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AST Guidelines for Best Practices on the Perioperative Role and Duties of the Surgical Technologist During Robotic Surgical Procedures

Introduction

The following Guidelines for Best Practices were researched and authored by the AST Education and Professional Standards Committee, and are AST approved.

AST developed the guidelines to support healthcare delivery organizations (HDO) reinforce best practices in the role and duties of the surgical technologist during robotic surgical procedures as related to the role and duties of the Certified Surgical Technologist (CST®), the credential conferred by the National Board of Surgical Technology and Surgical Assisting. The purpose of the guidelines is to provide information OR supervisors, risk management, and surgical team members can use in the development and implementation of policies and procedures for the role and duties of the CST during robotic surgical procedures in the surgery department. The guidelines are presented with the understanding that it is the responsibility of the HDO to develop, approve, and establish policies and procedures for the surgery department regarding the role and duties of the CST during robotic surgical procedures practices per HDO protocols.

Rationale

Robotic surgery is defined as a surgical procedure or technology that adds a computer-assisted electromechanical device to the interaction between the surgeon and the patient.[6] Examples include micromanipulators, remotely-controlled endoscopes, and console-manipulated devices.[6] These devices enhance the surgeon's vision, tissue manipulation, and tissue-sensing which alter the traditional surgeon-surgical wound direct contact. Robotic surgery devices have developed well beyond the investigational stage and their use in the OR has become an accepted method for performing minimally invasive surgery (MIS) in most surgical specialties on a routine basis.

Small healthcare to large research facilities are purchasing surgical robots and training their surgical personnel in the use of the robots. The surgical robot continues to evolve in development (first generation surgical robots had two manipulators (arms) and the current generation has four; henceforth, the layman term "arms" will be used throughout the document), and surgical applications; additionally, in anticipation that they become more economical to purchase their usage is anticipated to continue to increase. The most well-known robotic system is the da Vinci®; the most recent generations are the *da Vinci S HD*, *da Vinci Si*, and *da Vinci Xi* that are hi-definition, 3-dimensional vision systems that consist of the patient cart, surgeons console with foot pedals, and vision cart that contains the camera, focus controller, light source, electrosurgical unit, and equipment.[1, 15] Additionally, specially designed EndoWrist® instruments that provide a full range of motion and precision are used by the surgeon.

This demands the CST to have the technical knowledge to assist the surgeon in providing quality surgery that ensures the safety of the patient.

Approach to Organization of Guideline

As compared to other AST Guidelines, this guideline has a different approach regarding format and wording. The guidelines are placed under the general headings of Preoperative, Intraoperative, and Postoperative to sequence of the role and duties fulfilled by the CST. Additionally, the guidelines focus more on the "process", meaning the specific "actions" the CST performs during robotic surgical procedures. For example, the CST is now "handing" surgical instruments to the robotic arm and assisting with specific actions such as insertion of an instrument into a port.[10] Essentially, it is no different from when the surgeon is across from the CST during non-robotic surgical procedures; the exception being, obviously, the surgeon is now at the surgeon's console manipulating the extension of his/her own arms which is the robotic arms, and the CST must have the knowledge as related to the technicalities of the robotic device. Therefore, based upon inquiries received at AST by surgeons, CSTs, and OR supervisors regarding what is the role and duties of the CST during robotic surgery, this guideline includes specific process-based information. For the duration of the guideline the technical information will focus on the current generation of da Vinci models.

Evidence-based Research and Key Terms

The research of articles, letters, nonrandomized trials, and randomized prospective studies is conducted using the Cochrane Database of Systematic Reviews and MEDLINE®, the U.S. National Library of Medicine® database of indexed citations and abstracts to medical and healthcare journal articles.

The key terms used for the research of the guidelines include: robotics; robotic surgery; da Vinci robotic system. Key terms used in the guidelines are italicized and included in the glossary.

Guideline I

The CST should complete training specific to the robotic device being used at the HDO.

