

2016 AAPM Spring Clinical Meeting
Clinical MRI Safety
Saturday, March 6, 2015: 2-4 PM

Model MRI Safety Program

The University Hospitals / Case Western Reserve Experience

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Disclosure

No relevant disclosures

Objectives for Today

To describe:

- History of program and current status
- Real-world challenges (and solutions) when implementing ACR MR safety guidelines

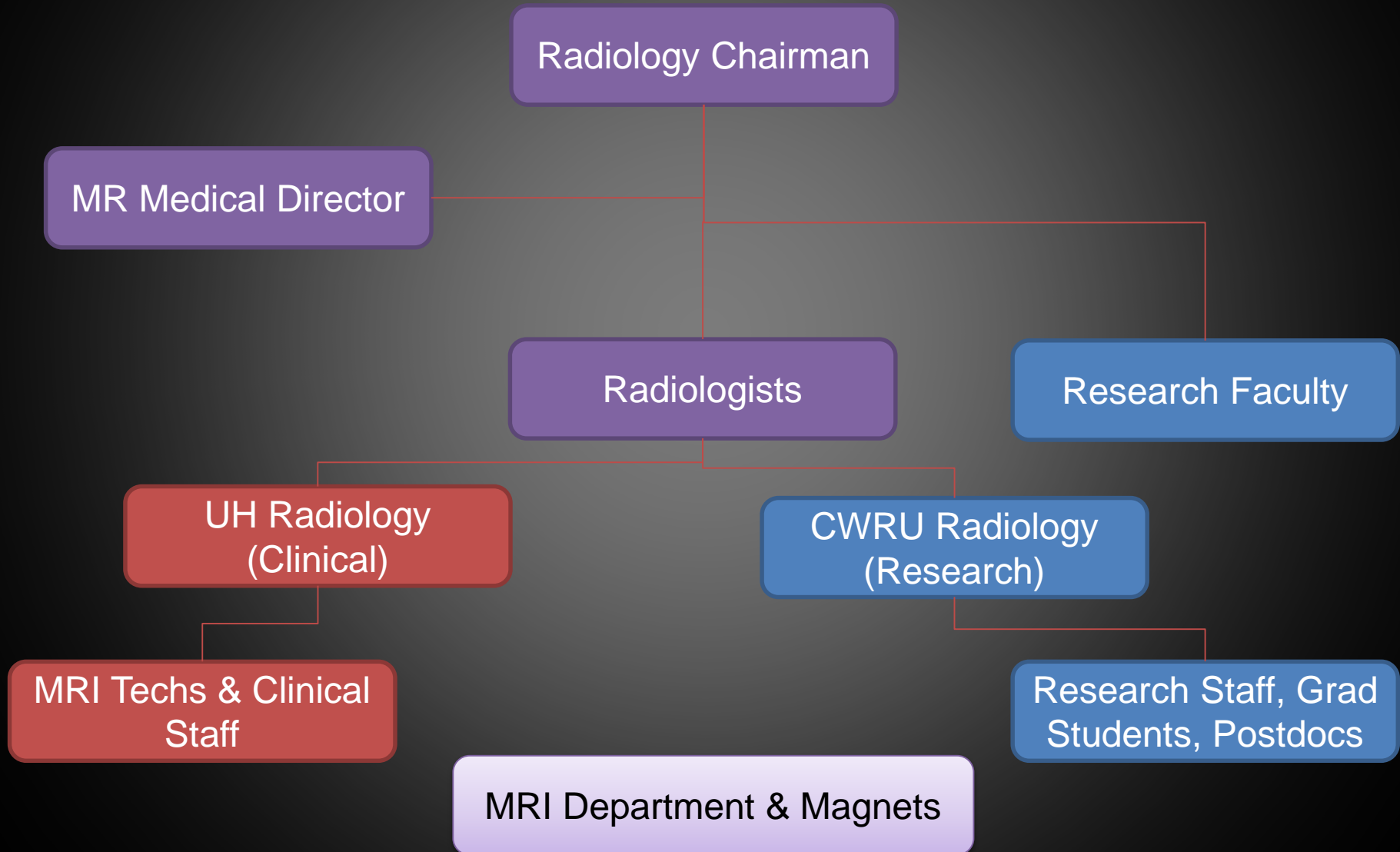
Limitations

Insufficient time to discuss all aspects of comprehensive program

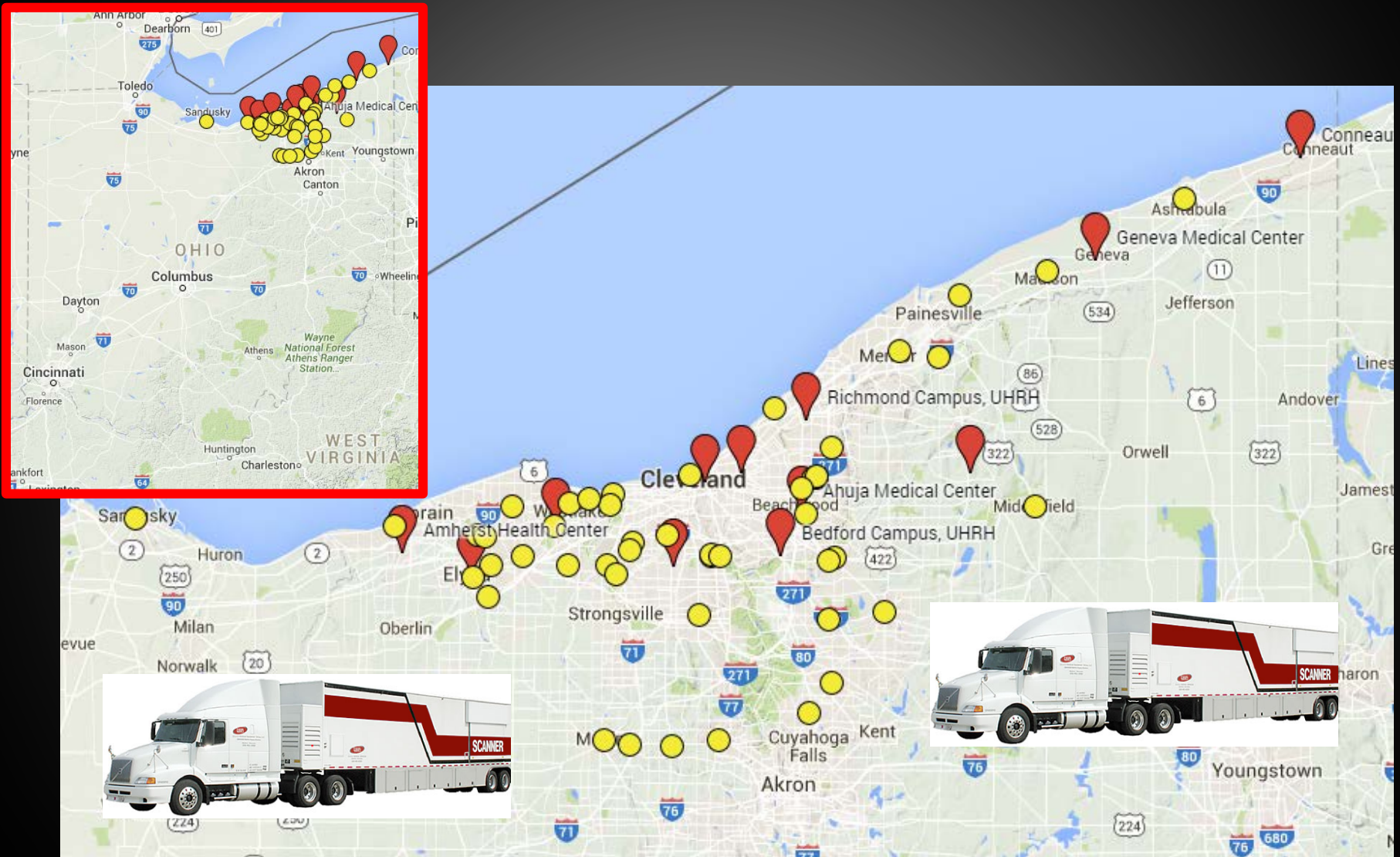
General approach: address all recommendations of:

- ACR Guidance Document on MR Safe Practices
- ACR Manual on Contrast Media

Organization of our MR program:



UH Regional Radiology operations:



32 magnets in 26 facilities

Michael Colombini (2001)



