

NSHA Central Zone Laser Program Procedures Manual

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LASER POLICY

Capital Health is committed to providing a safe and healthy work environment for all Capital Health employees, physicians, other practitioners, volunteers, students, contractors, associates of Capital Health, and employees of Capital Health Foundations (collectively known for the purposes of this policy as the employee).

Capital Health is dedicated to reducing the risk of workplace injury and illness and shall take every reasonable precaution to provide a safe and healthy workplace for employees.

Capital Health recognizes the Nova Scotia Occupational Health and Safety Act and accompanying Regulations; relevant federal acts and regulations as minimum for occupational health and safety.

In keeping with Capital Health's commitment to a safe and healthy workplace, a Laser Committee has been established and this Laser Program has been developed to protect persons (staff, patients and visitors) from the hazards associated with the use of lasers in the health care facilities.

The Laser Program provides the responsibilities of persons involved in the use of lasers and the procedures to be followed. All departments or services that use class 3 or 4 lasers must follow this program.

Responsibilities

Directors, Managers and Physician Chiefs must ensure:

- All elements (policies and procedures) of the Laser Program are implemented in their areas of responsibility where lasers are used.
- All laser and laser related equipment is installed, used, maintained, repaired and inspected in accordance with manufacturers' specifications and the laser safety program.
- The Laser Committee is consulted when purchasing laser equipment.
- Training, in accordance with the Laser Safety Program, is provided to all laser users and personnel in laser controlled areas under their authority
- All reported laser safety hazards and incidents are reported, investigated and documented in accordance with Capital Health Policy CH80-022 Employee Hazards and Incidents – Reporting, Investigation and Documentation
- Personal Protective equipment is available, maintained and used in their areas of responsibility
- Only authorized personnel (operators and console operators) use the Laser equipment.
- A means is in place to secure laser equipment when not in use.
- External contract equipment repairs and preventative maintenance are arranged as per manufacturer's specifications.

- All documentation, certification and training records for their areas of responsibility are maintained in accordance with Documentation Procedure and available upon request.

Laser Operators and Laser Console Operators must ensure:

- They are working in a manner that is safe and healthy for all individuals and follow the requirements and procedures outlined in the Laser Safety Program
- They only use equipment as authorized (credentialed), trained and in accordance with manufacturers' specifications
- All pre and post checks are performed before, during and after use of equipment as outlined in the procedures
- Appropriate personal protective equipment (PPE) approved for the laser (masks, glasses, clothing) is worn as required
- The safety equipment (smoke evacuators) is used when required
- They monitor, identify and report all equipment safety issues to the manager for immediate correction.
- Their credentials and training are up to date and, if not, report to appropriate manager
- They attend training: Laser Safety Course and annual review of laser safety
- They report all hazards, incidents (with or without injury/illness), and non-compliance with the Laser Program to their Manager, SAFE (473-7233), the Laser Safety Officer and the Laser Committee.

Laser Room Personnel in Controlled Laser Areas

- They are working in a manner that is safe and healthy for all individuals and follow the requirements and procedures outlined in the Laser Safety Program
- Follow directions of the Laser Operator or Laser Console Operator
- Follow laser safety program procedures
- Use PPE, when in the Nominal Hazard Zone (NHZ)
- Attend training: Laser Safety Course and annual review of laser safety
- Report all hazards, incidents (with or without injury/illness) and non-compliance with the Laser Safety Program to their Manager, SAFE (473-7233), the Laser Safety Officer and the Laser Committee.

Laser Safety Officer

- Develop and provide training to employees for laser safety. Update as required.
- Perform Laser Program Audit at least annually on representative components of the program.
- Assign responsibility and time lines for correction of identified deficiencies in audits
- Provide audit results and recommendations to the Laser Committee and the respective Manager(s)
- Provide safety and utilization consults when requested by clinical staff

Laser Committee

- Meet at least quarterly, or more frequently as may be required.

- Maintain a Committee Terms of Reference defining the committee's responsibilities and ensure committee functions are performed.
- Review reported incidents at each meeting
- Review and update the Laser Program at least annually or when necessary.
- Review and update physician credentialing as required.
- Communicate changes to departments/services that use lasers.
- Develop program requirements and procedures as review identifies.
- Make written recommendations to the person(s) with the responsibility and authority to ensure effectiveness in the program elements.
- Ensure the program review and updates are provided to Safety Program Department for review and input by the Joint Occupational Health and Safety Policy Committee.

Laser Committee Chair or Designate

- Arrange quarterly meetings of the Laser Committee
- Respond to urgent compliance or credentialing issues. May be in consultation with managers for staff issues.
- Assign, in consultation with LSO, interim privileges, when required
- Provide administrative support for the Laser Committee

Biomedical Engineering

- Respond to reported equipment issues and provide corrective maintenance
- Perform or arrange non-contract equipment repairs and preventative maintenance as per manufacturer specifications

Preceptors

- Preceptors must be certified laser users
- Complete and sign the 'Authorized Laser Personnel' form for individuals, including the specific wavelength and model, where proficiency has been demonstrated.

Definitions

Laser Classifications: CSA Standard Z386-14

Class 1- Laser equipment emitting radiation that is not considered hazardous even for long term exposure. These lasers do not require hazard warning labelling. It should be noted however, that service personnel opening the laser enclosure of a Class 1 laser can be exposed to Class 1M, 2, 2M, 3R, 3B or 4 levels of radiation. Examples of Class 1 lasers are those used for positioning and alignment for radiographic examination, low-level laser therapy, and home-use lasers.

Class 1M- Laser equipment emitting radiation that is not considered hazardous for the naked eye even for long term exposure. However, the MPE of a person exposed to the

beam through enhancing optics such as a magnifying glass, binoculars, a microscope, or other equipment can be exceeded, and this could result in permanent eye injury.

Class 2- Laser equipment emitting visible radiation in the wavelength range from 400nm to 700 nm that is considered safe for exposure of duration less than 0.25s. This level of exposure can cause temporary visual disturbance such as flash-blindness, dazzle effect, and after image. Examples of Class 2 lasers include alignment lasers used in aiming the visible radiation of CO₂ and Nd:YAG lasers

Class 2M- Laser equipment emitting visible radiation in the wavelength range from 400nm to 700 nm that is considered safe for exposure of duration less than 0.25s. This level of exposure can cause temporary visual disturbance such as flash-blindness, dazzle effect, and after image. However, the MPE of a person exposed to the beam through enhancing optics such as a magnifying glass, binoculars, a microscope or other equipment can be exceeded, and this will result in permanent eye injury.

Class 3R- Laser equipment emitting radiation that can exceed the MPE when viewed directly but with low risk of permanent eye injury. Direct viewing can cause temporary visual disturbance such as flash-blindness, dazzle effect and after image.

Class 3B- Laser equipment emitting radiation considered hazardous to the skin and eyes from direct exposure or a specular reflection.

Class 4- Laser equipment emitting radiation considered hazardous to the skin and eyes from direct exposure or a specular or diffuse reflection.

