

Non-Hospital Medical and Surgical
Facilities Accreditation Program

ACCREDITATION STANDARDS

Laser Safety

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Introduction

A wide variety of lasers are used in health care and their use continues to grow with advancements in health-care technology, equipment and procedures. While lasers offer several advantages such as enhanced precision, the use of lasers also has its risks including eye and skin burns, fire, toxic fumes, and electrical shock. Therefore, patient safety depends on the safe and effective use of lasers by knowledgeable health-care providers.

The accreditation standards relating to occupational health and safety include those most critical to staff safety in the non-hospital settings; however, they do not encompass all of the requirements under the *Workers Compensation Act* of British Columbia. Medical directors are encouraged to review section 115 of the Act and the associated *Occupational Health and Safety Regulations* as well as the Canadian Standards Association (CSA) Z386 *Safe use of lasers in health care* and the American National Standards Institute (ANSI) Z136.3 *Safe use of lasers in health care* to ensure they are meeting all regulatory requirements in British Columbia. Questions specific to the Act and the associated Occupational Health and Safety Regulations should be directed to WorkSafeBC for interpretation, advice and direction. Questions specific to CSA Z386 and ANSI Z136.3 should be directed to the facility's laser safety officer or medical director, as appropriate, for interpretation, advice and direction.

No.	Description
LAS1.0	LASER SAFETY
LAS1.1	<p>The safety of patients and staff is supported through an established laser safety program. <i>Intent: A laser safety program, in conformance with CSA Z386 Safe use of lasers in health care, is in place. In facilities that have/use a laser, the medical director is responsible for ensuring that all personnel possess the appropriate laser education and training and that a laser safety program is in place and is current.</i></p>
LAS1.1.1	<p>M Each laser used in the non-hospital facility is registered with the College’s Non-Hospital Medical and Surgical Facilities Accreditation Program (NHMSFAP). <i>Guidance: All lasers (Class 1, Class 1M, Class 2, Class 2M, Class 3R, Class 3B and Class 4) used in non-hospital facilities are registered with the NHMSFAP and a copy of the Laser Registration form is on file at the facility. The College is notified when a laser is acquired (e.g. a new laser registration form is submitted) and when a laser is removed from service.</i></p>
LAS1.1.2	<p>M There is a laser safety officer (LSO) who is responsible for overseeing the control of laser hazards, as appropriate. <i>Guidance: In facilities where Class 3B and Class 4 lasers are used, there is a laser safety officer (LSO) who has been appointed by the medical director. A LSO may also be required for Class 1M and Class 2M lasers if a person can be exposed to the beam through enhancing optics such as a magnifying glass, binoculars, a microscope, an eye-loupe, a telescope or other equipment. An LSO is not required for Class 1, Class 2 and Class 3R lasers. The LSO is responsible for overseeing the control of laser hazards and is appropriately qualified. A deputy laser safety officer may also be appointed as determined by the medical director. In addition to the LSO, each member of the laser team has the responsibility and authority to stop unsafe laser practice to ensure patient and staff safety at all times. It is also recommended that the facility have a laser safety committee whose membership includes the LSO, nursing administration, medical administration, anesthesia and personnel who work in the laser-controlled area.</i></p>

