

# Deciphering MR Conditional Labeling

Tobias Gilk - Sept 27, 2022

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Deciphering MR Conditional Labeling

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As a member of the the Board of the ABMRS, I am prohibited from speaking on specific examination question content, but permitted to provide education on MRI safety concepts and principles.

This presentation is not an exam preparation for any examination.

# Rules of the Road

- Everything on the screen is for you (you can copy or take photos).
- If you have questions, ask!
- If you disagree, please speak up.

# Outline

## Deciphering MR Conditional Labeling

- Intro
- MR Conditional Labeling / Conditions
- How Devices Are Tested
- Violating MR Conditional Status
- Unlabeled Devices / Foreign Bodies
- “Off-Label” ≠ Unsafe (‘It’s All About Harm’)
- Q & A

# What Does “FDA Approved” Mean?

What exactly did the FDA approve?

# What Does “FDA Approved” Mean?

What exactly did the FDA approve?

- Drug / device meets minimum criteria for efficacy?
- Drug / device meets minimum criteria for safety?

# What Does “FDA Approved” Mean?

## What exactly did the FDA approve?

The FDA’s responsibility is to grant and oversee a company’s interstate medical product marketing.

<https://www.hudson.org/research/7264-fda-approval-does-not-mean-what-you-think-it-does->






# **How To Read MR Conditional Labels**

**What Are “MR Conditional / MR Safe / MR Unsafe”?**

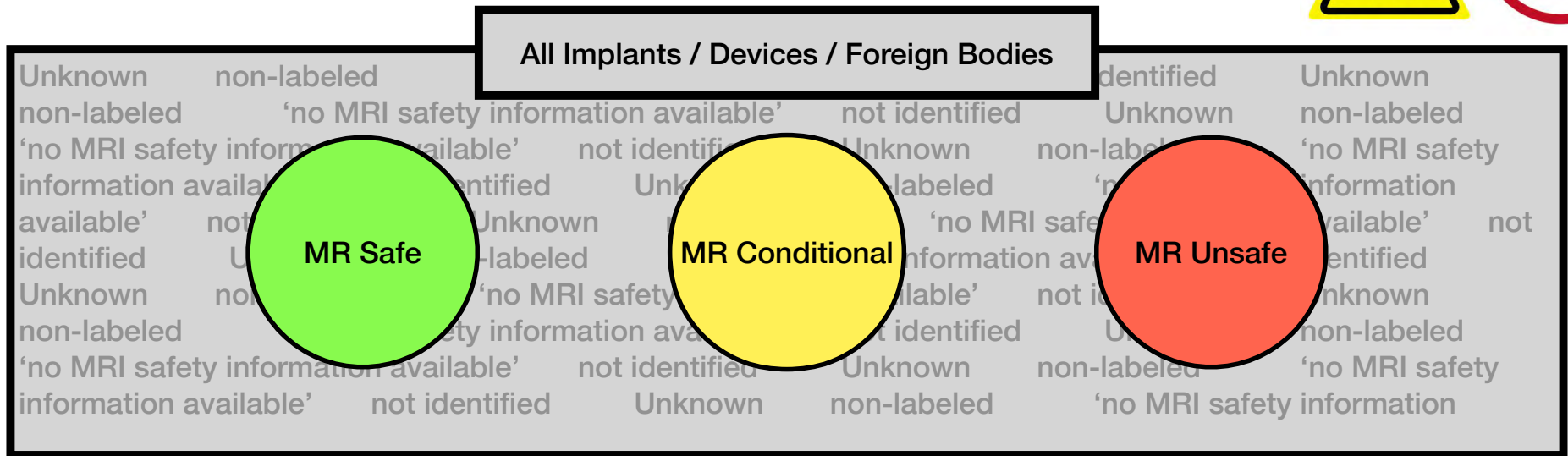
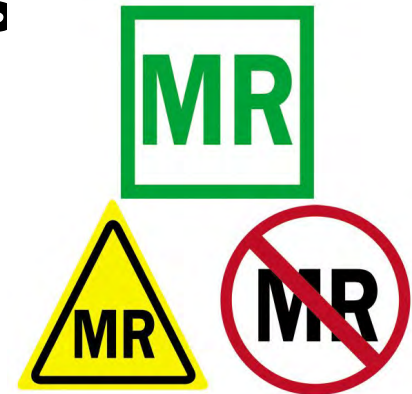
# How To Read MR Conditional Labels

## What Are “MR Conditional / MR Safe / MR Unsafe”?

|                |   |   |
|----------------|---|---|
| MR safe        |    | The device or implant is completely nonmagnetic, nonelectrically conductive, and nonradiofrequency reactive, therefore eliminating all the primary potential risks during MRI scanning  |
| MR conditional |   | The device or implant may contain magnetic, electrically conductive, or radiofrequency-reactive components that are safe for operation in proximity to the MRI, provided the conditions for safe operation are defined and observed (both for the MR scanner and the device itself) |
| MR unsafe      |  | Objects that are significantly ferromagnetic and pose a clear and direct threat to persons and equipment within the magnet room   |

# How To Read MR Conditional Labels

What Are “MR Conditional / MR Safe / MR Unsafe”?

