


**GUAM MEMORIAL HOSPITAL AUTHORITY  
ADMINISTRATIVE MANUAL**

<b>APPROVED BY:</b>    Peter John D. Camacho, MPH Hospital Administrator/CEO	<b>RESPONSIBILITY:</b>  Environment of Care Committee, Laser Safety Officer, Operating Room	<b>EFFECTIVE DATE:</b>  February 20, 2018	<b>POLICY NO.:</b>  A-EC200	<b>PAGE:</b>  1 of 13
<b>TITLE: LASER SAFETY PROGRAM</b>				
<b>LAST REVIEWED/REVISED: 09/2017</b>				
<b>ENDORSED: LSO 09/2017, NM 09/2017, EOC 10/2017, MEC 10/2017, EMC 12/2017</b>				

**PURPOSE:**

The purpose of this policy is to provide guidelines for protection from workplace hazards associated with the use of laser devices and laser systems. This purpose is to be accomplished through the implementation of administrative and engineering controls and the use of personal protective equipment (PPE), in accordance to the American National Standard for Laser Safety in Healthcare Facilities (ANSI Z136.3).

**SCOPE:**

The Laser Safety Program applies to all employees, and contractors of Guam Memorial Hospital Authority (GMHA) who are authorized to operate laser equipment. Authorized staff that operates any laser equipment must complete all required training, and health clearance certification.

**RESPONSIBILITIES:**

- **ENVIRONMENT OF CARE COMMITTEE** is responsible for:
  - the review and approval of the Laser Safety Program and any amendments made by the Laser Safety Officer (LSO);
  - Enforcement of the Laser Safety Program
- **LASER SAFETY OFFICER**, is responsible for:
  - Development of the written Laser Safety Program and all necessary amendments.
  - Compiling and maintaining (as needed ) a laser system/device inventory for all laser systems on site
  - Ensuring that all Class 3B and Class 4 lasers are marked with appropriate designation from the manufacturer, including warning label, power, and wavelength.
  - Assessment of hazardous conditions or potential hazards in work areas where lasers are used.
  - Establishing a nominal hazard zone (NHZ) when necessary, to determine the boundary between the hazardous areas and non-hazardous areas of the work environment.
  - Recommending and/or implementing control measures to remedy hazardous conditions in the areas where lasers are used
  - Investigating all accidents and/or injuries that occur as a result of laser operations
  - Examining and approving all forms eye personal protective equipment used in the laser work environment. The LSO shall make these examinations periodically to ensure that all PPE is adequate, in satisfactory condition, and to determine whether replacements are necessary.

- Approving and ensuring that all work areas where lasers are used have signage on the exterior door(s) indicating the presence of laser equipment. The LSO shall ensure that all postings are within the ANSI standard.
- Administration or facilitation of initial laser safety training to laser operators prior to use of lasers; refresher training will be provided as needed-either for remediation or changing regulations.
- The LSO will coordinate with the Operating Room Director regarding instrument orientation, training, standard operating procedures, and control measures to ensure that the equipment is operated according to ANSI standards.
- Performing periodic inspections to ensure that implemented control measures are being followed, all procedures are conducted in a safe manner and all PPE is in working condition.
- Report to the Environment of Care Committee on any related Laser safety concern or incident.
  
- **LASER SAFETY COMMITTEE** is responsible for:
  - Laser Safety Program development and management
  - Verification of safety practices within all areas where laser is in use.
  - Conduct periodic review of the laser safety program,
  - Provide guidance and/or feedback on laser safety issues.
  
- **OPERATING ROOM SUPERVISOR** has primary responsibility for providing a safe work environment for the employees that work where lasers are used, and are responsible for:
  - Identify all laser hazards and implement all appropriate hazard controls. If found, correct any identified unsafe or non-compliant conditions.
  - Identify all personnel who may operate or maintain a laser or laser system. Ensure proper training for these authorized personnel.
  - Monitor all authorized personnel for compliance with the Laser Safety Program;
  - Ensure that laser(s) and laser system(s) are maintained adequately to ensure proper working order
  - Maintain a copy of this written program in the workplace.
  - Implement control measures that minimize potential hazards associated with laser use.
  - Reporting all incidents and accidents associated with the use of lasers to the LSO.
  
