



# A Pilot Study of a Low Cost Simulation to Teach and Assess Breast Cancer Communication and Procedural Skills

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# Introduction

- Duty hour implementation has limited surgical training opportunities
- General surgeons in training will perform on average <5 sentinel lymph node biopsy in residency, yet many will graduate and be expected to perform them as a part of their practice
- Surgical simulations are known to help speed acquisition of surgical skills in a safe environment
- Existing simulators are very expensive and not accessible for most residents
- Existing simulations also do not address other associated core breast surgery skills including communication in a patient care setting
- Purpose: to create a low cost mixed reality surgical and standardized patient simulation to encompass the essential skills for breast surgery, and to test the simulation for fidelity of the simulation and improvement in resident confidence

# Methods

- We created a breast simulator to perform lumpectomy and sentinel lymph node (SLN) biopsy for approximately \$60:
  - Mannequin torsos used as base
  - Foam used as axillary simulation, small blue felt ball placed within foam as lymph node simulation
  - Synthetic skin overlying axilla
  - Breast prosthesis donated from American Cancer Society, wire localization vs. Savi scout radar localizer inserted into breast prosthetic
  - Surgical drapes placed overlying patient to simulate sterile environment

Mannequin Breast Simulator and MRH Simulation
Plastic Mannequin Torso = \$50.00
Synthetic Skin Pad for Axilla = \$5.00 (per pad)
Foam to Simulate Axilla (3-inch thickness) = \$1.00 (per axilla)
Felt Balls to Simulate Lymph Nodes = \$4.00 for 30
Standardized Patient = Breast Cancer Nurse Navigator
Total = \$60.00

Plastic Mannequin Torso = \$50.00
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# Simulation Format



- Standardized patient (SP) encounter
  - Deliver diagnosis of breast cancer
  - Discussed surgical treatment options with patient
  - Assessed by objective third party observer, both verbal and nonverbal skills assessed
- Surgical simulation
  - Perform lumpectomy and SLN biopsy
  - Interpretation of lymphoscintigraphy, intraoperative radiographs
- Patient handoff
  - Simulated post operative handoff between surgeon and post anesthesia care unit (PACU)
- Performance assessed using binary checklist
- Residents also completed a pre/post simulation survey

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# Simulation



**Standardized patient encounter**



**Lumpectomy and sentinel lymph node biopsy**



**Performing a surgical handoff**

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# Results

- 33 residents (post graduate year, or PGY, 1-5) at 3 general surgery residency programs participated
- Resident performance improved with increasing PGY level
  - Procedure demonstrated most statistical significant differences between junior and senior residents, followed by handoff techniques
  - Residents had similar performance on SP interaction regardless of seniority

Resident Simulation Performance

Checklist (# of Items)	Mean # Items Missed					p-value
	PGY-5 (N=3)	PGY-4 (N=6)	PGY-3 (N=5)	PGY-2 (N=6)	PGY-1 (N=13)	
SP Interaction (19)	2.0	3.3	2.6	4.0	3.2	.60
Procedure (20)	0.7	3.7	4.0	9.5	13.4	.0001
Handoff (25)	4.7	4.8	1.8	6.7	9.2	.0289

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# Results

- Survey results demonstrated that most residents had completed <5 breast procedures, while 1/3 residents had performed no breast procedures at all
- Post simulation, resident anxiety levels fell by an average of 0.75 and confidence levels raised by 1.25 (confidence 1=least 5=most, anxiety 1=most 5=least)
- Residents reported strong fidelity of simulation compared to operative experience and reported a positive educational experience

Residents Procedural Confidence and Anxiety

Survey Item (Δ pre/post)	Total (N=33)
Confidence	2.85-4.10 (+1.25)
Anxiety	3.4-4.15 (-0.75)

<sup>1</sup>Confidence (1=Least 5=Most)

<sup>2</sup>Anxiety (1=Most 5=Least)



# Conclusions

- Standardized patient simulation is a cost-effective way to provide experience for general surgery residents to learn to deliver a difficult prognosis and perform breast surgery in a way that increases confidence and lessens anxiety.
- Senior level general surgery residents performed better than interns and junior level residents in communication, procedures, and post-operative handoffs, proving that experience leads to proficiency.
- We have successfully pilot tested a longitudinal, low-cost simulation to teach breast communication and procedural skills. The simulation distinguished between resident levels, improved confidence, lessened anxiety, and was felt to be a valuable educational experience.

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