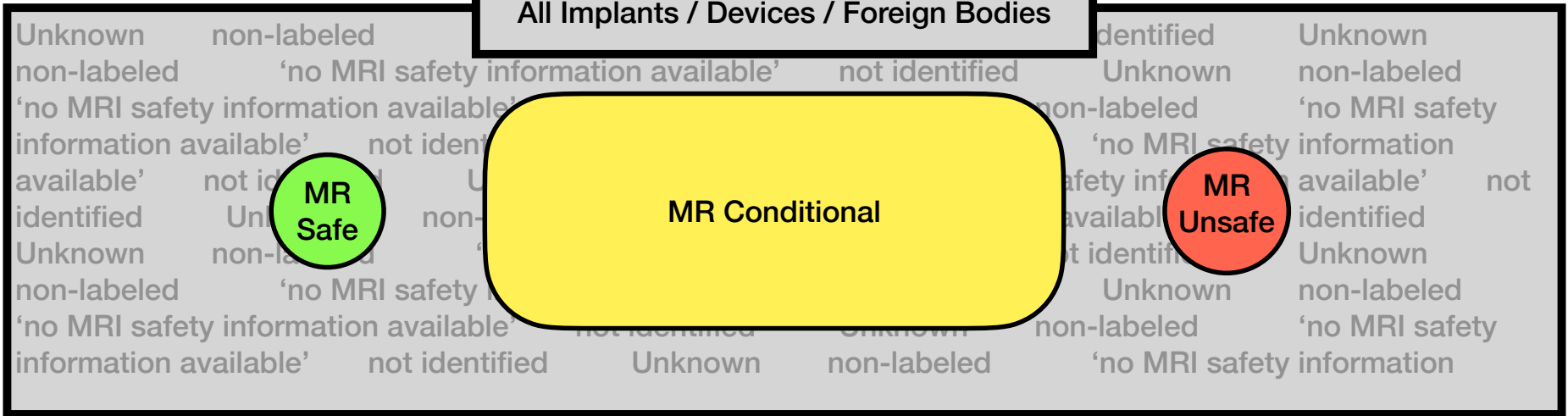


# How To Read MR Conditional Labels

## What Are “MR Conditional / MR Safe / MR Unsafe”?



All Implants / Devices / Foreign Bodies



All Implants / Devices / Foreign Bodies

MR Conditional

All Implants / Devices / Foreign Bodies

**MR Conditional**



RISK



# How To Read MR Conditional Labels

What is 'Conditionality'?



# How To Read MR Conditional Labels

What is 'Conditionality'?



Manufacturer-Assured Safety When All Stated Conditions Are Met.



# How To Read MR Conditional Labels

## What is 'Conditionality'?



- “Up to” vs. “At”
- Electromagnetic Fields
- Assemblies vs. Lone Objects
- Device Functionality

# How To Read MR Conditional Labels

## What is 'Conditionality'?



“Up to” vs. “At”

- All MR Conditional Conditions ‘Up To’ For All Risks ***Except*** Focal Heating (Burns)
- Field Strength In MR Conditional Labeling Two Separate Risks:
  - Torque (‘Up To’)
  - RF Frequency For Resonant Circuit Heating (‘At’)

# How To Read MR Conditional Labels

## What is 'Conditionality'?



## Electromagnetic Fields

- Most of MR Conditional Labeling Parameters Are Based On Controlling Exposure To Electromagnetic Fields
  - By Position (e.g., 'Center Above / Below')
  - By Setting (e.g., 'no more than 2 W/kg or 150 T/m/s')
  - By Coil (e.g., 'T/R knee coil')

# How To Read MR Conditional Labels

## What is 'Conditionality'?



## Assemblies vs. Lone Objects

- Many MR Conditional Implants Aren't Lone Objects, But Rather Assemblies:
  - Plates & Screws
  - Pulse Generator & Lead-Set
- If Assembly Hasn't Been Tested Together, Shouldn't Be Labeled.

# How To Read MR Conditional Labels

## What is 'Conditionality'?



## Device Functionality

- MR May Affect Device Function:
  - Shunt Valve Position
  - Implanted Medication Pumps
  - 'MR Mode' For Pacemakers / Neurostimulators
  - ECG Readouts

# How To Read MR Conditional Labels

## What is 'Conditionality'?



| MRI Safety Information  |  |
|---|--|
|   |  |
| <b>MR Conditional</b>   |  |
| Item Name and/or Identification, Item Manufacturer, Warning Statement, Additional Resources for MR Safety Information such as URL and/or phone number   |  |
| e.g., A patient with the <manufacturer> <item name(s)> <item identification> may be safely scanned under the following conditions. Failure to follow these conditions may result in injury to the patient and/or item malfunction. Additional MR Safety information may be found at <website> or by calling <phone number>. |  |
| Parameter   | Condition of Use / Information   |
| Static Magnetic Field Strength (B <sub>0</sub> ) [T]  | e.g., 1.5 T, 3 T<br>e.g., ≤1.5 T, ≤3 T<br>Note: These numbers are examples; other field strengths may be used.     |
| Type of Nuclei  | e.g., hydrogen, <sup>31</sup> P or sodium<br>Note: If no nucleus is listed, the nucleus is assumed to be hydrogen. |
| Static Magnetic Field (B <sub>0</sub> ) Orientation   | e.g., Horizontal, Cylindrical Bore<br>e.g., Perpendicular to Patient, LR<br>e.g., Perpendicular to Patient, AP     |
| Maximum Spatial Field Gradient (SFG) [T/m] and [gauss/cm]   | e.g., x T/m and xxx, gauss/cm  |
| Maximum Gradient Slew Rate per axis [T/m/s]   | e.g., 200 T/m/s per axis   |
| RF Polarization   | e.g., Circularly Polarized (CP)  |

|   |
|---|
| e.g., Multichannel-2 (MC-2) or Circularly Polarized (CP)<br>Note: Circularly polarized RF is also commonly referred to as quadrature drive(s).  |
| e.g., Integrated Whole Body Transmit RF coil<br>e.g., Detachable Head Transmit/Receive RF coil<br>e.g., Detachable Extremity Transmit/Receive RF coil<br>e.g., Any Transmit RF Coil may be used.<br>Note: All coils are either integrated or detachable. A detachable RF coil is one that must be plugged into the MR system.   |
| e.g., Any receive RF coil may be used.  |
| e.g., "Normal Operating Mode"<br>e.g., "First Level Controlled Operating Mode or Normal Operating Mode"<br>e.g., "RF Power Restricted"  |
| Note: For Normal Operating Mode and First Level Controlled Operating Mode, SAR information may be included.<br>Note: For RF Power Restricted, B <sub>1+RMS</sub> and/or SAR information shall be included, B <sub>1+RMS</sub> is preferred. Landmark based restrictions may also apply.   |
| For RF Power Restricted:<br>e.g., B <sub>1+RMS</sub> ≤ 2.8 μT<br>e.g., B <sub>1+RMS</sub> ≤ 1.7 μT, for MR systems that do not report B <sub>1+RMS</sub> , see Whole Body Averaged SAR<br>Note: When both B <sub>1+RMS</sub> and SAR limits are provided, include a note in the labeling to specify which single limit is preferred, if any. See Figure X.1.2 for examples. |
| For RF Power Restricted:<br>e.g., Whole Body Averaged SAR ≤ 1.2 W/kg<br>Note: It is not recommended to list a Whole Body Averaged SAR value of <1 W/kg.   |
| Example for Head SAR labeling for less than the Normal Operating Mode:<br>Head SAR ≤ 1.2 W/kg   |

e.g., Any anatomic location at  
e.g.,  
Transmit Coil: Integrated Whole Body  
Scan Regions:  
Superior: Place isocenter at or  
Inferior: Place isocenter at or

