



FLORIDA HOSPITAL
NICHOLSON CENTER

Fundamentals of Robotic Surgery

Summary of the Ongoing Project

Grants Leadership



PI: Richard Satava, MD
Minimally Invasive Robotics Assoc

Source: Intuitive Surgical Inc.



PI's: Roger Smith, PhD & Vipul Patel, MD
Florida Hospital Nicholson Center

Source: US Department of Defense



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Intuitive Surgical's Training Pathway

Surgeon and OR Team Pathway

Phase	Content	Trainer
I: Introduction to <i>da Vinci</i> Surgery ▼	Product Training ▼	Intuitive Surgical
II: Preparation and System Training ▼		
III: Post System Training ▼	Clinical Training ▼	Independent Surgeons & Societies/Academic Institutions
IV: Advanced Training ▼		
Beyond the Pathway	Continuing Clinical Education	Independent Surgeons & Societies/Academic Institutions

- Phases I-II focus on product training, while phases III-IV focus on clinical training
- Beyond the pathway, skills are honed with continuing clinical education

FRS Mission Statement

Create and develop a validated multi-specialty, technical skills competency based curriculum for surgeons to safely and efficiently perform basic robotic-assisted surgery.

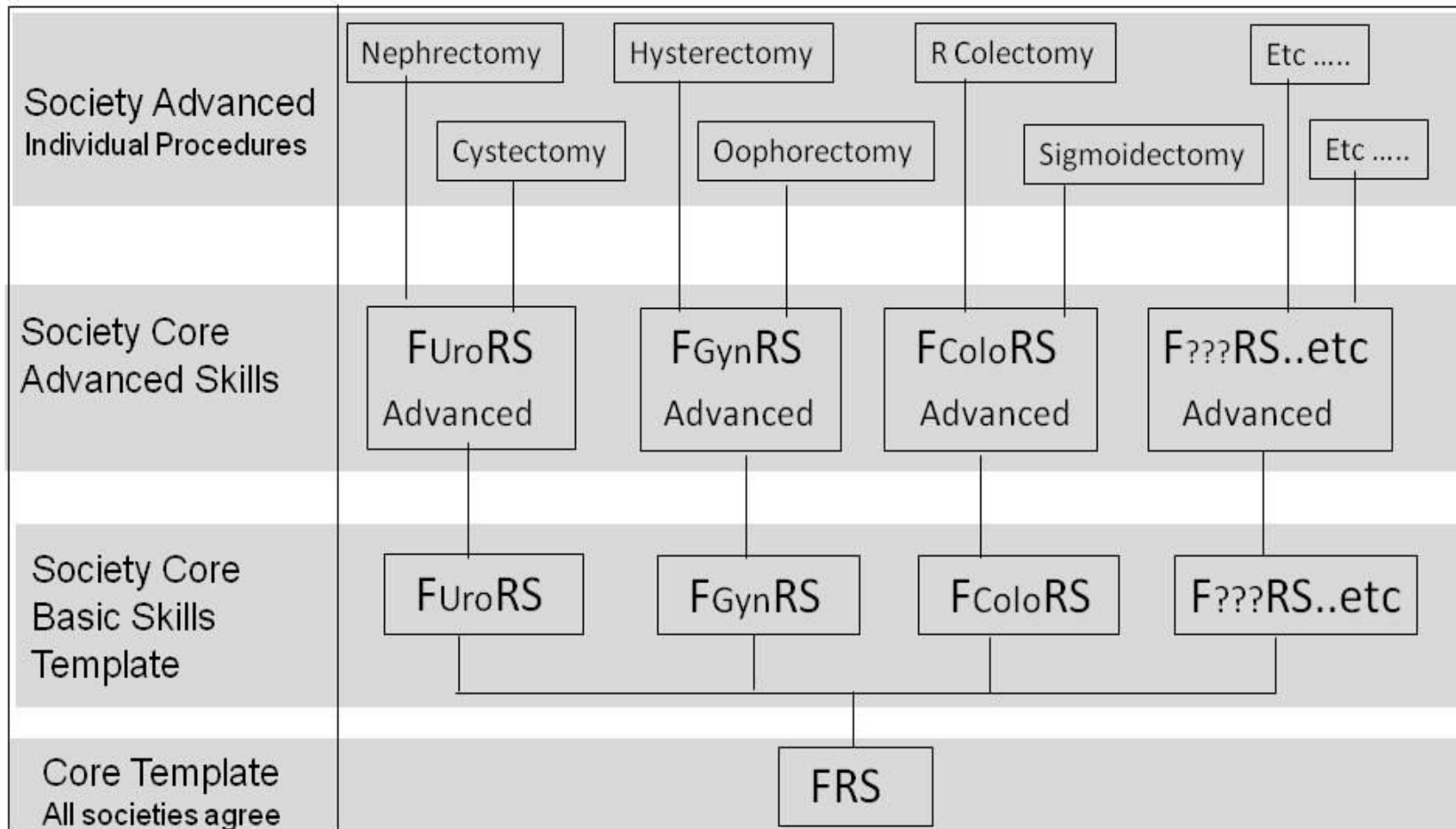
Note: The intent is to create a curriculum that is device-independent. This is admittedly difficult given the single approved surgical robot at this time. Therefore, significant attention is being paid to material that is device-flexible in anticipation of future robots.