1. As with any technology used in the OR, the completion of training by the CST is necessary in order to achieve competence with the robotic technology and surgical procedures.
   A. As a graduate of an accredited surgical technology program, the CST gained entry-level knowledge of robotic surgery.
      (1) The initial formal education on robotic surgery is primarily through didactic studies.[2]
         a. The surgical technology student should be familiar with the medical terminology specific to robotic surgery, e.g. degree of freedom or rotation, articulated, manipulators, telesurgery, and carry this knowledge into the OR as a CST practitioner. Knowledge of medical terminology contributes to the competency of the CST by being able to communicate with the other team members using the common robotic "language", as well as an understanding of the robotic components and instrumentation.
      (2) There may be instances where the surgical technology student may have exposure to robotic surgery during surgical rotation; however, it depends upon if the HDO has a robot, and if the student is allowed to observe and/or scrub-in on robotic procedures.

B. Prior to participating in robotic surgery, the CST should complete specific preclinical training for each type of robotic device utilized at the HCF.
   (1) Due to the complexity of robotic devices, robotic surgery demands the CST to complete didactic and hands-on training that is provided by the device manufacturer and the HDO including ongoing continuing education.[2, 3]
      a. The HDO is responsible for setting the training and competency requirements for the equipment used on patients.[11]
   (2) When the HDO purchases a new robotic device including the accessories and instruments, or any new item for the currently used surgical robot the CST should complete continuing education provided by the device manufacturer.[3]
   (3) The training should initially be observation and familiarization that progresses to hands-on training in a lab/simulated practice to allow the CST to learn the technical skills as well as the ability to efficiently work with the surgical team managing unforeseen situations including trouble-shooting equipment malfunctions or patient emergencies such as internal hemorrhaging.[14]
   (4) The training should include the following (this list is not all inclusive):
      a. Preferably, the HDO has a dedicated OR for robotic surgery where the system components are permanently maintained. If not, training should involve proper transportation of the surgeon console, patient cart, and vision cart to the OR that prevents damage to the components.
      b. How to connect the robot system components.
      c. Proper setup, draping, and positioning arms.
      d. Proper technique for white balance and calibration of endoscope and camera.
      e. Proper technique for inspecting robotic instruments for functionality and defects.
      f. Proper technique for placing the instruments in the robotic arms and exchange of instruments.
      g. Proper technique for inserting instruments into trocars as directed by the surgeon.[9]
      h. Proper technique for removal, exchange, cleaning and re-introduction of the endoscope.
      i. Proper technique for manipulating/moving the uterus for visualization as directed by the surgeon. (S. Walsh, personal communication, July 21, 2012).
      j. Proper technique for grasping and inserting the Endo Catch™ or Endobag™.
      k. Proper techniques regarding how to safely and quickly move the system components in a patient emergency such as internal hemorrhaging.
      l. Trouble-shooting technical problems, e.g. if the device suddenly stops working or shuts down, arms make independent movements that are potentially unsafe to the patient.
      m. Assisting with wound closure.
      n. Proper cleaning, disinfection and sterilization of reusable instruments, accessories and endoscopes used with the robotic device.
      o. Specific variations for each procedure setup.
   (5) A HDO should ensure that 3-4 teams consisting of a surgeon, CST, and RN are trained to establish a continuity of patient care.[5]

(6) The Robotics Team Leader (see Standard of Practice II) should document all training and confirm the competencies of the CST. See Appendix A for a sample competency checklist.
   a. The Robotics Team Leader is responsible for documenting the training completed by CST employees including visual confirmation of the competencies of the CSTs who are a member of the robotic team.
   b. The Robotics Team Leader should document additional continuing education the CST employees complete regarding robotic surgery to include training on new robotic components, instrumentation, and accessories the HDO purchased, and surgical procedures.

2. Upon completion of training and gaining experience working with the team on robotic surgical procedures, the CST can contribute to the training of other surgical staff members.

Guideline II

It is recommended that the HDO designate an individual in the surgery department as the Robotics Team Leader.

