UAMS Laser Safety Guidelines and Procedures

UAMS Laser Committee

Purpose and Function

The Laser Committee is a sub-committee of the Interventional Services Committee which has joint responsibility to the UAMS Medical Board and the UAMS Safety Coordinating Committee, and is charged with the responsibility of evaluating, approving, monitoring, and correcting hazards associated with the use of all lasers on campus. The LC meets as needed and reports activities to the SCC and the ISC.

Organization and Responsibility

The Laser Committee Chairman is appointed by Chairman of the Interventional Service Committee. The Laser Committee members are appointed by the Chairman of the Laser Committee. The UAMS Laser Safety Officer (LSO) is a member of both the Laser Committee and the Safety Coordinating Committee, and reports at least quarterly to the SCC on activities.

The Responsibilities of the Laser Committee are:

- Advise the Credentialing Committee regarding acceptable requirements for obtaining laser privileges.
- Prescribe special conditions that will be required while using a laser delivery system, such as need for protective equipment and minimum level of training and experience of users.
- Receive and review safety infraction reports from the Laser Safety Officer or other individual delegated responsibility for laser safety practices.
- Formulate and review the institutional training programs for the safe use of laser sources.
- Maintain written records of actions taken by the committee.

UAMS Laser Safety Officer

Purpose and Function

The Laser Safety Officer (LSO) is charged with the authority and responsibility to implement the evaluation and control of laser hazards within UAMS. The LSO ensures the directives of the Laser Committee are initiated and ongoing.

Organization and Responsibility

The Laser Safety Officer is appointed by the Chairman of the Laser Committee and confirmed by the Chancellor. The Laser Safety Officer reports to the Laser Committee and the Safety Coordinating Committee.

The Responsibilities of the Laser Safety Officer are:

- Ensuring the proper hazard classification of laser systems.
- Hazard evaluation of laser treatment areas.
- Assuring prescribed control measures are in effect. Recommending and approving alternate measures when primary measures aren't feasible or practical. Ongoing assessment of control measure efficacy.
- Approval of standard operating procedures or other administrative control measures.
- Recommendation, approval and inspection of protective equipment e.g., eye-wear, barriers and filters.
- Approval of warning labels and area signage.
- Approval of laser system installation or modification prior to use.
- Ensuring the adequacy of ongoing laser safety training.

UAMS Deputy Laser Safety Officer

Purpose and Function

The Deputy Laser Safety Officer (DLSO) is charged with the authority and responsibility to perform the duties of the Laser Safety Officer when the LSO is unavailable or when tasked with LSO delegated activities.

Organization and Responsibility

The DLSO is appointed by the Laser Safety Officer and confirmed by the Laser Committee. The Deputy Laser Safety Officer reports to the Laser Safety Officer and the Laser Safety Committee.

Approved Laser Operator

Purpose and Function

An Approved Laser Operator (ALO) is an individual trained and certified to operate and ensure the safe operation of Class 3B and Class 4 laser systems.

Organization and Responsibility

The ALO is trained and certified by the Laser Safety Officer to oversee the safe operation of clinical laser systems and is required for surgical cases utilizing either a Class 3B or Class 4 laser.

The Responsibilities of the Approved Laser Operator are:

- Preoperative setup and testing of laser and associated equipment.
- Establishment of the laser treatment controlled area.
- Ensuring the use of required protective equipment.
- Safe operation of clinical laser system. (Laser placed in standby when not actively in use).
- Ensuring all safety measures are followed throughout the procedure.
- Providing laser safety checklist and settings to the circulator for inclusion within operation report.
- Reporting all safety concerns or violations to the Laser Safety Officer.

