

## Perioperative Services Competency Assessment - Vanderbilt University Medical Center

Laser Safety	Interpretation	Rationale
A. Describe basic safety using lasers in the operating room.	<ol style="list-style-type: none"> <li>1. Education is required for both physicians and staff for safe laser operation.               <ol style="list-style-type: none"> <li>a. Surgeon's complete:                   <ol style="list-style-type: none"> <li>1. Didactic lecture on both laser and clinical</li> <li>2. Applications</li> <li>3. Hands-on experience with laboratory models</li> <li>4. Preceptorship with experienced operators</li> <li>5. Residency training in University Hospitals</li> </ol> </li> <li>b. Staff complete:                   <ol style="list-style-type: none"> <li>1. Didactic lecture on basic laser physics and laser safety</li> <li>2. Operational training with return demonstration and validation.</li> </ol> </li> </ol> </li> <li>2. Warning signs should be placed on all doors leading to the OR.</li> <li>3. Always place eye protection on all doors leading into the operating room.</li> <li>4. The nominal hazard zone is considered to be the procedure room</li> <li>5. Before the procedure, laser will be test fired (COS) and/or calibrated prior to patient entering the OR. If the laser does not function properly:               <ol style="list-style-type: none"> <li>a. Obtain another laser of the same wavelength.</li> <li>b. Notify attending physician if no other laser is available.</li> </ol> </li> <li>6. Keep floor dry around the laser.</li> <li>7. Avoid placing liquids on top of the laser.</li> </ol>	<ol style="list-style-type: none"> <li>1. Education is required for safe laser operation.</li> <li>2. A nominal hazard zone should be identified to prevent unintentional exposure to the laser beam.</li> <li>3. Warning signs should be placed conspicuously to alert bystanders of potential hazards.</li> <li>4. Lasers are high-voltage equipment that should be protected against short circuiting associated with spillage or splatter.</li> </ol>
B. Describe injuries to eyes and prevention measures.	<ol style="list-style-type: none"> <li>1. All safety eyewear must be wavelength specific for each laser regardless of color.</li> <li>2. For both open and closed procedures, appropriate eye protection is required for all viewers within the nominal hazard zone.</li> <li>3. Eye protection for the patient includes:               <ol style="list-style-type: none"> <li>a. When anesthetized CO2 Laser, eyes are taped and lubricated</li> <li>b. Saline saturated eye pads applied to eyes and covered by aluminum foil if the wavelength specific goggles interfere with surgery.</li> <li>c. Awake patients may wear wavelength specific laser goggles</li> </ol> </li> <li>4. All wavelength lasers:               <ol style="list-style-type: none"> <li>a. Require wavelength specific glasses/goggles with side guards</li> <li>b. Surgeon wears glasses or uses special filter lens on all scopes</li> <li>c. All wavelength lasers require all viewing windows be covered/closed except for the CO2.</li> </ol> </li> </ol>	<ol style="list-style-type: none"> <li>1. Unprotected eyes can become injured in the cornea and retina.</li> <li>2. Scattered, diffuse, and reflected laser beams in addition to direct exposure from misdirected and damaged fibers can cause eye injuries.</li> </ol>
C. Describe preventive measures for skin injuries.	<ol style="list-style-type: none"> <li>1. Laser light can be reflected off any shiny surface causing a variety of skin injuries. Methods to prevent light reflection include:               <ol style="list-style-type: none"> <li>a. Use ebonized or dull finished instruments.</li> <li>b. Modified laryngoscopes and bronchoscopes.</li> <li>c. Special micro laryngeal instruments.</li> </ol> </li> </ol>	<ol style="list-style-type: none"> <li>1. Light reflection can result in injuries.</li> <li>2. Anodized, dull, non-reflective, or matte-finished instruments decrease the reflectivity of laser beams.</li> </ol>
D. Describe preventive measures for risks associated with laser plume.	<ol style="list-style-type: none"> <li>1. Lasers produce plume (smoke) containing hazardous components which may cause:               <ol style="list-style-type: none"> <li>a. Eye, nose and throat irritation</li> <li>b. Nausea, vomiting, and flu-like symptoms.</li> </ol> </li> <li>2. Staff should wear PPEs, including special high filtering masks.</li> <li>3. Adequate Plume (Smoke) Evacuation includes:               <ol style="list-style-type: none"> <li>a. Double suction set-up</li> <li>b. Place disposable filters in suction lines.</li> <li>c. Use a separate smoke evacuator with disposable filter and tubing</li> </ol> </li> </ol>	<ol style="list-style-type: none"> <li>1. HPV has been isolated in CO2 plume.</li> <li>2. Personnel working in the laser environment should avoid exposure to smoke plume generated during laser surgery.</li> </ol>
E. Describe fire prevention strategies specific to laser use.	<ol style="list-style-type: none"> <li>1. Fire prevention with Laser use includes:               <ol style="list-style-type: none"> <li>a. Airway</li> <li>b. Non-combustible endotracheal tubes</li> <li>c. Cuff is inflated with methylene blue.</li> <li>d. Cottonoids are packed around cuff so if laser light punctures cuff, the methylene blue leaks onto the cottonoids.</li> <li>e. Anesthesia may use jet ventilation as an alternative to intubation.</li> </ol> </li> <li>2. Airway Fire protocol (when ignition occurs):               <ol style="list-style-type: none"> <li>a. Notify attending physician if no other laser is available</li> <li>b. Disconnect oxygen supply</li> <li>c. Flood area with water or saline</li> <li>d. Immediately extubate the patient</li> <li>e. Secure a new airway</li> </ol> </li> <li>3. Nursing considerations for Fire Prevention:               <ol style="list-style-type: none"> <li>a. Always use non-flammable prep agents</li> <li>b. Always keep a bowl/syringe of sterile saline/water on back table to extinguish a fire</li> </ol> </li> </ol>	<ol style="list-style-type: none"> <li>1. Standard endotracheal tubes are combustible and should not be used.</li> <li>2. Fire is one of the most significant hazards of laser use.</li> </ol>

## Vanderbilt University Medical Center: Perioperative Services

	c. Always use moist towels to drape surgical area for open procedures	
F. Describe safety considerations during laser operation.	<ol style="list-style-type: none"> <li>1. Surgeon directing the laser should be in control of the foot pedal.</li> <li>2. Place laser on stand-by each time the surgeon takes his/her foot off the foot pedal.</li> <li>3. Check all electrical components of laser before plugging unit into wall.</li> <li>4. Troubleshooting includes: <ol style="list-style-type: none"> <li>a. Check Power Source</li> <li>b. Check all connections</li> <li>c. Turn laser off and back on</li> <li>d. Call charge nurse of the service line</li> <li>e. Call Laser Safety Officer- Moeseval Moralde.</li> </ol> </li> </ol>	<ol style="list-style-type: none"> <li>1. Attention to proper placement of the foot switch and use of the standby switch can reduce unintended activation of the laser beam and potential injury to the patient, operator, and/or bystanders.</li> </ol>
G. Describe Laser Documentation.	<ol style="list-style-type: none"> <li>1. Documentation includes: <ol style="list-style-type: none"> <li>a. Which laser is used.</li> <li>b. Safety measures taken.</li> <li>c. Time laser is used.</li> <li>d. Document in OR nursing record (VPIMS) and Laser Log if unit requires.</li> </ol> </li> </ol>	<ol style="list-style-type: none"> <li>1. Documentation provides a record of type of laser used and safety measures taken.</li> </ol>