collaborations with our owned community affiliates this year, and will strive to harmonize our service lines, protocols, IT resources and quality efforts with these sites.

This year, we will also strengthen our focus on improving efficiency, from patient throughput, to reporting, to elimination of waste in its many forms, to imaging appropriately and safely, and to staffing and service coverage. We will also be implementing changes to enable us to provide the highest quality integrated Interventional Radiology Services both at BIDMC and across our growing affiliate network.

With great pleasure we now welcome **Muneeb Ahmed** to the new leadership role of Director of Interventional Services in our department. This new position has been established to reflect the need to better align and integrate our many interventional services, and to optimize patient care, to standardize procedures, protocols, training, outcomes metrics and quality reporting, and to provide one stop shopping for our customers. I hope you will all welcome and support Muneeb in this exciting and timely new role.



*Muneeb Ahmed and Barry Sacks*

- Jonny

## Congratulations Rap!

"In recognition of his outstanding contribution to gastrointestinal and abdominal radiology," Dr. Vassilios Raptopoulos was made an Honorary Fellow of the European Society of Gastrointestinal and Abdominal Radiology (ESGAR) during their 2014 annual meeting held in Salzburg, Austria. *[Note the marvelous photo by Deborah Raptopoulos]*


Beth Israel Deaconess Medical Center

HARVARD MEDICAL SCHOOL TEACHING HOSPITAL

# BIDMC Radiology Department

# Code of Conduct

Our department is committed to leadership in the delivery of patient care through technical and clinical expertise in medical imaging. To be the best at what we do, we must hold ourselves to the highest standards. We have set the following values and expectations for ourselves in order to create the best working environment. By sharing these common goals we can build successful teams and a strong community that values safety, openness and respect for personal privacy and confidentiality.

## *Embrace the following values*

- Honesty
- Integrity
- Trust
- Empathy
- Tolerance
- Compassion
- Equity

## *Exhibit Professionalism*

- Be on time and fully engaged for meetings or lectures
- Show respect to patients and staff alike
- Give all stakeholders a voice
- Foster teamwork and be a good teammate
- Demonstrate a positive attitude and clean neat presentation in both dress and speech
- Seek to build a safe and supportive environment for a strong sense of community

## *Take Personal Responsibility*

- Make patient care your number one priority
- Maintain the pursuit of excellence through continuous education, training, and professional certification
- Take a proactive, not reactive, approach
- Take the initiative and lead by example
- Provide a safe environment for all employees, free from bullying or coercion

## *Be Accountable*

All Radiology employees must be accountable for their actions and empowered to hold others to the same standards. Accountability is evidenced by:

- Taking ownership of your work
- Following through on commitments
- Complying with all applicable policies and guidelines
- Making it safe and comfortable for employees to report problems or issues

## New Academic Year + New Faculty = New Office Locations!

| | |
|---|---|
| Muneeb Ahmed (VIR) | W/CC-308F |
| Darren Brennan (Community) | W/CC-376 |
| Peter Gordon (Community) | W/CC-308B |
| Karen Lee (ED/MRI) | W/CC-385 |
| Robin Levenson (ED) | W/CC-385 |
| Colm McMahon (MSK) | TCC-426 |
| Jennifer Ní Mhuircheartaigh (MSK/Community/VIR) | TCC-426 |
| Vassilios Raptopoulos (Abd/CT) | W/CC-308A |
| Barry Sacks (VIR) | W/CC-308B |
| Ammar Sarwar (VIR) | W/CC-376 |
| Leo Tsai (MRI) | Ansin 2 |

***Stay tuned for more relocations particularly at the East Clinical Center (TCC-3) as the Integrated Breast Center is completed.***



Bob Butler and Donna Hallett at the Chestnut Hill Square (200 Boylston St.) Open House on Thursday, June 26, 2014.

## Speaking of New Locations:

**Welcome Robert D. Butler RTR (CT), AS**

It is with great pleasure I share with you that Bob Butler will be returning to BIDMC as the radiology manager for our new Chestnut Hill Square Radiology site. For those who don't know Bob, he started his radiology career at BID in 1996 as a radiographer and then Sr. CT Technologist. He left in 2002 to go to the Mount Auburn CT department where he continued his leadership journey, serving as Supervisor of Cross Sectional Imaging and QC Technologist. Bob brings strong communication and management skills and I am very pleased he will be joining our team. You will start to see Bob around the Medical Center on June 9th, please welcome him back.

Thank you to my great team of interviewers (Betsy Grady, Tim Parritt, Bernie Kennedy, Allen Reedy, Olga Augustus and Dr. Gordon) in assisting me in finding the right person for this important position.

*– Donna T. Hallett, Director of Operations*

# Radiology Calendar July 2014

As usual, Consult the webpage for the most up-to-date schedule:
https://apps.bidmc.org/departments/radiology/residency/conferences/displayMonth.asp

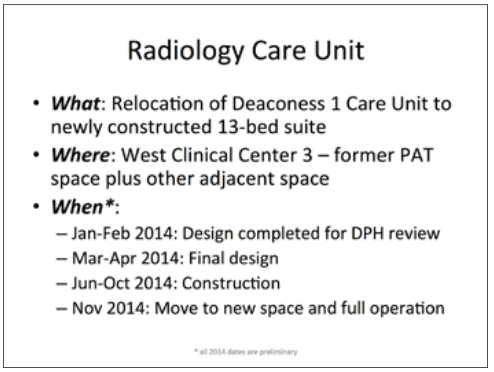
| Mon | Tues | Wed | Thurs | Fri |
|---|---|---|---|---|
| Weekly Mon Section Meetings:<br>3:00-4:00 ED section meeting (monthly) [ED annex, WCC] | | Weekly Wed Section Meetings:<br>11:00-12:00 MSK clinical conf<br>12:00-1:00 CardioThoracic, GI/GU Oncology<br>3:00-4:00 Mammo [TCC-484] | Weekly Thurs Section Meetings:<br>12:00 - 1:30 Abd [WCC-354]<br>12:00-1:00 MSK | Friday Grand Rounds:<br>Sherman Auditorium, East Campus (unless stated otherwise) |
| | 1<br>8:00 - 9:00<br>Board Review / Jeopardy (Senior Resident) | 2<br>7:30 - 9:00<br>NO CONFERENCE - plan to be on service at 8:15 (Orientation for the R1's) | 3<br>7:30 - 8:15<br>New Innovations Orientation (Katie Armstrong) | 4<br>7:30 - 9:00<br>NO CONFERENCE<br>- FOURTH OF JULY HOLIDAY |
| 7<br>7:30 - 8:15<br>CT and MR Enterography (Martin Smith)<br>8:15 - 9:00<br>MRI Basics - sequences, contrast, NSF (Jesse Wei) | 8<br>7:30 - 8:15<br>US of the uterus and endometrium (Janneth Romero)<br>8:15 - 9:00<br>CT technique and dose (Vassilios Raptopoulos)<br>10:30-11:30 NMMI meeting [GZ-103] | 9<br>7:30 - 8:15<br>US guided interventions (Colin Mcardle)<br>8:15 - 9:00<br>Lower GI Cases (Ronald Eisenberg)<br>7:15 - 8:00 US meeting (WCC-304A Gallery) | 10<br>7:30 - 9:00<br>Speech pathology (Baars) | 11<br>12:00-1:00 pm<br>No Grand Rounds |
| 14<br>7:30 - 8:15<br>Aorta (1) (Diana Litmanovich)<br>8:15 - 9:00<br>Aorta (2) (Diana Litmanovich)<br>12:00-1:00 MRI Meeting [Ansin 2] | 15<br>7:30 - 8:15<br>Atelectasis (Janneth Romero)<br>8:15 - 9:00 Chest cases (Janneth Romero)<br>8:00-9:00 IR Meeting [West Recovery] | 16<br>7:30 - 9:00<br>Physics - First year fundamentals (1) (Matthew Palmer) | 17<br>7:30 - 9:00<br>IR (TBD) | 18<br>12:00-1:00 pm<br>No Grand Rounds |
| 21<br>7:30 - 9:00<br>MSK (TBD) | 22<br>7:30 - 9:00<br>MSK (TBD)<br>10:30-11:30<br>NMMI meeting [GZ-103] | 23<br>7:30 - 9:00<br>MSK (TBD) | 24<br>7:30 - 9:00<br>MSK (TBD) | 25<br>12:00-1:00 pm<br>No Grand Rounds |
| 28<br>7:30 - 9:00<br>Chest - topic to be determined (Ronald Eisenberg) | 29<br>7:30 - 8:15<br>Describe and diagnose (Paul Spirn)<br>8:15 - 9:00<br>Chest cases (Paul Spirn) | 30<br>7:30 - 9:00<br>Physics - First year fundamentals (2) (Matthew Palmer) | 31<br>7:30 - 9:00<br>IR (TBD) | |

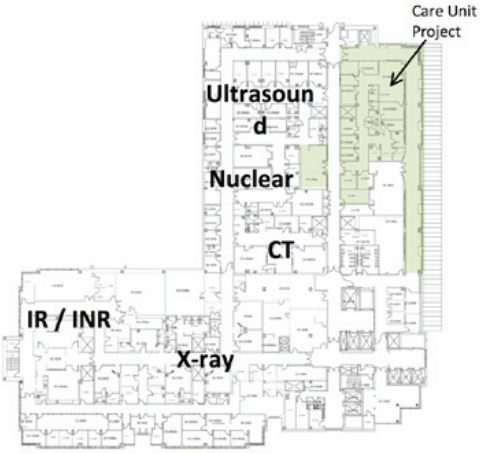
On Friday, June 6 the 21st Annual Risa and Felix Fleischner Lecture, **Imaging 3.0 Radiologists Shaping The Future of Diagnostic Radiology,** was presented by **Bibb Allen, Jr., MD FACR,** Chairman, Board of Chancellors of the American College of Radiology (ACR).


*Allen Reedy*
*Radiology Business Director*

## Radiology Care Unit Project Update

The project to construct a new Radiology Care Unit on West CC3 has started, and will be completed by mid-November. Most of the construction will be contained within the former PAT space, so we do not anticipate any major disruptions to our operations. Over the next couple of weeks, you can expect to see temporary partitions constructed in the central corridor that runs from the Reception area to the Farr bridge. There may be times when it is easier to use the corridor that runs past the Ultrasound reading room rather than the central corridor, but again, we do not anticipate that these times will be extensive.




Other upcoming changes include:

(a) the entry to the Clouse Conference Room will change from the exterior corridor to the central corridor

(b) the main supply room will move from its current location off the central corridor to a former Nuclear Medicine room, also off the central corridor

(c) the exterior corridor overlooking Joslin Park will be closed off later in the project to become part of the Care Unit, and all traffic will be directed to the central corridor

We look forward to finally consolidating the Care Unit into the main West campus Radiology operations areas on the third floor, and thank you for your patience and cooperation during this project. Please contact Allen Reedy or Bridget O'Bryan if you have any questions.

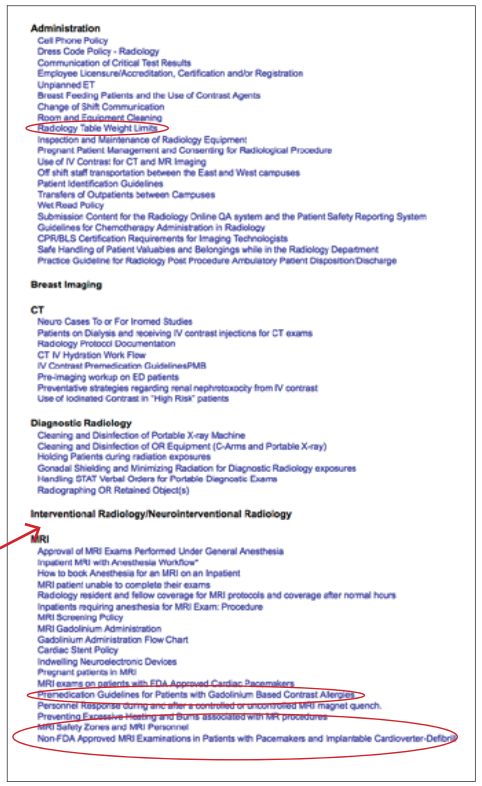

Another happy day in the body MR reading room just after Belgium beat the USA (2-1) in Round 16 of the World Cup on Tues, July 1st -- only to lose to Argentina on Sat, July 5th.