Laser Operator: a physician or healthcare professional who has the training, experience and approved documentation to apply the therapeutic laser energy of specific wavelength for patient procedures

Laser Console Operator: a nurse, tech or other healthcare professional who has the training, experience and approved documentation to make adjustments on the console in order that the laser operator can apply the correct laser energy for patient procedures.

Laser Room Personnel: Persons who are authorized to be in the room while the laser is being operated and have received laser safety training.

Authorized Laser Personnel: All personnel who are trained and permitted, for safety and patient care reasons, to be in the room when lasers are being operated. This includes laser Operators, Laser Console Operators and Laser Room Personnel.

Preceptors: Laser Operators or Laser Console Operators authorized to supervise and confirm an individual has met the competency requirements for a specific model and wavelength of laser.

Non-authorized Laser Personnel: Anyone not trained in laser safety.

CREDEIENTIALLING, TRAINING and EDUCATION

Laser Operator

Rationale: To set forth the procedure for Capital Health Medical Staff (Physicians) or other healthcare professionals to apply for Laser Operator privileges. As tissue effects, delivery methods and safety precautions vary greatly between laser Systems, it is necessary to receive training specific to each laser wavelength.

1. All applicants will be considered on an individual basis.
2. All applicants for Laser privileges **must have medical staff privileges at Capital Health or be a Capital Health employee.**
3. All applicants must provide all required information and documentation to the Laser Committee, including the following:
 - 3.1 **A letter from the Department Head for each specialty, recommending laser privileges for the applicant.** The Department Head will review the submitted information and documentation to ensure requirements are met. One or more of the following must be attained, documented and confirmed in the letter:
 - a. **Formal Laser training, seminars or workshops,** to include:
 - four hours of instruction in theory and fundamentals of LASERs and their applications to include a minimum of 1.5 hours of laser physics and safety.
 - orientation to include clinical laser procedures specific to the applicant's specialty and wavelengths applied for.
 - b. **Supporting documentation must include:**
 - copy of course outline including laser used
 - dates(s) attended
 - location
 - copy of certificate
 - c. **Laser training in specialty**
 - Applicants must supply evidence of procedures performed and the supervising physician/healthcare professional. Written verification of experience must be obtained from the Department Head stating procedures performed and Laser modalities used. This must include competence in safety and tissue interactions, laser physics, and competence in application including indications and contraindications.
 - 3.2 Preceptorship
 - When applying for privileges for additional wavelengths, a preceptorship for the requested wavelength must be completed. In certain circumstances a preceptorship may be required in addition to a formal workshop or residency training. This may be accomplished through cooperation of a Laser Operator

currently holding laser privileges in the requested specialty area. A letter from the supervising Laser Operator stating procedures performed and attesting to the applicant's proficiency must be sent to the Laser Committee.

- 4 The Laser Committee reviews the Department Head's letter and documentation or Preceptor Letter to grant laser operator privileges.
- 5 When the Laser Operator privileges are granted, the Laser Committee will complete the Authorized Laser Personnel Form and forward the form and a copy of all relevant documentation to the appropriate department(s). (See procedure, Laser Registry).
- 6 The Laser Committee Chair, in consultation with the Laser Safety Officer (LSO), can review a Laser operator Applicant's information and grant interim laser operator privileges until the Laser Committee reviews the information at the next available Laser Committee Meeting. The Chair and LSO will complete the Authorized Laser Personnel Form, indicating interim approval, and forward to the applicable departments.
- 7 Laser Operator Proficiency Maintenance: Proficiency, specific to the laser wavelength must be demonstrated by use of the laser wavelength, at least once within a 12-month period. If not, a preceptorship with an Authorized Laser Operator must be completed and the preceptor must provide a letter to the Laser Committee. The Laser Committee will review the information, complete the Authorized Laser Personnel Form and forward it to the applicable departments.
- 8 When the Authorized Laser Personnel Form is received by Department Managers (or designate) for their areas, they must ensure the Laser Registry Form is completed and the Authorized Laser Personnel Form is added to the Laser Registry.
- 9 To ensure the department registries are current, as of May 1, 2014, all Laser Operators currently using LASERs must complete a documentation letter describing their qualifications (when known) and experience with the current models and wavelengths of lasers being operated. Each Laser Operator must review and complete the Authorized Laser Personnel Form and provide it to the Laser Committee, with any supporting documentation. Upon review by the Laser Committee, each Laser Operator shall be deemed a credentialed user. The Laser Committee will ensure the Authorized Laser Personnel Form and appropriate documentation is distributed to the respective departments to update their Laser Registry.
- 10 The Laser Committee will maintain original documentation and forward copies to departments. (Refer to Procedure for Laser Registry and Capital Health Policy CH100-055 Retention of Records).
- 11 All documentation and Records will be maintained by the Manager or designate in the Department Laser Registry. (Refer to Procedure for Laser Registry and Capital Health Policy CH100-055 Retention of Records).

Residents

The above laser operator process is required to be followed for any medical residents who would be independently operating a laser. Residents that operate a laser, under the supervision of an authorized Laser Operator are considered to be “in training” and therefore the laser operator would be accountable for any application of the laser energy. All residents are required to have basic laser safety training that they should receive during their resident training program.

Laser Console Operator

Rationale: To set forth the procedure for Capital Health nursing or technicians staff. As tissue effects, delivery methods and safety precautions vary greatly between Laser Systems, it is necessary to receive training specific to each Laser wavelength and Laser model.

1. All Laser Console Operator certification will be considered on an individual basis by an authorized Laser Console Operator.
2. All Laser Console Operator certifications will be attained in the following manner:
 - a. Formal Laser training seminar/workshops provided by the LSO, to include:
 - instruction in the theory and fundamentals of Lasers and their applications
 - tissue effects
 - laser safety and PPE
 - hand-on to cover Laser delivery systems, safety, handling of laser equipment
 - Certificate awarded upon successful completed
 - b. For staff who have laser certification from an outside agency, documentation must be provided to the department manager (or designate) or LSO.
 - Copy of course outline including laser(s) used
 - Dates(s) attended
 - Location of training
 - Copy of certification
 - c. Preceptorship by a certified user specific to the wavelength and model required.
3. Certification for Laser Console Operator will be granted after a preceptorship, until the Laser Console Operator demonstrates proficiency, specific to the wavelength and model. The preceptor completes and signs all fields on the Authorized Laser Personnel Form.
4. **Maintenance of Laser Console Operator Certification:**
 - All Laser Console Operators must have the following training:
 - Basic Laser Safety Course
 - An annual review of laser safety

- a. If the Laser Console Operator has operated the laser within a one year period, certification can be maintained by operating the laser console and attending an annual review of laser safety.
 - b. If the Laser Console Operator has not operated the laser console within a period of one year, certification can be regained by operating the laser console under the supervision of an Authorized Laser Console Operator Preceptor and attending an annual review of laser safety. The Preceptor will complete and sign the Authorized Laser Personnel Form.
 - c. Laser Console Operators who, in the opinion of the Committee, have a long history of laser experience may have the required preceptorship minimized at the discretion of the laser committee. The Laser Console Operator, being reinstated, will submit information to the Laser Committee for approval. The Laser Committee, upon approval, will send an approval letter for a standing order to the appropriate departments. The appropriate departments will update the Laser Registry and maintain the standing order in the laser registry.
5. To continue to use Laser(s), Laser Console Operators must ensure their credentialing is current in accordance with this procedure and must report any issues with their credentialing to their manager.
 6. Documentation of training and credentials will be maintained by the manager or designate in the Laser Registry.