Participating Organizations

- **American Association Gynecologic Laparoscopy (AAGL)⁺**
 - American College of Surgeons (ACS)
 - American Congress of OB-Gyn (ACOG)
 - **American Urologic Association (AUA)⁺**
 - American Academy of Orthopedic Surgeons (AAOA)
 - American Assn of Thoracic Surgeons (AATS)
 - American Assn of Colo-Rectal Surgeons (ASCRS)
 - American Assn of Gynecologic Laparoscopists (AAGL)
 - **Florida Hospital Nicholson Center***
 - **U.S. Department of Defense (DoD)***
 - U.S. Department of Veterans Health Affairs (VHA)
 - **Minimally Invasive Robotic Association (MIRA)***
 - Society for Robotic Surgery (SRS)
 - **Society of American Gastrointestinal and Endoscopic Surgeons (SAGES)⁺**
 - American Board of Surgery (ABS)
 - Accreditation Council of Graduate Medical Education (ACGME)
 - Association of Surgical Educators (ASE)
 - Residency Review Committee (RRC) – Surgery
 - Royal College of Surgeons-Ireland (RCSI)
 - Royal College of Surgeons-London (RCSL)
- * Funding Organizations
+ Executive Committee**

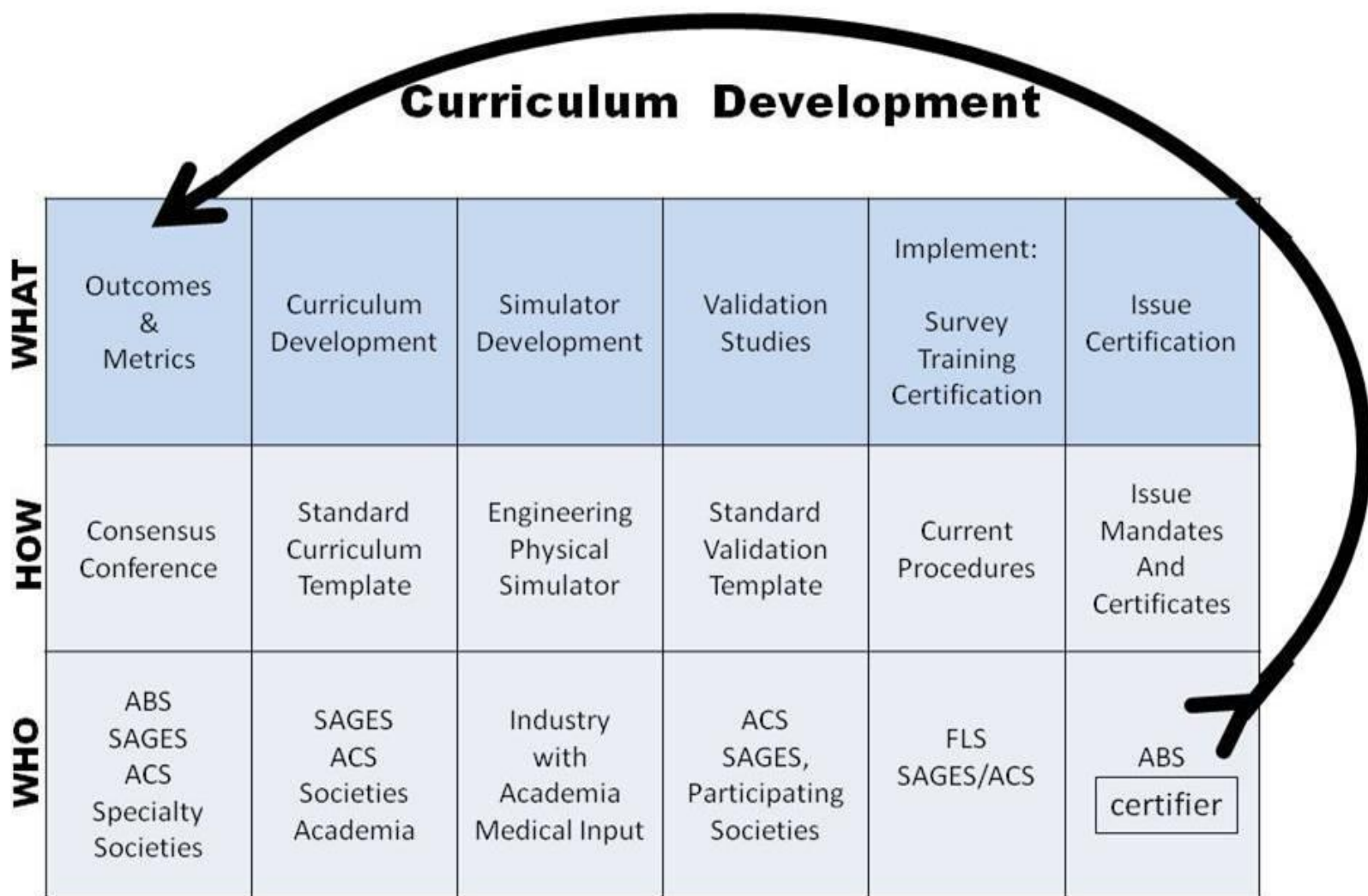
Development of Curriculum from common template