## Departmental News: Updated Policy Notification

*Donna Hallett, BSc*
*Director of Operations*

Beginning this month, Radical Views will be listing departmental policies, procedures, guidelines and directives (PPGD) that are new, have been edited or reviewed with no change (see below). To ensure that you are up to date on the newest, most current information, please click on the link below to view the specific PPGD.


*Note that PPGDs are organized by section rather than Policy Number on this webpage*

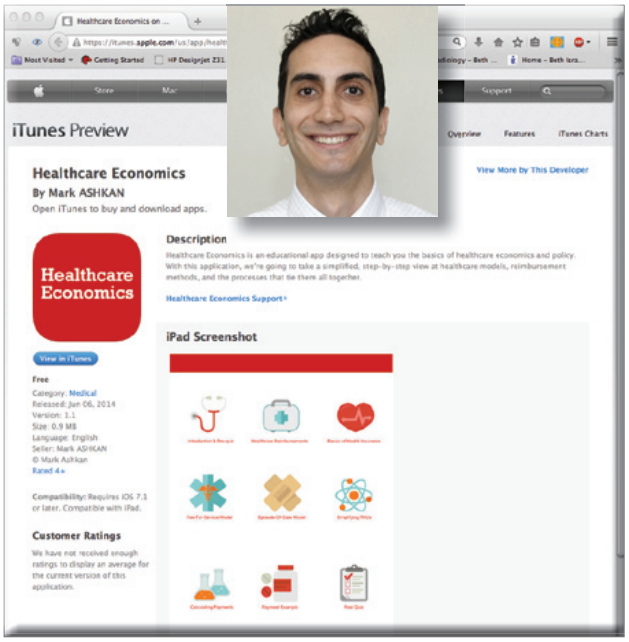



## https://apps.bidmc.org/cms/dispManuals.asp

| Policy Number / Type | Title | Next Review | Comment |
|---|---|---|---|
| RAD-80 Guideline | Premedication Guidelines for Patients with Gadolinium Based Contrast Allergies | 1/14/2016 | **New policy recommendations from ACR** |
| RAD-85 Procedure | Personnel Response During and After a Quench | 5/1/2016 | Reviewed |
| RAD-86 Guideline | Preventing Excessive Heating and Burns associated with MR procedures | 5/1/2016 | Reviewed |
| RAD-88 Guideline | MRI Safety Zones and MRI Personnel | 11/10/2016 | **New policy** |
| RAD-89 Procedure | Non-FDA Approved MRI Examinations in Patients with Pacemakers and Implantable Cardioverter-Defibrillators | 2/4/16 | **New policy** |
| RAD-47 Guideline | Handling of STAT VERBAL portable DX guideline | 1/1/16 | Update - no change |
| RAD-35 Guideline | Radiology Departmental Risk to Fall/Injury Prevention Guideline | 6/1/16 | Update - no change |
| RAD-87 Guideline | Practice Guideline for Radiology Post Procedure Ambulatory Patient Disposition/Discharge | 3/2/16 | Update - no change |
| RAD-61 Guideline | Radiology Table Weight Limits Guideline | 5/1/16 | **Updated** |
| RAD-61 Guideline | Table Weight Limit guideline - Revision #2 | 6/4/14 | **Updated for new equipment** |
| RAD-36 Guideline | Breast Feeding Patients and the Use of Contrast Agents | 6/1/16 | Minor grammatical changes made. The 2013 ACR recommendations remain the same. |
| RAD-75 Guideline | Transfers of Outpatients between Campuses | 6/1/16 | Minor grammatical changes made. |
| RAD-68 Procedure | MRI exams on patients with FDA Approved Cardiac Pacemakers | 3/14/15 | New title |
| RAD-35 Guideline | Rad Dept Risk For Fall Prevention Guide | 6/1/16 | Reviewed |
| RAD-37 Guideline | Patient Unable to Complete Exam | 5/1/16 | New title |

## Residency News

*Priscilla J. Slanetz, MD, MPH*
*Director, Radiology*
*Residency Program*




I wanted to let you know about a new **iPad app** that was developed by one of our graduating residents, **Mark Ashkan**. The content meets the healthcare economics milestones in radiology and starting this July, all of the radiology residents will be expected to download and complete the module by the end of the next academic year. Although it uses imaging cases to take you through the key concepts, I believe there is relevance for trainees and even medical students in other specialties. See the link available for download on iTunes. Health care Economics iPad app: https://itunes.apple.com/us/app/healthcare-economics/id883870108?mt=8

Kudos to 2nd yr resident **Quang Nguyen**, 3rd yr resident **Neda Sedora-Roman**, and 4th yr residents **Sahil Mehta** and **Javier Perez-Rodriguez** for their impressive efforts in getting BIDMC accepted as a **RAD-AID Chapter** as Neda explains below:

*Neda Sedora-Roman*

*Quang Nguyen*

*Sahil Mehta*

*Javier Perez-Rodriguez*

A Nonprofit Public Service
RAD-AID.org
Radiology serving the world

The Radiology Department at Beth Israel Deaconess Medical Center (BIDMC) has been accepted to form part of the RAD-AID Chapters program. RAD-AID International is a nonprofit organization founded by a team of radiologists trained at Johns Hopkins Hospital whose main objective is to improve and optimize access to medical imaging and radiology in developing regions of the world in order to increase radiology's contribution to global public health initiatives and patient care. BIDMC residents already play an active role in international health through a pilot project with Scottish Livingston Hospital in Botswana where images are remotely sent for interpretation. Through this newly established RAD-AID chapter, residents, fellows and attendings will be able to participate in monthly webinars and online presentations from international radiology speakers. In addition, the Radiology Department will be able to benefit from RAD-AID educational resources, help develop or partake in global health research projects sponsored by RAD-AID and strengthen current projects at BIDMC. The radiology residents extend their gratitude to the program directors, Dr. Slanetz, Dr. Kung and Dr. Eisenberg for supporting this endeavor. The BIDMC chapter and its website will be activated in the coming months. Additional information is available now at the following link http://www.rad-aid.org/default.aspx. RAD-AID holds a yearly conference. For anyone interested in attending, this year's conference will be held on Saturday, October 25, 2014 at Johns Hopkins University School of Medicine in Baltimore, Maryland.

## The Gallery:

*Wild Game Photos by Radiology Chair Dr. Jonathan Kruskal, check it out at WCC-304A!*

## Jonathan Kruskal,

*Physician, Photographer & Wild Life Chronicler*

*Inveterate photographer and adventurer, Dr. Kruskal is pleased to share some of his favorite portraits of his beloved South African homeland.*

JB Kruskal: Portraits of my Africa

As always, please contact Donna Wolfe if you, too would like to share your photos, paintings or sculptures: dwolfe@bidmc.harvard.edu or 4-2515

# 21st Risa & Felix Fleischner Graduation Dinner

*On Thursday, June 5th, our 21st Risa & Felix Fleischner Graduation Dinner was held as usual at The Harvard Club on Comm Ave with the utmost elegance!*


Four of our first year residents (Class of 2017): Jenny Steinkeler, Ning Lu, Hannah Perry (with her husband, Andy Hale) and Quang Nguyen (with his wife, Vy Tran) enjoy their first Fleischner event.

Jonny Kruskal bestows a wreath and the Hercules Award to **Barry Sacks** for his Olympic efforts as outgoing Chief of Vascular and Interventional Radiology.

Fleischner Young Investigator Award - **Ammar Sarwar**

RSNA Roentgen Research Award - **Leo Tsai**

Section of the Year Award - **MRI**: Marty Smith, Koenraad Mortele, graduating fellows Leo Tsai and Krithica Kaliannan, Maryellen Sun and Jesse Wei. (Not shown: **Karen Lee**, who was also recognized with the Norman Joffe Award)

Berezin Award for clinical mentoring of fellow residents - **Pauline Bishop**


Omer Awan

Graduating MSK Fellow **Omer Awan** accepts the 2014 Fellow of the Year Award from Jonny Kruskal and it was wonderful that his family (above right) was able to be there with him! Omer will walk up again to receive the 2014 Fellow Award for Excellence in Teaching Medical Students, along with **Kate Troy** who received the 2014 Resident Award for Excellence in Teaching Medical Students; and **Paul Spirn**, **Colin McArdle** and **Gillian Lieberman** (not shown) who likewise received faculty awards from the medical students.


Kate Troy


Paul Spirn


Colin McArdle

Kate Troy and Michael Acord present the Ferris Hall Faculty Award for Excellence in Teaching to **Mary Hochman.**


Monica Agarwal

Tamuna Chadashvili

Left: Priscilla Slanetz presents Humanism Awards *for best demonstrating the ideals of compassionate & respectful care for the physical & emotional well being of patients* to graduating residents **Monica Agarwal** and **Tamuna Chadashvili**.

We were fortunate that Fleischner Distinguished Lecturer **Dr. Bibb Allen** (right) was able to stop in, too!

# New Postings for the Radiology Residents Class of 2014

*Back row: Gunjan Senapati, Tamuna Chadashvili, Pauline Bishop, Monica Agarwal and Liz Asch. Front row: Mark Ashkan, David Glazier, Seth Berkowitz and Samir Shah.*

**Monica Agarwal, MD** – Abd Imaging Fellow, BIDMC

**Elizabeth Asch, MD** – Pediatric Radiology Fellow, Children's Hospital Boston

**Mark Ashkan, MD** – MSK Radiology Fellow, University of California, San Francisco

**Seth Berkowitz, MD** – VIR Fellow, BIDMC

**Pauline M. Bishop, MD** – VIR Fellow, BIDMC

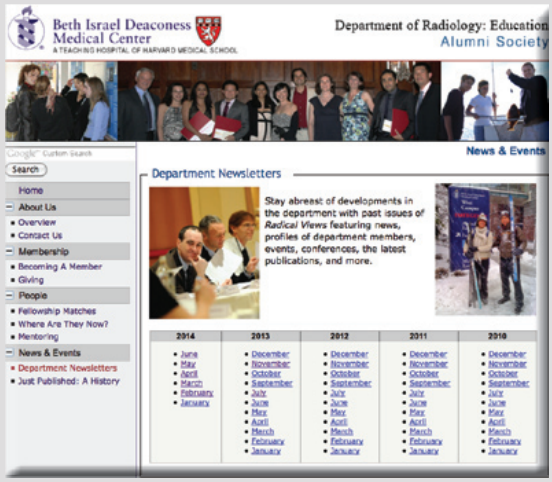
**Tamuna Chadashvili, MD PhD** – Breast Imaging Fellow, BIDMC

**David A. Glazier, MD** – MSK Fellow, BIDMC

**Gunjan M. Senapati, MD** – Breast Imaging Fellow, Brigham & Women's Hospital

**Samir H. Shah, MD** – MSK Fellow, University of Washington, Seattle

***Stay in touch: Join BIDMC Radiology Alumni Association*** *Alumni will receive our monthly Radical Views via our web link below. You can also contact Radical Views Editor Donna Wolfe at 4-2515 or dwolfe@bidmc.harvard.edu with updates, especially after completion of your fellowships!*



# Radiology Fellows Class of 2014 and Where They Are Headed Next

Kristopher Daley, Kate McGillen, Deirdre Moran, Bahar Tamjeedi, Noam Millo, Kamal Sahi.