Training Requirements:

- Pass ANSI compliant laser safety training.
- Review all UAMS Laser Safety Policies and Guidelines
- Review laser operator’s manual (laser specific)
- Review Standard Operating Procedure (laser specific)
- One hour hands-on training (laser specific)
- Act as an ALO under the supervision of certified ALO for three cases
- Ongoing annual training required

Laser Treatment Controlled Area

Purpose and Function

A laser treatment controlled area (LTCA) shall be established when Class 3B or Class 4 lasers are in use. The LTCA is established to clearly define areas where laser hazards exist and create an isolated environment to address all laser safety issues.

Requirements:

The LTCA shall be defined by the limits of the nominal hazard zone, the extent of which is clearly designated, and:

- Shall be considered, at minimum, the entire room in which the procedure is performed.
- Posted with the appropriate warning sign(s).
- Provide adequate personal protective equipment upon entry.
- Supervised by authorized personnel.
- Under the direct supervision of a credentialed laser user.
- Be located in an area with limited access to observers.
- Have any potentially hazardous beam terminated in a beam stop of an appropriate material.
- Employ only diffusely, reflective materials in or near the beam path where feasible.
- Ensure all personnel who regularly require entry into a laser treatment controlled area are adequately trained, provided with appropriate protective equipment and observe all applicable administrative and procedural controls.

Ocular Safety

Purpose and Function

To prevent ocular injuries to patients and health care personnel working with Class 3b and Class 4 laser systems. Lasers produce radiation capable of causing eye injury. Everyone within the laser treatment controlled area must be protected with appropriate laser safety eyewear, filters or opaque barriers when the laser is in operation. The patient's eyes shall be protected adequately when the laser is in operation.

Requirements:

- Appropriate eyewear will be worn by everyone in the room while the laser is operational. Appropriate eyewear consists of glasses or goggles of sufficient optical density to prevent ocular damage at the wavelength in use. An exception is provided for operators using a microscope that is equipped with an appropriate filter to protect the user from laser exposure. (**Ensure the safety filter is installed prior to any splitting optics to protect both observers. If installed after the splitter, ensure the non-protected user wears laser protective eyewear**).
- Prior to use, the operator and ancillary personnel will be responsible for selecting and examining eyewear for comfort, proper fit, and presence of labels describing both wavelength and proper optical density.
- If eyewear is damaged, it must not be worn, and must be reported to the LSO.
- Contact lenses are not acceptable as protective eyewear. Prescription lens wearers must use appropriate laser safety eyewear.
- All laser safety eyewear must have side shields to protect from peripheral injury and impact.
- Any articulated arm which is not shuttered must be capped when not connected to the hand piece or the microscope.
- The laser system must be placed in the standby mode when delivery optics are moved away from the target.
- 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, corneal eye shields shall be used.

Annual Eyewear Inspection

Purpose

To ensure laser safety eyewear is in good condition and is optically adequate to protect personnel, the Laser Safety Officer shall inspect annually.

Procedure:

- Laser Safety Officer shall gather and inspect eyewear at least annually.
- Damaged eyewear shall be removed from service. Since this inspection can be somewhat subjective the following list shall serve as a guide for exclusionary criteria:
    - Lack of mechanical integrity.
    - Extensive scratching compromising the view.
    - Any scratch that compromises the protective dye or film.
    - Outdated filter material that has poor luminescent transmission.
- All eyewear inspections shall be documented.
- Laser Safety Officer shall ensure damaged eyewear is replaced.

Fire Prevention

Purpose

Since Class 3B and Class 4 lasers pose a fire risk, the physician and approved laser operator for each case shall be responsible for ensuring that all reasonable steps are taken to minimize the risk of fire when using the laser.

Procedure:

- Avoid flammable ointments or lubricants.
- Avoid flammable preps, liquids, gels, and sprays.
- Allow any flammable prep solutions to dry before applying drapes.
- Use only diffusely, reflective materials in or near beam path where feasible.
- Combustible surgical drapes shall not be used.
- Moistened towels shall be placed adjacent to treatment site where feasible.
- A basin of water shall be available to extinguish accidental fires involving the patient.
- An ABC type fire extinguisher shall be readily available during any procedure utilizing a Class 3B or Class 4 laser system.
- Beware of residual heat from fiber-optic tips.
- Laser resistant endotracheal tubes, jet ventilation or endotracheal tube removal shall be used during laser procedures involving the autodigestive tract.
- The lowest possible oxygen concentration that provides adequate patient oxygen saturation should be used.

