

Background and Significance

- Real-time Magnetic Resonance (MR) imaging enhances surgical precision and outcomes.
- In 2025, 167 scanning cases occurred in the MR Operating Room, including but not limited to tumors and implantation of neuromodulating device implantations
- Intraoperative MR scanning facilitates complete tumor removal, reducing risk to patients.
- Allows immediate surgical adjustments based on updated scans.
- Reduces the need for repeat surgeries, improving patient safety and anesthesia time.

Preparation and Planning

- Hybrid MR suite (Figure 1) constructed as part of hospital expansion, featuring a central magnet serving two MR operating rooms.
- New equipment procured, inspected, and validated to meet MR safety standards prior to clinical use.
- Operating capacity doubled, requiring deliberate expansion and training of the core team.
- Existing protocols and workflows reviewed and revised to support dual-theatre operations, with clear delineation of magnetic field zones and safe equipment placement when the magnet is deployed.
- Differences in magnet design evaluated, including the absence of a fringe field extending into the room, informing updated safety practices and staff education.



Figure 1: MROR Suite

Description of Team

- The primary team includes registered nurses working in the MR operating theatre.
- The team also consists of surgical scrub technologists, nurse educators, nurse managers, lead MR technologist and multidisciplinary professionals such as physicians and patient safety officers.

Description of Project

- Baseline nurse competency assessment (Figure 2) to evaluate of existing standardized skills checklists, knowledge assessments, direct MROR observation, and review of prior adverse events and near-misses relevant to practice.
- SIM will be utilized to ensure staff understood the new protocols and team validated that they preserved staff and patient safety.
- Staff working to develop a competency-based orientation program for neurosurgery that includes the MROR.

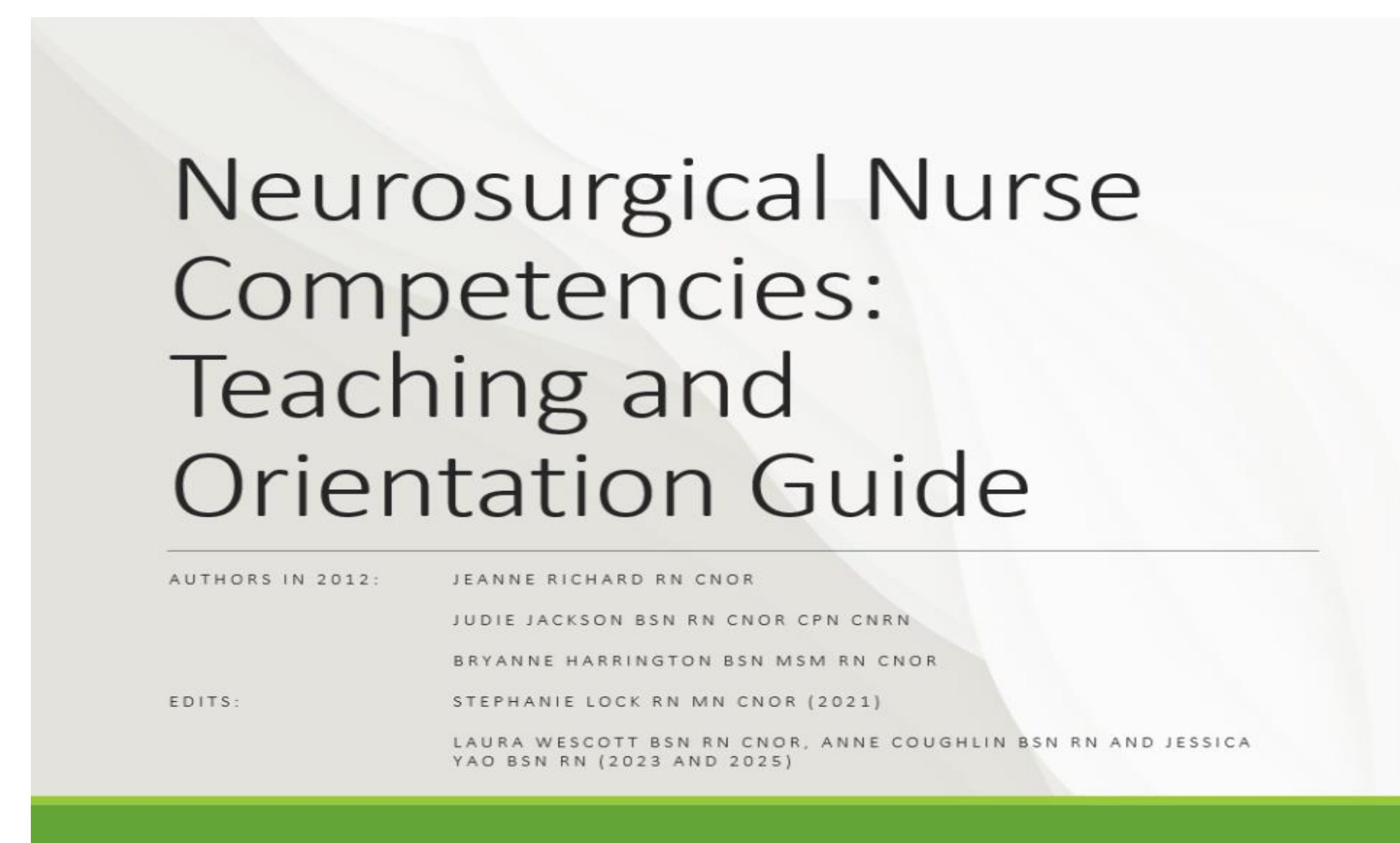


Figure 2: Competency Guide

Supporting frontline engagement and practice innovation while maintaining structured safety oversight.

Key Points/Project Highlights

- Orientation and onboarding to include staff becoming familiar with these operating theatres and the unique safety implications for patients and staff.
- Orientation included understanding and demonstration of MR safety.
 - Required MR safety education prior to independent practice
 - Standardized competency validation
 - Direct MROR observation
 - Partnership with MR technologists
 - Ongoing reassessment based on incident and near-miss trends
- Close working relationship developed between MR technologists and operating room staff.

Outcomes/Lessons Learned

- Established a collaborative partnership with nurses and technologists who practice routinely in the operating theatres, valuing frontline expertise in care of neurosurgical patients in this unique environment.
- Promoted interdisciplinary collaboration among anesthesia, surgery, nursing, and ancillary staff to develop and refine clinical practices.

Next Steps

- True collaboration within the patient care team through emphasizing shared decision-making, clear communication, and interdisciplinary partnership.
- The core team of nurses took ownership of MR safety; and are committed to continuous improvement
- Supported sustained competency, shared accountability, and a culture of patient and staff safety.
- Effectiveness to be evaluated through post-training assessments, ongoing competency evaluation, standardized checklist completion, and monitoring of incident and near-miss trends to identify opportunities for reinforcement and improvement.