No.	Description
LAS1.1.3	<p>M The LSO, if required, has completed LSO training. <i>Guidance: The LSO has completed Level 3 education and training as specified in CSA Z386 Safe use of lasers in health care which includes the application of CSA Z386 and other regulatory requirements (i.e. occupational health and safety regulations), types of lasers and their delivery systems, laser physics, laser-tissue interaction, understanding treatment parameters and dosimetry, roles, authority and responsibilities of laser team members, hazard identification and implementation of applicable control measures (i.e. evaluation and selection of personal protective equipment (PPE)), monitoring the environment and equipment during laser use, emergency procedures (e.g. in case of fire, gas leak), laser documentation, and the reporting of accidents, incidents or occurrences. If a deputy laser safety officer (DLSO) has also been appointed, then the DLSO must also have completed appropriate LSO training as outlined above. The medical director is responsible for ensuring the LSO has the proper qualifications, training and knowledge, and possess the competencies required for their role. Where there is a nationally or internationally recognized body that publishes standards and/or guidelines (i.e. CSA Z386 Annex E Education and training of laser personnel), the medical director must ensure that third-party course providers instruct in accordance to those standards/guidelines. The human resource file for the LSO (and DLSO) includes a copy of their LSO education and training.</i></p>
LAS1.1.4	<p>M Laser users have completed laser user training. <i>Guidance: A laser user is a person who directly uses the laser to deliver laser energy to the target for clinical, maintenance or demonstration purposes. The use of a laser to deliver laser energy to the target for clinical purposes (i.e. surgery, invasive procedures) is the surgeon/physician. Laser users have completed Level 4 education and training as specified in CSA Z386 Safe use of laser in health care which includes an overview of CSA Z386, types of lasers, and their delivery systems, including accessory equipment and instrumentation needed for specific applications, laser physics, laser-tissue interaction, the roles, authority and responsibilities of laser team members, clinical application and techniques for the intended laser procedures, treatment parameters and dosimetry for the intended laser procedures, patient and staff safety, management of complications, competency in operating the laser and its delivery systems, and competency in the use of safety equipment (i.e. protective eyewear, emergency stop switch, plume evacuator, fire extinguisher, etc.). The medical director is responsible for ensuring that the laser user has the proper qualifications, training and knowledge and possesses the competencies required for the safe use of lasers. Where there is a nationally or internationally recognized body that published standards and/or guidelines (i.e. CSA Z386 Annex E Education and training of laser personnel), the medical director must ensure that third-party course providers instruct in accordance to those standards/guidelines. The human resource file for surgeons/physicians who use lasers include a copy of their laser user education and training.</i></p>
LAS1.1.5	<p>M Laser operators have completed laser operator training. <i>Guidance: A laser operator is a person (assistant) who operates the laser-associated technology (e.g. the laser control panel, suction devices, cooling devices, biofeedback equipment, etc.). If there is no laser operator (assistant), then the laser user (surgeon/physician) also assumes the responsibilities of the laser operator. The human resource file for laser operators (assistants) includes a copy of their laser operator education and training.</i></p>

No.	Description
LAS1.1.6	<p>M Laser education and training is completed every two years. <i>Guidance: Following initial laser education and training appropriate to the person's role (laser user, laser operator, LSO), laser re-fresher education and training is completed every two years. At the discretion of the medical director in consultation with the LSO (as appropriate), current laser personnel that have not completed laser education and training (initial or re-fresher) within the last two (2) years may be grandparented until June 2021, after which time evidence of laser re-fresher education and training appropriate to the person's role must be on file. Laser safety and education is also conducted when an existing laser system is used in a new application, undergoes a change to operational components (e.g. software upgrade), when there is a new or replacement laser system, following a period of absence from providing care during laser procedures, and at the discretion of the medical director, LSO or the request of a staff member.</i></p>
LAS1.1.7	<p>M A list of authorized laser personnel is maintained. <i>Guidance: The LSO maintains a list of authorized laser personnel (this list is maintained by the medical director if an LSO is not required). This list specifies the name of the person, their role (i.e. laser user, laser operator, health-care personnel), the level of laser education and training completed (appropriate to their role) (i.e. Level 1,2 3 or 4), the laser equipment/procedures they are authorized to use/perform (user)/assist with (operator), the date their initial education and training was completed, and the date and level of re-fresher education and training that was completed.</i></p>
LAS1.1.8	<p>M The LSO or medical director, as appropriate, has completed a hazard analysis and risk assessment. <i>Guidance: Documentation of the hazard analysis and risk assessment is completed by the LSO or medical director, as appropriate, and is on file at the facility. The risk assessment identifies the physical, chemical and biological hazards of the laser based on tissue interaction, dosimetry, the delivery system and the practice setting. It analyzes the potential risks associated with those hazards and determines the appropriate control measures (i.e. administrative, engineering, procedural) necessary to eliminate or control the hazards. A hazard analysis and risk assessment are completed when there is a new laser, when laser equipment is replaced, and in the event of a laser safety incident including near miss.</i></p>