**Abdominal Imaging:**

**Kristopher J. Daley, MD** – Private Practice, Commonwealth Radiology Associates, MA

**Kathryn L. McGillen, MD** – Radiology Attending, Penn State Hershey Medical Center in Hershey, PA

**Noam Ze'ev Millo, MD** – Radiology Attending, Health Sciences Centre, Winnipeg, Manitoba

**Deirdre Moran, MB BCh** – Returns to St. Vincent's University Hospital, Dublin, IR as a Radiology Attending

**Kamaldeep Singh Sahi, MD** – Attending Radiologist, Misericordia Community Hospital, Edmonton, Albert, Oct 2014

**Bahar Tamjeedi, MD** – Radiology Attending, Montford Hospital, Ottawa, Ontario, Canada

Back row: Richard Sharpe, Debbie Levine, Francesca Proulx, Tejas Mehta, Luis Serano, Mark Knox.
Front row: Seema Prakash, Priscilla Slanetz, Vandana Dialani, Janneth Romero, Valerie Fein-Zachary, Ferris Hall.

**Breast Imaging:**

**Mark T. Knox, MD** – Returns to St. James's Hospital, Dublin, Ireland as an Attending Radiologist

**Richard E. Sharpe, Jr., MD MBA** – Breast Imager, Colorado Permanente Medical Group, Denver

**Women's Imaging**:

**Francesca Proulx, MD CM, FRCPC** – Returns to Montreal as a Breast Imager at the McGill University Health Center General Jewish Hospital, Montreal

Alex Bankier, Pierluigi Ciet, Mariaelena Occhipinti, Benedikt Heidinger, Diana Litmanovich.

**Cardiothoracic Imaging**:

**Peirluigi Ciet, MD** – Returns to complete his PhD at Erasmus Medical Center, Sophia Children's Hospital, Rotterdam, The Netherlands

**Mariaelena Occhipinti, MD** (Cardiothoracic Research) (leaving 12/30/14) – Final year of Residency at Gemelli Hospital, Catholic University of the Sacred Heart, Rome

**Benedikt Heidinger, MD** (Cardiothoracic Research) (leaving 3/6/15) – Returns to complete PhD program in cardiovascular and pulmonary disease, Medical University of Vienna, Austria; will then pursue a residency in radiology

Left: Mary Hochman, Yu-Ching Lin, Omer Awan and Jim Wu. (Not shown: Jennifer Ní Mhuircheartaigh).

**MRI:**

**Krithica Kaliannan, MD** – TBD

**Leo L. Tsai, MD PhD MSc** – Radiology Attending in MR, BIDMC

**Musculoskeletal Imaging**:

**Omer Awan, MD** – Assistant Professor of Radiology in ED and MSK Radiology at Dartmouth Hitchcock Medical Center

**Jennifer Ní Mhuircheartaigh, MD** – Attending Radiologist in MSK, Community and VIR, BIDMC

**Yu-Ching Lin, MD** (MSK Research) – Returns to Taiwan as a Radiology Attending in Medical Imaging & Intervention, Chang Gung Memorial Hospital, Keelung and Chang Gung University, Taiwan

'Vas Garla, Iris Bonilla-Yoon, Anne Marie Sullivan, Jibran Ahmad

**Neuroradiology:**

**Jibran Ahmad, MD** – Private Practice, General Radiologist,

Millennium Medical Imaging (Our Lady of Lourdes Hospital) Binghamton, NY [8/1/2014]

**Iris Bonilla-Yoon, MD PhD** – Private Practice, Emerson Hospital, Concord, MA

**Sreenivas Garla, MD** – Private Practice General Radiologist, Commonwealth Radiology, Salem, MA

**Anne Marie Sullivan, MD** – Private Practice, CRA Medical Imaging at Crouse and Oswego Hospital, Syracuse, NY

Ammar Sarwar, Erica Gupta, Patrick Duffy, Michael Johnson

**Vascular & Interventional Radiology**:

**Patrick Duffy III, MD** – Private Practice at Jefferson Radiology, CT

**Erica A. Gupta, MD** – Attending Radiologist, Metrowest Medical Center, Framingham, MA

**Michael G. Johnson, Jr., MD** – Private practice at Radiologic Associates of Middletown, CT

**Ammar Sarwar, MD** – Attending Radiologist in VIR, BIDMC

*These and many more Fleischner photographs are available for downloading via secure file transfer. Please contact Michael Larson (mlarson1@bidmc.harvard.edu) for further details.*

## **Departmental News:** Vascular & Interventional Radiology Section Send-off of Fellows

Every year, the Interventional Radiology Section sends off their fellows with incredibly well thought out demonstrations of their appreciation where departing fellows and their families are serenaded, roasted and toasted by the angio team. This year, thanks to IR Admin Asst Maxima Baudissin, we were able to get a few shots of all the fun!

Angio fellows leave BIDMC equipped with everything they will need for their new attending roles (mostly hats!) including gifts to remind them of their time at BIDMC.

Our angio fellows . . . The PICC of the litter!

*Photos by Maxima Baudissin*


The Lollipop kids: Each year, the fellows are sent off with a personalized cake featuring their faces to show how young and full of life they were just one year ago!

To round out what seemed like a whole month of milestones, the section also celebrated Jon Underhill's 50th birthday on Monday, June 30th.

On the following pages are the initial versions of the 2014-2015 Staff and Residents/Fellows Posters.

Hard copies will be professionally printed in July once we have final versions.

Please contact Radical Views Editor Donna Wolfe (dwolfe@bidmc.harvard.edu, or call her at 4-1515) with any corrections or changes. Thank You!

= The following 2 posters are DRAFTS ONLY: plz send corrections to dwolfe@bidmc.harvard.edu = Thank you!