- **EMPLOYEES** are responsible for:
  - Complying with all rules regarding laser safety
  - Attending all required laser safety training
  - Be current with their AHA Basic Life Support Certification
  - Reporting all incidents, injuries, or suspected injuries to their supervisors and to the LSO. A Patient Safety Occurrence Report must be completed and submitted accordingly.
  - Notifying their supervisor or LSO of any unsafe conditions in the work area.
  - Reporting any problems to their supervisor regarding PPE/eye protection.

### **LASER SAFETY PROGRAM:**

GMHA is committed to the minimization of accidents and/or injuries caused by the use of a laser or laser system. The main goal is to ensure that all exposures to laser radiation (both to the eyes and skin) are kept below the applicable maximum permissible exposure limit. This will be accomplished through training and education of employees on laser safety and the use of

administrative controls, engineering controls and PPE. For determination of its effectiveness and for any necessary amendments, this Laser Safety Program will be re-evaluated periodically.

The Laser Safety Program will have oversight by the Laser Safety Committee, appointed by the Hospital Administrator to consist of the following members:

- Operating Room Medical Director, shall be the Chairperson of the Committee
- Laser Safety Officer
- Employee Health Services
- Anesthesia
- Operating Room Nurse
- Facilities Management
- Biomedical Representative
- Risk Manager Officer
- Compliance Officer

The Laser Safety Committee shall meet quarterly, or as necessary when an incident occurs. The Laser Safety Officer shall schedule the meeting and ensure pertinent laser safety reviews are included in the agenda.

## **PROCEDURE:**

### **I. CONTROL MEASURES FOR THE WORK ENVIRONMENT**

Control measures must also be implemented with regards to the laser work area and its physical orientation to ensure that the work environment is safe for all personnel.

**A. NOMINAL HAZARD ZONE:** For work environments where Class 3B or Class 4 lasers are used, a nominal hazard zone (NHZ), must be established when necessary. NHZ is to determine where the hazards associated with exposure to Class 3B or Class 4 lasers end and the safe, laser hazard-free areas begin within the work environment. The establishment of the NHZ is the responsibility of the LSO. This zone shall be referred to as the Laser Treatment Controlled Area (LTCA)

**B. POSITIONING OF LASER EQUIPMENT:** Laser equipment should be positioned in the work environment using the following methods where feasible:

1. The laser or laser system shall be positioned at a level above or below eye level where feasible to prevent direct exposure to the beam, reflections, or scattered laser radiation.
2. All laser equipment shall be securely mounted on a sturdy surface to prevent unintended distribution of the laser beam.
3. All areas of traffic within the work area shall be free of all electrical cords extending from laser equipment to prevent tripping or possible unintended exposure to laser radiation.
4. No laser equipment shall be moved and operated away from the currently established NHZ.
5. When operating laser equipment, take all necessary precautions when working near surfaces that are wet.

**C. POSTINGS:** According to the ANSI Z 136.1 standard, work areas where Class 3B and Class 4 lasers are located must be labeled as follows:

1. The sign must display the word “DANGER” in large letters with the following information (Example seen in Attachment I):
  - a. Laser Type
  - b. The wavelength emitted
  - c. Maximum energy output
  - d. Pulse duration
2. Posting must be present at each entry/exit, and easily visible to all human traffic.
3. Additional warning signs, as necessary, such “Please knock before entering”
4. The LSO must recommend, inspect, and approve all postings necessary for laser safety.

**D. LASER KEY CONTROL**

1. The laser key should only be available to authorized personnel to prevent any misuse of the laser device or laser systems.
2. The laser key must not be left in the laser when it is not in use.
3. The laser key is stored and secured in the Narcotic box. Only authorized laser users can retrieve the key.