No.	Description
LAS1.1.9	<p>M The LSO has determined the NOHA, as required. <i>Guidance: A nominal ocular hazard area (NOHA) analysis must be completed for all Class 3R, Class 3B and Class 4 lasers and is required for Class 1M and Class 2M lasers when enhancing optics (i.e. magnifying glass, binoculars, microscope, etc.) are in the vicinity of the laser. The NOHA is the area within which the beam irradiance or radiant exposure exceeds the appropriate corneal maximum permissible exposure (MPE), including the possibility of accidental misdirection of the laser beam. The NOHA is the area within which the level of direct, reflected or scattered radiation during normal operation of the laser exceeds the applicable MPE. MPE is the level of laser radiation to which a person can be exposed without hazardous effects or adverse biological changes in the eye or skin. The NOHA can be determined by laser manufacturer information, by measurement or by using the appropriate NOHA equations or other equivalent assessment (see CSA Z386 Annex A). Alternately, the LSO may determine the entire operating/procedure room as the NOHA. Class 1 and Class 2 lasers do not require a NOHA. Class 1M and Class 2M lasers do not require a NOHA unless enhancing optics (i.e. magnifying glass, binoculars, microscope, etc.) are present in the vicinity of the laser. Calculation of the NOHA is not necessary if the entire laser-controlled area is designated to be within the NOHA and the laser radiation is prevented from leaving this space (i.e. operating/procedure room). Documentation of the NOHA analysis, if required, is on file at the facility (i.e. laser safety policy and procedures specify the NOHA).</i></p>
LAS1.1.10	<p>M Only laser equipment bearing a CSA mark/label or a label recognized by the CSA is used. <i>Guidance: The CSA mark certifies that the laser equipment has been tested and meets applicable Canadian standards.</i></p>
LAS1.1.11	<p>M The effectiveness of the laser safety program is audited annually. <i>Guidance: The audits should include examining all laser-related equipment and safety devices (e.g. eyewear, warning signs), verifying laser personnel competency in laser safety and observing laser practices to ensure they are in compliance with the laser safety program requirements including the facility's laser policies and procedures. Audits are to be completed annually at minimum and are reviewed by the LSO or, if an LSO is not required, by the medical director. Review of the audit report is formally acknowledged by the LSO or medical director (i.e. report signed and dated), and audit reports for the last three (3) years are on file at the facility.</i></p>
LAS1.1.12	<p>M Annual laser safety program audit reports are maintained for a period of at least three (3) years. <i>Guidance: Audits are completed annually at minimum and are reviewed by the LSO or, if an LSO is not required, by the medical director. Review of the audit report is formally acknowledged by the LSO or medical director (i.e. report signed and dated), and audit reports for the last three (3) years are on file at the facility.</i></p>
LAS1.2	Laser equipment features support the safety of patients and staff.
LAS1.2.1	<p>M The laser equipment has a power meter, as appropriate. <i>Guidance: The laser power meter (or energy meter in the case of a pulsed laser) indicates the tissue incident power for Class 3R, Class 3B and Class 4 lasers.</i></p>
LAS1.2.2	<p>M The laser equipment has a removable key or similar device, as appropriate. <i>Guidance: Class 3R, Class 3B and Class 4 lasers have a removable key or other mechanism to turn the laser on/off.</i></p>

No.	Description
LAS1.2.3	M The laser equipment key or similar device is stored away from the laser when it is not in use. <i>Guidance: When the laser is not in use, the keys or other device are stored in a locked compartment that is accessible only to authorized laser personnel. When a combination lock is used, only authorized laser personnel are provided with the code. The code should be changed every six (6) months and when it is suspected the code may be in the possession of unauthorized personnel.</i>
LAS1.2.4	M The laser equipment has a visual warning that is activated during laser emission.
LAS1.2.5	M The laser equipment has warning labels at all apertures. <i>Guidance: Openings or holes on the equipment through which the laser beam travels are marked with a warning label (i.e. laser radiation is emitted from this aperture).</i>
LAS1.2.6	M The laser equipment has a switch guard to prevent unintended operation. <i>Guidance: The foot pedal or handheld device has a guard to prevent unintended operation.</i>
LAS1.3	A laser-controlled environment is established for the safe use of lasers. <i>Intent: The surgeon/physician (laser user) is responsible for ensuring that a laser-controlled environment has been established and that safety equipment is immediately available should it be needed.</i>
LAS1.3.1	M The doors to the laser room are closed. <i>Guidance: Doors to the laser room remain closed throughout the laser procedure.</i>
LAS1.3.2	M The windows in the laser room are covered, as appropriate, for the laser wavelength. <i>Guidance: Windows and door windows are covered with a barrier that blocks laser beam transmission as appropriate to the laser being used. Window barriers (e.g. covers, filters) must be used for wavelengths shorter than 4000 nm and in between 180 nm to 300 nm, tested and approved to attenuate transmission of the laser beam to below the maximum permissible exposure (MPE). The window barriers must be labeled in accordance with IEC 60825-1, meet infection prevention and control requirements, must be controllable from inside the laser room, and do not allow any light leakage at the perimeters. Note: the beam of a CO2 laser does not pass through glass. Therefore, windows and other openings might not require covering when this type of laser is in use.</i>
LAS1.3.3	M Warning signs are posted at all entrances to the laser-controlled area when lasers are in use. <i>Guidance: Warning signs must be posted when Class 2, 2M, 3R, 3B and 4 lasers are in use. Use of Class 1 and Class 1M lasers do not require the posting of a warning sign at the entrance to the laser-controlled area, The warning signs are posted on all means of access to the laser-controlled area (i.e. at all entrances to the laser room/area): they are posted at eye-level, specify the wavelength and class of laser being used, are posted only when the laser is powered on or is in standby, and indicate the personal protective equipment (PPE) that must be worn in the laser-controlled area. Warning signs are removed when the laser procedure is completed (e.g. when the laser has been turned "off" and the key or other mechanism to turn the laser on/off has been removed).</i>