Note: If the item manufacturer are necessary, describe item po  
Include any restrictions on the  
system's isocenter. Consider it  
acceptable.  
Note: If the anatomic diagram  
different transmit coil, include  
e.g., Scanning patients who hav  
is acceptable as long as the MR  
satisfied.  
e.g., The safety of this item dur  
is another implant within 15 cm  
e.g., The patient has no implanted  
leads.  
e.g., Patient height greater than 1  
Note: Include any constraints o  
patient and potential patient co  
well as the patient's physical a  
constraints/instructions about if  
to this implant should be place  
e.g., Supine, patient's arms mu  
e.g., Patient must be oriented i  
e.g., The item may not be scan  
e.g., Any patient position is ac  
e.g., The item shall not be scan  
e.g., Lead wires shall exit strai  
without loops, positioned awa  
the patient with appropriate pa

|  |
|--|
| e.g., Catheter shall be oriented parallel to patient's legs.<br>e.g., This item shall be used only with the following specified MR Conditional components (Implantable Pulse Generator (IPG) Model A with Leads Model B or Model C).<br>e.g., The injection port for this item shall be secured to prevent movement in the magnetic field.<br>e.g., The external pulse generator for this item shall be kept outside the 200 Gauss line.<br>e.g., The external components for this item shall remain outside the MR environment.<br>e.g., The item shall stay outside the RF Transmit/Receive coil<br>e.g., The item shall stay outside the bore of the MR system, at all times.<br>e.g., The drug reservoir shall be emptied prior to scanning.<br>Note: Include any constraints or special instructions on positioning the item or component with respect to the patient or the MR system. Include any constraints/instructions about components that can be used together. Consider including figures or diagrams to show what is acceptable. |
| Scan Duration and Wait Time<br>e.g., Scan for 15 minutes of continuous RF exposure with one or more MR imaging pulse sequences (scans or series) followed by a wait time of 5 minutes before resuming scanning.<br>e.g., There is no limit on MR scan duration for the labeled RF conditions.<br>e.g., Scan for 60 minutes with one or more MR imaging pulse sequences (scans or series) followed by a wait time of 15 minutes before resuming scanning.<br>Note: Autocannula / Autocan Mode is considered continuous scanning.<br>Note: Short pauses between scan sequences are considered part of the scan time.   |
| MR Image Artifact<br>e.g., Image distortion and artifacts must be considered when planning an MR exam and when interpreting MR scan images in proximity to the implanted item. Distortion and artifacts may occur beyond the boundaries of the item.<br>e.g., In non-clinical testing, the MR image artifact caused by the item extended approximately 14 mm from the item when imaged with a gradient echo pulse sequence using a TE of 20 ms and a 1.5 T MR system.<br>e.g., The presence of this item may produce an MR image artifact. Some manipulation of scan parameters may be needed to compensate for the artifact.<br>e.g., Detailed image artifact information is available upon request.<br>e.g., The presence of the item may produce an MR image artifact. Imaging protocol modifications may be necessary to compensate for the MR image artifact.   |
| Required programming settings<br>e.g., Pulse generator is in MRI mode during the MR exam.<br>e.g., Turn off item during the MR exam.   |
| Instructions to be followed before, during and/or after the MRI exam<br>e.g., Patient required to have item programmed and checked before and after the MR exam by an appropriate expert.<br>e.g., Radiographic setting confirmations might be required following the MR exam to verify item settings and/or functionality.<br>e.g., Proper patient monitoring shall be provided during the MR exam.   |

# How To Read MR Conditional Labels

## What is 'Conditionality'?




| MRI Safety Information   |  |
|--|--|
| <br>MR Conditional   |  |
| A patient with the BestCompany AlwaysOpenStent may be safely scanned under the following conditions. Failure to follow these conditions may result in injury to the patient. |  |
| Additional MR Safety information may be found at <a href="http://www.bestc.com/alwaysopenstent">www.bestc.com/alwaysopenstent</a> or by calling 1800-XXX-XXXX                |  |
| Parameter  | Condition of Use / Information   |
| Static Magnetic Field Strength (B <sub>0</sub> )   | ≤3 T   |
| Static Magnetic Field (B <sub>0</sub> ) Orientation  | Horizontal, Cylindrical Bore   |
| Maximum Spatial Field Gradient (SFG)   | 30 T/m (3000 gauss/cm)   |
| RF Polarization  | Circularly Polarized (CP) (i.e., quadrature drive)   |
| RF Transmit Coil   | Any Transmit RF Coil may be used.  |
| RF Receive Coil  | Any Receive RF coil may be used.   |
| MR System (RF) Operating Modes or Constraints  | Normal Operating Mode  |
| Scan Duration and Wait Time  | Scan for 15 minutes of continuous RF exposure with one or more MR imaging pulse sequences (scans or series) followed by a wait time of 5 minutes before resuming scanning. |
| MR Image Artifact  | The presence of the AlwaysOpenStent may produce an MR image artifact. Imaging protocol modifications may be necessary to compensate for the MR image artifact.             |

Figure X1.1 Exemplar MR Conditional IFU language for a passive item intended to enter the bore of a MR system.