1. The Robotics Team Leader should be an individual that has extensive robotic surgical experience who serves as the coordinator of the robotic services program in the surgery department.[12]
   A. The CST, with training and experience, can serve as the Robotics Team Leader.
      (1) It is recommended the HDO appoint a Robotics Team Leader when the HDO is establishing a new *robotics* surgical program who can serve as the lead person in coordinating all aspects of the program including scheduling robotic procedures; purchasing new and replacement accessories and instruments; confirm availability of accessories and instruments for robotic procedures; provides and/or arranges training and continuing education.[12] See Appendix B for a comprehensive list of recommended responsibilities.
      (2) The Team Leader should be an active member of the robotic team participating in robotic procedures who can be relied upon to provide expert guidance, suggestions and recommendations to the team during the procedure.

Guideline III

The surgery department should review the policies and procedures (P&P) regarding robotic surgery on an annual basis.

1. The surgery department should include members of the surgical team and administration when reviewing the P&Ps, including CSTs, surgeons, RNs, risk management, and infection control officer.
   A. The surgery department should document when the P&Ps were reviewed, revision completed, and who participated in the review process.
2. CSTs should be familiar with the P&Ps for robotic surgery. The orientation of new employees should include reviewing the P&Ps.

Preoperative Guidelines

Guideline IV

The CST must have a thorough understanding of the two robotic components, the patient and vision carts, to be able to participate in setting up the components when scrubbed in or as an assistant circulator.

1. The following are brief descriptions of the patient and vision carts that the CST is involved with moving, setting up, and draping; the CST is referred to the Intuitive, Inc. publications for detailed information. The following information applies to the S HD, Si, and Xi da Vinci models.
   A. The patient cart contains the camera and instrument arms, and touchscreen monitor.
      (1) The S HD, Si, and Xi systems have a camera arm and three numbered instrument arms.

      (2) Each arm is equipped with a clutch button that assists with all movements of the arms as well as insertion and withdrawal of instruments. To activate the clutch, the CST depresses the button and the arm can be moved; if the button is not depressed, the CST will meet with resistance and the arm will return to its original position.[7]
         a. There is a clutch button exclusive to the camera and instrument arms located at the top of each arm used to adjust the final positioning of the arm during the docking procedure as well as to insert and withdraw the endoscope and instruments.
      (3) The are several accessory items that must be sterile that are positioned when draping each arm; the items are:
         a. Camera sterile adapter
         b. Camera arm sterile adapter
         c. Instrument arm sterile adapter
         d. Camera trocar mount
         e. Instrument arm sterile adapter – this has a limited use life and only reused 50 times
         f. Instrument arm sterile adapter – can only be used once
      (4) The touchscreen monitor is coordinated with the surgeon console; it displays the system status icons and text messages for the CST and circulator to view.[1] The monitor can also be mounted on the vision cart.[7]
      (5) The patient cart is moved with the use of a motor drive that provides for easily docking the cart to the OR table and trocars.
      (6) The connections for cables are located on the back of the cart.
   B. The vision cart contains the light source, camera focus controller and storage bin, and video processing equipment; additionally, a telemonitor may be placed on the cart.[15]
      (1) For the S HD system, the light source is a sterile bifurcated cable that is attached to the endoscope to illuminate the right and left channels; the Si system uses a single light source cable.[7]
      (2) The endoscope is connected to the camera head and the camera head is also connected to an automatic focus control that is connected to the surgeon console. The optical channels of the camera are connected to chip camera control units (CCU) to produce the three-dimensional image at the surgeon console.[1]

(3) The vision cart system contains a digital zoom so the surgeon can magnify the tissue without having to move the endoscope.
(4) One of the more recent revisions to the Si patient cart involves the light source and camera control unit combined into a single connection.
(5) The white balance is completed using the telemonitor.
(6) The wheel locks are located on the rear wheels of the vision cart.[16]

Guideline V
The CST must have a thorough understanding of the specialty EndoWrist® instruments to properly handle and care for the instruments.