“Sweet* Tree”



* Adapted from Rob Sweet, MD, Professor of Urology, University Minnesota, 2010

The Metrics Drives the Process



Creator: Rick Satava, MD, Univ of Washington

Consensus Conference Process

1. Outcomes Measures (Dec 12-13, 2011)
2. Curriculum Outline (April 29-30, 2012)
- 2.5 Curriculum Development (Aug 17-18, 2012)
3. Validation Criteria (November 17-18, 2012)
4. Validation Studies (2013)
5. Transition to Objective Testing Organization (est. July 2013)

- Expert Discussion and Contributions
- Modified Delphi Voting Mechanism

#1 Outcomes Measures

Pre-Operative	Intra-Operative	Post-Operative
System Settings	Energy Sources	Transition to Bedside Asst
Ergonomic Positioning	Camera Control	Undocking
Docking	Clutching	
Robotic Trocars	Instrument Exchange	
OR Set-up	Foreign Body Management	
Situation Awareness	Multi-arm Control	
Closed Loop Comms	Eye-hand Instrument Coord	
Respond to System Errors	Wrist Articulation	
	Atraumatic Tissue Handling	
	Dissection – Fine & Blunt	
	Cutting	
	Needle Driving	
	Suture Handling	
	Knot Tying	
	Safety of Operative Field	