# BIDMC Radiology Faculty 2014-2015

HARVARD MEDICAL SCHOOL

## *Clinical and Teaching Faculty*

**Muneeb Ahmed, MD**
Chief, Vascular & Interventional Radiology
35326

**M. Julie Armada, MD**
Breast Imaging/ Community Radiology - BID-Needham
30552

**Alexander A. Bankier, MD, PhD**
Chief, Cardiothoracic Imaging
30753

**Andrew E. Bennett, MD, PhD**
Community Radiology/ BID-Needham/Harrington
31905

**Rafeeque A. Bhadelia, MD**
Clinical Director, Neuroradiology
31875

**Phillip M. Boiselle, MD**
Cardiothoracic Imaging
33402

**Darren Brennan, MD**
Community Radiology - Harrington, BID-Needham

**Ian Brennan, MD**
Vascular & Interventional
94347

**Olga Brook, MD**
Vascular & Interventional
90861

**Felipe B. Collares, MD**
Vascular & Interventional
39676

**Vandana M. Dialani, MD**
Breast Imaging
Director, Breast MRI
32381

**Kevin J. Donohoe, MD**
Nuclear Medicine & Molecular Imaging
32407

**Ronald L. Eisenberg, MD**
Cardiothoracic Imaging/MSK
Assoc. Dir., Residency Prog.
30801

**Per Eldh, MD**
Community Radiology - BID-Needham
(781) 453-3053

**Salomao Faintuch, MD**
Vascular & Interventional
38931

**Valerie Fein-Zachary, MD**
Breast Imaging
32841

**Alice Fisher, MD**
Neuroradiology/Community Radiology - BID-Needham
91611

**Elisa N. Flower, MD**
Emergency / Community Radiology - BID-Needham
39321

**Peter H. Gordon, MD**
Community Radiology
4-2506

**Peter D. Gross, MD**
Breast Imaging/ Community Radiology - Lexington, 1101 Beacon
35191

**David B. Hackney, MD**
Chief, Neuroradiology
33505

**Ferris M. Hall , MD**
Musculoskeletal/Breast Imaging
31614

**Mary G. Hochman, MD, MBA**
Chief, Musculoskeletal Imaging
33060

**Robert A. Kane, MD**
Co-Director, Ultrasound
Director, Abd Ultrasound
92055

**E. Jane Karimova, MD**
Breast Imaging
7-3102

**Jonathan Kleefield, MD**
Neuroradiology
4-2009

**Gerald M. Kolodny, MD**
Chief, Nuclear Medicine & Molecular Imaging
31971

**Herbert Y. Kressel, MD**
Magnetic Resonance Imaging
7-0299

**Jonathan B. Kruskal, MD, PhD**
Abdominal Imaging
91408

**Justin Kung, MD**
Musculoskeletal Imaging/ Community Radiology - Harrington
Assoc. Dir., Residency Prog
91203

**Karen S. Lee, MD**
Emergency Radiology/MRI
Director, Rad Fellowship Prog
91642

**Robin Levenson, MD**
Interim Chief, Emergency Radiology
32858

**Deborah Levine, MD**
Co-Director, Ultrasound
Director, OB/GYN Ultrasound
7-8901

**Gillian Lieberman, MD**
Director, HMS Student Radiological Education
4-2597

**Diana Litmanovich, MD**
Cardiothoracic Imaging
Director, Cardiac Imaging
94016

**Colin McArdle, MD**
Ultrasound
31968

**Colm McMahon, MD**
Musculoskeletal Imaging
35854

**Tejas S. Mehta, MD, MPH**
Chief, Breast Imaging
Ultrasound
33053

**Gul Moonis, MD**
Neuroradiology
34224

**Koenraad Mortele, MD**
Director, Clinical Magnetic Resonance Imaging
35930

**Jenny Ni Muircheartaigh, MD**
Musculoskeletal Imaging/ Community Radiology/VIR
94354

**J. Anthony Parker, MD, PhD**
Nuclear Medicine & Molecular Imaging
31978

**Jordana Phillips, MD**
Breast Imaging / Community Radiology - Harrington/Hubbard
93741

**Vassilios Raptopoulos, MD**
Director, Computed Tomography
32653

**Dean J. Rodman, MD**
Community Radiology
Chief of Radiology, BID-Needham
35130

**Rafael Rojas, MD**
Neuroradiology
34676

**Janneth Y. Romero, MD**
Thoracic Imaging/Ob/Gyn
91216

**Barry A. Sacks, MD**
Vascular & Interventional
91052

**Ammar Sarwar, MD**
Vascular & Interventional / Informatics
90857

**Luis F. Serrano, MD**
Director, Breast Imaging Harrington Hospital
34629 or (504) 481-9934

**Sejal Shah, MD**
Emergency Radiology
94164

**Robert Sheiman, MD**
Abdominal Imaging
Co-Director, Vascular Lab
33097

**Bettina Siewert, MD**
Chief, Abdominal Imaging
35791

**Priscilla Slanetz, MD, MPH**
Breast Imaging
Director, Residency Program
90767

**Marty P. Smith, MD**
Interim Chief, Harrington
Abd Imaging/MRI
Director, Community MRI
91218

**Paul W. Spirn, MD**
Cardiothoracic Imaging
33484

**Maryellen R. Sun, MD**
Abd Imaging/MRI
Director, GU Imaging
91701

**Leo Tsai, MD PhD MSc**
Abd Imaging/MRI/ MRI Research
90858

**Girish Tyagi, MD**
Abdominal Imaging / Community Radiology - Harrington, BI-Needham
33538

**Shambhavi Venkataraman, MD**
Breast Imaging
94023

**Jesse L. Wei, MD**
MRI/Abd Imaging
Director, IT Radiology
39014

**Jim S. Wu, MD**
Musculoskeletal Imaging
38932

*Per Diem & Courtesy Staff*

**Phoebe Lewit Olhava, MD**
Community Radiology

**Laura Perry, MD**
Vascular & Interventional
32836

## *Research Faculty & Technical/Adjunct Staff*

**David C. Alsop, PhD**
Director, Rad Research
Director, MR Research
7-0275

**Alexander Brook, PhD**
Statistician
7-0273

**Deborah Burstein, PhD**
MR Research
7-3349

**Melvin E. Clouse, MD**
Cardiovascular Research
4-2529

**Weiying Dai, PhD**
MR Research
7-3266

**John V. Frangioni, MD, PhD**
Molecular Imaging
7-0692

**S. Nahum Goldberg, MD**
Adjunct Faculty
Abd Imaging Research
(4-2674 M. Ahmed)

**Aaron K. Grant, PhD**
MR Research
7-3265

**Thomas H. Hauser, MD**
Cardiac Nuclear Imaging
7-4363

**Frank S. Levy, PhD**
Image utilization/ Health Care Policy (MIT)
617-253-2089

**Warren J. Manning, MD**
Cardiac MR
31144

**Matthew R. Palmer, PhD**
Manager,
Medical Imaging Physics
38077

**Subhendra Sarkar, PhD**
MRI Physicist
7-2757

**Chun-Shan Yam, PhD**
Director,
Departmental Computing
38076

2014 RADIOLOGY RESIDENTS & FELLOWS

# Radiology Residents and Fellows 2014-2015

*Beth Israel Deaconess Medical Center*

## *Residents (40)*

### 1st Years (10)


Thomas Anderson, MD
95242


John Cavanaugh, MD MBS
95243


Jeffrey Dines, MD
95244


Anthony Esparaz, MD
95245


Daon Ha, MD
95246


Christopher Hostage, MD
95247


Stella Lam, MD
95248


Jason Song, MD
95249


Powen Tu, MD PhD MSc
95250


Catherine Wei, MD PhD
95251

### 2nd Years (10)


Christine Chen, MD
37527


Andrew (Drew) Colucci, MD
37528


Matthew Del Guzzo, MD
37529


Jawad Hussain, MD, MSc
37530


Ning Lu, MD
37531


Quang Nguyen, MD
37532


Hannah Perry, MD, MSc
37533


Jennifer (Jenny) Steinkeler, MD
37534


Komal Talati, MD
37535


Amanda Trotter, MD
37536

### 3rd Years (11)


Caitlin Connolly, MD
92289


Lauren Ferrara, MD
92290


David Khatami, MD, PhD
92291


Jonathan Kim, MD
92292


Pritesh Mehta, MD
92293


Matthew Miller, MD, PhD
92294


Tonguc Pinar, MD
93726


(Diamanto) Amanda Rigas, MD
92295


Neda Sedora-Roman, MD
92296


Yuri Shif, MD
92297


George Watts, MD
92298

### 4th Years (9)


Michael Acord, MD
93718
*Chief Resident*


Edward Ahn, MD
93719


Rashmi Jayadevan, MD
93720
*Chief Resident*


Ann Leylek, MD
93722


Mark Masciocchi, MD
93723


Sahil Mehta, MD
93724


Javier Perez-Rodriguez, MD
93725


Patrick Redmond, MD
93727


Katherine Troy, MD
34767
*Chief Resident*

## *Clinical Fellows (21)*


Monica Agarwal, MD
Abd
90900
*Chief Fellow*


Seth Berkowitz, MD
VIR
94339


Pauline Bishop, MD
VIR
94342


Nadia Caplan, MD, MSc
Body MRI
95252


Tamuna Chadashvili, MD PhD
Breast Imaging
94340


Yu-Ming Chang, MD, PhD
Neuro
95253


Micah Cohen, MD
MSK
95254


Cameron Cummings, MD
Neuro
95255


David Glazier, MD
MSK
94341
*Chief Fellow*


Almamoon Justaniah, MD
VIR
95256


Thomas Keimig, MD
Abd
95257

Jeremy O'Brien, MD
Abd
95258


Elena Resnick, MD
Body MRI
95259


Kimberly Smith, MD
Neuro
95260


Karen Song, MD
Cardiothoracic
95261


Amogh Srivastava, MD
Abd
95262


Corinne Strickland, MD, MSc
Abd
95263


Nathaniel Temin, MD
Abd
95264


Irene Tseng, MD
Breast Imaging
95265


Cynthia Wallentin, MD
Neuro
95266


Raphael Yoo, MD, MS
VIR
95267

**Clinical Fellows by Section:**

**Abd Imaging** (6)- Agarwal, Keimig, O'Brien, Srivastava, Strickland, Temin
**Body MRI** - Caplan, Resnick
**Breast Imaging** - Chadashvili, Tseng
**MSK** - Cohen, Glazier
**Neuroradiology** (4) - Chang, Cummings, Smith, Wallentin
**Cardiothoracic Imaging** - Song
**VIR** (4) - Berkowitz, Bishop, Justaniah, Yoo

## *Research Fellows (9)*


Elisa Franquet, MD
NMMI
7-2099


Huzifa Haj-Ibrahim, MBBS
Cardiac CT
7-2535


Benedikt Heidinger MD
Cardiothoracic Imaging
7-3141


Guarav Kumar, PhD
Minimally Invasive Tumor Therapy Lab
(857) 204-2573


Yu-Ching (Jason) Lin, MD
MSK
7-1286


Mariaelena Occhipinti, MD
Cardiothoracic Imaging
7-2606

Ninad Salastekar, MD MPH
Cardiac CT
7-2535


Gopal Varma, PhD
MRI
7-0281


Yuanguo (Garry) Wang, PhD
Minimally Invasive Tumor Therapy Lab
(617) 319-6927

## WELCOME 2014-2015 RADIOLOGY CLINICAL FELLOWS

With the new academic year kicking into full gear this week, we would like to introduce to you the incoming group of fellows across subspecialties. We are excited to welcome them into our department and know that they will be a wonderful group to work with over the next year. ***[Please see the June 2014 Radical Views for an introduction to the incoming Residents!]***

### Abdominal Imaging

***Monica Agarwal, MD***: Monica is staying on at BIDMC for fellowship after completing residency training here in June. A graduate of Boston University School of Medicine, she enjoys traveling, photography, dancing and scuba diving outside of work.

***Thomas Keimig, MD***: Tom is a graduate of Wayne State University School of Medicine in Detroit, MI. He completed his residency at Henry Ford Hospital, also in Detroit, and he comes to us with an extensive background in research, having worked as a Research Assistant in the Hypertension and Vascular Division at Henry Ford Hospital before medical school.

***Jeremy O'Brien, MD***: Originally from Canada, Jeremy graduated from the University of Western Ontario and completed his residency in radiology at McGill University in Montreal. Outside of medicine, he enjoys music and sports, and considers himself to be an avid international traveler.

***Amogh Srivastava, MD***: A graduate of Wayne State University School of Medicine in Detroit, MI, Amogh completed his residency in diagnostic radiology at Rhode Island Hospital/Brown University. As a resident, he was highly involved in cardiac imaging research as well as quality improvement projects involving the implementation of new technologies.

***Corinne Strickland, MD, MS***: Corinne received her medical degree from the University of Arizona and completed her diagnostic radiology residency at the University of New Mexico. In addition to her career in medicine, she also holds a Masters degree in Genetic Counseling from Brandeis University and served in the Peace Corps in the Central African Republic.

***Nathaniel Temin, MD***: Nate is a graduate of Tufts University School of Medicine in Boston and completed his residency at Lahey Clinic Medical Center in Burlington. Outside of medicine, he enjoys competitive tennis, international travel and supporting Boston sports teams.

### Breast Imaging

***Tamuna Chadashvili, MD, PhD***: Tamuna is staying on with us after completing her residency training here in June. Receiving her MD/PhD from Chicago Medical School, Tamuna continued to fuel her interest in research as a resident by working on various projects with neuroradiology and breast imaging. This led to her completing a mini-fellowship in Radiology Research as a 4th Year and receiving a Certificate of Excellence at graduation.

***Irene Tseng, MD***: Irene is a graduate of the University of Michigan Medical School in Ann Arbor and she completed her residency at the University of Pittsburgh Medical Center, where she also served as chief resident. Outside of medicine, she enjoys art, photography, piano and tennis.

### MRI

***Nadia Caplan, MD, MSc***: Nadia received both her medical degree and her Masters degree in Neurobiology and Genetics from Hebrew University in Jerusalem, Israel. She comes to our department with an extensive background in research, having published 13 papers (three as first author) in the fields of ophthalmology and genetics prior to starting her residency which she just completed at Hadassah Medical Center in Israel in June.

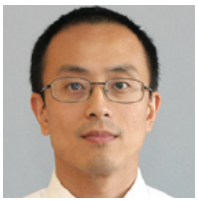
***Elena Resnick, MD:*** Elena is a graduate of Tufts University School of Medicine in Boston. She completed two years of Internal Medicine training here at BIDMC prior to transferring into the diagnostic radiology program at Maine Medical Center in Portland, ME. Outside of medicine, her interests include oil painting, distance running and spending time with her children.

## MSK

***Micah Cohen, MD***: Micah graduated AOA from Temple University School of Medicine, where he participated in research in orthopedic surgery. He completed his residency training at Mount Sinai Medical Center in New York, NY prior to joining our department. He enjoys ice hockey (he was president and captain of the men's league in medical school), weightlifting and traveling.

***David Glazier, MD***: Dave is continuing at BIDMC after completing his residency training here in June and is a graduate of Tufts University School of Medicine. Outside of medicine, Dave has a strong interest in website design and development, having created several sites since medical school and he co-developed a radiology-specific application for teaching files.

## Neuroradiology



***Yu-Ming Chang, MD, PhD***: Yu-Ming completed a combined MD-PhD program at Boston University School of Medicine and stayed on at BU, completing his residency at Boston Medical Center in June. Outside of medicine, he is trained in wushu and sanshou, forms of traditional Chinese kick-boxing. He is also an avid collector of 1st edition books by American authors and Chinese ethnographic authentic weapons.

***Cameron Cummings, MD***: Cameron is a graduate of the Medical College of Wisconsin in Milwaukee and he completed his residency training at the University of Nebraska Medical Center in Omaha, NE. His interests include running, traveling, reading Shakespeare and building computers.

***Kimberly Smith, MD***: Kimberly graduated AOA from Temple University School of Medicine, where she stayed to complete both her surgical internship and radiology residency. Though her medical education and training have all taken place in Philadelphia, she is no stranger to Boston, having spent a summer at Harvard Medical School in the Institute of Chemistry and Cell Biology conducting cell cycle research.

***Cynthia Wallentin, MD***: Cynthia is a graduate of the Alpert Medical School at Brown University and she completed her residency training at Norwalk Hospital in Connecticut. Outside of medicine, she enjoys cooking, baking, reading and spending time with family.

## Cardiothoracic Imaging

***Karen Song, MD***: Karen graduated from Stony Brook University School of Medicine in New York and completed her residency training in diagnostic radiology at Long Island Jewish Medical Center. Throughout residency, she maintained a dedicated interest in radiology research, completing several projects, including one on *"Diagnosing Fatty Liver on Contrast-enhanced Abdominal CT Scan."*

## Vascular & Interventional Radiology

***Seth Berkowitz, MD***: Seth is staying on at BIDMC for fellowship after completing residency training here in June and he received his medical degree from Johns Hopkins University School of Medicine in Baltimore. Throughout his residency, he developed several radiology-specific iPad applications, which are being used to help educate both his peers and patients.

***Pauline Bishop, MD***: Pauline graduated from Boston University School of Medicine in Georgia and completed her residency here at BIDMC in June. Prior to her starting her career as a physician, Pauline was Director of the Behavior Department at NorthShore Healthcare Center, a neuro-rehabilitation center. Outside of medicine, she enjoys rugby (voted MVP of her college team!) and working on "DIY" projects for her home.