Fatal injury: strike from ferrous O2 tank

2003: Wheelchair and Oxygen tank





2003: Floor Buffer machine



2007: IV Pole



2011: Laundry Hamper



2013: IV Pole





2011-2015: Stepping Up Our Program

Zone 3 & 4 Access Control

Training for “visiting” personnel

Screening cooperation with inpatient units

Master policy & program for the health system

Medical physicist safety audits

Program Authority and Leadership

ACR Guideline:

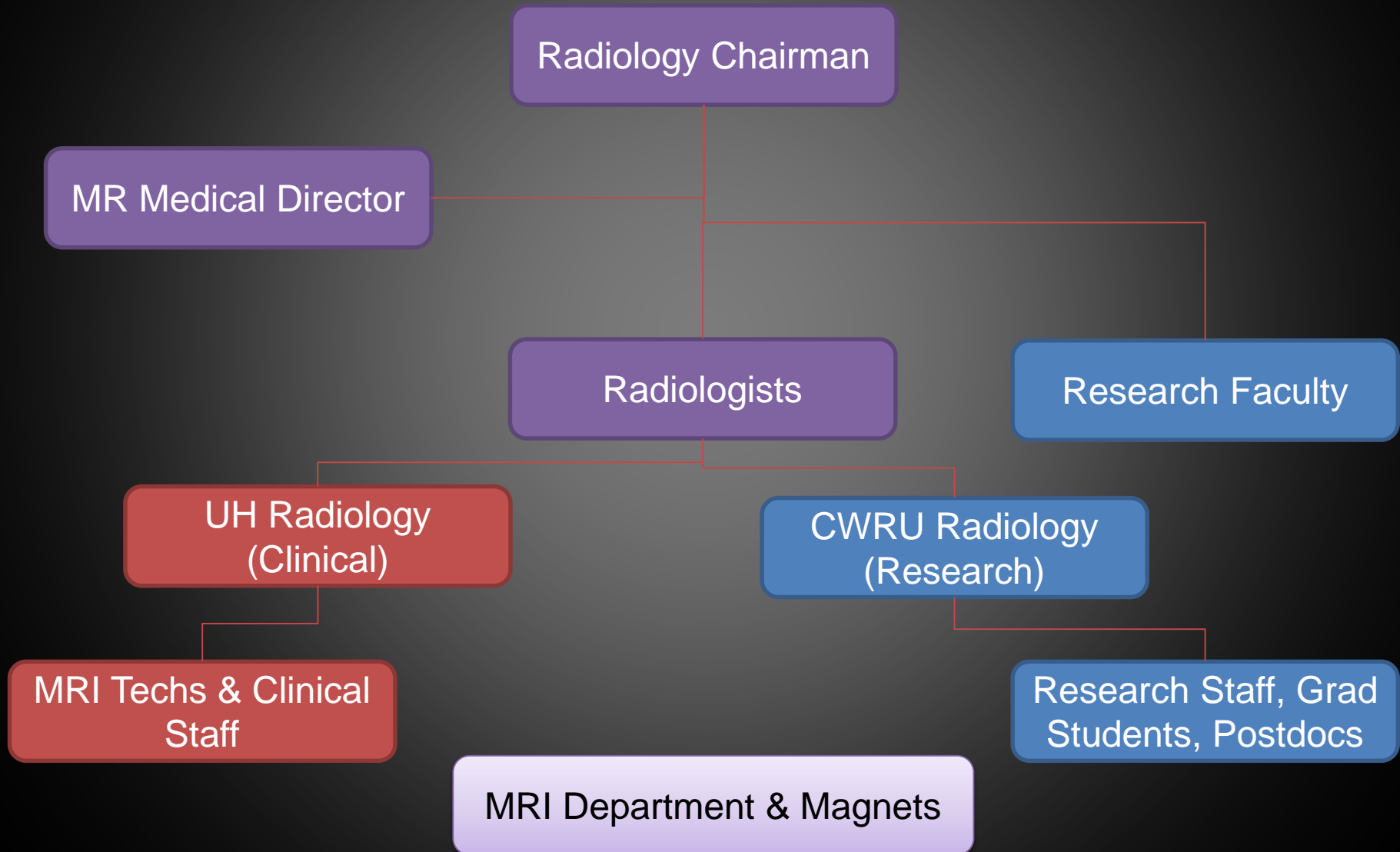
MR Medical Director has ultimate responsibility for content and implementation of MR safety program