No.	Description
LAS1.3.4	<p>M The appropriate signal word is used on the warning sign. <i>Guidance: "CAUTION" is the signal word used on the warning signs posted when Class 2 and Class 2M lasers are in use. "DANGER" is the signal word used on the warning signs posted when Class 3R, Class 3B and Class 4 lasers are in use.</i></p>
LAS1.3.5	<p>M All personnel in the laser-controlled area are approved by the LSO or medical director as laser personnel. <i>Guidance: The LSO or medical director, as appropriate, maintains a list of authorized laser personnel. All health-care personnel, observers and trainees present within the laser-controlled area when the laser is in use possess the appropriate laser education and training. This includes persons who are not directly involved with the operation of the laser but have a function in the clinical management of the patient (i.e. anesthesiologists, nurses, technicians), trainees who are under the supervision of authorized laser personnel (i.e. students, residents), and observers (i.e. family members of the patient, administrative personnel, industry representatives). The laser user has completed Level 4 training and the laser operator has completed Level 2 training as outlined in CSA Z386 Annex E. Personnel who are not directly involved with the operation of the laser and trainees have completed Level 1 training as outlined in CSA Z386 Annex E. Documentation of this training is on file at the facility. The LSO or medical director, as appropriate, determines the level of education and training of observers and this is specified in the facility's laser safety program, policy and procedures.</i></p>
LAS1.3.6	<p>M Protective eyewear and filters are inspected prior to use to ensure they are in good working order, as appropriate. <i>Guidance: The protective eyewear and filters are inspected prior to use for pitting, crazing, cracking, mechanical integrity, discoloration and coating damage. They are maintained in accordance with manufacturer's instructions for use and are carefully handled and stored to prevent scratches and damage (e.g. stored in individual cases or sleeves when not in use). Protective eyewear and filters may not be necessary for Class 1, 1M, 2 and 2M lasers. Class 1M and 2M lasers may be hazardous if viewed with optical instruments/equipment such as but not limited to a magnifying glass, binoculars or a microscope. Therefore, a protective filter or protective eyewear may be needed.</i></p>
LAS1.3.7	<p>M Protective eyewear has a sufficiently high optical density, as appropriate. <i>Guidance: The protective eyewear is permanently labelled with applicable optical densities (OD) and wavelengths. The protective eyewear worn must have a sufficiently high OD to protect against the wavelengths of the laser in use.</i></p>
LAS1.3.8	<p>M Fire extinguishers are located within the laser-controlled area when the laser is in use, as appropriate, and are free of obstruction. <i>Guidance: This pertains to Class 4 lasers only. All facilities are required to have policy and procedures for fires in the operating room in accordance with the NHMSFAP Emergency Preparedness standard. The BC Fire Code requires fire drills to be conducted at intervals not greater than 12 months. Laser personnel should know how to operate fire extinguishers.</i></p>
LAS1.3.9	<p>M Water/saline is immediately available within the laser-controlled area, as appropriate. <i>Guidance: This pertains to Class 4 lasers only. In addition, wet cloths/drapes should be on hand to protect non-targeted areas as necessary.</i></p>

No.	Description
LAS1.3.10	<p>M The environment is free of highly reflective surfaces. <i>Guidance: Highly reflective surfaces (i.e. jewelry, mirrors, highly-polished glass, non-matte instruments) may interfere with the beam path.</i></p>
LAS1.3.11	<p>M Manufacturer's operator/user manuals for the laser(s) are available for reference. <i>Guidance: A manual from the manufacturer that has installation (where appropriate), operation and maintenance instructions is available for each laser in the facility. This manual is kept with the laser at all times (i.e. with the laser in the equipment room when the laser is not in use, or with the laser in the laser-controlled area when the laser is in use).</i></p>
LAS1.4	The laser checklist supports laser safety.
LAS1.4.1	<p>M A laser checklist is completed for each procedure. <i>Guidance: The laser checklist may be a stand-alone document or may form part of the laser procedure record. The laser checklist is completed for each laser procedure and confirms: the laser-controlled area has been established, the laser system has been tested, all control measures are in place, appropriate protective equipment for staff and the patient has been donned, and the appropriate laser parameters have been selected. The laser checklist is filed in the patient's medical record. The laser checklist does not replace the surgical safety checklist. Both the laser checklist and the surgical safety checklist must be performed. The surgical safety checklist should include a checklist item to confirm that the laser checklist has been completed.</i></p>
LAS1.4.2	<p>M The operational procedures for each item on the laser safety checklist are outlined. <i>Guidance: The operational procedures for each checklist item must be outlined on the document used (i.e. laser procedure record or laser checklist). The laser safety checklist may be a stand-alone document or may form part of the laser procedure record.</i></p>
LAS1.4.3	<p>M The full surgical/procedure team is present and participates in the laser checklist. <i>Guidance: The surgeon, anesthesiologist, perioperative nurses and laser operators must be present when the laser checklist is completed.</i></p>
LAS1.4.4	<p>M The laser checklist confirms that the laser-controlled area has been established. <i>Guidance: The laser checklist includes confirmation that each parameter and item necessary to establish the laser-controlled area is completed. These may include but are not limited to: closing doors, covering windows, posting warning signs, checking PPE for damage, ensuring the environment is free of reflective surfaces.</i></p>
LAS1.4.5	<p>M The laser checklist confirms testing of the laser system. <i>Guidance: The laser checklist includes confirmation of each of the following items as appropriate: that the laser was visually inspected for potential malfunctions or damage, that the laser microscopy and lens was checked and tested, that the laser fibre and waveguide was checked and tested, that the laser beam alignment and fibre integrity was checked, and that all ancillary equipment (e.g. plume evacuators, filters, cooling apparatus) were checked.</i></p>