1. The instruments are manipulated by the surgeon at the surgeon console; they have seven degrees of freedom with a wide degree of articulation and rotation that simulate the movements of the wrist and hand.
   A. The CST must confirm the robotic system that is being used if the HDO has the standard and S systems because the instruments are not interchangeable between the systems.
      (1) The instruments for the standard system are 52 cm with grey-colored housing, whereas the S systems instruments are 57 cm with blue-colored housing.[7]
   B. Each instrument has a fixed life of 10 uses at which time it is discarded.[9]
      (1) The system tracks the number of uses remaining for each instrument and provides the information on the telemonitor.[9] The CST must pay careful attention to this information since the instrument arm will not function if an instrument that has exceeded the number of uses is inserted onto the arm.
      (2) The CST should have extra of each instrument available in the OR in the event an instrument has reached its number of uses.

Guideline VI
The CST should demonstrate the knowledge and skills with the preoperative preparation and setup of the system's components.

1. The surgeon console, patient cart, and vision cart should be carefully transported into the OR to prevent damage.
   A. The components should be slowly and carefully transported per manufacturer's instructions.
      (1) The patient cart is transported using the motor drive.
      (2) The robotic arms must be in the stow position and kept from moving during transportation to avoid damage, e.g. hitting a wall or door.
   B. The components should be arranged in the OR per the surgical procedure that allows maximum movement of the patient on the stretcher, provides the surgeon a clear view of the patient from the console, clear traffic pathways, and tension-free connections of the cables between equipment.
      (1) The components should be arranged according to non-sterile and sterile areas to keep traffic and communication pathways clear.
         a. The surgeon console is arranged in the non-sterile area that allows the surgeon a clear view of the patient and sterile field.
         b. The vision cart is arranged in the non-sterile area that can be accessed by the circulator and viewed by the CST.

c. The patient cart is initially placed away from the OR table and draped; it is moved into the sterile field once the patient has been positioned and draped.

C. When connecting components to the main power outlet(s) extension cords must not be used.

2. The CST should confirm all necessary supplies and instruments have been "pulled" prior to transporting the case cart into the OR. Items to confirm include the endoscopes; endoscope sterile adapter; camera arm sterile adapter; drapes for the camera and instrument arms; endoscopic light cable Veress needle; two 12 mm sharp trocars with sheaths; and three 5 or 8 mm sharp or blunt (surgeon's preference) trocars with sheaths.
3. The CST should perform all other routine duties that are completed prior to any type of surgical procedure including opening sterile supplies and instruments to establish the initial sterile field on the back table; perform the surgical scrub; gown and glove self; set up the sterile back table.
   A. The CST should carefully inspect all instrumentation for proper functioning and defects with specific attention to the EndoWrist® instruments.
4. The CST and circulator work as a team in draping the instrument and camera arms. The drapes must not be positioned too tightly as this will impede the range of motion of the robotic arms.[7]
   A. It is recommended the CST and circulator practice as a team draping the arms prior to working together during surgical procedures.
      (1) The draping of the arms is a complex process and demands close observation by the two team members to make certain there are no breaks in sterile technique. Prior practice aids in creating a team that can anticipate the actions of each other as well as facilitate positive communication skills.
   B. The CST and circulator should follow the steps for draping the patient cart as provided by Intuitive Surgical, Inc. and manufacturer of the specialty drapes. The following is a brief outline of the steps of the draping procedure.
      (1) All cables are first connected: system, focus control, optical channels, and power. The system can then be turned on and it will perform a self-test to confirm system operability. During the self-test, the circulator must not move the arms or any other part of the system or it will activate a fault.
      (2) The circulator positions the instrument and camera arms to as to allow enough room for draping by the CST.
      (3) The arms are removed from stow position and the home sequence initiated. The CST and circulator should verbally confirm they heard three audible beeps when the homing sequence has completed.
      (4) The instrument arms should be completely covered by the sterile drape. Each arm is separately draped; therefore, the CST must have three drapes on the back table.[9] Each arm should be fully extended while draping to allow the CST to easily slide the drape over the arm.[1] Standing in front of an arm the CST places the drape over the arm and the circulator assists by grasping the inside of the drape to help pull through. As each arm is draped, the CST should slightly move the arm to the side to prevent contamination of the drape by the non-draped arms. The trocar mount of the S systems is permanently attached and must be covered by the drape.

