

HS06

Laser, UV & Optical Radiation Protection Policy

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1.0 Policy Statement (Purpose / Objectives of the policy)

- This policy sets out the arrangements in place for the safe use of artificial optical radiation throughout The Royal Wolverhampton NHS Trust.
- The highest risk devices (Lasers and Ultraviolet Therapy) are addressed specifically, including the safety of laser and ultraviolet (UV) therapy equipment.
- General principles are described for other devices.
- The policy aims to introduce best practice in the management of optical safety and to comply with health and safety legislation.
- Given the widespread use of optical devices across the Trust this policy is relevant to management across all areas.
- This policy is to ensure, so far as is reasonably practicable, the health and safety of Trust employees and patients, of contractors working on the premises and of members of the public who may be exposed to the hazards arising from the use of artificial optical radiation especially lasers and therapeutic ultraviolet radiation, and to establish good communication and co-operation at all levels.

2.0 Definitions

Authorised Operator A person has been assessed as competent to use a class 3B or 4 laser or Therapy UV equipment and who signs an annual declaration to confirm that they are familiar with and comply with Local Rules. For lasers which require Local Rules (class 3B and 4), laser operators / users must always be authorised operators. The LPS working with the local manager performs this assessment and authorisation.

Distraction Risk All lasers no matter what class, that emit visible light, have the potential to cause distraction risks. Typical examples include laser light directed at the eye or reflected into the eye of a person operating hazardous equipment or driving. Any person carrying out a task that requires continuous concentration may be subject to distraction risks from lasers. In most cases this must be staff in close proximity to the laser, but many lasers are capable of emitting a beam of light that is visible at a considerable distance and which can be reflected. All the laser classes have a distraction risk unless invisible.

Laser Light Amplification by Stimulated Emission of Radiation. Normally a device that emits a coherent (in phase), low- divergence, narrow beam of light either directly or by use of optical components. Light is often emitted with a narrow wavelength spectrum, but some lasers have multiple wavelengths or broader spectrum. Can be a standalone device or an assembly of devices including 1 or more laser components. Technical definitions of lasers are included in BS EN 60825.

Laser Classes Lasers can be classified on the basis of risk. Laser Classes are defined in BS EN 60825. In order of increasing risk the classes are 1, 1M, 2, 2M, 3R, 3B and 4. A short definition in each class is included below. A more detailed definition of classes, including risks and appropriate precautions is included in [Appendix A](#). Older lasers may have classifications marked in roman numerals I, II, III, IV or classified as 1, 2, 3a, 3b and 4. The classifications are not directly interchangeable with the current classes and must be treated with caution until risks have been assessed.

Laser: Class 1 Safe under all expected operating conditions – Standard risk assessment required.

Laser: Class 1M Safe unless used with optical instruments – Standard risk assessment required.

Laser: Class 2 Safe under normal use, may cause eye injury if person stares into the beam or has suppressed blink reflex – Standard risk assessment required.

Laser: Class 2M As Class 2 above but may also cause eye injury if used with optical instruments – Standard risk assessment required.

Laser: Class 3R Potential to cause eye injury under some conditions, but otherwise considered relatively low risk if used appropriately. Detailed risk assessment required.

Laser: Class 3B High risk laser: may cause injury to eye or skin; diffuse reflection safe. Detailed risk assessment required.

Laser: Class 4 Very high risk laser. Direct or reflected beam may cause injury to eye or skin, and the beam may ignite flammable materials. Detailed risk assessment required.

Laser Protection Supervisors (LPS) Trust employees whose role includes day to day responsibility for laser safety. Each area where lasers are used must have an LPS; each LPS must liaise with the Trust Laser Safety Officer and must raise issues of concern with the relevant Trust manager immediately as they arise.

Laser Operator For all classes of laser, a person who operates the laser controls, including parameter settings and actuator switch.

Laser User For all classes of laser, the person who controls delivery of the laser beam to the patient or work area. May be the same person as the laser operator.