**E. LASER FOOT PEDAL**

1. The laser foot pedal must be available only to the surgeon, who will be using the fiber or hand piece to deliver the laser energy.
2. Prior to the beginning of the procedure the surgical team shall identify the laser pedal to the provider.

**F. ADDITIONAL CONTROL MEASURES**

1. A Laser Safety Checklist shall be conducted prior to the beginning of any procedure that uses a laser device or laser system. The checklist shall include:
  - a. Danger sign posted
  - b. Window protection. All windows and windows built into doors of the work area should be covered with dark, non-penetrable material to confine all laser radiation to the work area.
  - c. All employees have eye protection
  - d. Fire Safety: Refer to Section II-Fire Safety in a Laser Environment
  - e. Method to protect patient’s eyes
2. All doors in work area containing laser equipment should be locked (when no procedure are ongoing), giving only authorized personnel access to the area.

3. Laser operators should not operate laser equipment while working alone. Another laser operator or qualified individual should be present in case of an accident.

## II. FIRE SAFETY IN A LASER ENVIRONMENT

- A. In the event of a fire, an acceptable fire extinguisher class should be available.
- B. Rapid egress and emergency access-All laser areas must have a controlled means of rapid egress and admittance for emergency situations
- C. Avoid combustible ointments or lubricants, liquids, gels, or sprays
- D. Have only diffused reflective materials on near beam path, where feasible.
- E. Do not use combustible surgical drapes
- F. A basin of water shall be available to extinguish accidental fires involving patients.
- G. Beware residual heat from Nd-YAG contact tips

## III. LASER PLUME

A smoke evacuator shall be used or on standby when smoke plume is anticipated.

- A. A laser smoke evacuator shall be installed and tested in the LTCA prior to laser treatment.
- B. During laser treatment the smoke evacuator tubing shall be placed as close to the point of vaporization without interfering with treatment and the physician/operator.
- C. The smoke evacuator's motor shall be adjusted to efficiently capture plume.
- D. The smoke evacuator filter shall be replaced as per manufacturer's recommendation.
- E. Smoke evacuator tubing and filter media is handled as biohazardous material, and disposed accordingly.

## IV. PERSONAL PROTECTIVE EQUIPMENT

- A. EMPLOYEES: Personal Protective Equipment must be used as the primary means of protection.
  1. Eyewear: Since the hazards associated with the use of lasers are primarily to the eyes, it is imperative for all employees operating these lasers to wear laser eye protection. It is the responsibility of the LSO and the Operating Room Unit Supervisor to ensure that the eyewear used when operating the laser equipment is manufactured for laser protection.  
  
The eyewear protection shall be removed only when the procedure has been completed, and the laser equipment has been shut off.
  2. Masks: When laser plume is anticipated, employees shall wear appropriate masks.
- B. PATIENTS: Patients will be fitted with appropriately labeled eyewear, or have their eyes covered with wet cloth pads/towels. When laser treatment is near the eyes, then corneal eye shields shall be used.

- C. **MAINTENANCE OF EYEWEAR:** The following measures must be taken to ensure that laser eye protection remain effective in protection against laser radiation:
1. Each pair of eye protection must be inspected prior to use and annually for cracks, scratches and breaks that could allow the penetration of laser radiation
  2. Each pair of eye protection shall be cleansed per manufacturer's recommendation, after each use.
  3. Eye protection that is suspected to be damaged or not working properly should be examined for functionality or disposed of if dysfunctional. Employees should inform the LSO of the defectiveness.

**V. PREVENTATIVE MAINTENANCE OF LASER DEVICES**

All healthcare laser systems and delivery devices shall be inspected and maintained according to manufacturer's recommendation, or semi-annually whichever is most frequent. All inspections shall conform to the standards of ANSI and OSHA.