Faculty Members: Outcomes Measures

- Arnold Advincula, MD American Assoc of Gynecologic Laparoscopists & ACOG
- Rajesh Aggarwal, MD Royal College of Surgeons - London
- Mehran Anvari, MD Minimally Invasive Robotic Association (MIRA)
- John Armstrong, MD USF Health, CAMLS (now Florida Surgeon General)
- Paul Neary, MD Royal College of Surgeons - Ireland
- Wallace Judd, PhD Authentic Testing Corp.
- Michael Koch, MD American Board of Urology
- Kevin Kunkler, MD US Army Medical Research & Materiel Command TATRC
- Vipul Patel, MD Global Robotics Institute - Florida Hospital Celebration Health
- COL Robert Rush, MD US Army Madigan Healthcare System
- Richard Satava, MD Minimally Invasive Robotic Association (MIRA)
- Danny Scott, MD Society of American Gastro and Endoscopic Surgeons (SAGES)
- Mika Sinanan, MD University of Washington
- Roger Smith, PhD Florida Hospital Nicholson Center
- Dimitrios Stefanidis MD Association for Surgical Education
- Chandru Sundaram, MD American Urological Association
- Robert Sweet, MD American Urological Association
- Edward Verrier, MD Joint Council on Thoracic Surgery Education

Outcomes Definitions (Sample)

Task Name	Description	Errors	Outcomes	Metrics	Importance Rating					Rank Order
					1	2	3	4	Total Score	
Needle driving	Accurate and efficient manipulation of the needle.	Tearing tissue, Troughing the needle, Needle scratching, Wrong angle on entry/exit, Adjacent organ injury, (more)	Accurate and efficient placement of needle through targeted tissue, Following the curve of the needle, without associated tissue injury	Time, accuracy, tissue damage, material damage	0	0	3	6	33	3
Atraumatic handling	Haptic comprehension. Using graspers to hold tissue or surgical material without crushing or tearing.	Traumatic handling, Tissue damage or hemorrhage	Manipulates tissue and surgical materials without damage	Metric-respect for tissue, Stress and strain indentation and deformation	0	0	3	6	33	4

#2 Curriculum Development

Didactic & Cognitive	Psychomotor Skills	Team Training
Lecture-based	Principle-based	Checklist-based
Intro to Robotic System	Based on Physical Models (Virtual Models are Derivative)	#1: WHO Pre-Op
Pre-Operative Activity	3D Exam Tools	#2: Robotic Specific
Intra-Operative Activity	Use Tasks that have Evidence of Validity	#3: Undocking & Debriefing
Post-Operative Activity	Multiple Outcomes Measured per Exercise	#4 Crisis Scenarios
Each Activity includes: Goals, Conditions, Metrics, Errors, Standards	Cost Effective Solution	
	High Fidelity for Testing, Lower Fidelity for Training	
	IRR Requires Ease of Administration	