Local Rules Local Rules are written procedures or protocols detailing how lasers can be used safely. They are binding safety instructions intended by the Trust to ensure compliance with legislation. Local Rules are required for all Class 3B and 4 lasers and therapeutic UV units. They may be required for other devices as a result of risk assessment.

Optical Device Any object or instrument that allows but may affect transmission of light, for example magnifying lenses, mirrors, magnifying glasses, view finders, microscopes etc. The reason optical devices are important in laser safety is that a device may refocus a wider laser beam to a point, making an otherwise safe beam capable of causing injury, especially eye injury.

Radiation Protection Group (RPG) The Trust Group with overall responsibility for reviewing and reporting to the Trust Board on laser safety including incidents, risks and compliance with this policy and Local Rules.

Risk Assessment A risk assessment to confirm that a specific optical device is used appropriately and that basic controls required to prevent injury and comply with legislation are in place. Manufacturers/suppliers advice must be sought as appropriate. Any device which may cause discomfort or pain or with an intended therapeutic effect will need a detailed risk assessment to ensure compliance with staff exposure limits. A standard risk assessment is appropriate for all

lasers in class 1, 1M, 2 and 2M provided that they are used in accordance with manufacturer's instructions and without additional optical equipment that might lead to a higher risk. If standard risk assessment indicates additional risks due to the way in which the device is used, a detailed risk assessment is required for each such laser.

Therapeutic Ultraviolet Unit Any medical device using UV radiation intended to produce a biological effect on a person.

Trust Laser Safety Officer (LSO) Trust appointed officer who must provide specialist technical advice on laser and UV selection, use and safety across the Trust. The Trust Laser Safety Officer (LSO) must make periodic reports to the Trust Radiation Protection Group and if necessary, raise issues of concern with Trust Directors as they arise. The LSO has no expertise or responsibility for optical devices other than lasers and therapeutic UV. Responsibility for ensuring appropriate safety advice and raising issues of concern for other devices lies with the manager responsible for the device in liaison with the Health Safety & Improvement Coordinator.

Ultraviolet (UV) Non-visible optical radiation with a wavelength shorter than that of visible light, between 400 and 100 nm. Presents Hazards to skin and eyes with increasing risks as wavelength shortens.

UV Protection Supervisors (UVPS) Trust employees whose role includes day to day responsibility for UV safety analogous to an LPS. Each area where UV is used must have an UVPS, each UVPS must liaise with the Trust Laser Safety Officer and must raise issues of concern with the relevant Trust manager immediately as they come to light.

UV Operator for UV therapy units, a person who operates the UV controls, including parameter settings.

3.0 Accountabilities

3.1 Chief Executive Officer

Under the Trust Health and Safety Policy the Chief Executive Officer has overall responsibility for ensuring the safety of all patients, visitors and employees of the Trust. Under the Control of Artificial Radiation at Work Regulations 2010 (CAORWR) the Chief Executive Officer is accountable for the safe use and maintenance of optical radiation equipment. He/she is also responsible for ensuring that staff are adequately trained. Under this policy, the Chief Executive Officer is specifically responsible for:

- Ensuring that the Trust has a Radiation Protection Group (RPG) and that optical radiation safety is a standing agenda item on this Committee. RPG is authorised by the Chief Executive Officer to appoint a Trust wide LSO.
- Identifying a Director with overall responsibility for optical radiation safety to be lead for this policy. The tasks of implementing the laser safety arrangements are delegated to the Chief Medical Officer.