Laser Room Personnel

1. All Laser Room Personnel who are present during laser use, must have the following training:
 - Basic Laser Safety Course
 - An annual review of laser safety
2. The LSO will provide the manager with a training record for the staff member. The manager or designate will maintain a copy in the Laser Registry.

LASER SAFETY PROGRAM PROCEDURES

GENERAL LASER USE

The following procedures must be performed by all departments/services in which laser are used.

1. To ensure safety, reduce potential laser hazard exposures and ensure consistency during laser use, the room (controlled laser area) in which the laser is being used will be considered the Nominal Hazard Zone (NHZ). (if not, the distance for NHZ should be posted and marked so staff are aware of and don't have to guess at the distance).
2. Lasers will be operated only by Authorized Laser Operators or a combination of Laser Operators and Laser Console Operators.
3. Before operating a laser, personnel must obtain the appropriate Credentialing Requirements and received training in laser physics, laser safety and operation of the specific laser unit (refer to training, education and credentialing procedure).
 - a. Laser Operators will be granted privileges only after meeting and documenting criteria outlined in the Credentialing, Training and Education Section.
 - b. Laser Console Operators must meet and document criteria outlined in the Credentialing, Training and Education Section.
4. All personnel working in a Controlled Laser Area must have appropriate training (refer to training, education and credentialing procedure).
5. Laser keys will be accessible only to authorized/certified Laser Personnel. Keys must be removed from the Laser when not in actual use, and secured in a locked storage cupboard.
6. The users of lasers in the operating room/clinic will follow policies, procedures and guidelines established by the Laser committee and documented in this program.
7. All Environmental Safety Procedures will be followed prior to, during and after laser use (refer to Environmental Safety Procedure).
8. If, at any time, the laser is not functioning properly, or the beam alignment is incorrect, the laser will **not** be used (removed from service and locked out/tagged) until the problem is rectified. Biomedical Engineering or the contracted maintenance provider, as the case may be, will be notified immediately to ensure the equipment is serviced and approved for return to use. In the case of equipment maintained by a contracted maintenance provider, the Laser Safety Officer will be notified immediately when the laser is in need of service and when it comes back from the contracted maintenance provider. The LSO will be provided a copy of the maintenance/service record.

9. No laser will be used if the laser operator, laser console operator, operating surgeon/physician, and/or the anesthetist have any serious concerns regarding the laser equipment, related equipment or non-compliance with any requirement in this manual.
10. The Laser Operators and/or Laser Console Operators have the authority to shut down the laser for any laser usage determined unsafe. The situation must be evaluated before laser use may resume. This may require consultation with the Laser Committee chair or designate. All occurrences must be reported immediately to the Manager, SAFE (473-7233) and the laser safety officer.
11. All incidents (with or without injury/illness) involving a physician, staff member, equipment and procedures must be reported to the Manager and SAFE (473-7233), as well as, the laser committee.
12. All incidents involving patient safety will be reported via the on-line patient safety reporting system (PSRS).

LASER USE IN OPERATING ROOMS

The following procedure must be used in operating rooms, as well as in conjunction with the General Laser Use Procedure:

1. Lasers used in operating rooms are to be operated only by Authorized Laser Operators and Laser Console Operators trained in the use of the equipment.
2. Members of the operating room team (Laser Room Personnel) must complete a laser safety course and annual review of the laser safety in the OR. This will be recorded in the Laser Registry.
3. The Laser Console Operator will function independently of the circulating nurse unless a protocol has been established, documented and maintained in the OR.
4. The Laser Console Operator will obtain the laser key from the secured cupboard.
5. Access to the controlled laser area must be limited to necessary personnel and appropriately instructed visitors.
6. The Laser Console Operator will be present at all times during the actual laser procedure to monitor safety, operate the laser control panel and ensure there are qualified personnel to perform the procedure.
7. The Laser Operator or Laser Console Operator must complete the environment and equipment safety checklists prior to using the laser.
 - a. Approved warning signs, specific to the laser in use (correct laser type, wavelength and maximum power) must be posted on all operating room doors while laser is in use.
 - b. Glasses/goggles of the appropriate optical density (OD) will be made available outside the controlled area for visitors and/or staff. Visitors and staff must wear glasses and goggles when entering the room and they must be maintained outside room
 - c. All windows shall have the appropriate coverings to stop the Laser beam.
 - d. Equipment should be positioned to minimize risk of falls, injuries, or equipment damage.
 - e. Electrical cords, control cords and water hoses will be inspected for integrity before use (refer to procedure, testing of laser alignment and laser console).
 - f. Surgical instruments used near the direct path of the laser beam must be ebonized, brush finished or covered with a wet, non-reflective material. Appropriate smoke evacuation equipment will be available for use during the laser procedure (refer to procedure for Smoke Evacuation for Laser Procedures).
 - g. Sterile water will be immediately accessible to control non-electrical fires.

- h. Personnel must know the location of the nearest fire extinguisher in the event of an electrical fire and how to use it.
 - i. Exposure to the laser beam is to be limited to the operative field except when the laser is being test fired. (see policy testing of laser alignment and laser console)
 - j. The laser machine shall be secured by removing the keys when not in active use
Doors will be closed during any procedure utilizing a laser.
 - k. Only non-flammable skin preps will be used if the laser is to be used on skin surfaces.
 - l. The operative area must be draped with dampened cloth material, checked throughout the procedure and dampened as required.
 - m. Eyewear is to be used by patient (Glasses/goggles or covered according to manufacturer's recommendation with protective layers), when applicable for the clinical procedure.
8. All operating room personnel will utilize protective devices to avoid direct and indirect exposure to Laser beams.
 - a. Appropriate safety eyewear will be worn by all personnel in the controlled area, including the patient.
 - b. Exception: the Physician when using a scope with a laser lens filter, where appropriate.
 9. Test firing of each laser, where applicable, will be completed according to the safety check list and prior to the patient entering the operating room/clinic. (see **Testing of Laser Alignment and Laser Console' procedure**)
 10. Appropriate safety measures for the laser will be provided according to the laser specific safety checklist.
 11. Appropriate smoke evacuation equipment (sufficient to handle the anticipated level of plume for all procedures within the expected application) will be used during all laser surgery procedures where a plume is generated and may present a respiratory hazard for persons present (refer to procedure, Smoke Evacuation for Laser Procedures). Evacuation equipment is used for removal of laser plume only. The smoke evacuation equipment will:
 - a. Be appropriately sized for requirements
 - b. Filter(s) particulate > 0.12 um
 - c. Have fluid traps, as applicable
 12. Unfiltered wall suction is not to be used for any laser procedure as carbon deposits from the laser plume will deposit in and block suction lines.
 13. Where a laser plume is not generated, a laser mask or properly fitted respirator is not necessary.
 14. Patients who may be exposed to laser plume and can wear a mask without interfering with the surgical procedure should wear a laser protective mask during laser treatment.