- A. All services and repairs shall be performed by a qualified technician.
- B. All system controls shall be tested to ensure proper function.
- C. The emergency stop button shall be tested for proper function

**VI. LASER TRAINING and STAFF COMPETENCIES and PHYSICIAN CREDENTIALINGS**

- A. All employees who will operate or assist in procedures with any laser equipment must complete the Laser Safety Training before using a class 3b or 4 laser or laser system, and annually thereafter. Training should also be conducted should any update or changes occur related to laser safety.
- B. The designated LSO shall completed specific laser safety training, regulated by ANSI and OSHA, which will maintain a LSO certification.
- C. The LSO shall have oversight for the staff competencies. Prior to operating or working with a laser system, staff shall be complete the Laser Operator Competency and Skills Validation Checklist (Attachment III)
- D. All physicians who operate the laser system(s) shall be credentialed, as per Medical Staff By-Laws.

**VII. MEDICAL SURVEILLANCE**

- A. **PRE CLEARANCE MEDICAL EXAMINATION:** Under the ANSI A136.1 standard, it is recommended that all laser personnel (individuals who directly work with lasers) and all incidental personnel (exposure is possible, but unlikely) has a medical examination prior to beginning work with lasers or in an area where laser are operated. These exams are given for the purpose of establishing a baseline to make comparison in the event of an injury to the eyes. All exams should be given by a qualified ophthalmologist, and include: a review of ocular history, visual acuity, and macular function. Any individual whose test results are abnormal will need to undergo further ocular testing.
- B. **POST EXPOSURE/INCIDENT EXAMINATION:** In the event of an injury, suspected injury, or exposure, employees should seek medical examination as soon as possible (preferably within 48 hours). Information such as symptoms, wavelength of the laser device, and the type of beam output should be provided to the examiner.

## **VIII. ACCIDENT/INJURY REPORTING**

- A. All accidents, injuries, or suspected injuries must be reported immediately to the LSO, the Operating Room Supervisor, and the House Nurse Supervisor on Duty.
- B. Any employee injury or suspected injury must undergo an immediate evaluation in the Emergency Department. Employee Health Nurse shall be notified, as soon as possible on the incident that has caused injury or suspected injury to the employee.
- C. Follow policies and procedures related to incident reporting; include the Laser Incident Infraction report, if needed (Attachment IV).

## **IX. QUALITY ASSURANCE**

To provide a method of tracking laser activities and ensure that safe practices are being observed, the Laser Safety program will have a component of quality assurance. The following activities are included in the Laser Safety Quality Assurance Program (forms attached):

- A. A laser procedure log that includes patient information and procedure, as well as the Laser System information and settings. The procedure log also has the completed laser safety checklist.
- B. Laser Training: Name of laser training, and date of training, with an attendance roster
- C. Laser Operator Skills and Competency Checklist
- D. Laser Safety Infraction Report
- E. Laser Safety Audit Report to be conducted twice a year

It is the responsibility of the LSO to investigate any discrepancies found with the Laser Safety Program, and to provide recommended solutions with the Laser Safety Committee and Environment of Care Committee's review and oversight.

## **REFERENCES:**

- ANSI Z 136.1 (2014). American National Standard for Safe Use of Lasers
- ANSI Z 136.3 (2011). Safe Use of Lasers in Healthcare Facilities

## **RELATED POLICIES**

A-PS800, Patient Safety Program, of the Administrative Manual.

6202-10, Employee Health Services Program, of the Employee Health Services Policy and Procedure Manual

## **ATTACHMENTS**

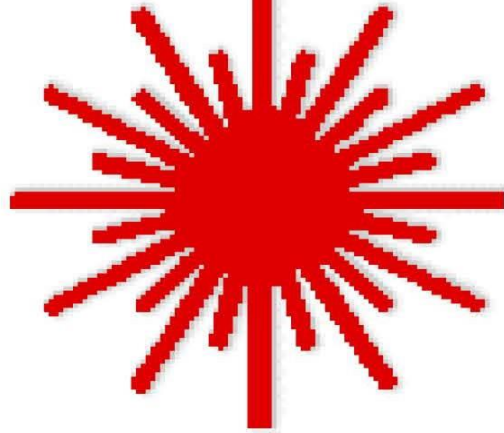
- I. [Posting Signs](#)
- II. [Laser Operator Competency and Skill Validation Checklist](#)
- III. [Procedure Log and Laser Safety Checklist](#)
- IV. [Laser Safety Infraction Report](#)
- V. [Laser Safety Audit Report \(specific to the laser device/system\)](#)

ATTACHMENT I



Special precautions:

Laser Surgery in Process – Eye Protection Required.  
Visible and Invisible Laser Radiation – Avoid Direct Exposure to Beam.