(5) The camera arm is draped in the same way. The S systems require a camera arm sterile adapter. Depending on when the HDO purchased the system, some systems require a separate sterile endoscope trocar mount, while other systems the mount is permanently attached.
(6) Next, the touchscreen monitor is draped.
(7) The endoscope is draped by connecting the camera sterile adapter to the endoscope and taping the drape to the sterile adapter. The camera head is connected to the endoscope and the drape inverted over the camera head and optical cables.
(8) The sterile light cable is connected to the endoscope and the camera and endoscope are activated. The CST completes the white balance of the endoscope/camera head apparatus by using a sterile piece of white paper. The CST can complete the white balance using the camera head or touchscreen monitor.
(9) The CST now completes the 3D calibration to align the endoscope and establish the endoscope settings. The CST uses the alignment target on the tip of the endoscope in conjunction with the camera head or touchscreen monitor. Each endoscope that may be used during the procedure must be calibrated.
(10) The last step completed by the CST is setting what is referred to as the "sweet spot" of the camera arm by aligning the trocar mount with the center of the patient cart column and extending the camera arm to establish about 20" of space between the back of the camera arm and patient cart. The CST should use the guide on the camera arm that helps to set the sweet spot. This step is necessary to allow for maximum range of motion (ROM) of the arms and prevent hitting each other.

5. CST completes additional routine duties prior to the start of the intraoperative phase including gowning and gloving the surgeon(s); assist with draping the patient; set up electrocautery, suction, camera, and light cords.

Intraoperative Guidelines

Guideline VII
The CST at the sterile field assists the surgeon in performing a safe robotic surgical procedure.

1. During the intraoperative phase the CST carries out the following duties to assist the surgeon in the performance of a safe robotic surgical procedure. This list is not all inclusive since there are multiple routine duties the CST completes during any type of surgical procedure.
   A. The CST follows the standard procedure in assisting the surgeon with insertion of the trocars.
      (1) After the pneumoperitoneum is established, a 12 mm trocar with sheath is placed to be used for the endoscope; another 12 mm trocar is placed for the camera arm.
      (2) 5 or 8 mm sheaths with blunt or sharp trocars are placed for the instruments arms.

B. The patient cart is moved into position (referred to as "docking") by the circulator using the motor drive aligning the patient cart tower, arms and anatomy.[8]
   (1) When docking the patient cart, the team should assist the circulator in avoiding hitting, pinching, or pushing against the patient's arm, body, or leg.[7]
C. The camera arm is the first arm to be connected to the patient by locking the camera trocar mount to the camera trocar.[7, 8] The CST should not use the camera clutch to move the camera arm as this will limit the ROM of the camera. The camera setup joint buttons must be used to move the camera arm into position and the camera clutch to fix the arm in place.
D. Next, the instrument arms are attached to the robotic trocars. Snap mounted devices are used to place the instrument arms. Just as with the camera arm, the port clutch is used to move the instrument arms and the instrument clutch used for establishing the final trajectory.
   (1) When all arms are connected, the surgical team should confirm each arm for proper working distance and ensure the arms are not applying pressure on the patient; the team members should verbally confirm these two items.
   (2) When the first instrument arm is connected the motor drive brakes of the patient cart automatically lock to keep the cart from moving. For safety purposes, a yellow LED on the motor drive labeled "Cannula installed; Cart drive disabled" will light up when the first instrument arm is connected and the motor drive brakes are locked.[16]
E. Prior to the insertion of the endoscope the CST must prevent fogging of the lens. The CST can perform one of two methods to prevent fogging of the lens.
   (1) Place the end of the endoscope that contains the lens in a basin of body temperature sterile water while setting up the sterile back table.
   (2) Use a commercial product such as FRED™ (fog reduction/elimination device); the product should be used per manufacturer's instructions.
F. The CST assists by inserting the endoscope and instruments into the arms while the surgeon has direct visualization of the ends of the sheaths at the surgeon's console.
   (1) During insertion of the endoscope and instruments the CST must be careful not to puncture the sterile drapes covering the arms.
   (2) The CST inserts the endoscope by placing the lens into the sheath and locking it into the camera trocar mount. The CST then advances the endoscope through the sheath into the surgeon's view of the surgical field using the camera clutch button.
   (3) Prior to inserting the EndoWrist® instruments, the CST should verbally confirm with the surgeon that the wrist is straight and not at an angle to avoid damage to the instrument. The CST places the instrument tip into the sheath and slides the instrument housing into the adapter. Next, the CST advances the instrument through the sheath into the surgeon's view of the surgical field using the instrument clutch button. The endoscope and each instrument are placed into the patient by the CST while the surgeon views the surgical field at the surgeon console.