Facility/Institution Structure:

Senior leadership must provide this individual with authority, resources, and support

E.g.: Radiology Chair, hospital COO and CMO, management of other sites¹⁶

Organization of our MR program:



Access Control

Physical security (RFID swipe card access) passing from Zone 2→3



Access Control

Administrative security:

RFID system separate from hospital swipe card system;

Swipe cards issued by MRI manager directly

Individual access to Zone 3 on “need” basis only

“Visiting Staff”

Patients accompanied by:

Nursing, anesthesia, sedation,
respiratory therapy, medical students
and residents

Source of numerous small missile
incidents and “near hits”

Chaotic environment in shared control
area (5 magnets)

“Visiting Staff” Training

Level 1 MR safety training
developed BY and FOR each
individual area

Review/approval by MRI
department

Departments tasked to train ALL
staff, OR designate Level 1 trained
personnel to come to MRI

MR Room “Time Out” Procedure

Carried out by MRI techs for
ANYONE entering room (Zone
3→4)

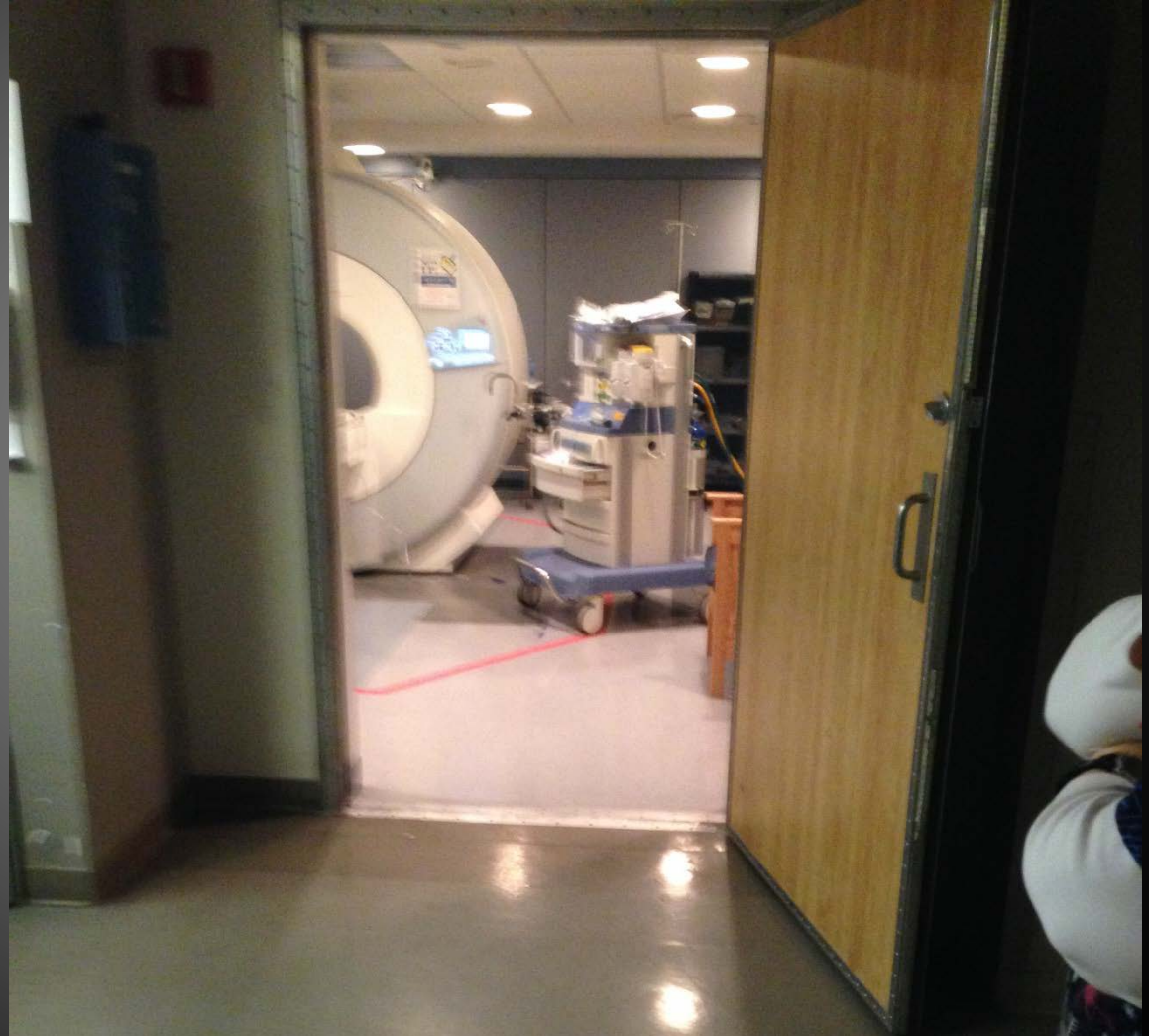
Secondary check: everyone
should ALREADY be screened