3.2 Chief Medical Officer

The Chief Medical Officer is the lead Director for this policy. His/her specific responsibilities include:

- Reporting to the Chief Executive Officer and the Board on significant issues relating to optical radiation safety. Any significant risks that are not adequately controlled must be included in the Trust corporate risk register.
- Ensuring that this policy is implemented across the Trust.
- Ensuring that the Trust has access to appropriate and competent advice relating to the use of lasers/UV, risk assessments and legal compliance (LSO's and Health and Safety professionals).
- Ensuring that controls identified as necessary following risk assessments or within local rules are implemented.
- Ensuring that environments where lasers/UV and other relevant optical devices are used are suitable to ensure safety, including provision of safety devices in good working order.
- Ensuring that the specific requirements of this policy are followed where optical devices and especially lasers are used within the Estates and Facilities Directorate.
- Ensuring that the specific requirements of this policy are followed where high risk devices are used by staff.
- Ensuring that all relevant staff using optical devices are competent to do so.

The Chief Medical Officer is also responsible for ensuring that this policy is complied with by medical staff required or intending to use laser, UV devices or other items covered by the policy. His/her specific responsibilities include:

- Ensuring that the specific requirements of this policy are followed where devices are used by medical staff. All relevant staff must be aware of and must comply with this policy.
- Ensuring that optical devices are not used until suitable risk assessments have been carried out and local rules written where necessary. This specifically includes devices on loan, trial or demonstration, which must comply with all aspects of this policy.
- Ensuring that optical device safety is considered, and this policy referred to when assessing all proposed new procedures involving lasers/UV therapy or other high risk devices.
- Ensuring that all medical staff using optical devices are competent to do so, specific implementation of this policy within specialities must be delegated to relevant Divisional Medical Directors and Clinical Directors.

3.3 Director of Nursing

The Director of Nursing is responsible for ensuring that this policy is complied with by non-medical clinical staff required or intending to use optical radiation devices. His/her specific responsibilities include:

- Ensuring that the specific requirements of this policy are followed where devices are used by non-medical clinical staff.
- Ensuring that all such staff using devices are competent to do so.

Specific implementation of this policy within the divisions must be delegated to relevant local managers.

3.4 Divisional Medical Directors / Clinical Directors

Divisional Directors via the Clinical Directors are responsible for implementing this policy within each division. Day to day implementation within divisions may be delegated to Heads of Nursing or Matrons as appropriate. Specific responsibilities include:

- Ensuring they are aware of and have an inventory of all lasers/UV/high risk optical devices used in the division and the class of each laser is known.
- Ensuring that up-to-date risk assessments and where necessary local rules are in place for all lasers/UV/high risk optical devices and areas where they are used. Necessary control measures must be put into place and monitored.
- Ensuring significant findings from optical radiation risk assessments are included in divisional risk registers.
- Ensuring PPE assessments are completed where PPE is required to ensure safety.
- Ensuring that the procedures are followed when considering changes to location where lasers/UV/high risk optical devices are in use, introduction of new equipment or changes to procedures.
- Confirming that all staff using optical radiation devices are competent to do so and that supervision arrangements are suitable.
- Reporting significant and inadequately controlled risks or safety issues relating to optical radiation devices to divisional Quality Board for escalation to Trust Quality and Safety Committee at an early stage.
- Identifying laser/UV protection supervisors (LPS/UVPS) for all areas that require local rules, new LPSs & UVPSs must require specific training.

3.5 Heads of Nursing / Matrons

Heads of Nursing / Matrons are responsible for overseeing the implementation of this policy in the clinical areas that they are specifically responsible for:

- Ensuring that control measures identified to ensure safe use of lasers/UV/high risk optical devices are in place and are followed.
- Ensuring that senior sisters/charge nurses / departmental managers identify training needs and requirement for supervision of all staff that are involved in laser/UV use.
- Ensuring that relevant wards / departments have access to PPE identified as required in risk assessments or local rules.

3.6 Senior Sisters/Charge Nurses / Departmental Managers (where lasers/UV devices are in use)

Senior Sisters/Charge Nurses / Departmental Managers are responsible for implementing this policy on a day-to-day basis. Specific responsibilities include:

- Keeping lasers/UV/high risk optical devices secure when not in use. The security required depends upon risk: that for class 1, 1M, 2 or 2M lasers need not be any different to that for other Trust equipment of equivalent value and importance in service delivery. Specific safeguards are required to secure higher risk lasers (3R, 3B and 4) and UV therapy units and other optical devices as identified. These must be included in the risk assessment.
 - Arranging for all staff using lasers/UV therapy/high risk optical devices or working in areas where they are used to receive necessary training. It is the manager's responsibility to

maintain records to demonstrate staff are competent and safe.