Laser Generated Airborne Contaminates (LGAC)**Purpose**

Lasers are capable of producing plume and airborne contaminates that may contain toxic gas and vapors (eg, benzene, hydrogen cyanide, formaldehyde); bio-aerosols; dead and living cell material, including blood fragments; and viruses. When LGAC are anticipated, local exhaust ventilation and high-filtration masks shall be used within the LTCA to limit occupational exposure to LGAC.

Requirements:

- A local exhaust ventilation (LEV) system shall be installed and tested in the LTCA prior to laser treatment. The LEV is considered the primary means to protect personnel from LGAC.
- All personnel inside the LTCA shall wear high-filtration masks.
- Respiratory protection at least as protective as a fit-tested surgical N95 masks are recommended for procedures with disease transmissible cases such as human papillomavirus and during high-risk or aerosol transmissible disease procedures such as tuberculosis, varicella and rubeola.
- During laser treatment the LEV tubing shall be placed as close to the point of vaporization as possible without interfering with treatment and physician but no greater than 2 inches from the source
- The LEV motor shall be adjusted to efficiently capture plume.
- The LEV filter is time limited and shall be replaced as outlined in the manufacturer's operating manual. The LEV filter and tubing should be handled using standard precautions for biohazardous waste.

Health Care Laser System Maintenance

Purpose

All Health Care Laser Systems (HCLS) and delivery devices shall be inspected and maintained according to manufacturer's recommendations to ensure reliable operation, optical safety, electrical safety and conformance to the CDRH requirements.

Requirements:

- All service and repairs shall be performed by a qualified technician in accordance with the manufacturer's recommendations.
- All test equipment must be calibrated by procedures traceable to NBS standards.
- All system controls shall be tested to ensure proper function.
- Preventive maintenance shall be performed according to manufacturer's recommended frequency and procedures.
- System shall be inspected for conformity to CDRH standards.
- All record of service performed on the HCLS will be maintained.

Clinical Laser Privileges

Purpose

Physicians must obtain laser privileges to use and oversee the use of clinical laser systems to ensure the highest standard of safety and competency.

Requirements:

- Applicant must meet all requirements as outlined within "Laser Privilege Criteria" section.
- An application shall be obtained from the UAMS Medical Staff Office. One application for each type of laser / wavelength the applicant wishes to obtain privileges.
- Application shall be completed in full by physician.
- Application shall be submitted to department head for signature.
- Completed and signed application shall be returned to the Medical Staff Office.
- Medical Staff Office submits application to Credentialing Committee, Executive Committee, Hospital Medical Board and then to the Board of Trustees. Signature of approval must be made by all committees.
- An official letter from the Hospital Medical Board will be sent to applicant advising him/her of approval.

Criteria:

- Applicant must meet and provide documentation for at least one of the following requirements:
    - Attendance of a laser training course specific to the laser system the applicant is seeking privileges.
    - Completion of preceptorship as defined by the policy "Laser Preceptorship Requirements."
    - Letter attesting to training and competency on the laser system applicant is seeking privileges from the Department Chairman or Residency Training Director of the Institution where the applicant trained. Training must have been completed by 1990 or later.
- Applicant must complete UAMS ‘Clinical Laser Safety’ module.

Clinical Laser Preceptorship

Purpose

A preceptorship shall be completed by physicians desiring laser privileges that lack training for the laser system they wish to utilize clinically. The preceptorship provides a well-defined method of fulfilling the objective of safely training physicians for the use of clinical laser systems.