15. Where it is not possible to remove a significant portion of the plume, all staff using and in the nominal hazard zone (NHZ) of the laser surgery procedure should wear a properly fitted half-mask respirator (N95).
16. In instances where a smoke evacuator is not being used during laser surgery, a properly fitted half-mask respirator (N95) must be used.
17. All staff required to use the half-mask respirator (N95) must have a “respirator fit test and training” to ensure the respirator is properly fitted and staff know how to use properly.
18. The laser operator is responsible for selecting laser settings (watts, duration, mode) and for testing beam alignment before beginning the procedure, where applicable. Changes in the laser settings shall be conveyed to the laser console operator. The laser console operator will repeat the requested changes in setting for verification, prior to changing the settings.
19. The laser will remain “Off” when not in actual use. The keys must be removed and maintained by the laser console operator.
20. The laser will be placed in “standby” in the following cases:
 - a. When the laser operator removes his/her hands, or eyes from the operative field or from the laser beam delivery device.
 - b. When the laser operator gives a verbal “standby” command
21. In the event a fire should occur, the laser unit is to be **immediately** turned off by activating the emergency shut-off switch.
22. All warning signs at access points will be removed or covered when the laser is not in use.
23. A laser utilization record (laser utilization downtime form) shall be kept for each laser. These records shall be available for review by the laser committee, safety programs, and regulatory authorities.

LASER USE IN CLINICS AND OPHTHALMOLOGY ORs

Clinics, Ophthalmology ORs or other areas often have circumstances based on the laser equipment, controlled area and personnel that may require special documentation for an environmental safety checklist and laser utilization record. Therefore, each clinic must develop an appropriate and effective laser utilization record, and an environment safety checklist based on the applicable items identified in the Environmental Safety during Laser Procedure.

The Manager of the clinic or designate must submit any special documentation (checklists and/or utilization records) to the Laser Committee for initial approval, and as changes occur.

The following procedures must be included in the environmental safety checklist and laser utilization record for the clinics/areas. In addition, the General Laser Use Procedure must be included in any checklist:

1. Lasers are to be operated only by Laser Operators and Laser Console Operators trained in the use of the equipment.
2. Members of the clinic team/ophthalmology OR staff (Laser Room Personnel) must have completed a basic orientation and annual review of laser safety. (refer to training, Education and Credentialing procedures)
3. The Laser Operator or Laser Console Operator will obtain the laser key from the secured cupboard.
4. Access to the controlled laser area is limited to necessary personnel and appropriately instructed visitors.
5. The Laser Operator or Laser Console Operator must monitor safety during the laser procedure.
6. The Laser Operator or Laser Console Operator must complete the appropriate environment safety checklist prior to using the laser.
 - a. Approved warning signs, specific to the laser in use (correct laser type, wavelength and maximum power) must be posted on all doors where a laser is in use.
 - b. Glasses/goggles of the appropriate optical density (OD) will be made available outside the controlled area for visitors and/or staff.
 - c. Visitors and staff must wear glasses and goggles when entering the room and laser is operating in ready mode.
 - d. All windows shall have the appropriate coverings to stop the Laser beam, if applicable.

- e. Equipment must be positioned to minimize risk of falls, injuries, or equipment damage.
 - f. Electrical cords, control cords will be inspected for integrity before use (refer to procedure, testing of laser alignment and laser console).
 - g. Appropriate smoke evacuation equipment will be available for use during the laser procedure, if applicable (refer to procedure for Smoke Evacuation for Laser Procedures).
 - h. Sterile water will be immediately accessible to control non-electrical fires, if applicable.
 - i. Personnel must know the location of the nearest fire extinguisher in the event of an electrical fire and how to use it.
 - j. Exposure to the laser beam is to be limited to the area of treatment except when the laser is being test fired. (see policy testing of laser alignment and laser console)
 - k. The laser machine shall be secured by removing the keys when not in active clinical use. Doors will be closed during any procedure utilizing a laser.
 - l. Instruments used near the direct path of the laser beam must be appropriate to laser use, ebonized, brush finished or covered with a wet, non-reflective material.
 - m. Only non-flammable skin preps will be used if the laser is to be used on skin surfaces.
7. The Laser Operator or Laser Console Operator must complete the manufacturer's laser specific safety checklist for coaxial alignment of aiming beam with laser energy and operational verification of all panel functions and indicators (equipment start-up self test) prior to using the laser. This record will be maintained with the equipment, in the clinic for seven (7) years.
 8. Test firing of each laser will be completed, when applicable, according to the safety check list and prior to the patient entering the treatment room/clinic. (see procedure, testing of laser alignment and laser console)
 9. All clinic personnel in the controlled laser area will utilize protective devices to avoid direct and indirect exposure to Laser beams.
 - a. Appropriate safety eyewear will be worn by all personnel in the controlled laser area, including the patient.
 - i. Exception: the Physician when using a scope with a laser lens filter, where appropriate.
 - i. In the Eye Care Centre and ophthalmology OR the laser procedure is on the eye(s) and the non-procedure eye is used for fixation.
 10. Appropriate smoke evacuation equipment (sufficient to handle the anticipated level of plume for all procedures within the expected application) will be used during all laser surgery procedures where a plume is generated and may present a respiratory hazard for persons present (refer to procedure, Smoke Evacuation for Laser Procedures). Evacuation equipment is used for removal of laser plume only. The smoke evacuation equipment will:
 - d. Be appropriately sized for requirements

- e. Filter(s) particulate > 0.12 um
 - f. Have fluid traps, as applicable
11. Unfiltered wall suction is not to be used for any laser procedure as carbon deposits from the laser plume will deposit in and block suction lines.
 12. Where a laser plume is not generated, a laser mask or properly fitted respirator is not necessary.
 13. Patients who may be exposed to laser plume and can wear a mask without interfering with the surgical procedure should wear a laser protective mask during laser treatment.
 14. Where it is not possible to remove a significant portion of the plume, all staff using and in the nominal hazard zone (NHZ) of the laser surgery procedure should wear a properly fitted half-mask respirator (N95).
 15. In instances where a smoke evacuator is not being used during laser surgery, a properly fitted half-mask respirator (N95) must be used.
 16. All staff required to use the half-mask respirator (N95) must have a “respirator fit test and training” to ensure the respirator is properly fitted and staff know how to use properly.
 17. Due to the small physical size of most clinic lasers, the Laser Operator has easy access to all controls and functions. It is therefore generally impractical for the Laser Console Operator to make changes in settings (ie power, pulse duration and mode). The Laser Operator is responsible for selecting laser settings (watts, duration, mode) and for testing beam alignment before beginning the procedure. The Laser Operator may however, request the Laser Console Operator to make the setting changes.
 18. The Laser Operator must operate the laser activation control during the treatment.
 19. In the event a fire should occur, the laser unit is to be **immediately** turned off.
 20. The laser will remain “Off” when not in clinical use. The laser is placed in standby between clinic patients and only authorized staff have access to the laser room.
 21. The laser will also be placed in “standby” in the following cases:
 - a. When the laser operator removes his hands, or eyes from the operative field or from the laser beam delivery device.
 - b. When the laser operator gives a verbal “standby” command
 22. All warning signs at access points will be removed or covered when the laser is not in use.
 23. The keys will be returned to the secure cupboard when the laser is shut down.