- Ensuring Local Rules are kept in an appropriate location and are accessible to all relevant staff.
- Where required, keeping a log of “authorised operators”, this must be kept with the Local Rules. Only authorised staff must have access to lasers.
- Ensuring adequate supervision of staff using lasers as part of their training until they are assessed as competent.
- Ensuring that when PPE is required to ensure safety during laser use, its use is compulsory, PPE must be suitable for the task and must also be compatible with other PPE and things like spectacles, masks etc.
- Ensuring that higher risk lasers and UV devices are used only in accordance with Local Rules and procedures.
- In the event of an LPS/UVPS giving notice that they are leaving/going on extended period of absence (i.e. maternity leave) a replacement must be found and training provided as soon as possible. This must normally be before the post holder leaves and use of the relevant device(s) may need to cease if this is not accomplished.

3.7 Health & Safety Manager

Expert technical advice on laser and UV safety is provided by the Trust Laser Safety Officer (LSO). Advice on other devices must be obtained by the manager responsible for the equipment. The Trust LSO will liaise with the Trust Health & Safety Manager and local LPSs and UVPSs and with managers to assist with the implementation of this policy. Specific responsibilities of the Trust Health & Safety Manager include:

- Attending the Radiation Protection Group and reporting issues on optical radiation safety directly to the lead director.
- Providing advice on risk assessment to ensure a consistent approach to magnitude of risks is applied to all laser use across the Trust.
- Ensuring review and revision of this policy within timescales set out in the cover sheet.

3.8 Trust Laser Safety Officer (LSO)

The LSO is the designated person with the responsibility for monitoring and advising on the control of laser and UV safety across the Trust. The LSO must be named in the local rules for lasers and is appointed via the Radiation Protection Group. The LSO need not be a Trust employee and may be appointed via a contract with another organisation.

The LSO is required to have and maintain a detailed knowledge of evaluating and controlling laser and UV hazards and sufficient scientific knowledge and authority to advise laser users and managers. The LSO will not necessarily have a detailed knowledge of the operation and uses of the specific lasers. The role also includes similar advice provision on UV therapy devices. It does not include other optical devices.

Specific responsibilities of the LSO are as described in BS EN 60825 and in any contract for laser safety services; they must include:

- Monitoring and advising on the control of laser safety across the Trust.
- Advising on the need for and/or content of the local rules and/or procedures for laser use.
- Providing the expert advice on laser safety to allow risk assessment to be completed.

- Providing senior clinicians, managers and potential users with advice on suitability and potential safety issues related to new lasers or replacement, safety equipment or changes to facilities where there is significant risk arising from laser use.
- With respect to higher risk lasers (Local Rules needed), supporting the device manager to ensure all relevant safety procedures are in place before the use of lasers starts (new equipment, new procedures, new or altered area, changed safety arrangements).
- Provide advice on the levels of laser safety training required for all staff involved in laser use and for LPS's.
- Providing ad-hoc advice on laser safety as required, this must normally be via Lead Director, LPS's, Divisional Directors or members of the RPC.
- Providing advice on laser safety to all designers of new or upgraded facilities to be used for clinical services involving lasers.
- Making a report to the RPG detailing:
 - New or significantly altered laser/UV devices / procedures / locations.
 - Significant changes to local rules or procedures
 - Any inadequately controlled risks
 - Any outstanding controls (such as uncompleted works)
 - Any identified non-compliance with legislation or currently accepted best practice in particular any failings that might lead to serious injury or to HSE enforcement action.
- Alerting to the Lead Director (directly in emergency or via the Head of Health & Safety) to any significant laser/UV related safety risks of non-compliances with this policy.
- Reviewing this policy and confirming it is suitable and sufficient to ensure compliance with statutory requirements and current best practice in laser/UV safety if implemented.
- Assisting with review and revision of this policy within timescales set out in the cover sheet.