Laser type/power/wave/duration:

2100 nm Holmium:YAG laser, 3.5J, 50 Hz  
Diode, 635 nm, continuous, 5.0mW Max

**Class IV laser**



ATTACHMENT II

<b>Competency Skills Checklist Assessment – Lumenis Pulse 120H Holmium</b>			
<b>Employee:</b>		<b>Observer:</b>	
		<b>MET</b>	<b>NOT MET</b>
1. Laser policy and procedure reviewed			
2. Baseline Eye Exam performed      Date: _____		Record with EHS? <input type="checkbox"/> YES	
3. Attended an equipment in-service by instructor approved by LSO Date: _____		Certificate in Employee File <input type="checkbox"/> YES	
4. Attended a training course in Laser Safety?      Date: _____		Certificate in Employee File <input type="checkbox"/> YES	
<b><u>PRE-OPERATIVE</u></b>			
		<b><u>MET</u></b>	<b><u>NOT MET</u></b>
Bring laser & all necessary equipment to the room:			
Obtain laser key from its secure location.			
Have appropriate fiber & back-up available.			
Safety considerations:			
Place laser signs & eyewear on all doors (No need to cover windows for holmium wavelength).			
Provide appropriate eye protection for all persons in the room, including patient.			
Have water & wet towels readily available; know the location of the nearest fire extinguisher.			
Have smoke evacuator ready if using the laser externally.			
Connections:			
Connect to appropriate power source (220 volt/50 amp). Ensure that the circuit breaker is in the on (up) position & the emergency stop is not depressed.			
Ensure that foot pedal is placed & interlock plug is properly connected.			
<b><u>INTRA-OPERATIVE</u></b>			
Turn laser on (approx. 2 ½ minute start up time):			
On back – insert key & rotate to the open lock position <i>THEN</i> :			
On front – press & hold the main On/Off button for 1 full second & release.			
Open & attach fiber to laser. Verify fiber integrity & aiming beam.			
On Home screen (Urology), choose procedure.			
Confirm settings with surgeon (Safe start pre-sets are provided per procedure & right/left foot pedal controls).			
Place in ready when directed by surgeon. Place in standby whenever the laser is not in use (Surgeon can also press top foot pedal button			

for Ready/Standby).		
Chart original settings & ongoing changes.		
<b><u>POST-OPERATIVE</u></b>		
Place laser in standby and chart total energy used (Kj):		
Select Reports from Home screen. Most recent procedure displays at the top.		
Turn off laser (approx. 1 minute to power down)		
Select Shutdown from the Home screen. Hit OK on confirmation window. No need to press main On/Off button.		
Rotate key to closed lock position. Remove & return to secure location.		
Remove fiber & dispose of properly or send for reprocessing.		
Collect all laser eyewear. Wash with soap & water. Store in protective cases.		
Remove laser signs from all doors.		
(CON'T)	<b>MET</b>	<b>NOT MET</b>
Disconnect from power source.		
Clean & store laser & components.		
Completes all documentation forms		
<b>Comments:</b> <input type="checkbox"/> <b>PROFICIENT</b> <input type="checkbox"/> <b>NOT PROFICIENT</b>		
Base on the above assessment, the staff member is <input type="checkbox"/> <b>PROFICIENT</b> <input type="checkbox"/> <b>NOT PROFICIENT</b> in his/her competency, skills, and other requirements to operate a laser device or laser system.		
<b>Employee Signature:</b>	<b>Date:</b>	
<b>Print Name and Title:</b>		
<b>Observer's Signature:</b>	<b>Date:</b>	
<b>Print Name and Title:</b>		