“Fix” for visiting staff who need to
bring unsafe items into Zone 3.

MR Room “Time Out” Procedure

Checklist
posted at each
magnet room
entrance door

FMD hand-
wand check



Ongoing Challenge: MRI Tech Staffing

ACR recommends minimum of two Level 2 personnel in the “Zone 2 through 4 area” when scanning...

- Are 5 techs / 5 magnets enough?
- For satellites, which non-tech staff can truly be trained to assist? Where do they sit?


Inpatient Screening


- ACR requires screening to be carried out by 2 trained individuals
- For inpatients, nursing and referring physicians have best knowledge of patients' allergies, medical/surgical history, implants
- Extra concerns for anesthesia

Safety Screening via EMR MRI Order Entry

Order:	MRI Brain Function		
Requested By:	Morgenstern-Clarren, Hadley Scott	Template Name:	
Messages:			

Check all Conditions that Apply






Wet Reading


☐

Priority


Level 3 - Routine Today




Transport Method



Current Signs and Symptoms





Radiologist to Determine Optimal Study


☒

Requesting Physician Contact #

7960607

Is Pregnant?


No



Special Instructions

ScheduledDtm

LMP



Safety Screening via EMR MRI Order Entry

☐ max # of activations.

Height (cm) 165 Weight (kg) 55 BSA 1.59 BMI 20.2

Relevant Results

Relevant Medications

Can lie flat 1 hr or duration of scan?
Yes

Check all Conditions that Apply

Wet Reading ☐

If Pt Requires pre-medication is "Yes" must answer the following questions:
BMI greater than 40? (pre-populates if BMI is on the chart)
BiPAP or CPAP for sleep?
Use high flow O2 40% FIO2 or greater? (pre-populates if documented on the flow sheet)

Pt requires pre-medication? Yes BMI greater than 40? No BiPAP or CPAP for sleep? Use high flow O2 40% FIO2 or greater? No

Instructions
To request Anesthesia for an adult MRI, contact anesthesia scheduling at 42270 between 8:00 AM and 5:00 PM, Monday through Friday. After 5:00 PM, or for urgent scans, call the Mather OR desk at 42260 and ask to schedule an MRI case with Anesthesia. Also, contact MRI at 26558

Safety Screening via EMR MRI Order Entry

Safety Check			
Information was obtained/verified by	<input type="checkbox"/> patient	<input checked="" type="checkbox"/> family member...	<input checked="" type="checkbox"/> provider...
Family member name			
Provider name			
Problems with Previous MRI (s)	<input checked="" type="radio"/> yes...	<input type="radio"/> no	
Describe			
Can lie flat 1 hr or duration of scan	<input checked="" type="radio"/> yes	<input type="radio"/> no	
Pain, pre-medication, or claustrophobic	<input checked="" type="radio"/> yes	<input type="radio"/> no	
BMI greater than 40	<input checked="" type="radio"/> yes	<input type="radio"/> no	
BiPAP or CPAP for sleep	<input checked="" type="radio"/> yes	<input type="radio"/> no	
High flow O2: 40% FiO2 or greater	<input checked="" type="radio"/> yes	<input type="radio"/> no	
Surgical operation or procedure	<input checked="" type="radio"/> yes...	<input type="radio"/> no	
Previous surgeries and approximate dates			
History of injury by metal object/foreign body (e.g. bullet, BB shrapnel)	<input checked="" type="radio"/> yes...	<input type="radio"/> no	
Describe			
History of metal object in eye (slivers, shavings, other metal object)	<input checked="" type="radio"/> yes...	<input type="radio"/> no	
Medical attention sought	<input checked="" type="radio"/> yes...	<input type="radio"/> no	
Describe findings			
History of kidney disease, asthma, diabetes, high blood pressure, or other allergic respiratory disease	<input checked="" type="radio"/> yes	<input type="radio"/> no	
Received contrast agent or X-ray dye for MRI, CT, Other X-ray or study	<input checked="" type="radio"/> yes...	<input type="radio"/> no	
Have you ever had a X-ray dye or magnetic resonance imaging (MRI) contrast agent allergic reaction	<input type="radio"/> yes...	<input type="radio"/> no	
Pregnant or suspected pregnant	<input checked="" type="radio"/> yes	<input type="radio"/> no	<input type="radio"/> N/A
Date of last menstrual period			
Currently breastfeeding	<input type="radio"/> yes	<input type="radio"/> no	<input type="radio"/> N/A
Post-Menopausal	<input type="radio"/> yes	<input type="radio"/> no	<input type="radio"/> N/A