# How To Read MR Conditional Labels

## What is 'Conditionality'?



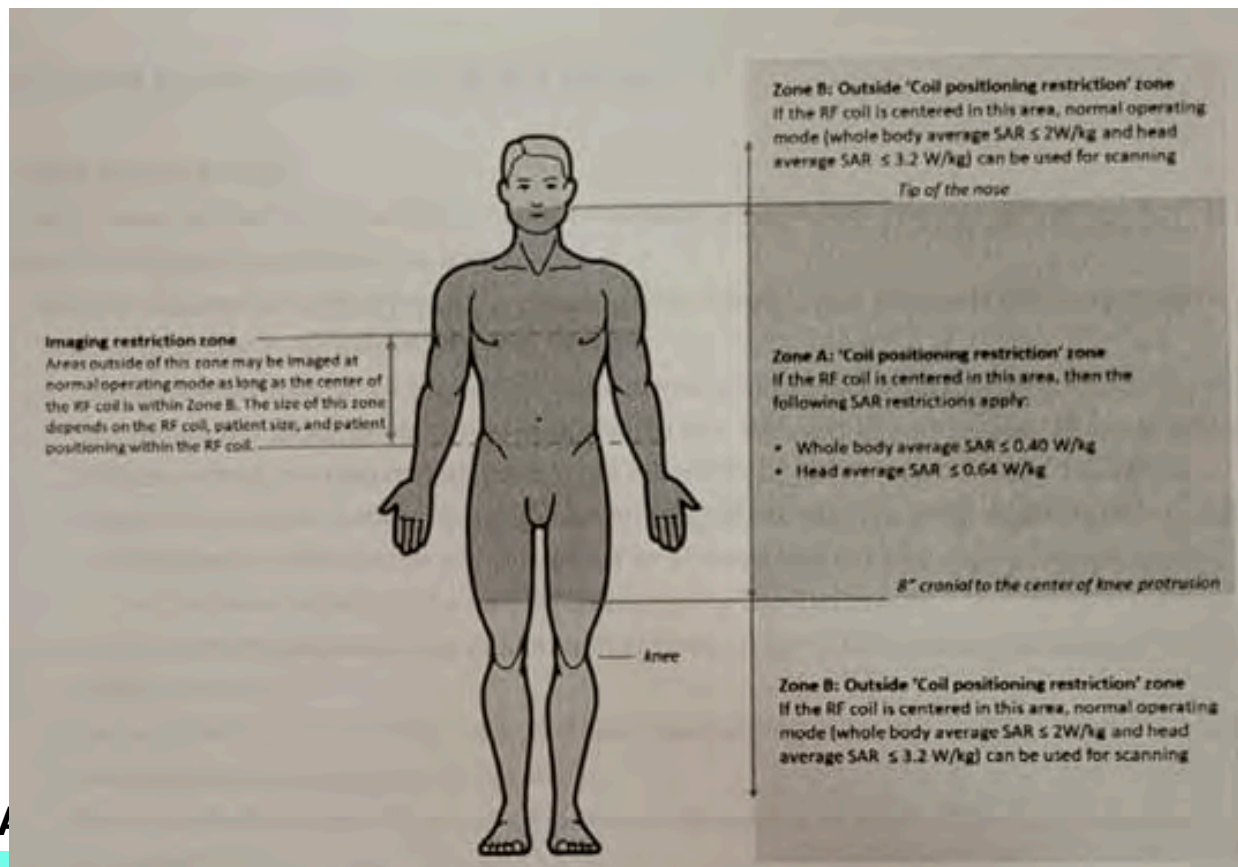
### MRI Statement

The MULTI-LINK VISION Coronary Stent has been shown in non-clinical testing to be MRI safe immediately following implantation. MRI test conditions used to evaluate this stent were: for magnetic field interactions, a static magnetic field strength of 3 tesla with a maximum spatial gradient magnetic field of 3.3 tesla/meter; for MRI-related heating, a maximum whole body averaged specific absorption rate (SAR) of 2.0 W/kg for 15 minutes of MR imaging. While a single stent produced a temperature rise of less than 0.6°C and should not migrate under these conditions, the response of overlapping stents or stents with fractured struts is unknown. Non-clinical testing has not been performed to rule out the possibility of stent migration at field strengths higher than 3 tesla. MR image quality may be compromised if the area of interest is in the exact same area or relatively close to the position of the stent.



# How To Read MR Conditional Labels

## What is 'Conditionality'?



# How To Read MR Conditional Labels

## What is 'Conditionality'?

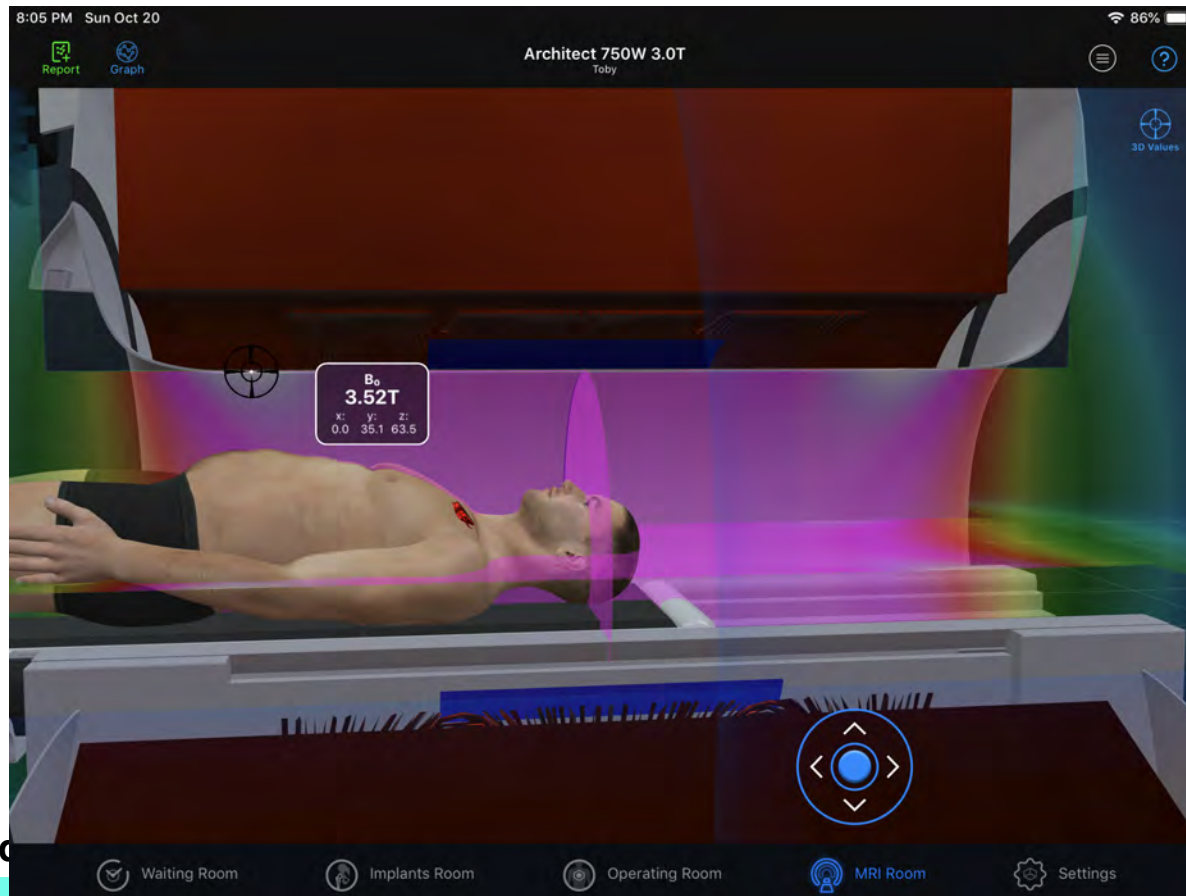


Static Magnetic Field (1 of 2) - Torque / Rotation

- 'Up To' *System Rating* (For Torque)
- What The System Is Sold As (e.g., 1.5T, 3.0T)
- Not The Specific Exposure Of The Device  
(Even If The Exposure Is Greater Than The Listed Value)