3.9 Laser Protection Supervisors (LPS)

The LPS is a local laser safety officer. This is a designated person who has authority to supervise, monitor and enforce the control of laser safety in the local working environment of specific lasers. LPS's are appointed by the RPG (normally nominated by Divisional Director or senior sister/departmental manager). The LPS must be named in the Local Rules for the relevant lasers, and their appointment is via the Radiation Safety Group. This person must have and maintain a sound knowledge of evaluating and controlling laser hazard (usually obtained via a specific course) and have a detailed knowledge of the operation and uses of the specific lasers for which they are LPS. It will be helpful for the LPS to be trained in risk assessment, if not they must work in conjunction with a person trained in risk assessment when lasers are assessed.

Specific responsibilities of LPS's include:

- Carrying out and regularly reviewing laser risk assessments.
Advising staff at all levels, patients and the general public on laser related matters
Maintaining a safety folder for each device.
- Maintaining records of training in each directorate or department for all authorised users and other staff working near lasers – Responsibility for ensuring staff are trained remains a line management responsibility, but the LPS must make the line manager aware of any issues relating to training promptly.
- Communicating the requirements of this policy to relevant staff.

- Notifying the LSO and Health Safety & Improvement Coordinator of any incidents relating to laser use.

3.10 Authorised Operators (Laser Operators & Laser Users: class 3B or 4 lasers)

Authorised operators are required to:

- Be aware of Local Rules and annually sign a declaration to state that they understand and must comply with them.
- Always work in compliance with the relevant Local Rules and procedures including ensuring PPE is used when specified.
- Only use the laser specified in the Local Rules. Different types, makes or models of laser on loan or demo must not be used unless the full procedure for a new laser has been followed and permission granted by LSO. This applies even if the new laser is considered by the user to be equivalent to the existing unit.
- Exercise reasonable care when using lasers.
- Use any laser equipment, accessories and protective equipment, safely and properly.
- Report any defect in such equipment.
- Undertake and maintain any training deemed necessary.
- Maintain standards required by legislation or Department of Health guidance.
- Report immediately to their Laser Protection Supervisor or the Trust Laser Safety Officer and relevant Manager if any incident occurs in which any person may have received a laser exposure greater than intended, if there is any injury or harm resulting from laser use. An incident form must be completed, or incident logged using the web-based reporting system. Near miss incidents must also be reported.

3.11 Low Level Laser Users – (Not Authorised Operators)

Please note this paragraph applies only to low-risk lasers that are used by directing the beam. It does not apply to lower risk lasers embedded in equipment where the beam is not directed or directly controlled by the user (see below).

The Local Rules and Authorised Operator Systems are required only for higher risk lasers. Lower risk lasers of classes 1, 1M, 2, 2M (and 3R but see below) may be used in areas with no Local Rules and by staff who are not authorised operators.

Such users are responsible for:

- Being aware of the class of laser they intend to use, and the risks associated with its use. This includes checking the device is CE marked as well as class identified.
- Being familiar with the risk assessment and procedures for use of the equipment.
- Being familiar with the laser itself and having reviewed the manufacturer instructions.
- Ensuring that they are competent to use the laser in the way intended, users must report any concerns to their Manager.
- Reporting defective equipment and taking out of service until repaired.
- Reporting any risks, incidents or near misses to their Manager and using the Trust incident reporting system.

Low Level Laser Users must not:

- Use any laser of class 3B or 4 under any circumstances, they must only be used as specified in Local Rules by authorised operators.
- Use 3R lasers without being aware of the risk assessment.
- Use lasers on or in the vicinity of patients with potentially compromised blink reflexes.
- Use lasers in a way that might distract colleagues or interfere with work causing lapse in concentration or creating any additional safety risk.

