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MRI Safety

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MR Safety Compliance and Clinical Applications in the USA

Don-Soo Kim

Boston Children's Hospital, Harvard Medical School, USA

Magnetic resonance imaging (MRI) is one of the most powerful and versatile diagnostic tools in modern medicine, yet it carries distinct safety risks that remain a challenge for U.S. healthcare institutions. Projectile accidents, implant malfunctions, and patient burns highlight that MRI, though non-ionizing, is not without hazards. While radiologists and technologists manage daily operations, the comprehensive oversight needed to ensure consistent MR safety compliance is often fragmented or absent.

Medical physicists are uniquely positioned to fill this gap. With specialized expertise in physics, imaging technology, and regulatory standards, physicists bring a systems-level approach to MR safety. They design and implement safety programs, conduct independent risk assessments, lead incident investigations, and provide ongoing staff training that goes beyond routine protocols. Moreover, physicists play a critical role in evaluating and safely integrating emerging technologies—such as high-field systems, MR-guided interventions, and hybrid imaging platforms—into clinical practice.

This presentation argues that every healthcare system must formally integrate physicists into their MR safety structure. Case examples and practical strategies will demonstrate how physicist-led programs not only reduce risks and strengthen regulatory compliance, but also improve institutional credibility, patient trust, and clinical outcomes. Establishing the physicist as a central figure in MR safety is not optional—it is essential for advancing both patient care and organizational excellence in the era of rapidly evolving MRI technology.

Keywords: *MRI Safety, Patient and staff safety, Physicist role, Compliance, Accreditation, ACR guidelines, FDA regulations, Joint Commission Standards, Quality Assurance, Staff Training and Education, Risk Assessment, Patient Trust, Institutional Credibility*