G. Throughout the procedure, the CST removes and exchanges instruments and endoscopes from the arms, and guides both items into the sheaths as needed and requested by the surgeon. (S. Walsh, personal communication, July 21, 2012)
   (1) To remove an instrument, the CST verbally confirms with the surgeon the wrist of the instrument is straight; the CST squeezes the release levers and pulls the instrument out.[7] The CST then performs the steps as outlined above for the insertion of the next instrument. The S systems offer a guided tool change where the next instrument is inserted and placed to a depth of 1 mm short of the previous instrument position.[7]
   (2) Verbal communication between the CST and surgeon is always important, but it is of particular importance during robotic surgical procedures during the insertion and exchange of the endoscope and instruments to avoid movements that could damage the items and/or injure the patient. The system is equipped with an audio intercom that allows the surgeon to clearly communicate with the CST and circulator while still looking into the viewer of the surgeon console.[9]
   (3) When exchanging instruments the CST should clean the tips of the instruments with instrument wipes.
   (4) When the CST exchanges an endoscope, the end is cleaned when indicated and a de-fogging agent should be applied prior to insertion into the patient.

H. When needed during gynecological procedures, the CST may manipulate/move the uterus for visualization as required and directed by the surgeon.

I. When needed during genitourinary procedures, the CST may apply traction to the Foley catheter and/or replaces the catheter as required and directed by the surgeon.

J. To facilitate removal of tissue or an organ from a body cavity, the CST may grasp and insert the Endo Catch™ or Endobag™ as required and directed by the surgeon.

2. When the surgical procedure is completed, the instruments are removed first followed by the endoscope.
   A. The arms are disconnected from the trocars and the patient cart undocked from the patient. The motor drive of the patient cart will not be activated until all the instruments and endoscope with camera are removed, and all the arms disconnected.
   B. The surgeon re-enters the sterile field to extend a trocar incision to deliver the specimen retrieval bag.
   C. The CST must have the suture for fascial closure of the extended incision and 12 mm trocar incisions. The 5 and 8 mm trocar openings usually do not require fascial closure.
   D. If another robotic procedure is scheduled, the system does not need to be turned off.

Guideline VIII
The CST should be prepared to work with the robotic team troubleshooting system technical errors.

1. The CST should exhibit knowledge of the systems internal capabilities to assist the team in troubleshooting.
   A. The system has the ability to store memory of past technical errors.

B. The system has the internal ability to allow the surgical team to interact "live" with technical engineers at Intuitive Surgical, Inc.[8]
   (1) The system is connected through the Internet and transmits computerized messages to the technical engineers. The engineers log-in and can read what the team is seeing on the monitors in the OR allowing them to diagnose the problem and possibly fix it from the Intuitive Surgical, Inc. headquarters.[8]
   (2) When a technical error occurs, the team must follow the instructions displayed on the monitors. There are two faults: "recoverable" and "nonrecoverable".
      a. A recoverable fault is a technical error and the surgical procedure can continue after the team has confirmed the error and fixed it. The system has a set of alarms to indicate a recoverable fault as well as messages on the monitors and flashing LEDs on the patient cart arms. The system locks when the fault occurs and is unlocked by the team once it is resolved.
      b. A nonrecoverable fault cannot be fixed; the team must shut down the system and convert to an open procedure.