# How To Read MR Conditional Labels

## What is 'Conditionality'?



# How To Read MR Conditional Labels

## What is 'Conditionality'?

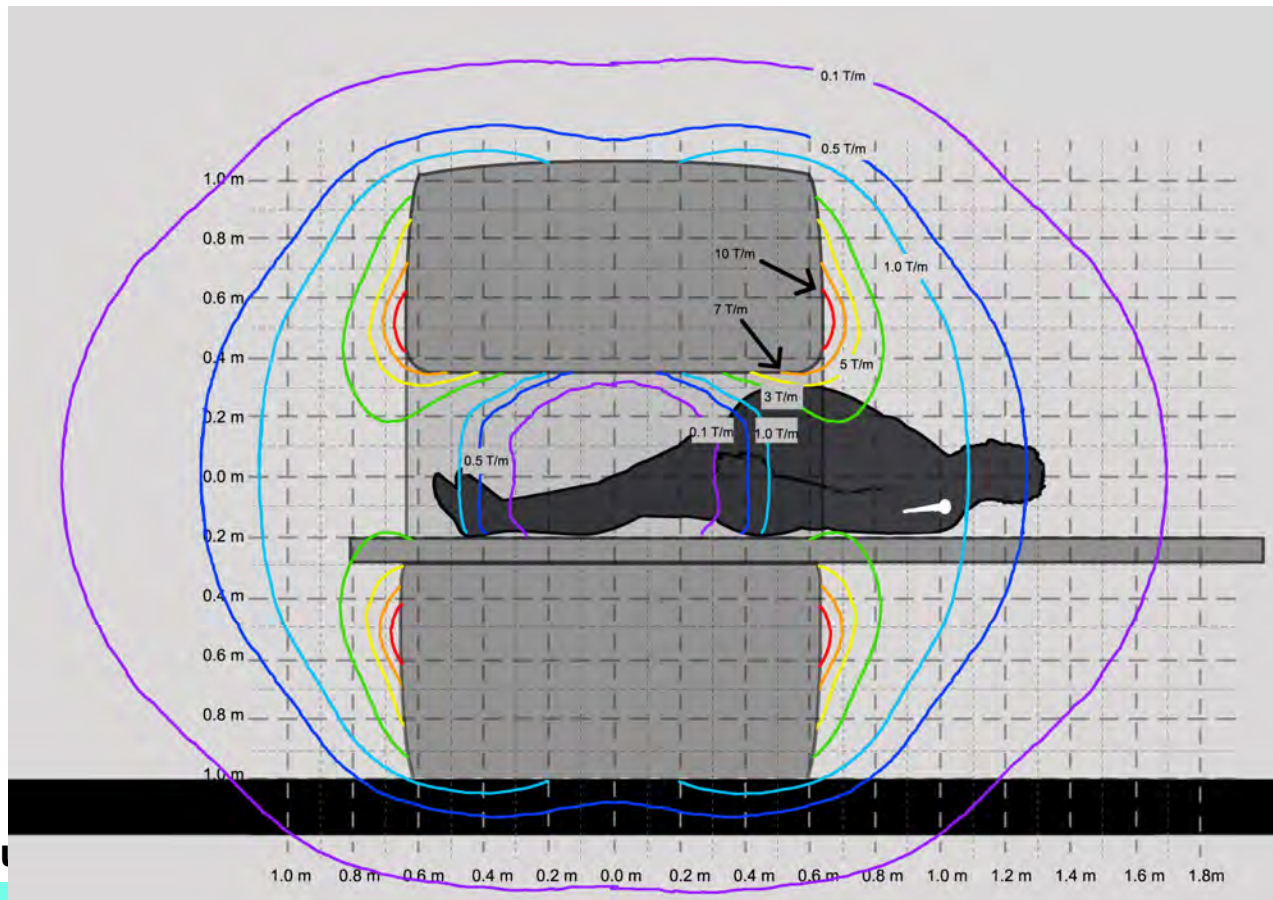


Spatial Field Gradient - Translation / Attraction

- 'Up To' Exposure Value (T/m, G/cm)
- Not System Max. What Device Will Be Exposed To.

# How To Read MR Conditional Labels

What is 'Conditionality'?