SCM Notice

Sunrise Clinical Manager

Contact ordering physician for anesthesia consult if not already completed.

OK

This pops up for the questions in the box

Images

Safety Screening via EMR MRI Order Entry

- Training for nurses and ordering MD's developed by each department / unit with review/approval by Radiology
- Training for screening and order entry delivered via electronic LMS module
- EMR roll-out team effort between Radiology, EMR/IT, individual nursing divisions

Patient Screening

- EMR entry flags issues requiring clinical consults with Radiologist, Anesthesia, Cardiology, etc.
- Implants are flagged for Technologist/Radiologist review
- 2nd screening performed by Technologist when patient arrives

Master MR Safety Policy

POLICY & PROCEDURE



SA-8 – Magnetic Resonance Imaging (MRI) Safety

Key Points

- Screening tools are used to determine safe access to MRI areas.
- Staff are required to support MRI imaging by maintaining pertinent, content specific department training programs.
- Specific levels of training are required before entering different MRI zones.
- High field magnets are always on; therefore no metal items are permitted in the magnet room.

Policy & Procedure

1. There are high field MRI imaging systems located within our academic, community and outpatient facilities. Due to the risk involved in these environments, there is a safety program. Staff education and training is conducted based on location, position or job assignment. There is a patient screening process and a staff screening process to enhance the workplace safety within the MRI areas. This policy is based on the American College of Radiology Guidance Document on MR Safe Practices: 2013
2. It is recommended that individuals who frequent the MRI suite have MRI safety training. The areas include but are not limited to the following:
 - 2.1. MRI Staff including Radiologists.
 - 2.2. Neurology.
 - 2.3. Transporters.
 - 2.4. Environmental Services.
 - 2.5. Protective Services.
 - 2.6. Local Fire Department.
 - 2.7. Nursing.
 - 2.8. Anesthesia.
 - 2.9. Research.
3. Content of training curriculum beyond basic MRI safety Level I training varies by responsibility and is determined by individual departments.

Approved May 2015

Standardized
expectations for MR
safety practices for
all facilities

Provides “teeth” for
Radiology safety
efforts

System MR Safety Roll-Out

Departmental procedures from academic center used as “templates”

Monthly coordination meetings with MR managers and lead techs

Roles of community hospital radiologists clarified, System MR Medical Director designated

Medical Physicist MR Safety Audits

Required by ACR MR accreditation program as part of scanner annual surveys

Added to Program Requirements 28-OCT-2013

ACR-standard forms released 17-APR-2014

Medical Physicist MR Safety Audits

Helpful to facilitate system-wide safety program roll-out:

- Small group of experts familiar with all facilities and programs
- Identify problems at individual sites
- Share/spread good practices among sites

Summary

1. MRI safety in a large, complex organization requires cooperation from many departments outside Radiology
2. Incidents and near-hits can raise deeper safety concerns and systematic issues
3. IT tools can help automate key steps in the MRI screening process

Summary

4. Safety training for Level 1 and 2 MR Personnel should be tailored to individuals' specific roles and duties
5. The fewer people in Zone 3, the better
6. Medical physicists have a key role in MRI safety; must be involved, but can't do it alone

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Questions?
Comments?
Feedback?

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