No.	Description
LAS1.4.6	M The laser checklist confirms that all control measures are in place. <i>Guidance: The laser checklist includes confirmation of each of the following items as appropriate: that water/saline is immediately available, that wet cloths/drapes are on hand to protect non-targeted areas as needed, that flammable agents (e.g. skin prep, tinctures) are dry and vapor has dissipated, that the integrity of the laser electrical cords and plugs were checked, that the environment is free of flammable surfaces or materials, and that fire extinguisher(s) are immediately available and unobstructed.</i>
LAS1.4.7	M The laser checklist confirms protective equipment for staff and the patient. <i>Guidance: The laser checklist includes confirmation that the patient and staff have been fitted with proper protective equipment.</i>
LAS1.4.8	M The laser checklist confirms that the appropriate laser parameters were selected. <i>Guidance: The surgeon/physician selects the appropriate laser parameters for the procedures and verbally confirms this during completion of the laser checklist with the perioperative team.</i>
LAS1.4.9	M The laser checklist confirms that each item has been checked and is signed by the laser user (surgeon/physician). <i>Guidance: The laser checklist is marked to acknowledge conformance with the operational procedures as each item is checked. The checklist is signed by the laser user (surgeon/physician). This signature can be obtained at the end of the procedure.</i>
LAS1.4.10	M The laser checklist is filed in the patient's medical record. <i>Guidance: The laser checklist may be included as part of the laser procedure record or may be a stand-alone document.</i>
LAS1.5	Lasers are safely operated in the laser-controlled area.
LAS1.5.1	M The laser is turned off and the keys/device removed when either the laser user or laser operator is not in attendance. <i>Guidance: The laser user is the surgeon/physician. The laser operator is the laser assistant.</i>
LAS1.5.2	M The laser and related equipment are set-up and tested before operation. <i>Guidance: The laser operator (laser assistant) or laser user (surgeon/physician) may perform the set-up and testing. The pre-laser set-up includes but is not limited to: establishing the laser-controlled area, obtaining the laser key, positioning the laser and all required laser-related and safety equipment in the laser-controlled area, visually inspecting the laser equipment for potential problems or damage, performing the applicable testing or calibration as specified in the manufacturer's instructions for use, and returning the laser to the "standby" position or shutting down and removing the key if laser use is delayed.</i>
LAS1.5.3	M The surgeon/physician checks the laser system before operation. <i>Guidance: The laser user (surgeon/physician) checks the laser system including the laser beam alignment and fibre integrity, visually inspects the laser equipment for potential electrical malfunctions, and ensures that the user/operating manuals and the facility's policies and procedures are present in the laser-controlled area.</i>
LAS1.5.4	M The surgeon/physician selects the appropriate laser parameters for the procedure.