# How To Read MR Conditional Labels

## What is 'Conditionality'?



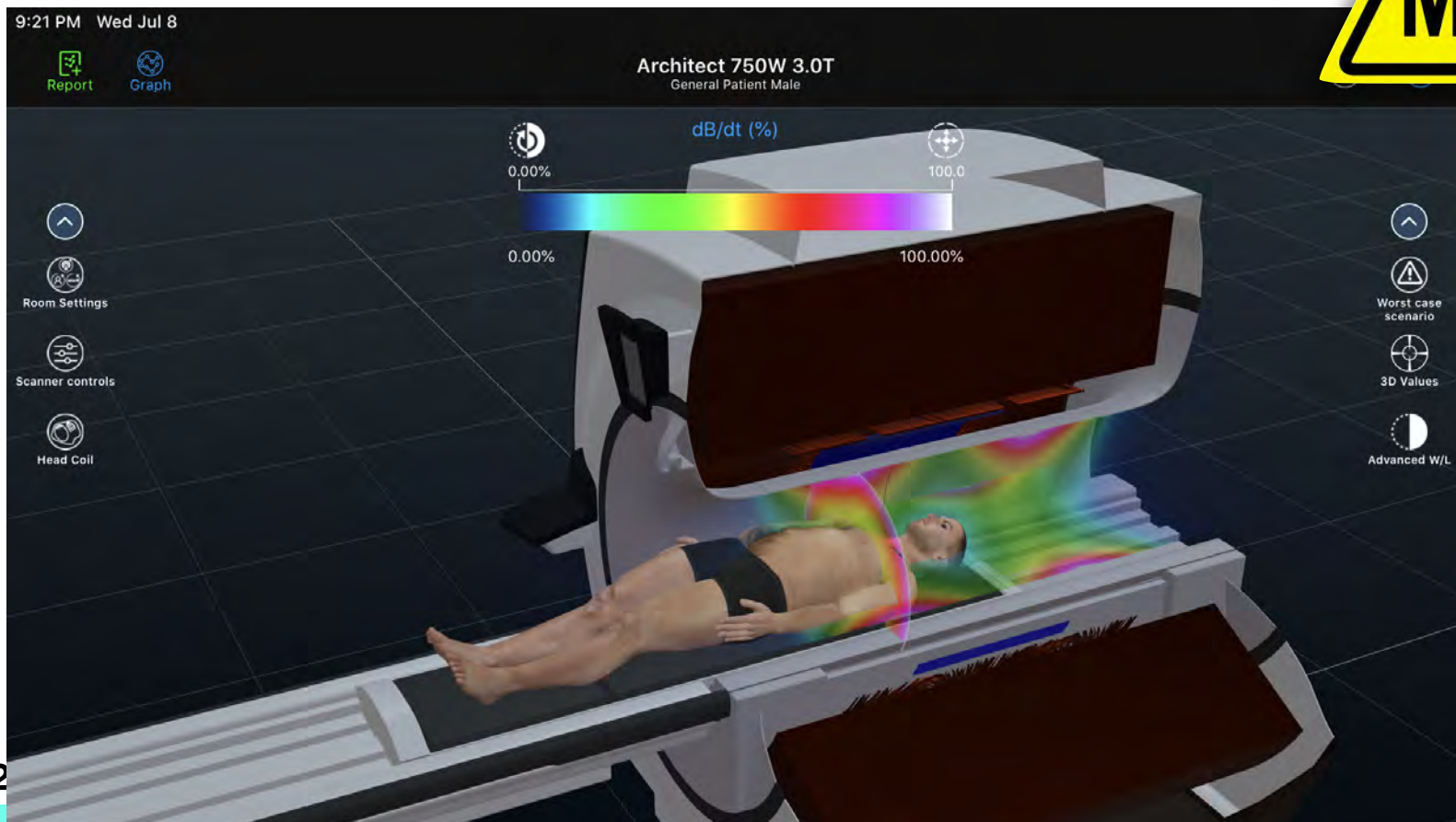
Time-Varying Gradient - Neuromuscular Stim / Device Interference

- 'Up To' Exposure Value (T/m/s)
- Not System Max (If Your System Allows TVG Controls). What Device Will Be Exposed To.
  - May Be Managed By Setting (e.g., 'Slew Rate  $\leq$  150 T/m/s')
  - May Be Managed By Position (e.g., 'Landmark Above / Below x')
- If System Doesn't Allow TVG Controls...



# How To Read MR Conditional Labels

## What is 'Conditionality'?



# How To Read MR Conditional Labels

## What is 'Conditionality'?



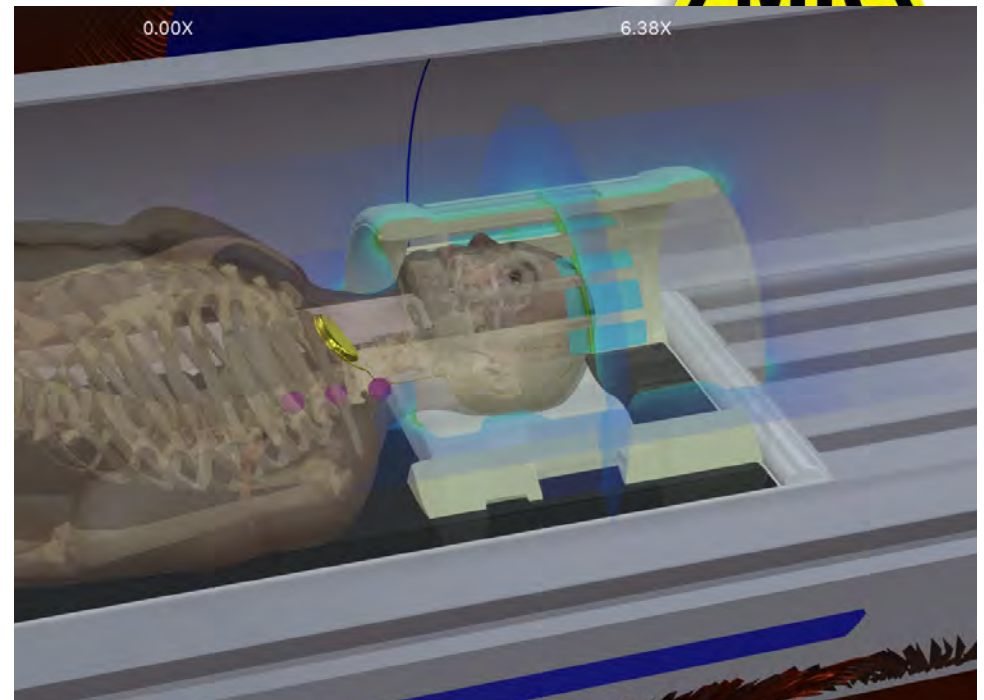
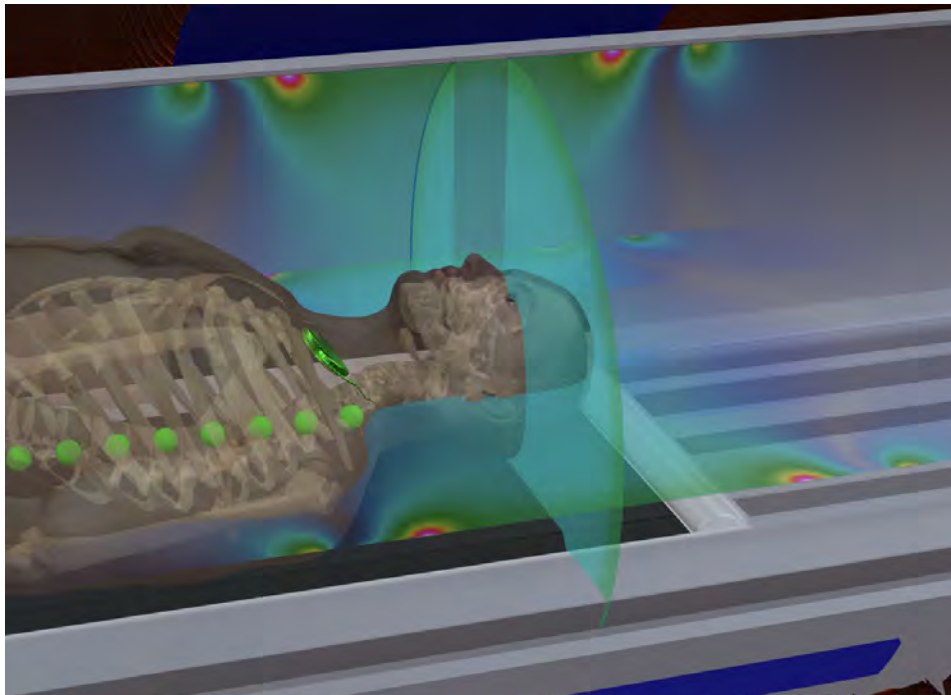
RF Magnetic Fields (1 of 2) - Diffuse Thermal Loading