***Almamoon Justaniah, MD***: Almamoon is a graduate of Umm Al Qura University in Saudi Arabia, and he received a Masters in Bioethics from Case Western Reserve University. He recently completed his radiology residency at Lahey Clinic Medical Center in Burlington, MA. His interests outside of medicine include travel, cars and outdoor activities.

***Raphael Yoo, MD, MS***: Raphael earned a Masters in chemistry and biochemistry from University of Delaware and received his medical degree from Drexel University College of Medicine where he also completed his residency training at Drexel University/Hahnemann University Hospital. He enjoys playing rugby, football and ultimate Frisbee.

# Getting from ALWAYS EVENTS to "WE CARE"

Aideen Snell, MSW
Service Excellence
Program Manager

From a healthcare quality standpoint we work very hard to keep "NEVER EVENTS" from happening in Radiology but what about "ALWAYS EVENTS"? As Radiology staff we interact with patients throughout the day and we are responsible for maintaining a relationship with our patients, regardless of how long or short these interactions are. Within this relationship are "ALWAYS EVENTS" that should always take place so that the patient knows who you are and what to expect, and feels that all their needs are being met.

Ultrasound supervisor, Juanita Cook, is a member of our Radiology Action Planning Committee, an in-house group dedicated to creating process improvement action items from the data we receive from the survey. Devoted to improving the patient experience, Juanita came up with a creative way to insure that we all remember our ALWAYS EVENTS through the use of the acronym WE CARE! The poster below has been distributed to all sections and the reminder for patients to take our survey is now included in all patient intake clipboards. *Thank you Juanita for all your hard work on improving the patient experience!*

At BIDMC RADIOLOGY
**WE CARE**

**W**ELCOME your PATIENT and their FAMILY MEMBERS

**E**XPLAIN who you are and YOUR ROLE IN THEIR CARE

**C**LARIFY (or confirm) reason for their visit and tell them WHAT TO EXPECT

**A**NSWER any QUESTIONS any CONCERNS respectfully and patiently

**R**EMEMBER to close the visit and EXPLAIN NEXT STEPS

**E**NCOURAGE PATIENT to provide FEEDBACK regarding their experience


BIDMC RADIOLOGY CARES
ABOUT YOUR
EXPERIENCE TODAY


SURVEY KIOSK IN WAITING AREA

PLEASE TAKE A MOMENT TO TELL US

Ultrasound staff sonographer Sheila Nadeau also illustrates her dedication to the tenets of "We Care" through her welcoming door decorations in her section. At Christmas Sheila also uses her artistic and creative skills to delight patients with doors wrapped as packages.


## Image Archive Week at BIDMC

During the week of June 23rd, the accomplishments of the Image Archive section of the department were recognized. This area touches each and every section of the department by the transfer of images, and do an exceptional job. The week included breakfasts, lunches and other goodies provided by the department sections. A big thank you to all in Image Archive for a job well done!

Thanks,
*Jim Brophy*
*Radiology PACS/Informatics Manager*

(L to R): Maritza Delalle, Ivelisse Oyola, Natalia (Gina) Noldseiro, Susan Nelson, Maryann Michilik, Joshua Fowler and Bessie Gray. Not pictured: Farrah Issa, Diane Diggs, Natalee Frazer, Thomas Konieczka, Cherki Benchraka, Norma Estwick and Carol McCann.

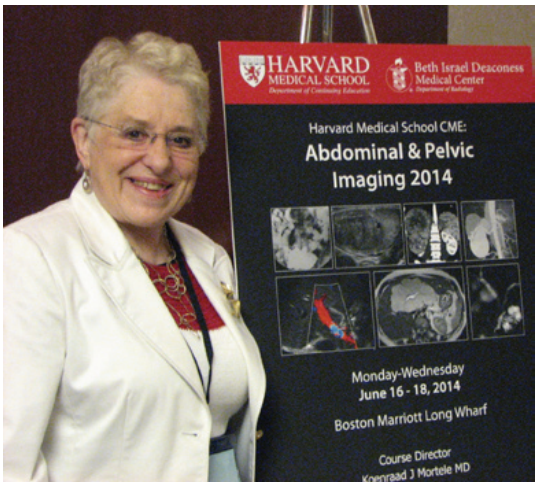
**KUDOS -** Each month, we share the positive feedback we receive about staff members and ask you to join us in congratulating them; as always, we are especially proud to acknowledge an unprecedented constellation of staff for providing outstanding care and service!

### Ultrasound

**Plinio Cabrera** was very helpful in assisting with coverage at the West Campus covering our unit coordinator's role. He quickly learned the basics to keep the area functioning. I also wanted to acknowledge the work Plinio has been doing to assist in training staff on the Golvo lift. He has worked with Juanita to train and refresh staff on this departmental goal.

**Elise Cook** was identified as a super user for our new Epiq US systems and has been very helpful in training staff in its functionality. She continues to be very supportive when staff has questions and providing feedback to staff.

## HMS CME: Abdominal & Pelvic Imaging 2014, Boston Marriott Long Wharf Hotel June 16-18, 2014



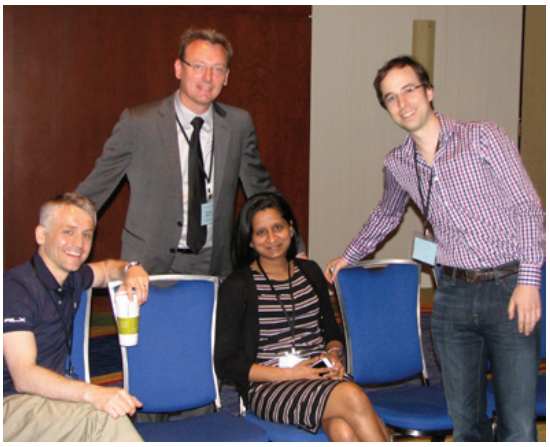

Lois Gilden again ensures a seamless registration process and course flow over 3 days.

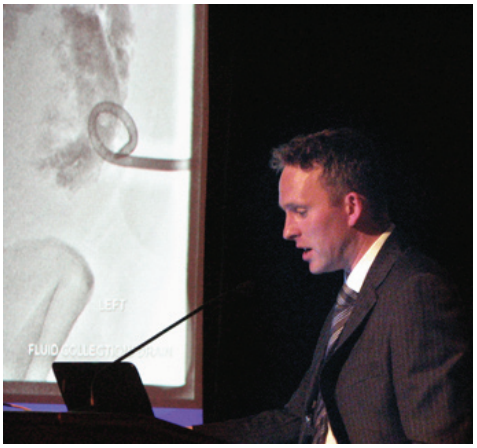
Supported by unrestricted educational grants from Bracco and Guerbet, and directed by MRI Chief Koenraad Mortele, Abdominal & Pelvic Imaging 2014 welcomed 100 participants from countries such as the USA, Canada, The Netherlands, Chile, Australia, Slovenia, Nigeria, Sweden, and Bangladesh at the Boston Marriott Long Wharf Hotel …and as usual, the faculty and staff enjoyed the chance to socialize and relax after a job well done! (*Clockwise from the left:* Frank Miller (Northwestern University), Koenraad Mortele, Liina Poder (UCSF), Jesse Wei, Marty Smith, Lois Gilden, Jim Gilden, Dejana Mortele and Ian Brennan.)

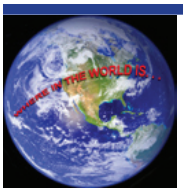
Below left: Graduating fellows (l to r) Mark Knox (Breast Imaging), Krithica Kaliannan (Body MRI), and Noam Millo (Abd Imaging) take advantage of this opportunity to experience the CME with Koenraad Mortele (center).

Below middle: Ian Brennan delivers his talk on the pearls and perils of percutaneous catheter drainage on Tuesday morning.

Below right: Dr. Mortele's family, youngest daughter Mila and wife, Dejana, show their support!








## Radiology Alumni: Where in the world is . . .
## Rola Shaheen?

"I have been busy focusing on improving breast screening participation numbers at SEHA as well as the quality of reporting for radiologists - a lot of challenges mainly after the published Canadian study in Feb 2014 questioning the value of screening mammography.

Anyways I thought it will be helpful to run a workshop and invite the radiologist in chief for breast imaging at Ontario Breast Screening Program from Cancer Center Ontario (Dr. Derek Muradali) and his senior provincial mammographer. It was a truly successful workshop in March which included hands on screening workshop sponsored by GE using universal workstations (http://www.ameinfo.com/blog/healthcare/mafraq-hospitals-ana-rosa-team-conducts-workshop-improve-quality-breast-screening-abu-dhabi/)

*Breast MRI Workshop*

Also in April it was a great privilege to work closely with Dr. Gillian Newstead from the University of Chicago on the Breast MRI course in Dubai sponsored by Philips.

In April, I was invited to speak in Saudi (Dammam) at the Cancer Forum 2014 where we shared challenges facing breast cancer in the region and how to overcome the barriers.

Lastly, we are working with Hologic™ on a workshop to improve technologists' skills and introduce new emerging technologies such as tomosynthesis.

I really hope we can raise the bar in practicing breast imaging in UAE through these hands-on workshops. The results are encouraging, slowly but surely.

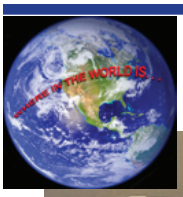
I am also excited to be invited by NCI, UICC and Breast Health Global Initiative to review the "Knowledge Summaries of Comprehensive Breast Cancer Control" which will serve as communication toolkit to policy makers and clinicians – it always feels great when I can brainstorm on these topics with my wonderful friends and colleagues at BIDMC who have genuine interest in improving global breast health!"

*Rola (center), her family and friends at Atlantis, The Palm Island resort in Dubai (note the faithful Red Sox fan!)*


*Phillips Breast MRI Course 2014*


*Rola at the Saudi Cancer Forum 2014*

*BIDMC alumna and faculty, Rola Shaheen, MD FRCPC keeps us up to date in her global activism efforts in breast imaging as Chief of Women's Imaging and lead radiologist for breast imaging strategic planning for SEHA (Abu Dhabi Health Services) in the United Arab Emirates is wonderful to keep us abreast of her work in the Middle East.*




## More Radiology Alumni: Where in the world is . . . former resident Mai Lan Ho?

## and a Publication Call Out: Neuroradiology Signs


In July 2013, Mai-Lan left Boston to pursue a Neuroradiology Fellowship at University of California, San Francisco. In July 2014 she will be continuing as a Clinical Instructor and Chief Fellow.

Co-Author Ron Eisenberg

I was excited when Mai-Lan asked me to be the co-author of Neuroradiology Signs, her first but doubtless not her last book in the field. Unlike my Atlas of Signs in Radiology, which was published exactly three decades ago, Mai-Lan's book is in color and focuses on a single subspecialty. What is most amazing is that she wrote and edited most of the book while studying for her oral board examination!

*Courtesy of Amazon.com:*

**NEURORADIOLOGY SIGNS**
- Mai-Lan Ho and Ronald L. Eisenberg

A COMPREHENSIVE, FULL-COLOR GUIDE TO NEURORADIOLOGY SIGNS ACROSS ALL IMAGING MODALITIES
Publication Date: June 20, 2014 | ISBN-10: 0071804323 | ISBN-13: 978-0071804325 | Edition: 1

The first book of its kind, Neuroradiology Signs provides a multimodality review of more than 440 neuroradiologic signs in CT, MR, angiography, radiography, ultrasound, and nuclear medicine. It is designed to enhance your recognition of specific imaging patterns, enabling you to arrive at an accurate diagnosis.