Low risk lasers must not be used in a way that might increase the risk until the LSO has reviewed and approved such use and a risk assessment has been completed.

3.12 Laser Users – (Low risk equipment containing embedded lasers)

Lasers are embedded in various pieces of equipment. Where the equipment (not necessarily the laser) is classed as 1, 1M, 2 or 2M it poses no significant risk if used appropriately. A DVD player and lasers in computers are examples of equipment of this type.

Where a laser is embedded in equipment of this type, no additional responsibilities are expected of users who must simply follow the basic requirements of equipment safety as follows:

- Be aware of the classification of the equipment (it must be labelled, unless class 1).
- Only use equipment you are competent to use.
- Use equipment as specified in manufacturer's instructions.
- Be aware of the risks associated with the equipment.
- Do not attempt to dismantle or repair equipment not in good working order.

Users must be aware that equipment classified as low risk (2M or below), may contain a higher risk laser, but the equipment is designed to attenuate or control the beam so that the beam that the user might be exposed to is of the lower classification. For example, a laptop computer might be class 1 but the laser it contains might be class 3B.

3.13 Ultraviolet Protection Supervisors (UVPS)

The UVPS is a local UV safety officer. This is a designated person who has authority to supervise, monitor and enforce the control of UV safety in the local working environment of specific lasers. UVPS's are appointed by the RPG (normally nominated by Divisional Director or Senior Sister/Charge Nurse / departmental manager). The UVPS must be named in the Local Rules for the relevant UV device, and their appointment is via the Radiation Safety Group. This person must have and maintain a sound knowledge of evaluating and controlling UV hazard (usually obtained via a specific course) and have a detailed knowledge of the operation and uses of the specific devices for which they are UVPS. It will be helpful for the UVPS to be trained in risk assessment, if not they must work in conjunction with a person trained in risk assessment when lasers are assessed.

Specific responsibilities of UVPSs include:

- Carrying and regularly reviewing UV risk assessments.
- Advising staff at all levels, patients and the general public on UV related matters.
- Maintaining a safety folder for the UV devices.

- Maintaining records of training in each directorate or department for all authorised users and other staff working near lasers. The responsibility for ensuring staff are trained remains a line management responsibility, but the UVPS must make the line manager aware of any issues relating to training promptly.
- Communicating the requirements of this policy to relevant staff.
- Notifying the LSO and Health Safety & Improvement Coordinator of any incidents relating to UV use.

3.14 Authorised Operators (Ultraviolet Equipment)

Authorised operators are required to:

- Be aware of Local Rules and annually sign a declaration to state that they understand and must comply with them.
- Always work in compliance with the relevant Local Rules and procedures including ensuring PPE is used when specified.
- Only use the UV devices specified in the Local Rules, different types makes or models on loan or demo must not be used unless the procedure has been followed. This applies even if the new device is considered by the user to be equivalent to the existing unit.
- Exercise reasonable care when using V devices.
- Use any UV device equipment, accessories and protective equipment, safely and properly.
- Report any defect in such equipment.
- Undertake and maintain any training deemed necessary.
- Maintain standards required by legislation or Department of Health guidance.
- Report immediately to their UV Protection Supervisor or the Trust Laser Safety Officer and relevant Manager if any incident occurs in which any person may have received a UV exposure greater than intended, if there is any injury or harm resulting from laser use. An incident form must be completed or incident logged using the web based reporting system. Near miss incidents must also be reported.

4.0 Policy Detail

The safety of all optical radiation devices hinges on a risk assessment. This must be performed on all devices that emit optical radiation whether new or pre-existing. In the vast majority of cases a common-sense judgement must indicate that there is no potential for harm and a formal written risk assessment is not required. However, if there is any intended therapeutic or biological effect, risk of pain/discomfort, harmful distraction then a formal written risk assessment is required. A formal written risk assessment is also required following any incident or near miss where optical radiation is identified as a contributory factor. The manager responsible for the equipment is responsible for ensuring the risk assessment is performed and is appropriately communicated.