No.	Description
LAS1.5.5	M The laser delivery device(s) used are appropriate for the laser. <i>Guidance: Only manufacturer-approved laser delivery devices are used with the laser system.</i>
LAS1.5.6	M The laser user (surgeon/physician) or operator (assistant) remains at the control panel at all times when the laser is in "ready mode."
LAS1.5.7	M Protective eyewear with side guards is worn by all personnel during laser use, as appropriate. <i>Guidance: The protective eyewear worn has side guards to protect against the beam entering between the eye and the eyewear and has a sufficiently high OD to protect against the wavelengths of the laser in use. The surgeon/physician (laser user) is responsible for ensuring the appropriate PPE is worn by all personnel in the laser-controlled area. Protective eyewear and filters may not be necessary for Class 1, 1M, 2 and 2M lasers. Class 1 M and 2M lasers may be hazardous if viewed with optical instruments/equipment such as but not limited to a magnifying glass, binoculars or a microscope. Therefore, a protective filter or protective eyewear may be needed. Some laser systems have built in filters to protect the laser user.</i>
LAS1.5.8	M Laser shutters or filters with the appropriate optical density are used on microscopes and microscope accessory ocular, as appropriate. <i>Guidance: Class 1M and 2M lasers may be hazardous if viewed with optical instruments/equipment such as but not limited to a magnifying glass, binoculars or a microscope. Therefore, a protective filter or protective eyewear may be needed. Some laser systems have built in filters to protect the laser user.</i>
LAS1.5.9	M Patients are fitted with eye protection appropriate to the procedure, wavelength and power levels being used. <i>Guidance: Eye protection methods are selected according to the positioning of the patient, the part of the body being treated, the level of anesthesia, and both the laser wavelength and delivery. Protection may include padding, eye cups, glasses, etc. Patients who remain awake during the procedure wear protective eyewear as appropriate for the type of laser being used. Patients under general anesthesia have their eyes protected with wet eye pads, laser-specific eye shields or other devices approved by the LSO or medical director, as appropriate. Patients that undergo laser treatments on or around eyelids have their eyes protected by metal corneal eye shields. Lubricant, if used, should be water based.</i>
LAS1.5.10	M Only anodized, dull, non-reflective or matte-finished instruments are used near the laser site. <i>Guidance: Instruments that are ebonized are checked to ensure the coating has not worn off from use and reprocessing. Reflective instruments that cannot be ebonized are covered with saline saturated radiopaque sponges or towels.</i>
LAS1.5.11	M Lasers are not activated until flammable agents are dry and vapors have dissipated. <i>Guidance: Skin prep, tinctures, etc. are given sufficient time to dry completely in accordance with manufacturer's instructions for use.</i>
LAS1.5.12	M Exposed tissues around the surgical site are protected with moistened sponges when lasers are being used, if appropriate. <i>Guidance: The laser manufacturer may recommend covering exposed tissue around the surgical site.</i>

No.	Description
LAS1.5.13	<p>M The surgeon/physician activates, fires and/or deploys the laser. <i>Guidance: The surgeon/physician is the only person who operates the laser delivery device (i.e. the energy-generating foot pedal is only activated by the surgeon/physician who also is in control of the energy-delivering laser hand piece). The laser foot switch should be placed in a position convenient for the surgeon/physician and where it will not be confused with other foot pedals. The foot pedal is not to be bagged as this can cause inadvertent firing.</i></p>
LAS1.5.14	<p>M Laser plume is evacuated, as appropriate. <i>Guidance: Surgical smoke generated in open and minimally-invasive surgical procedures must be evacuated at the source using a plume scavenging system (i.e. laser plume). Central medical-surgical vacuum systems (wall suction) are not to be used for surgical smoke evacuation. In addition, all personnel within the laser-controlled area are to wear a "laser mask" with a filtration rating of 0.1 micron. An N95 mask is worn when performing gynecological and/or urological procedures on patients with human papilloma virus. The laser user (surgeon/physician) is responsible for ensuring that ancillary equipment such as plume evacuation is used as appropriate.</i></p>
LAS1.5.15	<p>M The laser equipment is in safe condition before it exits the laser-controlled area and/or the laser-controlled area is dismantled. <i>Guidance: The laser user (surgeon/physician) is responsible for ensuring that the laser has been turned off and the keys removed prior to the dismantling of the laser-controlled area and/or moving the laser outside the laser-controlled area.</i></p>
LAS1.6	Endotracheal tube controls are implemented for laser procedures involving the airway or aerodigestive tract.
LAS1.6.1	<p>M Laser-resistant endotracheal (ET) tubes are used during laser procedures involving the airway or aerodigestive tract. <i>Guidance: ET tubes are selected based on the wavelength of the laser to be used and proof of manufacturer's testing within the surgical parameter anticipated during the surgery. A second back-up laser-resistant ET tube should be available.</i></p>
LAS1.6.2	<p>M ET tube cuffs are inflated with normal saline during laser procedures involving the airway or aerodigestive tract. <i>Guidance: The cuff of a laser-resistant ET tube can burst when exposed to a laser beam. Inflating the cuff with normal saline may help decrease the potential for the tube to ignite and adding methylene blue to the saline may help to identify a cuff rupture.</i></p>
LAS1.6.3	<p>M Moistened packs are placed around the ET tube during laser procedures involving the airway or aerodigestive tract. <i>Guidance: The moistened packs are kept moist throughout the procedure. In addition, non-flammable tape is used to secure the ET tube.</i></p>
LAS1.6.4	<p>M The patient's face is protected. <i>Guidance: Wet towels are placed over the patient's face.</i></p>
LAS1.6.5	<p>M The patient's eyes are protected. <i>Guidance: Wet eye pads and eye shields specific for the laser wavelength and laser system are placed over the patient's eyes and taped into place with non-flammable tape.</i></p>