## 2014 BIDMC Radiology Publications [New Citations in Blue*].

*A PubMed search for new BIDMC publications is made each month; however, if we miss your paper, please send the reference to dwolfe@bidmc.harvard.edu.*

*Note that publications do not always appear in Pubmed in the same month they are actually published and publications listing an Epub date may be updated in the new year, thus their paper publication will appear in 2014. In these cases, the EPUB date is **highlighted**.**

**Ahmed M**, Solbiati L, Brace CL, Breen DJ, Callstrom MR, Charboneau JW, Chen MH, Choi BI, de Baère T, Dodd GD 3rd, Dupuy DE, Gervais DA, Gianfelice D, Gillams AR, Lee FT Jr, Leen E, Lencioni R, Littrup PJ, Livraghi T, Lu DS, McGahan JP, Meloni MF, Nikolic B, Pereira PL, Liang P, Rhim H, Rose SC, Salem R, Sofocleous CT, Solomon SB, Soulen MC, Tanaka M, Vogl TJ, Wood BJ, **Goldberg SN**; For the International Working Group on Image-guided Tumor Ablation, Interventional Oncology Sans Frontières Expert Panel, Technology Assessment Committee of the Society of Interventional Radiology, and the Standard of Practice Committee of the Cardiovascular and Interventional Radiological Society of Europe. Image-guided Tumor Ablation: Standardization of Terminology and Reporting Criteria-A 10-Year Update. Radiology. 2014 Jun 13:132958. PMID: 24927329.

Akçakaya M, Gulaka P, Basha TA, Ngo LH, **Manning WJ**, Nezafat R. Free-breathing phase contrast MRI with near 100% respiratory navigator efficiency using k-space-dependent respiratory gating. Magn Reson Med. 2014 Jun;71(6):2172-9. doi: 10.1002/mrm.24874. PMID: 23900942; PMCID: PMC3870033.

Al-Hawary MM, Francis IR, Chari ST, Fishman EK, Hough DM, Lu DS, Macari M, Megibow AJ, Miller FH, **Mortele KJ**, Merchant NB, Minter RM, Tamm EP, Sahani DV, Simeone DM. Pancreatic ductal adenocarcinoma radiology reporting template: consensus statement of the society of abdominal radiology and the american pancreatic association. Gastroenterology. 2014 Jan;146(1):291-304.e1. doi: 10.1053/j.gastro.2013.11.004. PMID: 24355035.

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## MRI SAFETY MONTH

*MRI presented 4 safety tips in June that we reproduce here for easy reference*

Jeremy Stormann

The goal of the weekly tips and the June 9th MRI Safety lecture by Dr. Martin Smith is to provide the basic safety information needed to avoid accidents and injuries in the MRI environment. MRI safety training has become an extremely important standard in patient, employee and visitor safety.

Education is the most important factor to reduce the risk of injury in the MRI department. Anyone who works in or around an MRI department, or who may encounter the MRI environment, can prevent accidents and injuries when properly educated on MRI safety.

The MRI department understands that some of this information may not impact you directly, but we hope you find it informative and educational. Additionally, the department hopes you gain a new perspective about the modality and the hard work the MRI technologists do every day to ensure the safety of all who enter the MRI environment.

Thank you,
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MRI Safety Tip #1

# PREVENTING PATIENT BURNS IN MRI

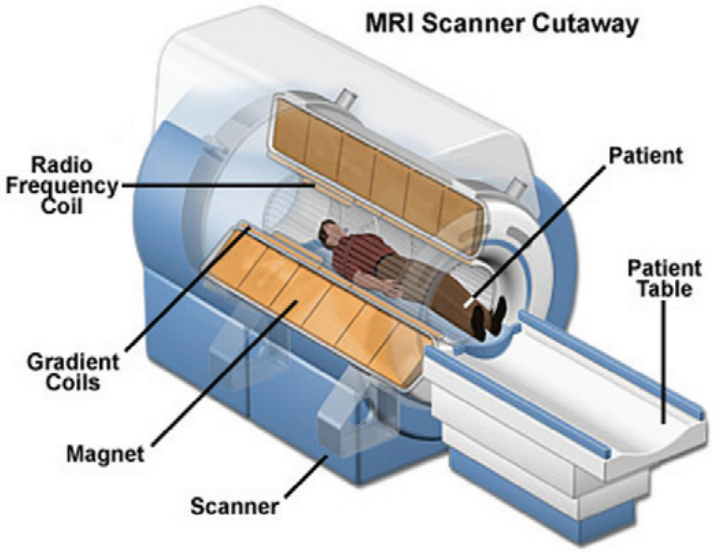


## ❖ Why are burns a concern in MRI?

Of the three types of fields that create safety concerns in MRI, two cause concern for patient burns during an MRI examination.

1) **Gradient Field** (also called a Time-Varying Magnetic Field)

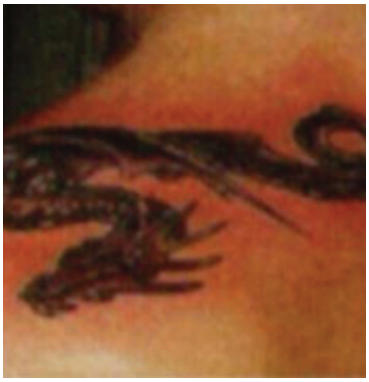
   Rapid switching of the Gradient Field that occurs during an MRI can produce current induction (Faraday's Law of Induction) through loops made by cables from the MRI coils or wires from monitoring equipment. The current induction leads to heating and radiofrequency concerns which can ultimately cause burns.




2) **Radiofrequency (RF) Field**

   The RF Field can cause tissue or implant heating.

   1) When tissue overheats, it can cause a burn similar to that of a sunburn.
   2) Just like touching a hot pan on a stove, when an implant heats and becomes too hot, it can cause a burn to the tissue it is touching.


## ❖ How do burns occur in MRI?

- Loops formed by the cables from MRI coils or wires from monitoring equipment. The result is local RF heating that can cause a burn.
- Ineffective patient protection from the magnet and the imaging coils/equipment. For example, allowing the patient's arms to rest against the inside walls of the magnet (bore) or resting MRI coil cables directly onto the patient.
- Not following the RF Field and Specific Absorption Rate (SAR) restrictions as developed by the manufacturer for a medically implanted device. Additionally, SAR restrictions must be met for any exam performed, regardless of whether or not the patient has an implant.

**IEC and FDA guidelines on SAR and heating in human MRI studies**

| Limit | Whole-Body Average | Heat Average | Head, Trunk Local SAR | Extremities Local |
|---|---|---|---|---|
| IEC (6-minute average) | | | | |
| Normal (all patients) | 2 W/kg (0.5° C) | 3.2 W/kg | 10 W/kg | 20 W/kg |
| First level (supervised) | 4 W/kg (1° C) | 3.2 W/kg | 10 W/kg | 20 W/kg |
| Second level (IRB approved) | 4 W/kg (>1° C) | >3.2 W/kg | >10 W/kg | >20 W/kg |
| Localized heating unit | 39° C in 10 g | 38° C in 10 g | | 40° C in 10 g |
| FDA | 4 W/kg for 15 min | 3 W/kg for 10 min | 8 W/kg in 1 g for 10 min | 12 W/kg in 1 g for 5 min |

- Insufficient screening prior to an MRI. Patients can have permanent makeup or tattoos that can burn. They can also be wearing medication patches that can cause burns. Inpatients need to have monitoring equipment switched over to MRI Safe monitoring equipment.
- Improper care of the imaging equipment and coils such as rips or tears in the coil cables or exposed wires in the coils.

***Table 1: Summary of FDA burn reports associated with ECG monitoring**

| Burn Description | Frequency/Severity | Suggested Causes |
|---|---|---|
| Burn area underneath electrode | 84 FDA reports<br>19 third-degree<br>10 second-degree<br>55 severity not specified | Formation of cable loop<br>Close proximity of cable to inside surface of MR bore wall<br>Electrode characteristics<br>Large Patients<br>Higher power investigations |
| Burn on patient's finger | 1 FDA report | ECG cable in contact with patient's finger |
| Burn at sites of ECG cable | 1 FDA report | Loop formation<br>Large patient<br>Small surface area electrodes used |

***Table 2: Summary of FDA burn reports associated with imaging coils**

| Burn Description | Frequency |
|---|---|
| Burn to patient's arm | 2 FDA reports |
| Burn to patient's thumb and thigh | 1 FDA report |
| Burn to patient's hand and buttock | 4 FDA reports |
| Burn to patient's neck | 4 FDA reports |
| Burn to patient's leg | 2 FDA reports |
| Burn to patient's shoulder and arm | 3 FDA reports |
| Burns to point of skin contact with coil cable | 1 FDA report |
| Burn area not specified 6 FDA reports | 6 FDA reports |

***Tables 1,2** from ***Thermal Injuries Associated with MRI*** by Mary F. Dempsey and Barrie Condon, Clinical Radiology 2001.

## ❖ Who is responsible for preventing burns in MRI and what can be done to prevent them? *(See BIDMC Policy #RAD-86 for more information)*

### ➢ MRI Technologist

1) Thoroughly screen the patient prior to the MRI.
2) Have the patient change into hospital clothing and remove any personal items such as jewelry and medication patches.
3) Switching inpatients to MRI compatible monitoring equipment and removing any monitoring equipment used by the floor.
4) Following any restrictions set forth by the manufacturer of medical implants.
5) Routine checks of equipment and coils.
6) Protect the patient inside the scanner.
   - ✓ Properly cushioning the arms and other parts of the body to prevent them from touching the inside walls of the scanner.
   - ✓ Providing protection from coil cables, ensuring the cables are not directly touching the patient. Also, there should be at least 1 cm of insulation between the patient's skin and the coil or the coil itself should be padded.
   - ✓ Making sure there are no loops in coil cables or in any monitoring wires.

### ➢ MRI Physicist

1) Testing of medical implants is necessary to ensure the safety of the patient. Testing reveals the way the implant will behave in the MRI field, specifically the amount it heats during the MRI. Implants that heat more within the field are given specific SAR values that the technologist must adhere to and stay within during the MRI.
2) Developing ways to safely scan patients with particular implants that are conditional for MRI and pose an elevated safety threat to the patient such as a Deep Brain Stimulator (DBS).

### ➢ MRI Engineer

1) Test coil and scanner function to ensure they are working properly.
2) Check the coils for integrity looking for tears, cracks, or exposed wires and repairing or replacing the damaged coil.

# MRI SAFETY FOR MEDICALLY IMPLANTED DEVICES



## ❖ Why are medically implanted devices a concern?

- **The strength of the magnetic field (Static Magnetic Field) can**:
  - Move implants from the location it was placed within the body causing injury to the patient. The injury can potentially be life threatening
- **The radiofrequency (RF) field can**:
  - Cause burn injuries to the anatomy near or surrounding the implant
- **Both the RF field and the static magnetic field can**:
  - Damage the implanted device
  - Alter the function of the implanted device

➢ At BIDMC, the strength of our clinical scanners is either 1.5 Tesla or 3.0 Tesla.
Being double the strength, 3.0 Tesla scanners pose a higher concern to implanted devices. Many implanted devices that are safe to scan at 1.5 Tesla are either unsafe or conditional (safe but with specific guidelines) at 3.0 Tesla.