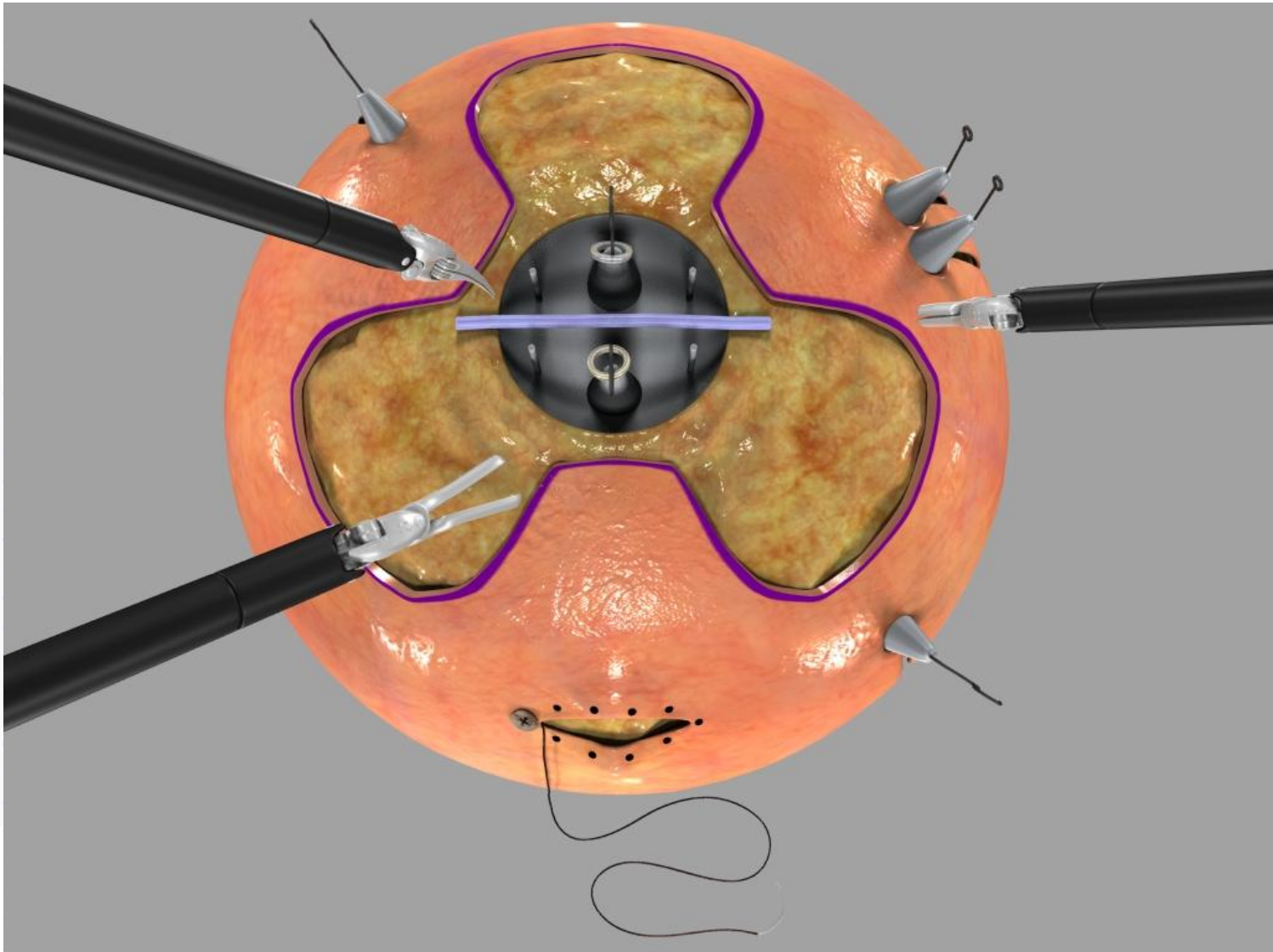
Faculty Members: Curriculum Develop

- Arnold Advincula
- Abdulla Al Ansari
- David Albala
- Richard Angelo
- James Borin
- David Bouchier-Hayes
- Timothy Brand
- Geoff Coughlin
- Alfred Cuschieri
- Prokar Dasgupta
- Ellen Deutsch
- Gerard Doherty
- Brian Dunkin
- Susan Dunlow
- Gary Dunnington
- Ricardo Estape
- Peter Fabri
- Vincenzo Ficarra
- Marvin Fried
- Gerald Fried
- Tony Gallagher
- Piero Giulianotti
- Larry Glazerman
- Teodar Grantcharov
- James Hebert
- Robert Holloway
- Santiago Horgan
- Lenworth Jacobs
- Arby Kahn
- Keith Kim
- Michael Koch
- Rajesh Kumar
- Gyunsung Lee
- Raymond Leveillee
- Jeff Levy
- C.Y. Liu
- Col. Ernest Lockrow
- Fred Loffer
- Guy Maddern
- Scott Magnuson
- Javier Magrina
- Michael Marohn
- David Maron
- Martin Martino
- W. Scott Melvin
- Francesco Montorsi
- Alex Mottrie
- Paul Neary
- Eduardo Parra-Davila
- Vipul Patel
- Gary Poehling
- Sonia Ramamoorthy
- Koon Ho Rha
- Richard Satava
- Steve Schwaitzberg
- Danny Scott
- Roger Smith
- Hooman Soltanian
- Dimitrios Stefanidis
- Chandru Sundaram
- Robert Sweet
- Amir Szold
- Raju Thomas
- Oscar Traynor
- Thomas Whalen
- Gregory Weinstein