Requirements:

- Physician shall complete UAMS ‘Clinical Laser Safety’ module.
- Physician shall observe a minimum of three cases, or more if deemed necessary by the preceptor, involving the specific laser the physician is wanting to learn.
- Physician shall perform a minimum of five cases, or more if deemed necessary by preceptor, under the direct supervision of a credentialed sponsor.

Third Party Health Care Laser System Service Provider

Purpose

Third party laser operators are permitted upon approval of the LSO. The LSO shall ensure third party laser operator training includes ANSI compliant laser safety training and comparable HCLS and procedure specific training. Third party laser operators must review and agree in writing to comply with UAMS Laser Safety Guidelines and procedures.

Requirements:

- The credentials of the third party laser operators meet UAMS laser guidelines.
- UAMS is provided written validation of the maintenance, service, cleaning and condition of the equipment.
- Data and elements of documentation collected by third party are appropriate, meet UAMS policy, and can be verified by UAMS personnel.
- All personnel expected to be in the room with the third party laser have had adequate safety control training on the laser and accessory equipment in order to ensure a laser safe environment.
- Intake assessment documentation is completed by LSO or DLSO for each visit that includes but not limited to;
    - Verification of surgeon privileges.
    - Verification of operator credentials
    - HCLS documentation – identifiers, service, cleaning and condition
    - HCLS electrical safety test results
    - Accessory inventory and sterility documentation if applicable
    - Documentation forms
    - Protective equipment inventory, condition and adequacy.

Laser Safety Training Program

Purpose

Ongoing laser safety training will be required for personnel routinely encountering Class 3B and Class 4 Lasers as part of their duties within UAMS. The training will cover laser physics, administrative and procedural controls, and protective equipment.

Requirements:

- The LSO will develop laser safety training material and shall be approved by the Laser Safety Committee.
- The Laser Safety Committee shall assign audience and frequency requirements.
    - Staff physicians seeking or holding laser privileges - every 2 years.
    - Laser Safety Officer and Deputy Laser Safety Officer- annually.
    - Approved Laser Operators - annually.
    - Resident physicians in specialties likely to encounter clinical laser systems - once.
    - Current required residency programs:
        - Anesthesiology
        - Dermatology
        - Obstetrics and Gynecology
        - Otolaryngology
        - Ophthalmology
        - Urology
    - LSO will ensure audience rolls are updated, accurate and compliant.
    - All laser safety training activity records will be retained.

Handling of Laser Fiber Delivery Systems

Purpose

To promote safe and proper handling of laser fiber delivery systems and to limit the potential for fiber breakage, damage and reduced efficiency during clinical laser procedures.

Requirements:

- Appropriate eye safety shall be used with endoscopes and microscopes.
- Position the laser to allow safe traffic patterns considering the path the fiber will occupy once installed.
- When feasible, fiber handling shall be limited to the surgeon to prevent the risk of developing knots, tangles or breakage.
- Carefully remove the fiber from the packaging and inspect all parts for damage. Replace fiber if any deficiencies or damage is observed.
- Secure the fiber to the surgical site using a tube holder or equivalent ensuring there are no knots, loops or twists. Do not use clamps or other surgical instruments to secure fiber to the operative site.
- Do not handle the strain relief or allow the weight of the connector to exert a bending force on the fiber when handing off or removing the proximal protective cap.
- Once the laser fiber is connected, activate the aiming beam and observe the output quality on a target. The output should be uniform, round and bright. Ensure light isn't escaping from other portions along the entire length of the fiber.
- If the aiming beam is observed anywhere other than the distal tip, replace the damaged fiber and repeat the previous steps.
- Calibrate the fiber in accordance with the manufacturer's directions when applicable.
- Never operate the laser unless you see the aiming beam, if used, and the tip of the laser fiber beyond the end of the endoscope.
- Monitor the fiber for distortion of the beam, decreased power transmission, and accumulation of debris of the tip of the laser fiber.
- Always put the laser in STANDBY mode when not being used.