No.	Description
LAS1.6.6	<p>M The patient's teeth are protected. <i>Guidance: Teeth in the operative field are protected with a wrapping of material appropriate to the wavelength emitted by the laser (i.e. non-flammable tooth guard covered with wet gauze) as the laser could irradiate tooth enamel and leave permanent marks.</i></p>
LAS1.7	Safety measures are carried out for endoscopic procedures using a laser.
LAS1.7.1	<p>M Before the procedure, the laser catheter sheath and laser fibre are assessed for damage.</p>
LAS1.7.2	<p>M During the surgical safety checklist, the laser catheter sheath is confirmed to be the appropriate length and the laser fibre is of sufficient length to extend beyond the catheter sheath. <i>Guidance: Laser catheter sheath length and laser fibre length extending beyond the sheath are confirmed as part of the surgical safety checklist AND communicated during handover of the laser catheter sheath and laser fibre to the physician.</i></p>
LAS1.7.3	<p>M During handover to the physician, the laser catheter sheath is confirmed to be the appropriate length and the laser fibre is of sufficient length to extend beyond the catheter sheath. <i>Guidance: Laser catheter sheath length and laser fibre length extending beyond the sheath are confirmed as part of the surgical safety checklist AND communicated during handover of the laser catheter sheath and laser fibre to the physician.</i></p>
LAS1.7.4	<p>M Only one length of laser catheter sheath and one length of laser fibre are present in the procedure/operating room during the procedure. <i>Guidance: If performing procedures (i.e. immediately sequential bilateral endovascular ablation procedures) that involve different lengths of laser catheter sheaths and fibres, only one length of laser catheter sheath and one length of laser fibre are present in the procedure/operating room.</i></p>
LAS1.7.5	<p>M Before laser energy is deployed, it is confirmed that the laser fibre extends beyond the laser catheter sheath. <i>Guidance: This is confirmed using imaging (i.e. X-ray, ultrasound).</i></p>
LAS1.7.6	<p>M After removal from the patient, the laser catheter sheath and laser fibre are confirmed to be intact and complete. <i>Guidance: If the catheter sheath and/or laser fibre is not intact and complete, the laser is removed from service, the facility implements its procedures for retained surgical items, and the medical director must notify the College within one working day after the discovery of a reportable incident. A completed Reportable Incident Form, signed by the medical director, must be submitted to the College within two weeks of the incident.</i></p>
LAS1.8	Laser documentation provides an accurate account of the patient's status, the actions of the perioperative team, and the patient's outcome.
LAS1.8.1	<p>M Laser procedure record documentation includes laser event times. <i>Guidance: Laser event times include but are not limited to on/off laser activation and deactivation time.</i></p>

No.	Description
LAS1.8.2	<p>M Laser procedure record documentation includes name and role of each person involved in the patient care provided in the operating/procedure room and any visitors. <i>Guidance: This includes but is not limited to the laser user (surgeon/physician), laser operator (assistant), nurses, students, residents, fellow, family and vendors (e.g. equipment reps). Documentation includes first and last name and role of each person. The laser operator (assistant) signs the laser record, and nursing personnel documentation also includes their initials/signature.</i></p>
LAS1.8.3	<p>M Laser procedure record documentation includes identification of the laser delivery system. <i>Guidance: The type of laser is documented including the fibre size and lot number, the hand piece used, objective lenses used, serial number or other unique identifier.</i></p>
LAS1.8.4	<p>M Laser procedure record documentation includes the laser parameters and settings. <i>Guidance: Laser parameters and settings such as power (watts), energy (joules), pulse duration, pulse repetition rate, total energy delivered, and wavelength, if a multi-wavelength laser is used, are documented.</i></p>
LAS1.8.5	<p>M Laser procedure record documentation includes all safety precautions taken. <i>Guidance: Safety precautions include but are not limited to patient and staff PPE, safety checks, use of ancillary equipment (e.g. plume scavenging, cooling apparatus), and use of laser-resistant ET tubes.</i></p>
LAS1.8.6	<p>M Laser procedure record documentation includes the exact laser procedure(s) performed. <i>Guidance: The laser treatment and the area/location treated is documented.</i></p>
LAS1.8.7	<p>M Laser parameters used during the laser procedures are documented and acknowledged by the surgeon/physician. <i>Guidance: If the laser equipment provides a print-out of the laser parameters following the procedure, this is printed out, signed by the surgeon/physician and filed in the patient's medical record. If the laser equipment does not provide a print-out, the surgeon/physician either signs the laser procedure record acknowledging the laser parameters documented on the procedure record or documents the laser parameters in the physician's operative note.</i></p>
LAS1.9	<p>Policies and procedures contain all the information necessary for the safety of patients, staff and visitors. <i>Intent: Policies and procedures ensure that activities/procedures are performed consistently and accurately by all personnel within the non-hospital facility.</i></p>
LAS1.9.1	<p>M There is policy and procedures for the safe use of lasers. <i>Guidance: The policy and procedures outline the safe use of lasers including the use of warning signs, covering of doors and windows, the use of personal protective equipment (PPE), the use of plume evacuators and masks, storage of the laser system keys, pre-procedural testing and calibration, specialized instrument requirements and accessories, clear communication among laser staff during the procedure, shutdown procedure, incident management, the orientation and training of new employees, accident/incident investigation, and health and safety audits. They are developed and revised/updated by personnel directly involved in laser use and operation in collaboration with the LSO, as appropriate, and approved by the medical director. The policy and procedures are reviewed annually and revised as necessary to ensure currency with standards, applicable regulations and professional guidelines.</i></p>