Guideline IX
The CST must be prepared for conversion to an open procedure such as in the event of a nonrecoverable fault of the robotic system or patient emergency, e.g., unanticipated hemorrhaging.

A. The CST must exhibit the proper knowledge and skills to quickly and safely assist the surgical team by properly removing and placing on the sterile back table the endoscope, camera, and instruments to allow the circulator to move components away from the sterile field.
   (1) An emergency power-off button is located on the back of the surgeon console that will completely turn off the power to the whole system.
   (2) The CST must remove the instruments and endoscope from the patient, and disconnect the arms from the sheaths to allow the circulator to undock the patient cart. A well-trained team performing in a coordinated effort should complete these actions in two to four minutes.[9]

Postoperative Guidelines

Guideline X
The CST is responsible for break-down of the sterile back table including the initial decontamination of the robotic instrumentation and accessory items.

1. The first step in the decontamination process occurs in the operating room (point-of-use).[5]
   A. The CST is responsible for pre-soaking the contaminated instruments to prevent organic material from drying prior to transport in the case cart to the decontamination room.
      (1) The CST must follow the robotic manufacturer's instructions for the decontamination of the endoscopes, instrumentation and accessory items.
      (2) The CST must exhibit careful technique handling robotic items when placing in the pan(s) for pre-soaking, placing the pans in the case cart, and transporting to the decontamination room to prevent damage to the items.

2. CSTs who work in central sterile supply or work in small HDOs where they work in the surgery and central sterile supply departments, are responsible for the further decontamination, preparation, and sterilization of the robotic items.
   A. The CST must follow the robotic manufacturer's instructions for decontamination, preparation and sterilization of the robotic items.
      (1) If using a da Vinci® robot system with endoscope and EndoWrist® instrumentation, it is recommended to use the information published on the Intuitive Surgical web site such as the *Reprocessing Instructions*.[13]

Competency Statements

Competency Statements	Measurable Criteria
1. CSTs have the knowledge and skills to prepare the robotic components, instruments and accessories for surgery. 2. CSTs have the knowledge and skills to assist the surgeon in performing robotic surgical procedures that ensure the safety of the patient and surgical team. 3. CSTs have the knowledge and skills to identify and work with the team to trouble-shoot robotic equipment malfunctions. 4. CSTs have the surgical patient care knowledge and skills to assist the surgical team in responding to patient complications including conversion to an open procedure. 5. CSTs have the knowledge and skills to decontaminate, prepare and sterilize the specialty robotic instruments and accessories.	1. Educational standards as established by the *Core Curriculum for Surgical Technology*.[4] 2. The didactic subject of robotic surgery is included in a CAAHEP accredited surgical technology program. 3. Students demonstrate knowledge of robotic surgical procedures during clinical rotation, given that the surgery department performs robotic surgery. 4. CSTs complete hands-on training specific to each type of robotic device. 5. CSTs complete continuing education to remain current in their knowledge of robotic surgery.[3]

CST® is a registered trademark of the National Board of Surgical Technology and Surgical Assisting (NBSTSA).

Glossary

Robotics: A branch of technology that designs, constructs, operates robots, as well as develops new applications for robots.

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Appendix A
Role and Duties of the Robotics Team Leader

The following list is not all inclusive, but meant to provide HDOs with information that can be used to develop a description of the role and duties of a Robotics Team Leader.

- Responsible for scheduling robotic surgical procedures.
- Serve as the clinical expert in robotic surgical procedures.
- Participate on the robotic team during surgical procedures.
- Serve as a public relations liaison between the HDO and public.
- Complete and document competency evaluations of team members.
- Document the progress of the HDOs robotics program including gathering data that can be used to adjust the program.
- Responsible for providing or arranging continuing education and training of robotic team members, including initial training.
- Coordinate purchasing of equipment, supplies and instrumentation with purchasing. department to keep an adequate amount of inventory.