4.1 Optical Radiation Risk Assessment

Where any relevant factors identified in 4.0 above indicate a formal risk assessment is required the following issues must be considered (using the principles in the Trust Governance and Risk Management Framework).

The Appendices may be used to assist this process.

- The hazards of the device arising from the optical radiation.
- The potential for legal occupational exposure limits to be breached (in practice this will require advice from equipment suppliers).
- Controls to prevent breaches of daily occupational exposure limits (in practice this may require advice from equipment suppliers).
- Controls to prevent harm to staff, patients and visitors.
- For lasers and UV sources advice must be sought from the Trust Laser Safety Officer
- It is common for a focus on optical hazards to detract from other hazards (trip, contamination, etc.) care must be exercised to ensure that such hazards are still captured.

Due to the complexity associated with lasers and UV radiation the majority of the policy addresses these specifically (see appendices).

5.0 Financial Risk Assessment

1	Does the implementation of this policy require any additional Capital resources	No
2	Does the implementation revenue resources of this policy require additional revenue resources	No
3	Does the implementation of this policy require additional manpower	No
4	Does the implementation of this policy release any manpower costs through a change in practice	No
5	Are there additional staff training costs associated with implementing this policy which cannot be delivered through current training programmes or allocated training times for staff	No

6.0 Equality Impact Assessment

An equality analysis has been carried out and it indicates that:

Tick	Options
✓	A. There is no impact in relation to Personal Protected Characteristics as defined by the Equality Act 2010.

7.0 Maintenance

This policy must be maintained by the Trust Laser Safety Officer in consultation with the Radiation Safety Group and the Health and Safety Steering Group (HSSG).

8.0 Communication and Training

Communication of the policy will be via All User Bulletin, HSSG, Radiation Safety Group, LPSs UVPSs, and direct email communication with Managers. The policy will sit on the Trust Intranet under Policies.

9.0 Audit Process

Criterion	Lead	Monitoring method	Frequency	Committee
Monitor incidents involving lower risk lasers and other optical radiation devices to RPC.	Laser Safety Officer/Health & Safety Manager	Via Datix	2 x yearly	Radiation Safety Group/HSS G
Laser and UV Compliance with The Control of Artificial Optical Radiation at Work Regulations (2010)	Medical Physics Department	Workplace inspections and audits	Annually	RSG

10.0 References

BS EN 60825-1:1994 Safety of Laser Products – Part 1: Equipment Classification requirements and user's guide

BS EN 60825-8:1999 Safety of Laser Products – Part 8: Guidelines for the safe use of medical laser equipment

BS EN 60825-14:2004 Safety of Laser Products – Part 14: A user's Guide

The Control of Artificial Optical Radiation at Work Regulations 2010

(CAORWR)

Guidance on the safe use of lasers, intense light source systems and LEDs in medical, surgical, dental and aesthetic practices DB2008(03) April 2008

Part A - Document Control

<p>Policy number and Policy version:</p> <p>HS06</p> <p>Version 6.0</p> <p>May 2023</p>	<p>Policy Title</p> <p>Laser, UV and Optical Radiation Protection Policy</p>	<p>Status:</p> <p>Final</p>		<p>Author:</p> <p>Trust Laser Safety Officer</p> <p>Chief Officer Sponsor:</p> <p>Medical Director</p>
<p>Version / Amendment History</p>	<p>Version</p>	<p>Date</p>	<p>Author</p>	<p>Reason</p>
	<p>1.0</p> <p>HS30</p>	<p>April 2004</p>	<p>Laser Safety Advisor</p>	<p>Original Policy</p>
	<p>2.0</p> <p>HS06</p>	<p>Nov 2007</p>	<p>Trust Laser Safety Officer</p>	<p>Change in Laser Safety Officer and review of practice</p>
	<p>3.0</p>	<p>Feb 2012</p>	<p>Trust Laser Safety Officer</p>	<p>Change in Legislation, review of practice and addition of UV Therapy</p>
	<p>4.0</p>	<p>July 2016</p>	<p>Trust Laser Safety Officer</p>	<p>Full review to meet needs of CAORWR 2010</p>
	<p>5.0</p>	<p>June 2019</p>	<p>Trust Laser Safety Officer</p>	<p>Reviewed by Medical Director – no changes required</p>
	<p>5.1</p>	<p>June 2022</p>	<p>Trust Laser Safety Officer</p>	<p>Extension</p>
	<p>6.0</p>	<p>May 2023</p>	<p>Trust Laser Safety Officer</p>	<p>Full review</p>
<p>Intended Recipients:</p> <p>All staff working with Lasers and therapeutic UV</p> <p>All staff working in Laser or UV controlled areas</p>				