- 'Up To' Pulse Sequence Setting (Whole Body Averaged SAR)
- May Be Managed By:
  - Pulse Sequence Setting
  - Smaller Transmit Volume (Local T/R Coils)



# How To Read MR Conditional Labels

What is 'Conditionality'?



# How To Read MR Conditional Labels

What is 'Conditionality'?



**“What’s the center frequency of your MR system?”**


# How To Read MR Conditional Labels

## What is 'Conditionality'?



RF Magnetic Fields & Static Magnetic Field (2 of 2)

- Focal Heating (Burns) Specifically From Resonant Circuit Effects

-  'At' Field Strength (Really Frequency)
- May Be Managed By:
  - Position Within Bore (e.g., 'Route Cable Along Central Z-Axis')
  - Position Outside Volume of Deposition (e.g., 'Above / Below x')
  - Pulse Sequence (e.g., 'SAR  $\leq$  0.5 W/kg')

# How To Read MR Conditional Labels

What is 'Conditionality'?



| Acme Buzz-O-Matic Neurostimulator |   |
|-----------------------------------|---|
| Static Magnetic Field             | 1.5 or 3.0 Tesla                            |
| Spatial Field Gradient            | 9 T/m (900 G/cm)                            |
| SAR                               | Normal Operating Mode<br>(up to 15 minutes) |
| B1 <sub>+RMS</sub>                | 2 $\mu$ T at 1.5 T                          |
| Time-Varying Gradient             | 150 T/m/s (150 mT/m/ms)                     |

# How To Read MR Conditional Labels

## What is 'Conditionality'?



- 'Up To' Highest System Rating For Torque
- *But* 'At' 1.5 or 3.0 T For Resonant Circuit Heating



| Acme Buzz-O-Matic Neurostimulator |  |
|-----------------------------------|--|
| Static Magnetic Field             | 1.5 or 3.0 Tesla                         |
| Spatial Field Gradient            | 9 T/m (900 G/cm)                         |
| SAR                               | Normal Operating Mode (up to 15 minutes) |
| B1 <sub>+RMS</sub>                | 2 $\mu$ T at 1.5 T                       |
| Time-Varying Gradient             | 150 T/m/s (150 mT/m/ms)                  |

# How To Read MR Conditional Labels

## What is 'Conditionality'?



| Acme Buzz-O-Matic Neurostimulator |  |
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| Static Magnetic Field             | 1.5 or 3.0 Tesla                         |
| Spatial Field Gradient            | 9 T/m (900 G/cm)                         |
| SAR                               | Normal Operating Mode (up to 15 minutes) |
| $B1_{+RMS}$                       | 2 $\mu$ T at 1.5 T                       |
| Time-Varying Gradient             | 150 T/m/s (150 mT/m/ms)                  |

- 'Up To' 9 T/m Device Exposure For Attraction

# How To Read MR Conditional Labels

## What is 'Conditionality'?



| Acme Buzz-O-Matic Neurostimulator |   |
|-----------------------------------|---|
| Static Magnetic Field             | 1.5 or 3.0 Tesla                            |
| Spatial Field Gradient            | 9 T/m (900 G/cm)                            |
| SAR                               | Normal Operating Mode<br>(up to 15 minutes) |
| B1 <sub>+RMS</sub>                | 2 $\mu$ T at 1.5 T                          |
| Time-Varying Gradient             | 150 T/m/s (150 mT/m/ms)                     |

- 'Up To' Normal Mode Console Readout RF Heating
- 'Up To' 15 Minutes Per Pulse Sequence (default)

# How To Read MR Conditional Labels

## What is 'Conditionality'?



| Acme Buzz-O-Matic Neurostimulator |  |
|-----------------------------------|--|
| Static Magnetic Field             | 1.5 or 3.0 Tesla                         |
| Spatial Field Gradient            | 9 T/m (900 G/cm)                         |
| SAR                               | Normal Operating Mode (up to 15 minutes) |
| B1 <sub>+RMS</sub>                | 2 $\mu$ T at 1.5 T                       |
| Time-Varying Gradient             | 150 T/m/s (150 mT/m/ms)                  |

- 'Up To' 2  $\mu$ T Console Readout RF Heating



# How To Read MR Conditional Labels

## What is 'Conditionality'?



| Acme Buzz-O-Matic Neurostimulator |   |
|-----------------------------------|---|
| Static Magnetic Field             | 1.5 or 3.0 Tesla                            |
| Spatial Field Gradient            | 9 T/m (900 G/cm)                            |
| SAR                               | Normal Operating Mode<br>(up to 15 minutes) |
| <b>"AND" / "OR"</b><br>B1+RMS     | 2 $\mu$ T at 1.5 T                          |
| Time-Varying Gradient             | 150 T/m/s (150 mT/m/ms)                     |

- But Which To Use When Both Are Listed?

# How To Read MR Conditional Labels

## What is 'Conditionality'?



| Acme Buzz-O-Matic Neurostimulator |   |
|-----------------------------------|---|
| Static Magnetic Field             | 1.5 or 3.0 Tesla                            |
| Spatial Field Gradient            | 9 T/m (900 G/cm)                            |
| SAR                               | Normal Operating Mode<br>(up to 15 minutes) |
| B1 <sub>+RMS</sub>                | 2 $\mu$ T at 1.5 T                          |
| Time-Varying Gradient             | 150 T/m/s (150 mT/m/ms)                     |

- 'Up To' 150 T/m/s  
Console Readout  
For Stim / Voltage

# How To Read MR Conditional Labels

What is 'Conditionality'?



“Just Follow The Label, Right?”