# Laser Procedure Log

DATE     /     /    

ID #
Patient Name
DOB
Gender/Race
Physician

MRI / OPC RADIOLOGY

Location: Main OR / ODS / LPR

Procedure: \_\_\_\_\_  
\_\_\_\_\_

## System Information

Laser Manufacturer: \_\_\_\_\_ Type: \_\_\_\_\_

## Laser Settings

Wavelength: \_\_\_\_\_ nm Spot Size: \_\_\_\_\_ mm Fluence: \_\_\_\_\_ J/cm<sup>2</sup>

CW: \_\_\_\_\_ Watts Pulse Parameters: \_\_\_\_\_

Number of Pulses: \_\_\_\_\_ Total Energy: \_\_\_\_\_ Joules

Delivery Mode: Micro-manipulator / Scanner / Waveguide / Fiber Optic / Hand piece / Lap Coupler

## Laser Safety Checklist

Follow SOP \_\_\_\_\_ Window Protection \_\_\_ Eye Protection \_\_\_ Fire Safety Measures \_\_\_

Sign Posted \_\_\_\_\_ Method Used To Protect Patients Eyes \_\_\_\_\_

Approved Laser Operator Signature \_\_\_\_\_

Laser Team Involved in Procedure (Name and Title)

_____	_____	_____
_____	_____	_____
_____	_____	_____

*ATTACHMENT IV*

**Laser Safety Infraction Report**

Date: \_\_\_\_\_ Time: \_\_\_\_\_ Area: \_\_\_\_\_

Name of person in violation: \_\_\_\_\_

Type of Procedure and Laser: \_\_\_\_\_

Infraction: \_\_\_\_\_

---

---

---

---

---

---

---

---

Corrective Action Taken: \_\_\_\_\_

---

---

---

---

---

---

---

---

Report Completed By: \_\_\_\_\_ Title: \_\_\_\_\_

**Any patient or visitor variance associated with this infraction shall be reported according to GMHA policy.**

**Completed Infraction Report should be sent to the Laser Safety Officer (LSO).**

ATTACHMENT V



LASER AUDIT – TO BE COMPLETED TWICE A YEAR

Date: \_\_\_\_\_

**LASER:** \_\_\_\_\_ **WAVELENGTH:** \_\_\_\_\_

**Glasses:**

Number needed: \_\_\_\_ Number present: \_\_\_\_\_ Cases present: \_\_\_\_

Condition (scratched or broken): \_\_\_\_\_

Number needed to be replaced: \_\_\_\_

Comments: \_\_\_\_\_

Signature: \_\_\_\_\_

**Signs:**

Number needed: \_\_\_\_ Number present: \_\_\_\_\_

Condition (intact and legible): \_\_\_\_\_

Number needed to be replaced: \_\_\_\_

Signature: \_\_\_\_\_

**LASER:** \_\_\_\_\_ **WAVELENGTH:** \_\_\_\_\_

Calibration done by qualified personnel: Y N Comments: \_\_\_\_\_

Electrical check complete by Biomed: Y N Comments: \_\_\_\_\_

Visual inspection, note any problems found: \_\_\_\_\_

Any problems reported by staff or surgeons? Y N

Comments: \_\_\_\_\_

**LASER:** \_\_\_\_\_ **WAVELENGTH:** \_\_\_\_\_

Calibration done by qualified personnel: Y N Comments: \_\_\_\_\_

Electrical check complete by Biomed: Y N Comments: \_\_\_\_\_

Visual inspection, note any problems found: \_\_\_\_\_

Any problems reported by staff or surgeons? Y N

Comments: \_\_\_\_\_

**LASER:** \_\_\_\_\_ **WAVELENGTH:** \_\_\_\_\_

Calibration done by qualified personnel: Y N Comments: \_\_\_\_\_

Electrical check complete by Biomed: Y N Comments: \_\_\_\_\_

Visual inspection, note any problems found: \_\_\_\_\_

Any problems reported by staff or surgeons? Y N

Comments: \_\_\_\_\_