## ❖ A few examples of implanted devices that pose a concern and why:

| | | |
|---|---|---|
| **Pacemakers** | ○ Movement and/or vibration of the pulse generator or lead(s)<br>○ Temporary or permanent modification of function<br>○ Inappropriate sensing, triggering or activation<br>○ Excessive heating of the lead(s) and/or induced currents in the lead(s)<br>○ Broken or abandoned lead(s) | Unsafe Pacemakers_mrisafety.com |
| **Stimulators** | ○ Movement and/or vibration of the generator or electrode(s)<br>○ Temporary or permanent modification of function<br>○ Excessive heating of the electrode(s) and/or induced currents in the electrode(s)<br>○ Broken or abandoned electrode(s) | Unsafe Stimulation Devices_mrisafety.com |
| **Stents, Filters and Grafts** | ○ Movement and/or vibration within 6 weeks of implantation (after 6 weeks the device typically secures itself in the tissue, in most cases from ingrowth.<br>○ Excessive heating<br>○ Drug eluting stents can be altered resulting in dose inaccuracies | mrisafety.com does not list any as being unsafe but many are conditional and some are not safe for 3.0 Tesla scanning |
| **Aneurysm Clips** | ○ Movement and/or vibration<br>○ Excessive heating | Unsafe Aneurysm Clips_mrisafety.com |
| **Otologic and Ocular Implants** | ○ Movement and/or vibration<br>○ Excessive heating | Unsafe Otologic Implants_mrisafety.com<br>Unsafe Ocular Implants_mrisafety.com |

## ❖ What is done about the safety concerns?

- Screening
  - Trained personnel meticulously screen patients, employees and visitors
  - Ensure a complete and accurate medical history
- Complete and Thorough Surgical Documentation
  - Any surgical procedures must be documented completely to provide the products and materials used specifically stating make and model of any implanted device
- Product Information & Testing
  - Manufacturer testing of all products needs to be done to determine the safety of the device and any restrictions that may be necessary
- Static Magnetic Field Strength
  - Check product information to determine the strength of scanner that can be used for scanning
- Parameter Adjustments
  - For MR conditional implanted devices, it may be required for the technologist to adjust imaging parameters to ensure scanning is performed within Specific Absorption Ratio (SAR) restrictions
- Coil Choice
  - Transmit/receive coil vs Receive only coil
  - Receive only coils use the body coil as a transmitter and result in a higher whole-body SAR
  - Transmit/receive coils transmit RF then change to a receive mode to receive the MR signal and result in a reduction to whole-body SAR
- Scanning Specific Areas
  - Some device manufacturers state that it is okay to scan a patient with a particular device if you do not scan in a specific area of the body; for instance, when the first MRI Safe Pacemaker was approved, scanning was restricted in the area between C1-T12

## ❖ BIDMC MRI: Best in Practice

- **Deep Brain Stimulators (DBS)**
  - BIDMC MRI Physicist, **Subhendra Sarkar**, has been working diligently on improving image quality for patients with Deep Brain Stimulators. He has continuously improved a Low SAR technique to safely scan these patients while obtaining high image quality.
    - ✓ S.N. Sarkar, E. Papavassiliou, D. Hackney, D. Alsop, L. Shih, A. Madhuranthakam, R. Busse, S. La Ruche, R. Bhadelia. **Three-Dimensional Brain MRI for DBS Patients Within Ultra-Low Radiofrequency Power Limits.** Movement Disorders, Vol. 00, No. 00, 2014.
    - ✓ S.N. Sarkar, E. Papavassiliou, R. Rojas, D.L. Teich, D.B. Hackney, J. Stormann, and R.L. Alterman. **Low-Power Inversion Recovery MRI Preserves Brain Tissue Contrast for Patients with Parkinson Disease with Deep Brain Stimulators.** *AJNR Am J Neuroradiol originally published online on March 27, 2014, 10.3174/ajnr.A3896.*

- **MRI-Safe Pacemakers**
  - BIDMC MRI began scanning patients with FDA-approved MRI Safe Pacemakers in March of 2012
  - MRI Safe Pacemakers include the Medtronic Revo Surescan and the newer model, Medtronic Advisa Surescan
- **Other Pacemakers**
  - BIDMC MRI and Cardiology have developed procedures and policies to safely scan patients with Pacemakers that are not the FDA-approved MRI Safe models
  - BIDMC will be one of only a few institutions in the nation to be scanning patients with Pacemakers that are not MRI Safe models
- **Additional challenging implants BIDMC MRI safely scans with careful imaging procedures**
  - Vagal Nerve Stimulators (VNS)
  - Depth Electrodes
  - Intra-thecal drug delivery systems such as Baclofen Pumps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# MRI CONTRAST SAFETY



## ❖ What intravenous (IV) contrast agents are used MRI?

### ➢ Gadolinium-based contrast agents (GBCAs)

- GBCAs contain gadolinium which is a paramagnetic metal ion. Paramagnetic ions move differently within a magnetic field making GBCAs useful in MRI.
- GBCAs are manufactured by a chelating process. Chelating is a procedure in which large organic molecules form a stable complex around an ion, gadolinium in this case. The stability gained from chelating the gadolinium reduces the chances of toxicity.
- GBCAs are not iodine-based and therefore, there is no cross-reactivity with patients who have iodine contrast allergies.

### ➢ BIDMC MRI uses five types of Gadolinium-based contrast agents for imaging:

| Agents | Structure/Charge | Chelate | Elimination |
|---|---|---|---|
| **Multihance** | Linear/Ionic | Gadobenate Dimeglumine | Renal |
| **Gadavist** | Macrocylcic/ Non-Ionic | Gadoutrol | Renal |
| **Prohance** | Macrocyclic/Non-Ionic | Gadoteridol | Renal |
| **Eovist** | Linear/Ionic | Gadoxetate Disodium | Renal and Hepatobiliary |
| **Ablavar** | Linear/Ionic | Gadofosveset | Renal |

## ❖ Why is Gadolinium a safety concern?

### ➢ Nephrogenic Systemic Fibrosis (NSF)

- NSF, formerly known as nephrogenic fibrosing dermopathy (NFD), is a systemic disorder that affects the skin and connective tissues throughout the body. The disorder, first identified in 1997, leads to skin thickening that may inhibit flexion and extension of joints. It can also cause fibrosis of other organs including the lungs. It is a progressive disease and it may be fatal.
- NSF has only been found to develop in patients in moderate to end stage renal disease.
- It is possible that, patients with kidney disease have more difficulty eliminating the GBCA and therefore, the GBCA has an opportunity to break apart or lose its chelate, thereby becoming toxic.
- Some of the patients that developed the disease received a GBCA dose that exceeded the recommended dose in product labeling.
- There is no known treatment for NSF.
- The use of a macrocyclic contrast agent has been a good way of decreasing the risk of NSF along with proper screening before the exam.

## ➢ Reaction

- **Frequency of occurrence is between 0.07%-2.4% with the majority being mild reactions which include:**

| Allergic-like | Physiologic |
|---|---|
| Limited urticarial / pruritis | Limited nausea / vomiting |
| Limited cutaneous edema | Transient flushing / warmth / chills |
| Limited itchy / scratchy throat | Headache / dizziness / anxiety / altered taste |
| Nasal congestion | Mild hypertension |
| Sneezing / conjunctivitis / rhinorrhea | Vasovagal reaction that resolves spontaneously |

http://www.acr.org/Quality-Safety/Resources/Contrast-Manual

- **Moderate reactions resembling an allergic response are very unusual and vary in frequency from 0.004%-0.7%. These types of reactions include:**

| Allergic-like | Physiologic |
|---|---|
| Diffuse urticarial / pruritis | Protracted nausea / vomiting |
| Diffuse erythema, stable vital signs | Hypertensive urgency |
| Facial edema without dyspnea | Isolated chest pain |
| Throat tightness/hoarseness without dyspnea | Vasovagal reaction that requires and is responsive to treatment |
| Wheezing / bronchospasm, mild or no hypoxia | |

http://www.acr.org/Quality-Safety/Resources/Contrast-Manual

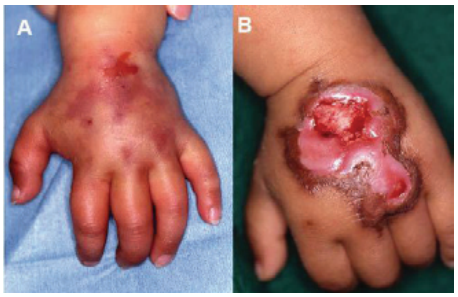
- **Severe anaphylactoid or non-allergic anaphylactic reactions are rare. These have a frequency rate of 0.001%-0.1%. Severe reactions include:**

| Allergic-like | Physiologic |
|---|---|
| Diffuse edema or facial edema with dyspnea | Vasovagal reaction resistant to treatment |
| Diffuse erythema and hypotension | Arrhythmia |
| Laryngeal edema with stridor and/or hypoxia | Convulsions, seizures |
| Wheezing / bronchospasm, significant hypoxia | Hypertensive emergency |
| Anaphylactic shock (hypotension & tachycardia) | |

http://www.acr.org/Quality-Safety/Resources/Contrast-Manual

- Patients with increased risk for gadolinium contrast reaction:
  - ✓ Asthma
  - ✓ Allergies – increased risk (≈2.0-3.7 times greater risk)
  - ✓ Prior adverse reaction to an iodinated contrast agent – twice as likely to have an adverse reaction to gadolinium.
- It is important to note that it is possible for a patient to have a "delayed reaction". Such reactions may develop between 30-60 minutes after contrast administration but can also occur up to 1 week later.
- At risk patients can be pre-medicated with corticosteroids. (BIDMC Policy #RAD-80)
- Can a patient receive an injection of Gadolinium if the type to be used is different than the type that caused a reaction in a prior MRI exam?
  - ✓ Yes. There is no cross-reactivity between different GBCAs since they have a different chemical makeup (chelate).

- **Extravasation**
  - When contrast escapes the vein into the surrounding tissue.
    - ✓ Characterized by sudden onset of pain, redness, or extreme pallor at the injection site
    - ✓ Tissue necrosis may occur if the extravasation is severe
  - IV sites should always be checked prior to administration of GBCAs for proper function and to be sure all parts of the IV are connected properly.
  - All precautions should be taken to ensure there will not be increased pressure during a power injection (picking a good IV site, keeping the arm straight instead of bent, using a proper gauge IV catheter).




- **Toxicity**
  - Could result from exposure to free gadolinium.
  - The stability gained from chelating the gadolinium reduces the chances of toxicity.
- **Pregnancy**
  - Standard GBCA has been shown to cross the placenta in primates and appear within the fetal bladder within 11 minutes after IV administration, therefore; GBCA crosses the blood-placental barrier into the human fetus. However, to date, there have been no known adverse effects to human fetuses reported when clinically recommended dosages of GBCAs have been given to pregnant women.
  - Because it is still unclear how GBCAs will affect the fetus, these contrast agents should be administered only with extreme caution and the potential risks of GBCA should be considered prior to proceeding with the MRI. They should only be used if it is considered to be critical and the potential benefits outweigh the risk to the fetus.
  - See BIDMC policy #RAD-65.

## ❖ How is it determined if a patient can receive Gadolinium?

- GBCA administration is determined by several factors including patient history, age, gender, race, and creatinine value. All of these factors, except patient history, factor into the estimated glomerular filtration rate (eGFR). The eGFR value is more comprehensive that the creatinine value alone and determines whether a patient has kidney disease and to what extent.
- All outpatients 60 years of age or older, must have a current creatinine value within 30 days of the exam.
  - If they do not, we have iSTAT devices that can provide a creatinine reading within 5 minutes. However, as stated in our policy, there are some considerations that must be weighed as the iSTAT result may vary slightly from a traditional lab test.
- Additionally, any outpatient that answers "YES" to any of the following "Choyke" questions must have a current creatinine value within 30 days of the exam.
  - Have you ever been told you have renal or kidney problems?
  - Have you ever been told you have protein in your urine?
  - Do you have high blood pressure?
  - Do you have diabetes?
  - Do you have gout?
  - Have you ever had kidney surgery?
- All inpatients must have a current creatinine value within 24 hours of the exam due to the increased risk of acute renal disease.
- Please see BIDMC Policy #RAD-57 for greater detail.