No.	Description
LAS1.9.2	<p>M There is policy and procedures for the laser safety officer responsibilities, as appropriate. <i>Guidance: The policy and procedures outline the responsibilities of the LSO which include but are not limited to: facilitating the development of the laser safety program; implementing and enforcing all laser safety policies and procedures approved by the medical directors; supporting and advising the medical director with respect to the safe use of lasers and compliance with protective measures; participating in the investigation of all laser-related incidents and making recommendations for their remediation and prevention; conducting hazard evaluations of the site(s) and determining the nominal ocular hazard area (NOHA); advising on the purchase of all laser-related personal protective equipment (PPE) and laser systems and instrumentation; auditing the effectiveness of the laser safety program; recommending the suspension, restriction or termination of the use of a laser or laser system if it is determined that the laser hazard controls are inadequate or unsafe conditions are present; verifying that preventative maintenance, repair and servicing are performed and advising the user of any resulting changes or modifications to the system; verifying that the manufacturer/distributor is in compliance with all applicable legislation; ensuring the safety education and training of all personnel involved in laser procedures and verifying and maintaining a list of health-care personnel, authorized laser operators and assistants as well as documentation of their clinical competency; and any additional responsibilities as determined by the medical director. CSA advises that the responsibilities of the LSO are extensive and if appropriate technical expertise is not available in-house, then the LSO should seek appropriate advice externally.</i></p>
LAS1.9.3	<p>M There is policy and procedures for the management of an unscheduled shutdown of the laser. <i>Guidance: The policy and procedures outline what to do in the event of an unscheduled shutdown or malfunction of the laser and include a checklist to manage the unscheduled shutdown or malfunction, specify the person(s) to notify in the event of an unscheduled shutdown or malfunction, and what information is to be recorded in the laser utilization record (e.g. time and date of shutdown or malfunction, nature of the problem, who was notified, and the date the laser was returned to service). Reasons for an unscheduled shutdown may include shutter failure, beam delivery system connectivity, unexplained or uncontrolled operation, fire, or other equipment malfunction affecting the safety of the patient and personnel.</i></p>
LAS1.9.4	<p>M There is policy and procedures for the reporting and investigation of laser safety incidents including near misses. <i>Guidance: The policy and procedures outline the required documentation including a detailed description of the incident, potential causes and assessment, and a review or analysis (i.e. root cause analysis) by management, the laser safety committee or laser safety officer, as appropriate, including recommendations for prevention of future incidents and actions taken. Incidents that require reporting to regulatory authorities (e.g. WorkSafeBC, the College) are reported when required.</i></p>

No.	Description
LAS1.9.5	M There is policy and procedures for laser surgery in the vicinity of an endotracheal (ET) tube, as appropriate. <i>Guidance: The policy and procedures outline that airway management during a surgical procedure where a laser is used in the presence of an ET tube is a shared responsibility of the surgeon and anesthesiologist, and specify the additional control measures (e.g. laser-resistant ET tube, jet ventilation anesthesia procedures) necessary, the protection of the patient's face and eyes, and the requirement that all emergency equipment designated in the airway management protocol is present in the laser-controlled area prior to the start of the surgical procedure.</i>

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Revision history

Date	Revisions
July 4, 2019	<ul style="list-style-type: none"> Record retention requirements for laser safety program audit reports added. Appropriate signal word on laser warning sign added. Laser checklist documentation includes physician/surgeon signature. New section on safety measures during endoscopic procedures using a laser. Substantial format changes and guidance added.