Didactic Knowledge (Sample)

Title	Description	Desired Presentation Format (Images/checklists/videos..)
Trocar placement: trocar entrance injury, incorrect position, spacing and location, incorrect insertion depth, port-site injury	<ul style="list-style-type: none"> • Ports placed in areas of previous scars • Not checking for injuries after placement • Tip of the trocar not visualized during insertion 	<p>Video demonstrations of safe use of open cutdown, Verress needle, and Optiview techniques. Ideally video showing injuries occurring</p> <p>Video of arm collisions at the bedside due to inappropriate trocar placement</p> <p>Video or picture showing injury to port site when port not inserted appropriately</p> <p>Images of correct and incorrect port positions (outside view and inside)</p>

Psychomotor Multi-Skill Device Design



Team Training and Communication (Sample)

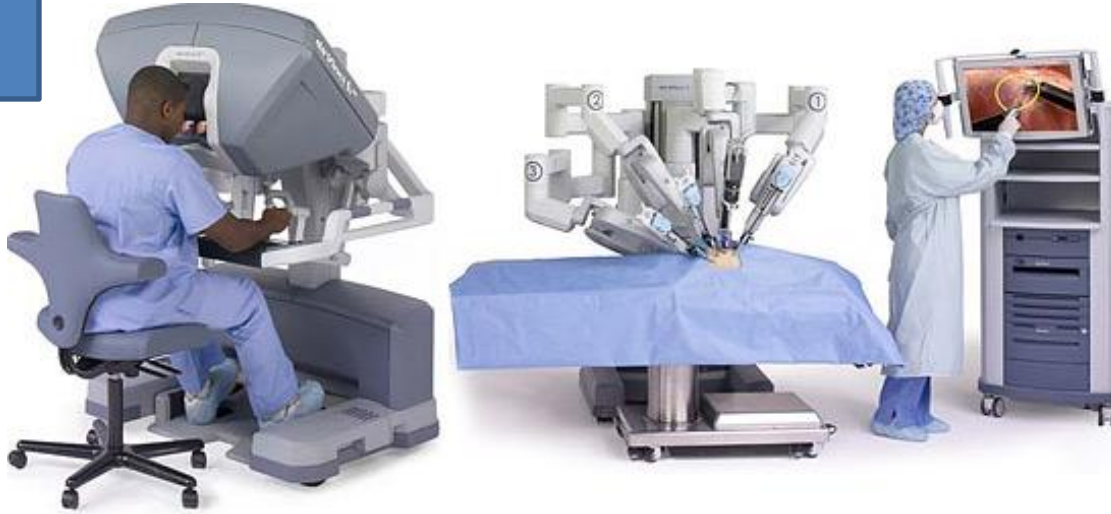
Checklist 1: Pre-operative
Checklist 2: Robotic Docking
Checklist 3: Intraoperative (see above)
Checklist 4: Undocking
Checklist 5: Debriefing

Checklist 3: Intraoperative Checklist (Pauses at Critical Steps in the Procedure and time-based - hourly)

- Is there good team communication concerning instrument usage and transfer?
- Are all foreign objects accounted for (i.e. white boarding) and removed?
- Are the periodic checks occurring to discuss case progression, team member continuity, and other issues?
- Has there been regular communication with anesthesia?

Testing Environments

Primary:
Robot



Derivative:
Simulator



#3 Validation Conference

- Criteria
 - Validate the curriculum and passing criteria that will be used to grant certification
- Multi-Institutional Study
 - 10 independent sites
 - ACS AEI accredited
 - Faculty in at least 2 specialties

Conclusions

- Objective curriculum in robotic surgery is needed for certification
- Development of such a curriculum is underway by a multi-specialty working group of experienced surgeons

Thank You!