## ❖ Are there any known drug interactions with the various GBCAs used in MRI at BIDMC?

- Yes. Multihance has a list of drug interactions that include the following:
  - Cisplatin
  - Anthracyclines,
  - Vinca alkaloids
  - Methotrexate
  - Etoposide
  - Tamoxifen
  - Paclitaxel

**References:**

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MRI Safety Tip # 4

# MRI EQUIPMENT SAFETY & TROUBLESHOOTING

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While MRI continues to evolve and improve, it remains one of the safest of all diagnostic procedures to be developed in modern medicine. Although imaging in MRI is very safe, proper procedures and safety precautions must be in place and followed appropriately to prevent injury from the potential risks associated with the magnetic field.

## ➢ Protecting employees, patients and visitors in the MRI Department:

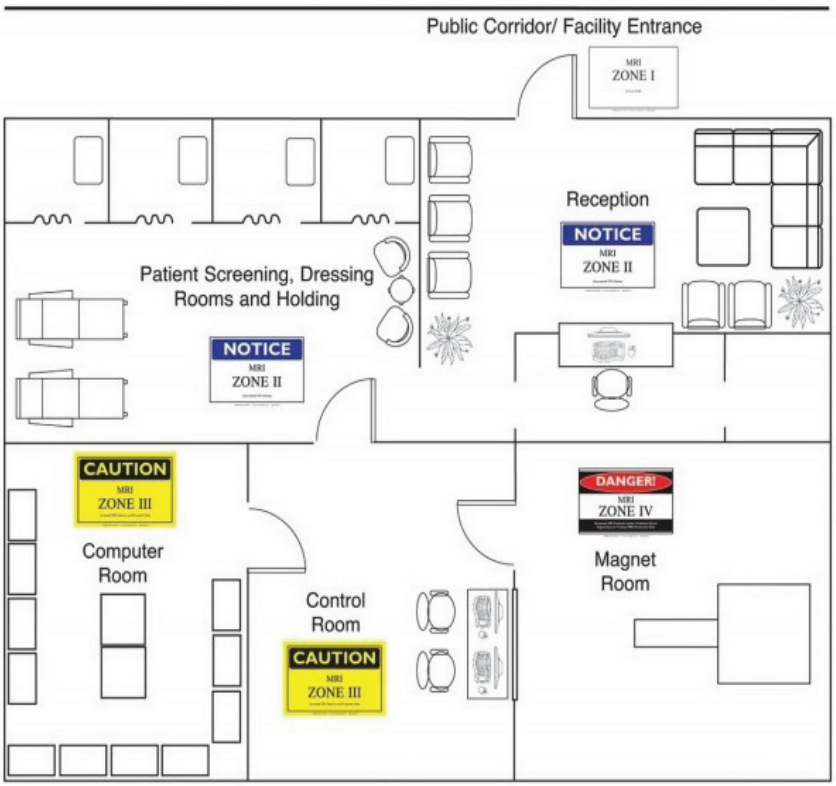
- Unrestricted access to the MRI department by untrained individuals or non-MRI personnel may result in serious injury or death as a result of the interactions between the individuals or equipment and the magnetic field of the MRI scanner.
- BIDMC MRI follows the ACR Guidance on MRI Safe practices for MRI department zoning. The MRI department is divided into four zones. (See BIDMC policy #RAD-88)

## GENERIC MRI ZONE DIAGRAM

**ZONE I**: Includes all areas that are freely accessible to the general public. Area is typically outside the MRI department and is the area through which patients, health care personnel, and other employees access the MRI department.

**ZONE II**: Typically patients are greeted in this area and are not free to move throughout the area unless under the supervision of MRI personnel. This is also the area where non-MRI personnel are screened.

**ZONE III**: In this area, free access by unscreened non-MRI personnel or ferromagnetic objects or equipment can create potential injury or death if it eventually enters Zone IV. All access to Zone III is to be strictly restricted, with access to regions within it controlled by, and entirely under the supervision of, MRI personnel.



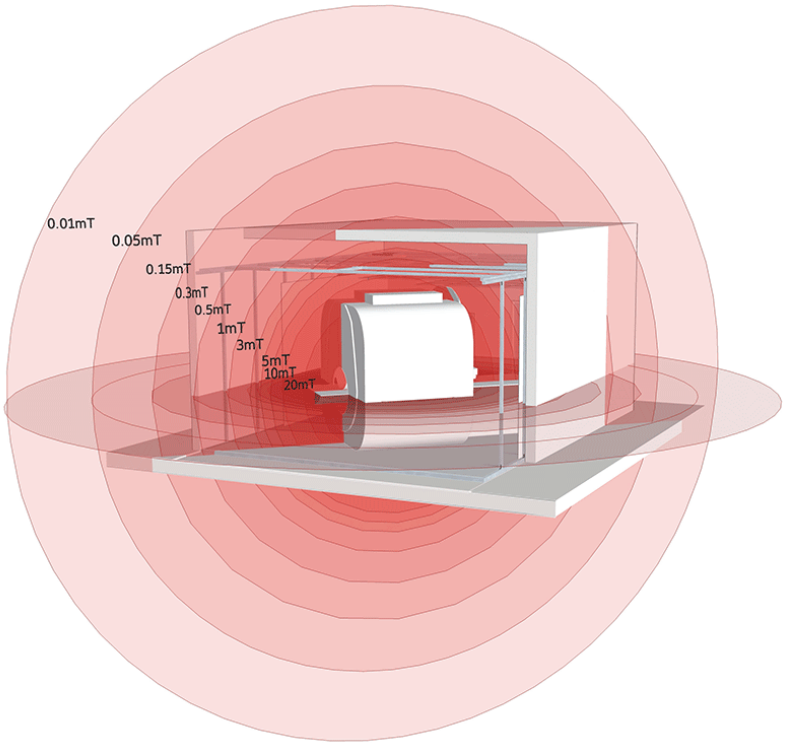

**ZONE IV**: This area is synonymous with the MRI scanner and the scanner room itself. Non-MRI personnel should be accompanied by, or under the immediate supervision of, and in visual or verbal contact with, one specifically identified Level II MRI personnel for the entirety of their duration within this area.

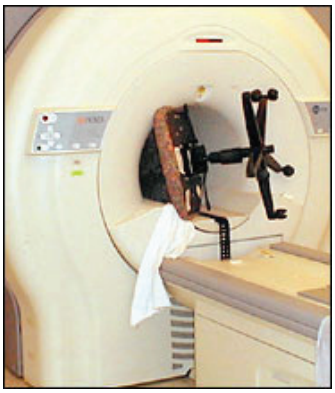
***Only Level II MRI personnel may move freely about all zones.**

# TIP # 4: MRI EQUIPMENT SAFETY & TROUBLESHOOTING

- ✓ The following personnel descriptions are provided to help understand the level of training distinguished by the ACR for various personnel groups that work in or may encounter an MRI department.
  - Level II MRI personnel are individuals who have been extensively trained and educated in the broader aspects of MRI safety issues, including, for example, issues related to the potential for thermal loading or burns and direct neuromuscular excitation from rapidly changing gradients. Level II personnel includes MRI technologists, MRI tech aides, MRI service personnel, MRI physicists, radiologists and designated personnel within the Radiology department.
  - Level I MRI personnel are individuals who have passed minimal safety educational efforts to ensure their own safety as they work within the MRI department.
  - Non-MRI personnel are individuals who have not had any MRI safety training or who have not had any formal training within the previous 12 months.

- ✓ The magnetic field extends in 3-dimensions. The magnetic field in MRI is large enough to extend into other areas or floors of the facility. Therefore, MRI zoning may extend to those areas, including other floors. Most MRI departments are designed and constructed to keep the magnetic field within the MRI scanner room.
  - ❑ An invisible boundary defined by the magnetic field's 5 Gauss Line is referred to, and often marked on floors and walls, for safety. The 5 Gauss Line (0.05mT) is the boundary at which the concern for the "missile effect" is the greatest.
  - ❑ The "missile effect" is the most dangerous safety concern in MRI. It occurs when magnetic forces pull magnetic items toward the center of the scanner or bore.



- ✓ As field strength and the mass of an object increase, so does the force of attraction between the two. A heavy object is pulled into the scanner as fast as or faster than a lighter object.
- ✓ The magnetic field can also twist or dislocate metallic components in electronics, power tools and medical implants.

- Labeling of equipment and items as MRI Safe, MRI Conditional and MRI Unsafe.
  - ✓ MRI Safe: Items that have been tested and proven to be safe in all MRI environments.
  - ✓ MRI Conditional: Items that are considered safe in most MRI environments but may have conditions or limitations to their use. These items must never be brought into the MRI environment without prior approval by Level II MRI personnel.
  - ✓ MRI Unsafe: Items that must never be brought into the MRI environment.




## ➢ Potential emergencies in MRI: What needs to be done for the safety of all involved?

- Emergency Situations
  - ✓ Code Blue / Medical Emergency
    - Press the Emergency Table Stop button on the keyboard, intercom device or magnet.
    - Manually retract the table and remove the patient from the magnet room.
    - Access into the magnet room needs to be restricted to ensure emergency personnel do not accidently enter the room.
  - ✓ Fire or any concern for electrical equipment (smoke, sparks, water around equipment, etc.)
    - Press the Emergency Off button on the wall.
    - Remove the patient from the magnet room.
    - Access into the magnet room needs to be restricted to ensure emergency personnel do not accidently enter the room. If emergency personnel need to enter the magnet room, they should be screened and their equipment checked for MRI compatibility.


- Quench
  - ✓ Liquid helium and liquid nitrogen are the most common cryogens used for MRI scanners. If the cryogens are exposed to room air the liquids will boil off rapidly and expand into a gaseous state producing several potential safety concerns.
    - Asphyxiation: The cryogenic gases replace oxygenated air.
    - Frostbite: The temperatures of the cryogenic liquids are extremely low.
    - Pressure: The thermal expansion of the cryogens can positively pressurize the magnet room and entrap persons inside until the pressure is equalized.
  - ✓ MRI scanner rooms are designed with an exhaust pipe/vent to safely draw the escaping cryogens out of the room to prevent the safety concerns above. Many designs are now including a second form of pressure relief in case the exhaust vent does not work properly.
  - ✓ In the event of an unexpected quench, the following steps should be followed:
    - Press the Emergency Table Stop button.
    - Immediately open the door to the magnet room. If the door doesn't open, it may be necessary to relieve the pressure from the room by breaking the viewing window. This is to be done with extreme caution as it is dangerous due to broken glass. However, it may be difficult to break the window due to the way the window was shielded for RF.
    - Remove the person/patient from the room as quickly and safely as possible.
  - ✓ If a person/patient gets pinned between the magnet and a ferromagnetic object, it may be necessary to initiate a magnet quench. In this situation, the following steps should be followed:
    - Press the Emergency Off button on the wall to power down the system.
    - Press the Emergency Quench button (encased in a plastic cover).
    - Remove the person/patient from the room as quickly and safely as possible.
  - ✓ A controlled quench performed by an engineer may need to be performed if an object has been pulled into the scanner. An attempt to remove an object from the scanner should not be made by any person other than an engineer. The engineer can perform a full quench or slowing ramp down the magnet, lessening its strength to have the ability to remove the object.

**References:**

1) Kanal E, Barkovich JA, Bell CB, et al. **ACR guidance document on MR safe practices**: Journal of Magnetic Resonance Imaging 2013; 37:501-530
2) Shellock, Frank G, Ph.D. and Shellock R & D Services, Inc. http://www.mrisafety.com/
3) Falck Alford Productions. **MRI Safety Level 1: Staff and Facility Personnel**. 2012.
4) Wardray Premise Limited. **RF Shielding for MRI Installations**. 2011. http://www.wardray-premise.com/structural/mri.html

MRI Safety Tip # 4 June 2014
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