UCSF Department of Surgery
University of California San Francisco

Bridging Simulation and Practice: Our Experience of Designing and Implementing a Curriculum for Educating Medical Students as Robotic Surgery Bedside Assistants

Camilla Gomes, MD MS, Alyssa Murillo, MD MD MAEd, Ye Lim Sarah Lee, BS, Riley Brian MD MAEd, Daniel Oh, MD, Hueylan Chern, MD, Adnan Alseidi, MD MAEd, Patricia O'Sullivan EdD

UCSF Surgical Skills Center
Department of Surgery

Background

- Medical students' role is limited in robotic surgery, resulting in an unmotivating learning environment.[1]
- Enhance education experiences with level-appropriate, hands-on opportunities such as bedside assistance.
- We aim to share our early experience designing and implementing a curriculum to educate medical students as robotic surgery bedside assistants.

Methods

- Curriculum for 4th-year surgical sub-I students.
  - Pre-OR training:
    - ❖ 2 hours (44 modules) of Intuitive Surgical (Intuitive Surgical Inc, Sunnyvale, CA) videos.
    - ❖ 4-hour hands-on simulation-based session.
      - ○ Tasks of a basic bedside assistant (**Figure 1**).[2]
  - Operative experience:
    - ❖ 4-6-week rotations, supervised cases → autonomy as judged by a trained bedside assist.
- Questionnaire:
  - Weekly # of cases attended, tasks performed, and challenges faced.
- Semi-structured interviews for feedback:
  - End of rotation.
  - Directed content analysis to code the interviews and identify themes.

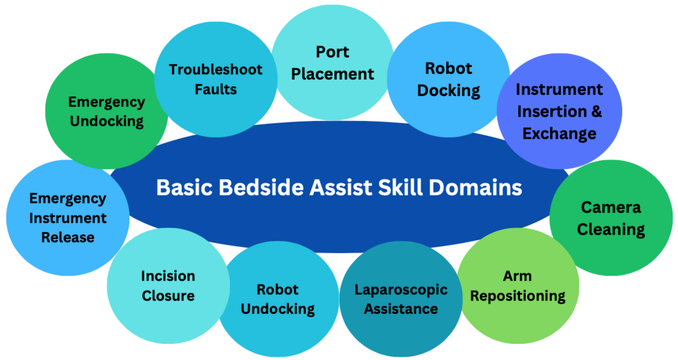


Figure 1. Basic bedside assist task domains.

Results

- 10 medical students in 4 months.
  - Rotating in 4 surgical specialties: 5 colorectal, 2 HPB, 2 CT, 1 general surgery.
- Students performed all tasks essential for basic bedside assistants.[2]
- A median of 9 robotic cases (range: 4-24) per student per rotation.
- 9 functioned independently by the end of their rotation.

Themes

Team Integration & Relationships	Skill Acquisition	Professional Growth	Curriculum Design	Balance of Responsibility
Appreciated the interdisciplinary collaboration and direct communication with other team members.	Valued the curriculum's emphasis on skill acquisition through hands-on, experiential learning.	Recognized that the unique skills learned in the curriculum enhanced their curriculum vitae.	Appreciated hands-on simulation-based learning, asynchronous video learning, and diversity of cases in the OR.	Emphasized the importance of balance between the educational opportunity and their need to perform as Sub-Is.

"I felt very integrated into the team, and I felt like I was actually a very vital aspect of the team. And people were very grateful for my help, and I was grateful for actually having the teachings and the trainings to help, you know, assist." S7

"It was a great opportunity to actually get in and practice exchanging the instruments for the attendings" S6

"I saw a wide range of robotic general surgery and foregut cases that I wouldn't have seen otherwise" S5

"But at the same time it was still incredibly incredibly useful and helpful to like, be able to practice the motions in a controlled environment where we didn't have to worry about like sterility or patient safety." S4

"It also offered a really great interdisciplinary opportunity to like work with the OR nurses." S3

"… and it's something that I am going to put on my CV and talk about in my interviews as well." S1

"I think it's something that's super useful for Sub-Is nowadays to be able to do. And I think that it's definitely an advantage to have as you go into Residency. You know, like, like you guys were saying, it's a great thing to add to your CV." S7

"We need letters of recommendation and, at least for me, my primary mentors aren't surgeons who do robotic cases." S4

Conclusion

- Designed and implemented a curriculum to educate medical students as robotic surgery bedside assistants for active OR participation
- Enhanced students' perceptions of robotic surgery by promoting an active role and fostering team integration
- Addressed key challenges in medical student education of robotic surgery by providing hands-on skills and invaluable OR experience
- Future directions:
  - Ensure balancing this curriculum with sub-I expectations
  - Refine the recruitment, training, and case assignment process, with the potential to formalize the curriculum as an elective course.
  - Expand the program to 3rd-year medical students and to those in Gynecology and Urology, who use robotic surgery.

Disclosures

- Camilla Gomes is a Robotics and Digital Research Fellow at Johnson & Johnson MedTech, where she receives a research stipend.
- Alyssa Murillo is a Research Fellow at Intuitive. Her position is not directly funded by Intuitive.
- Daniel Oh serves as the Vice President and Senior Medical Officer at Intuitive Inc., a position funded by the company.

References

1. Higgins RM, O'Sullivan P. The Robotic Surgery Learning Experience Through the Eyes of the Medical Student: What Do They See? *Journal of Surgical Education*. 2020;77(3):549-556. doi:10.1016/j.surg.2019.12.011
2. Brian R, Murillo A, Gomes C, Chern H, Oh D, O'Sullivan PS. Consensus guidelines on the bedside assistant skills required in robotic surgery. *Surgical Endoscopy*. Published online September 3, 2024. doi:10.1007/s00464-024-11206-x