24. A laser utilization downtime form or applicable record, as approved by the Laser Committee, shall be kept for each laser use. These records shall be open for review by the laser committee.

LASER EYEWEAR

Rationale

Due to the potential for eye injury it is necessary that eyewear be of sufficient optical density (OD) for each wavelength versus maximum power output.

Use

1. Each set of eyewear shall have the OD and wavelength clearly marked.
2. Training on the care, use, maintenance of laser eyewear shall be provided through the Laser Safety Training.
3. Appropriate safety eyewear must be worn by all persons in the controlled area, including the patient.
 - Physicians when using a “lensed” scope with a sufficient OD are exempt from wearing safety eyewear.
4. Before wearing, the user shall check the OD and wavelength to ensure the safety eyewear is appropriate for the laser being used.
5. Glasses/goggles will be made available outside the controlled area for visitors and/or staff.
6. It is the responsibility of all personnel involved in a laser procedure to ensure that they are wearing the correct eyewear.
7. If staff identify any eyewear that is not clearly marked or damaged it must be immediately removed from service, tagged “out of service” and provided to the Department Manager (and Laser Safety Officer) for repair or replacement.

Cleaning and Inspection

Cleaning and inspection of protective eyewear to ensure satisfactory condition.

1. Before each use, the user will inspect the glasses for the following
 - a. to ensure the markings are clear
 - b. there is no pitting, crazing, cracking, discoloration, etc.
 - c. the frame for mechanical integrity
 - d. straps or other restraining devices to ensure that they are not excessively worn or damaged.
 - e. Light leaks and coating damage that would permit hazardous intrabeam viewing.
2. Department Staff must complete periodic cleaning of laser eyewear: cleaning and disinfecting of lenses of protective eyewear in accordance with Infection Control Procedures, and the manufacturer’s instructions to avoid damage to the absorbing and reflecting surfaces. If during inspection or cleaning it is identified that safety eyewear may be compromised, it must be removed from service, tagged “out of service” and provided to the Department Manager or designate for repair or replacement.

TESTING OF LASER ALIGNMENT AND LASER CONSOLE

Rationale

To ensure proper functioning of the laser console and delivery system(s).

1. Ocular and skin hazards may exist during beam alignment procedures. When the laser must be turned on, such as beam alignment procedures, all personal safety procedures must be in place.
2. Initial safety check of specific laser equipment will be completed by Laser Operator or Laser Console Operator prior to each laser procedure, as follows:
 - a. All manufacturer's safety specifications.
 - b. Cords and hoses will be inspected for integrity
 - c. Verify coaxial alignment of aiming beam with laser energy (test fire on a tongue depressor) in accordance with manufacturer's specifications, where appropriate.
 - d. Verify laser self test is complete and passes, where appropriate
 - e. Verify all panel function indicators are operational, in accordance with manufacturer's specifications.

SMOKE EVACUATION FOR LASER PROCEDURES

Smoke evacuation during laser procedures will be the main prevention control for addressing laser plume.

1. Appropriate smoke evacuation equipment (sufficient to handle the anticipated level of plume for all procedures within the expected application) will be used during all laser surgery procedures where a plume is generated and may present a respiratory hazard for persons present. Evacuation equipment is used for removal of laser plume only. The smoke evacuation equipment will:
 - a. Be appropriately sized for requirements
 - b. Filter(s) particulate > 0.12 um
 - c. Have fluid traps, as applicable
2. Unfiltered wall suction is not to be used for any laser procedure as carbon deposits from the laser plume will deposit in and block suction lines.
3. Where a laser plume is not generated, a laser mask or properly fitted respirator is not necessary.

Care, Use, Cleaning and Maintenance: (the equipment is only as effective as it is used and maintained) (this would be based on the type of smoke evacuator and can be obtained from manufacturer's specifications or instructions).

1. The Laser Operator or Laser Console Operator will test the smoke evacuator prior to each use (manufacturer's checks).
 - a. Any issues identified affecting efficiency of equipment during testing will be reported immediately to the manager and corrective actions taken before the equipment is used which could include removal of the unit, substitution with another unit, replacement, repairs, etc.
2. Servicing will be reported immediately to the Laser Safety Officer or Biomedical Department.
3. Inspection and replacement of filters will be in accordance with the manufacturer's specifications
4. Documentation of inspections will be maintained in the department and will be available upon request.
5. Preventative maintenance and unit inspections will be performed in accordance with manufacturer's specifications by qualified persons.
6. All repairs will be performed in accordance with manufacturer's specification by qualified persons.

RESPIRATORY PROTECTION FOR STAFF AND PATIENT

1. Patients who may be exposed to laser plume and can wear a mask without interfering with the surgical procedure should wear a laser protective mask during laser treatment.

2. Where it is not possible to remove a significant portion of the plume, all staff using and in the nominal hazard zone (NHZ) of the laser surgery procedure should wear a properly fitted half-mask respirator (N95).
3. In instances where a smoke evacuator is not being used during laser surgery, a properly fitted half-mask respirator (N95) must be used.
4. All staff required to use the half-mask respirator(N95) must have a “respirator fit test and training” to ensure the respirator is properly fitted and staff know how to use properly.

LOW-POWERED LASER

Low powered lasers are used for a variety of diagnostic and therapeutic procedures.

Departments with these devices in use are required to have policies and/or procedures in place that address their particular safety issues. Typical concerns with these units would be related to:

- a. protecting the vision of patients and staff
- b. identifying which staff members have access to the unit, and
- c. recognizing safety procedures that need to be in place when using the unit.

The Laser Committee and the Laser Safety Officer can act in an advisory as well as a regulatory role in assisting departments develop appropriate policies and/or procedures for the lasers they have in use.