Appendix B
CST Competency Checklist for the
da Vinci® Surgical Robot System

CST Name: _____
Preceptor Name: _____

Date Internet Training Completed: _____

Date Hands-on Training Completed: _____

Log of Robotic Cases – Name and Date of Cases:
1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____

Completion of Robotic Orientation:
Preceptor Signature: _____ Date: _____
OR Manager Signature: _____ Date: _____

Draping Arms:
___ Unfolds the instrument arm drape to the sterile adapter reinforcement.
___ Slides the sterile instrument arm adapter into the sterile adapter. Raises the hinged portion to lock the adapter in place.
___ Opens sterile camera drape package and places arrow toward CSTs body.
___ Unfolds the closed end of drape until adhesive strip and reinforcement section are exposed.
___ Adheres the adhesive strip to the sterile camera arm adapter.
___ Places instrument arm drape over the top of the instrument arm without contaminating.
___ Places sterile instrument arm adapter hinges onto silver bar of instrument arm.
___ Pushes sterile adapter mount onto instrument arm until click heard and rotating of discs seen.
___ Checks discs for spongy feeling.
___ Aligns the sterile cannula mount for instrument arm with the holes in the drape.
___ Inserts the key into the slot on the instrument arm and twist lock in place.
___ Attaches drape straps in appropriate locations.
___ Moves the draped instrument arm away from the undraped camera arm by using set up joint.
___ Drapes the camera arm by aligning the sterile camera arm adapter with the carriage on the camera arm.

___ Creates a trough for the endoscope and pushes sterile camera arm adapter firmly in place.
___ Aligns the pins on the camera cannula mount with the reinforcement and hole in the drape, and snaps it into place.
___ Demonstrates the “sweet spot” rule for the camera arm.
___ Places instrument arms in a “hugging” position after completion of draping.
___ Drapes the robotic endoscope to the camera processor properly.

Camera and Endoscope Calibration:
___ Attaches the endoscope alignment target with the crosshairs running vertically and horizontally to the tip of the endoscope.
___ Demonstrates correct positioning of endoscope tip in endoscope alignment target for each endoscope, i.e., straight, up and down.
___ Communicates to circulator which endoscope and position of endoscope, i.e., straight, up and down.

EndoWrist® Instrument Placement and Removal:
___ Inspects the EndoWrist® instrument for cracked, chipped or worn parts.
___ Checks that sterile adapter carriage is at the top of the instrument arm and instrument wrist is straight with tips closed.
___ Uses hand to stabilize the instrument arm, and the other hand to align rails on the instrument with grooves on the sterile adapter.
___ Inserts the tip of the instrument into the cannula and then slides the rails on the instrument into the grooves on the sterile adapter.
___ Presses clutch button for first insertion of instrument.
___ Slowly introduces EndoWrist® instrument until the instrument tip is just visible emerging from the distal end of the cannula under direct observation of assistant monitor.
___ Presses the clutch button again only after initial insertion of instrument.
___ Checks with surgeon at surgeon console that instrument jaws are open, wrist is straight, and not clamped on any tissue.
___ Uses one hand to stabilize the sterile adapter and the other hand to depress the release tabs on the instrument.
___ Squeezes the release levers on the sides of the EndoWrist® instrument and gently pulls the instrument out of the sterile adapter while observing on assistant monitor.
___ Checks that the sterile adapter returns to the top of the instrument arm after removal.
___ Demonstrates knowledge of icons and their meaning.
___ Demonstrates correct subsequent instrument insertion and removal.
___ Demonstrates correct camera/endoscope attachment and removal.
___ Demonstrates proper cleaning of EndoWrist® instruments during case.
___ Demonstrates correct handling of sutures for robotic cases.
___ Demonstrates proper draping sequence for robotic case.