

Robotic Surgery

Question

What are the potential risks of robotic surgical systems (RSSs), and how should hospitals prepare to use the technology?

Answer

When dealing with any new technology, including an RSS, it is always best to assess and examine the risks proactively rather than after an adverse event. Training has consistently been a top concern with robotic surgery, and no universal approach to training and credentialing for robotic surgery currently exists.¹ Rather, healthcare organizations are responsible for determining their own standards for clinical training, proctoring and oversight, competency, and credentialing/privileging.

Guidance related to training and competency assessment have evolved over the years. In a 2016 case study, the Agency for Healthcare Research and Quality (AHRQ) recommended that, until well-validated credentialing and training models could be developed, hospitals should require a basic robotic safety curriculum for surgeons performing robotic surgery. AHRQ also recommended that hospitals require surgeons to provide case logs or undergo case proctoring before receiving robotic privileges.²

A 2018 statement from the American College of Surgeons (ACS) noted four principles for learning new procedures and technologies and incorporating them into clinical practice:

1. Mastering didactic content
2. Technical training in an inanimate model
3. Precepted incorporation of the new technique or technology into practice
4. Demonstration of satisfactory patient outcomes³

In 2022, national robotic surgery experts participated in a consensus conference recognizing the need for standardized robotic surgery credentialing criteria across institutions that promote surgeon proficiency. Their consensus was that privileges for robotic surgery should be given based on a video review of the surgeons' performance and their attainment of clearly defined objective proficiency benchmarks. These experts also specified parameters for ongoing outcome monitoring and defined recommendations for technical skills training, proctoring, and performance assessment.⁴

A January 2024 article published in the *Journal of Surgical Education* highlighted the efforts of the Robotic Surgery Education Working Group, which was formed to develop a universal, consensus-based robotic surgery curriculum for surgical residents. The group identified gaps in current training programs and developed a 5-level curriculum that focuses on technical proficiency and procedural proficiency and includes didactic and hand-on learning.⁵

In 2025, a special session at the ACS Clinical Congress focused on the need to formalize robotic surgery skills and credentialing practices as these procedures continue to grow and scrutiny around training and privileges increases.⁶

Thus, although no universal framework for training, credentialing, and competency is in place, evolving guidance can help healthcare organizations develop well-defined policies and procedures. Further, organizations, surgeons, and surgical teams that plan to implement an RSS should consider — at minimum — these additional risk strategies:

- Document all surgeon and surgical staff training and ongoing competency assessment related to each type of robotic procedure performed. Because training from device manufacturers might not prove adequate, consider supplementing the manufacturer's training and arranging mentorships.
- Collaborate with anesthesia teams to develop screening criteria to identify the best candidates for robotic procedures. Criteria should specify exclusions for patients who might be at higher risk for surgical complications, nerve injuries, or other complications.
- For each potential candidate for a robotic procedure, work with the treating anesthesiologist to evaluate the patient's history and physical to identify the risks and benefits of robotic surgery. Choose the conventional approach when indicated based on risk.

- Engage each patient in a thorough [informed consent discussion](#), including a review of the risks, benefits, and alternative treatment options. Document the pertinent details of the informed consent discussion in the patient's health record. The anesthesiologist also should conduct and document an informed consent discussion with the patient.
- Establish a contingency plan for converting from a robotic procedure to a laparoscopic or open procedure. Be cognizant of, and plan for, any risks that may occur during such a conversion.
- Document in the patient's health record any special actions taken before, during, or after the procedure that specifically minimized the risks associated with robotic surgery (e.g., patient positioning or special monitoring).

To learn more about risks and safety considerations for robotic surgery, see MedPro's [Risk Resources: Robotic Surgery](#) and [Robot-Assisted Surgery: Patient Safety and Liability Risks](#).

Endnotes

¹ Porterfield, J. R., Jr, Podolsky, D., Ballecer, C., Coker, A. M., Kudsi, O. Y., Duffy, A. J., Meara, M. P., & Novitsky, Y. W. (2024). Structured resident training in robotic surgery: Recommendations of the Robotic Surgery Education Working Group. *Journal of Surgical Education*, 81(1), 9–16. doi: <https://doi.org/10.1016/j.jsurg.2023.09.006>

² Agency for Healthcare Research and Quality. (2016, February). *Robotic surgery: Risks vs. rewards*. PSNet Web M&M Cases & Commentaries. Retrieved from psnet.ahrq.gov/webmm/case/368/robotic-surgery-risks-vs-rewards-

³ American College of Surgeons. (2018, April 1). *Statement on credentialing and privileging and volume performance issues*. Retrieved from www.facs.org/about-ac/s/statements/credentialing-and-privileging-and-volume-performance-issues/

⁴ Stefanidis, D., Huffman, E., Collins J. W., Martino, M., Satava, R., & Levy, J. S. (2022, July). Expert consensus recommendations for robotic surgery credentialing. *Annals of Surgery*, 276(1), 88-93. doi: 10.1097/SLA.0000000000004531

⁵ Porterfield, et al., Structured resident training in robotic surgery: Recommendations of the Robotic Surgery Education Working Group.

⁶ Fox, M. (2025, October 8). *Special session focuses on credentialing and privileging in robotic surgery*. American College of Surgeons. Retrieved from www.facs.org/for-medical-professionals/conferences-and-meetings/clinical-congress-2025/cc2025-news/special-session-focuses-on-credentialing-and-privileging-in-robotic-surgery/

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