LASER EQUIPMENT MAINTENANCE AND SERVICE

1. All laser equipment must have a label by the manufacturer to indicate the appropriate hazard classification.
2. All Laser equipment must be installed, repaired, maintained and used in accordance with manufacturer's specifications.
3. Only qualified persons will perform inspections, corrective and preventative maintenance on laser and related equipment.
4. The Biomedical Department will respond to all non-contract equipment related issues.
5. Departments (manager or designate) shall arrange preventative and corrective maintenance, as well as inspections, on contracted equipment by qualified personnel on equipment under its purview and in accordance with manufacturer's specifications. Equipment service documentation will be maintained by the department for the life of the equipment. The Health Services Manager will keep the LSO informed of such external maintenance activity. A copy of service documentation must also be provided to Biomedical Engineering for storage, as well.
6. The Biomedical Department shall ensure that periodic preventative maintenance and corrective maintenance service is performed by qualified personnel and assures that records of this maintenance and service are maintained for a minimum of 7 years.

DOCUMENTATION AND RECORD MAINTENANCE

1. All records and documentation for Lasers must be maintained in accordance with Capital Health Policy CH100-055 Retention of Records.
 - a. Equipment records of inspection, repairs and prevention maintenance must be maintained in the Biomedical Department for non-contract and contract equipment for a minimum of 7 years.
 - b. External maintenance providers or the manager (designate) shall provide a copy of all inspection, repairs, and preventive maintenance work on contract equipment to Biomedical Engineering to keep as a local copy.
 - c. A laser utilization record shall be kept for each laser.
 - d. Laser Program Audits will be conducted periodically, at the request of the Laser Committee or at least annually. Laser Program Audit records and corrective actions will be maintained by the LSO, Laser Committee and the respective audited departments for a minimum of 7 years.
 - e. All records of laser use including checklists, utilization downtime forms and special department specific forms must be maintained in each department.
2. All documentation and records must be available upon request at all times. A laser utilization record (laser utilization downtime form) shall be kept for each laser. These records shall be available for review by the laser committee, safety programs, and regulatory authorities.

Laser Registry

1. The Laser Registry and employee education/training records must be current and maintained by the manager or designate in the department where the laser is used.
2. The Laser Registry must be available at all times for review upon request.
3. The registry will contain:
 - a. The completed Authorized Laser Personnel Record (Appendix A) and a copy of any related documentation for credentials for each Laser Operator and each Laser Console Operator.
 - b. A training record of all Laser Room Personnel.
4. Any areas of concern with respect to a Laser Operator or Laser Console Operator's training or use of the laser must be reported to the Chairman of the Laser Committee or designate, the LSO, the Health Services Manager and the individual's Department Head.
5. The Manager or designate will conduct periodic, or at least annually, audits of the Laser Registry to ensure it is maintained and current.

REPORTING LASER HAZARDS, INCIDENTS AND NON-COMPLIANCE

1. Employees must report all hazards, incidents (with or without injury/illness) and non-compliance with the Laser Program to their Manager or designate and SAFE (473-7233) in accordance with Capital Health Policy CH80-022 Employee Hazards and Incidents – Reporting, Investigation and Documentation.
2. The manager or designate must investigate, implement corrective actions and document all reported laser safety hazards, incidents (with or without injury/illness) and non compliance with the Laser Safety Program in accordance with Capital Health Policy CH80-022 Employee Hazards and Incidents – Reporting, Investigation and Documentation
3. Reporting Non-compliance issues that require immediate action:
 - a. Physicians: report to the Laser Committee Chair Person (Physician member)
 - b. Employees: the Manager or person in charge
4. Laser users must monitor, identify and report all equipment deficiencies to the Laser Safety Officer for immediate correction and to the manager.
5. Laser Operators or Laser Console Operators must ensure their credentials and training are up to date, and if not, report to appropriate manager or their designate.
6. Any areas of concern with respect to a Laser Operator training or use of the laser must be reported to the Chairman of the Laser Committee or designate, the Laser Safety Officer and to the Health Services Manager and/or the Department Head.
7. Any areas of concern with respect to a Laser Console Operator training or use of the laser must be reported to the health services manager, and the Laser Safety Officer. All incidents involving patient safety will be reported via the on-line patient safety reporting system (PSRS).

REFERENCES

1. Capital Health Policy CH80-035 Occupational Health and Safety – Rights and Accountabilities
2. Capital Health Policy CH100-055 Retention of Records
3. Capital Health Policy CH80-022 Employee Hazards and Incidents: Reporting, Documentation and Investigation
4. Policy and Procedures Manual Abbott Northwestern Hospital Minneapolis, Minnesota
5. Policy and Procedures Manual Halifax Infirmary, Halifax, NS
6. ANSI Z136 Standard
7. CSA |Z386-14 Standard

APPENDIX A - Authorized Laser Personnel Record

Authorized Laser Personnel Record

*This form must be provided to each department where the Authorized Laser Personnel will use lasers.
The receiving Department is responsible to update page 2 of the form.*

Name: _____ **Title:** _____

SECTION A – INITIAL TRAINING (Check the box that applies to the individual)

Laser Operator Department Head letter or certification received and training approved

Laser Operator Privileges Granted Date: _____

Authorized Signature: (Laser Safety Committee Chairperson) _____

Laser Console Operator Formal training completed and prior documents reviewed

Formal Laser Training Completed/Reviewed Date: _____

Authorized Signature: (Course Instructor/Laser Safety Officer): _____

Laser Room Personnel Training completed and reviewed

Basic Laser Safety Course Completion Date: _____

Authorized Signature: (Course Instructor/Laser Safety Officer): _____

SECTION B – LASER APPROVAL (initial any additional wavelengths added)

Laser Type	Model	Wavelength	Date	Preceptor/Authorized Signature

**APPENDIX B - Perioperative: Laser Utilization Downtime Documentation
(CD0771MR_06_07)**



Capital Health
Perioperative
Laser Utilization
Downtime Documentation

Treatment # _____ Date _____ (YYYY/MM/DD)

Safety Checklist

- Protective Eye Glasses - Staff ^{0.01}
- Warning Signs on Door
- Windows Covered N/A
- Water on Set UP
- Fire Extinguisher in Room
- Restrict Noise/Traffic
- Protective Eye Glasses - Patient ^{0.01}
- Drapes: Linen Paper N/A
- Smoke Evacuator
- Laser Masks Worn
- Check Beam Alignment Calibration % _____
- Check Filters N/A
- Wet _____

Laser Nurse _____

Procedure _____

Diagnosis _____

Laser Surgeon _____ Anesthesiologist _____

Type of Laser _____ BME # _____ Lens _____

Type ETT _____ Size _____ Jet Vent

Type of Fiber/Handpiece _____ Lot # _____ Endoscopic _____

Probe/Scalpel _____

Watts	Mode	Pulse Duration	Tissue

Laser Start _____ Laser Stop _____

Number of Pulses _____ cum energy _____

Joules _____ Total Kilojoules _____

Laser Comments/Occurences _____ Report to Laser Safety Committee



Operative Records
CD0771MR_06_07

APPENDIX C - Eye Care Centre: Laser Safety Checklist: 01/06 LHC


LASER SAFETY CHECKLIST -ECC

ITEM	YES	NO
Have all employees who operate the laser been certified?		
Have all team members in the room had a review of laser safety within the past year?		
Has the laser self-test been completed?		
Are the appropriate warning signs posted on the doors to the laser area?		
Is the laser machine secured when not in active use? (i.e. keys removed)		
Is there a fire extinguisher available and do you know its location?		
Is the appropriate protective eyewear available for all personnel in the room and outside the room for visitors/other staff?		
Are all staff in the laser area wearing the protective eyewear?		
Are the windows covered sufficiently?		