# How To Read MR Conditional Labels

## What is 'Conditionality'?



| Acme Buzz-O-Matic Neurostimulator |   |
|-----------------------------------|---|
| Static Magnetic Field             | 1.5 or 3.0 Tesla                            |
| Spatial Field Gradient            | 9 T/m (900 G/cm)                            |
| SAR                               | Normal Operating Mode<br>(up to 15 minutes) |
| B1+RMS                            | 2 $\mu$ T at 1.5 T                          |
| Time-Varying Gradient             | 150 T/m/s (150 mT/m/ms)                     |

- 'Up To' Highest System Rating For Torque
- *But* 'At' 1.5 or 3.0 T For Resonant Circuit Heating
- 'Up To' 9 T/m Device Exposure For Attraction
  - 'Up To' Normal Mode Console Readout RF Heating
- 'Up To' 15 Minutes Per Pulse Sequence (default)
- 'Up To' 2  $\mu$ T Console Readout RF Heating
- 'Up To' 150 T/m/s Console Readout For Stim / Voltage

# **How MR Conditional Labels Are Written**

**How Are They Tested?**

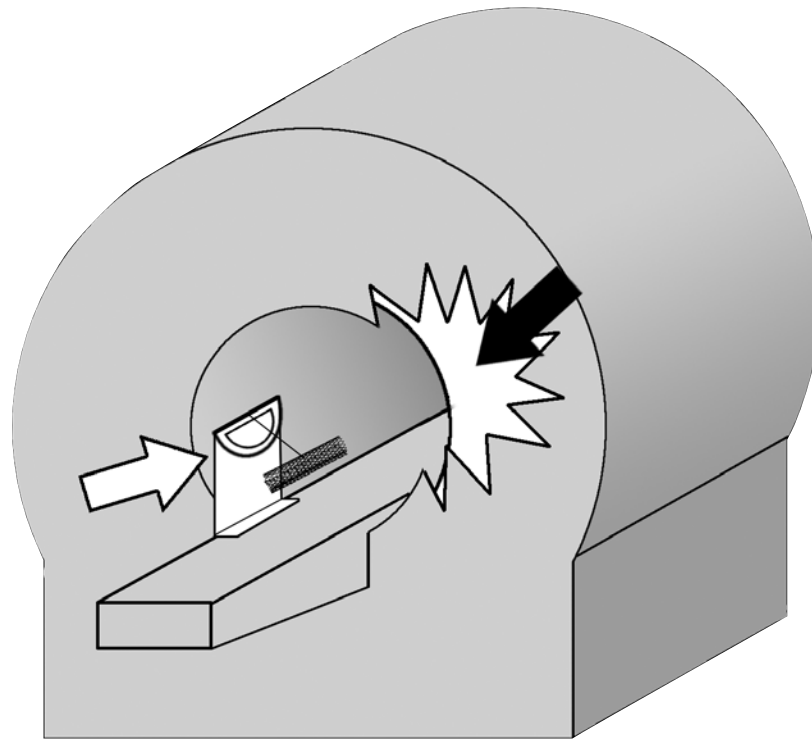
# How MR Conditional Labels Are Written

## How Are They Tested?

- Manufacturer Defines Test Parameters
- They Then Test (or contract-out testing)
- Manufacturer Reviews Test Data  
(& Decides On Whatever Parameters They Wish For FDA Submittal)
- FDA Reviews
  - Approves, or
  - Requests Supporting Data For Claims, or
  - Rejects

# How MR Conditional Labels Are Written

## How Are They Tested?



# How MR Conditional Labels Are Written

## How Are They Tested?

- Testing / Labeling Is **Not** Required To Indicate Safe Limits / Thresholds
- Manufacturer's Can Build-In Whatever Safety Margins They Choose To



# How MR Conditional Labels Are Written

## How Are They Tested?

- I Worked With A Manufacturer On Relabeling Their Device With A Greater Spatial Field Gradient Value (extrapolated).
- When the Manufacturer Sent Me A Courtesy Copy Of Their Draft FDA Application, I Discovered A Math Error. They Were Applying For Labeling ~65% Of What The Calculation Said They Could.
- Attorneys / Risk-Management Said It Wasn't Worth Correcting For The FDA.

# **How MR Conditional Labels Are Written**

**What If We Go Beyond / Outside MR Conditional Terms?**

# How MR Conditional Labels Are Written

## What If We Go Beyond / Outside MR Conditional Terms?

- If You Violate Even 1 Of 20 MR Conditional Conditions, That Scan Is 'Off-Label'

But...

- If You Know How To Identify MRI Risks & How To Break-Down MR Conditional Labeling, You Can Make Many Safety Deductions Even If You Go Outside MR Conditional Conditions

# **What About Devices (FBs) With No Labels?**

**“This Device Not Tested For MR Safety”**

# What About Devices (FBs) With No Labels?

## “This Device Not Tested For MR Safety”

- Just Because It Hasn't Been Manufacturer Tested Doesn't Mean You Can't Make Safety Assessments
  - Published Studies
  - Exposure Analysis (i.e., ‘to what will it be exposed?’)
  - Applying Standards (e.g., ‘FDA 2 cm standard’)
  - Materials Analysis (e.g., ‘are the materials ferromagnetic?’)

# **“Off-Label” ≠ Unsafe**

**It Means No Manufacturer Guidance**

# “Off-Label” ≠ Unsafe

## It Means No Manufacturer Guidance

- When Manufacturer MRI Safety Is **Not** Provided, A Site May Operate Under The *Presumption* That Unlabeled / Off-Label Imaging Is Unsafe, But **MR Unsafe** Is A Known Condition... Not An Unknown One.
- Yes, Some Off-Label Conditions Are Dangerous, But Just Because It's Unlabeled / Off-Label Does Not Automatically Mean That All MR Imaging Is Dangerous.

# It's All About The Harm

MRI Hippocratic Oath: First *Find* The Harm, Then Avoid It



# It's All About The Harm

## MRI Hippocratic Oath: First *Find* The Harm, Then Avoid It

- Risk vs. Benefit Requires That You Identify & Characterize The Risks
- In Identifying The Specific Risks, You Also Define What Is In Your Control / Outside Of Your Control To Manage
- If You Can Not Identify Specific Risks / Harms, You're Making Decisions Out Of Ignorance, Not Information

# Q&A

# Thank You

**Tobias Gilk, MRSO, MRSE**



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**[www.facebook.com/groups/MRIsafety](https://www.facebook.com/groups/MRIsafety)**