01/06
LHC

ECC Eye Care Centre

ECL
2A OPHT -HR + HPF



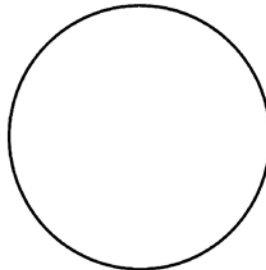
Capital Health
 Eye Care Centre
Laser Permission Report

I hereby give permission for the following Laser Treatment _____
 to my _____ eye(s) the effect and nature having been explained
 to me by Doctor _____

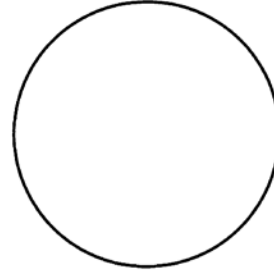
 Signature Witness Date (YYYY/MM/DD)

Dx

Procedure



RIGHT



LEFT

Colour	Area	Spot Size	Exp. Time	Power	#Exposures
Yag Mode	Area	Off Set	Pulse/Burst	Power	Total Pulses



Physician's Signature: _____

APPENDIX D - HAZARD ASSESSMENT AND CONTROLS

HAZARDS AND CONTROLS		
Check if applicable	Hazard	Control(s)
<input type="checkbox"/>	High Voltage	
<input type="checkbox"/>	Capacitors	
<input type="checkbox"/>	Unenclosed Beam/Access to Beam	
<input type="checkbox"/>	Fumes/Vapors	
<input type="checkbox"/>	UV Radiation or Blue Light	
<input type="checkbox"/>	Compressed Gases	
<input type="checkbox"/>	Hazardous Chemicals/Waste	
<input type="checkbox"/>	Housekeeping	
<input type="checkbox"/>	Reflective Material in Beam Path	
<input type="checkbox"/>	Fire	
<input type="checkbox"/>	Laser at eye level of person sitting or standing	
<input type="checkbox"/>		

ADDITIONAL CONTROLS		
Check if applicable	Control	Comments
<input type="checkbox"/>	Entryway (door) Interlocks or controls	
<input type="checkbox"/>	Laser Enclosure Interlocks	
<input type="checkbox"/>	Laser Housing interlocks	
<input type="checkbox"/>	Panic button/Emergency stop	
<input type="checkbox"/>	Beam Stops	
<input type="checkbox"/>	Master Switch (operated by key or computer code)	
<input type="checkbox"/>	Laser secured to base	
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		

APPENDIX E - PERSONAL PROTECTIVE EQUIPMENT - EYEWEAR

LASER EYEWEAR					
For this laser...			...Wear this eyewear		
Acquisition #	Type	Wavelength (nm)	Wavelength attenuated (nm)	Optical Density (OD)	Remarks
(example) 1234	CO ₂	10,600	10,600	At least 3.5	Glendale – white frames

PERSONAL PROTECTIVE EQUIPMENT - OTHER

What (item): And is available from (where): Which must be worn (when):

_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

APPENDIX F - SAMPLE LASER AUDIT FORM

Auditors Name: _____ Date of Audit: _____

Location of Laser System: _____

Name of Laser User: _____ Contact During Audit: _____

LASER SYSTEM INFORMATION:

Laser Type: _____ Laser Class: _____ Laser Make: _____

Laser Model: _____ Laser Serial Number: _____

Wavelength: _____ nm Output (Max/used): _____ **W or J** (Circle one)

Beam Diameter at Aperture: _____ nm Beam Divergence: _____ mrad

Pulse Duration: _____ sec Pulse Frequency: _____ HZ

Laser is Q-Switched/Mode locked: **Y or N** (Circle one)Laser is: **Active or Inactive** (Circle one)**LASER POSTING, LABELING AND SECURITY MEASURES:**Entrances properly posted: **Y or N** Comments _____Room security adequate: **Y or N** Comments _____Door interlock system: **Y or N** Comments _____Laser status indicator outside room: **Y or N** Comments _____Laser class label in place: **Y or N** Comments _____Laser hazard label in place: **Y or N** Comments _____Laser aperture label in place: **Y or N** Comments _____**LASER UNIT SAFETY CONTROLS:**Protective housing in place: **Y or N** Comments _____Interlock housing: **Y or N** Comments _____Interlock on housing functioning: **Y or N** Comments _____Beam shutter present: **Y or N** Comments _____Beam shutter functioning: **Y or N** Comments _____Key operation: **Y or N** Comments _____Laser activation indicator on Console: **Y or N** Comments _____Beam power meter: : **Y or N** Comments _____Emergency shutoff available: **Y or N** Comments _____**ENGINEERING SAFETY CONTROLS:**Laser secured to table: **Y or N** Comments _____Laser optics secured to prevent stray beams: **Y or N** Comments _____Laser at eye level: **Y or N** Comments _____Beam is enclosed: **Y or N** Comments _____Beam barriers in place: **Y or N** Comments _____Beam stops in place: **Y or N** Comments _____Remote viewing of beam: **Y or N** Comments _____Beam condensed or enlarged: **Y or N** Comments _____

Beam focused: **Y or N** Comments _____
 Beam intensity reduced through filtration: **Y or N** Comments _____
 Fiber optics used: **Y or N** Comments _____
 Windows in room covered: **Y or N** Comments _____
 Reflective materials kept out of beam path: **Y or N** Comments _____
 Beam management Documented: **Y or N** Comments _____
 Physical evidence of stray beams: **Y or N** Comments _____
 Class 4 diffuse reflection hazard: **Y or N** Comments _____

ADMINISTRATIVE SAFETY CONTROLS:

Authorization up-to-date: **Y or N** Comments _____
 Authorization posted: **Y or N** Comments _____
 SOP up-to-date: **Y or N** Comments _____
 SOP posted: **Y or N** Comments _____
 Emergency contact list posted: **Y or N** Comments _____
 Laser safety guidelines posted: **Y or N** Comments _____
 Laser safety policy manual available: **Y or N** Comments _____

OTHER LASER SAFETY MEASURES:

Eye exam requirement met: **Y or N** Comments _____
 Proper laser eye protection available: **Y or N** Comments _____
 Proper skin protection available: **Y or N** Comments _____
 All users have met training requirement: **Y or N** Comments _____

NON BEAM HAZARDS:

Toxic laser media in use: **Y or N** Comments _____
 Fume hood for dye mixing: **Y or N** Comments _____
 Cryogenics in use: **Y or N** Comments _____
 Compressed gasses in use: **Y or N** Comments _____
 High voltage power hazard: **Y or N** Comments _____
 Optical tables properly grounded: **Y or N** Comments _____
 Collateral radiation hazard: **Y or N** Comments _____
 Explosion hazard: **Y or N** Comments _____
 Fire hazard: **Y or N** Comments _____
 LGAC production: **Y or N** Comments _____

HAZARD ANALYSIS: LASER BEAM

Inventory Control Number: _____
 MPE1 _____ @time1 _____ @wavelength1 _____
 MPE1 _____ @time2 _____ @wavelength2 _____
 MPE3 _____ @time3 _____ @wavelength3 _____
 NHZ: Direct beam _____ @MPE _____

Lens on Laser _____ @MPE _____
 Diffuse beam _____ @MPE _____
 Reflectivity _____ viewing angle _____
 Optical fiber _____ @MPE _____
 Eyewear: Required OD1 _____ @MPE _____
 Eyewear: Required OD2 _____ @MPE _____

Beam path		Laser controlled area	
Totally enclosed	Y/N	Class3b	Y/N
Limited open	Y/N	Class 4	Y/N
Totally open	Y/N	Temporary	Y/N
Potential for stray beams	Y/N		
Non reflective surfaces in path	Y/N		
Flammable/combustible material	Y/N		

NOTES

APPENDIX G - Sample SOP- Controlled Access to the Laser Room

Purpose: To define the area in which control measures shall be applied, and to describe the control measures necessary in order to maintain a safe environment for patients, and for health care personnel (HCP).

Policy: Class 3B and Class 4 lasers will be operated only in areas where traffic flow and compliance with all safety procedures can be monitored.

Procedure:

1. Regulation Danger laser signs will be posted at eye level on all doors that access a room where a laser will be operated. These signs will state all required information as described in the ANSI Z136.3 standard, and will be removed when the laser is not in use.
2. Safety goggles labeled with the appropriate wavelength and optical density will be available at the entry where each door sign is posted.
3. Glass windows will be covered with shades or filters of appropriate optical density whenever a fiberoptic laser system is operational.
4. All safety procedures will be followed during service and demonstrations.
5. No one will be allowed into a laser room unless properly authorized, and protected.
6. The laser should not be activated when it is necessary to open the door, if the NHZ extends to doorway.
7. Laser keys will be kept in a secured area and signed out only by those authorized to do so.

APPROVED: _____

DATE: _____ **DATE REVIEWED:** _____

APPENDIX H - Sample SOP- Ocular Safety

Purpose: To prevent ocular injuries to patients receiving laser treatment, or to health care personnel (HCP) working with Class 3B and Class 4 lasers.

Policy: Within the nominal hazard zone (NHZ), or cases where the entire room is the NHZ, all personnel will adhere to appropriate eye protection procedures during all laser applications.

Procedures:

1. Appropriate eyewear (glasses or goggles of sufficient optical density to prevent ocular injury at the laser wavelength in use) will be worn by everyone in the NHZ while the laser is in operation. Exception to this is the operator looking through an attached microscope with a lens that has the appropriate optical density for the laser in use.
2. Prior to use, the user 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.
3. If damage to the eyewear is observed or suspected, consult with the LSO about using the eyewear.
4. Contact lenses are not acceptable as protective eyewear. Prescription lens wearers must use appropriate laser safety eyewear.
5. All goggles must have side shields to protect from peripheral injury and impact.
6. Any delivery system which is not shuttered must be capped, or the system turned off, when not connected to the hand piece or the operating microscope.
7. The laser system must be placed in standby mode when delivery optics are moved away from the target.
8. Proper patient protection of the eye is critical during laser surgery of facial tissues or regions near the face. Opaque shields, opaque pads, or goggles are required when the eye is potentially within the nominal hazard zone (NHZ), and corneal-scleral contact shields are required during lid or periorbital procedure.

APPROVED: _____

DATE: _____ **DATE REVIEWED:** _____

APPENDIX I - Sample SOP- Handling of Laser Fibre 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.

Policy: Personnel handling laser fibers will assure compliance with all safety procedures and will consider the fiber an extension of the laser system, governed by applicable standards and regulations.

Procedure:

1. Appropriate eye safety filters will be used with endo/microscopes.
2. Laser room windows will be covered completely with appropriate filters, if necessary.
3. Fibers and associated equipment will be positioned to allow for safe traffic patterns in the room.
4. The fiber will be examined for breaks or damage of the distal tip, the proximal connector, and the catheter sheath. Fiber will be calibrated in accordance with manufacturer's directions. If deficiencies or damage are noted, another fiber must be obtained.
5. Do not use clamps or other instruments to secure fiber in the operative site.
6. Always use coaxial cooling that is appropriate to the procedure. **NEVER USE GAS TO PURGE A FIBER IN THE INTRAUTERINE CAVITY!!!**
7. Never operate the laser unless you see the aiming beam (if used) and the tip of the fiber beyond the end of the endoscope.
8. Monitor the fiber for distortion of the beam, decreased power transmission, and accumulation of debris on the tip.
9. Never reuse a disposable fiber without manufacturer's directions.
10. Always put the laser in standby mode when not aimed at a target.

APPROVED: _____

DATE: _____ **DATE REVIEWED:** _____

APPENDIX J - Sample SOP- Non-Beam Hazards

Purpose: To recognize and effectively deal with a variety of potential non-beam hazards which may be present during laser procedures.

Policy: Non-beam hazards are the purview of safety and industrial hygiene personnel, who will effect the appropriate hazard evaluation and control.

Procedure:

I. Fire

1. Never use alcohol in the operating field. Fibers may be rinsed in hydrogen peroxide or saline intraoperatively.
2. Never place a hot fiber directly on paper drapes. Wait until tip is cool before contact is made with flammable material.
3. Use fire-retardant drapes, damp packs or pads. Fill pelvic cavity with Ringer's, saline or other appropriate solution during surgery.
4. Put laser system in standby mode when procedure is interrupted or terminated.
5. Avoid high levels of oxygen in the operative field.
6. Avoid laser beam exposure of the sheaths of flexible fiber endoscopes, since many of the sheaths are flammable.

II. Plume Management

1. Remove laser generated airborne contaminants from the energy impact site to reduce the transmission of potentially hazardous particulates.
2. Position smoke evacuator in the operating room whenever plume is anticipated.
3. Check operation of the plume management system prior to the beginning of the case.
4. Check the plume filter monitor, and if needed, install a clean filter.
5. In-line filters with minimum 0.3 μm filtration, will be placed between wall suction and the fluid cannister.
6. Verify that plume evacuator is properly connected and is independent from surgical suction.
7. Use even in cases producing minimal plume.
8. Stop procedure if failure of evacuator before or during operation.
9. Distal collection port must be no more than 2 cm from impact site, when practical.
10. All tubing, connectors, adaptors, and wands will be changed per case, and disposed of according to biohazard procedures.

III. Electrical Shock

During service or maintenance, precautions must be taken against electrical shock, which may be fatal.

1. Install HCLS lasers to National Electrical Codes.

APPROVED: _____

DATE: _____ **DATE REVIEWED:** _____