All managers	
Consultation Group / Role Titles and Date: Trust Radiation Safety Group Health & Safety Steering Group	
Name and date of Trust level group where reviewed	Trust Policy Group May 2023
Name and date of final approval committee	Trust Management Committee May 2023
Date of Policy issue	June 2023
Review Date and Frequency (standard review frequency is 3 yearly unless otherwise indicated – see section 3.8.1 of Attachment 1)	May 2027
Training and Dissemination: Trust intranet site, AUB, Via network of LPSs	
To be read in conjunction with: OP10 Patient Safety & Risk Management Policy HS01 Management of Health and Safety Appendix PPE Appendix PUWER HS11 Management of Medical Devices Policy The Control of Artificial Optical Radiation at Work Regulations 2010	
Initial Equality Impact Assessment (all policies): Completed Yes Full Equality Impact assessment (as required): Completed NA	
If you require this document in an alternative format e.g., larger print please contact Central Governance Department on Ext 85114.	
Monitoring arrangements and Committee	Half yearly to Radiation Safety Committee Annually to HSSG
Document summary/key issues covered: Safety of Artificial Optical Radiation with an emphasis on Lasers and Therapeutic Ultra-violet light	
Key words for intranet searching purposes	Laser Safety Ultraviolet Safety Ultraviolet Therapy Radiation Protection Optical Radiation Medical Laser Equipment

Appendix A - Risk Assessment Process for optical devices.

Conduct a risk assessment when any new optical device is brought on site (see HS01).

If the device can cause pain/discomfort or a therapeutic effect then further actions will be required, consult manufacturer for advice.

Consider any optical devices that might concentrate or refocus the light.

Be aware of the risk to patients with suppressed blink reflex and risk of distraction and where necessary take appropriate precautions.

If assessment indicates no further action necessary, then use device in accordance with manufacturer's instructions.

If the risk assessment indicates further action is required, then carry out a detailed risk assessment with advice from the supplier / manufacturer and contact the Health and Safety department for further advice or the Trust Laser Safety Officer (LSO) if device is laser or UV.

Specific Laser or UV Devices:

Class 3R Lasers

Lasers of this class are relatively low risk but do have the potential to cause eye injury in normal use and require a detailed risk assessment. Confirm that a suitable risk assessment is in place and that it is reviewed every 12 months or following any material changes. Risk assessment must be carried out following advice from the LSO and must take account of the requirements of EN BS 60825.

A Class 3R laser is considered safe if handled carefully, with restricted beam viewing. With a class 3R laser, the Maximum Permissible Exposure (MPE) can be exceeded, but with a low risk of injury. Visible continuous lasers in Class 3R are limited to 5 mW. For other wavelengths and for pulsed lasers, other limits apply.

Class 3B Lasers:

A Class 3B laser is hazardous if the eye is exposed directly, but diffuse reflections such as from paper or other matt surfaces are not harmful. Continuous lasers in the wavelength range from 315 nm to far infrared are limited to 0.5 W. For pulsed lasers between 400 and 700 nm, the limit is 30 mJ. Other limits apply to other wavelengths and to ultra short pulsed lasers. Protective eyewear is typically required where direct viewing of a class 3B laser beam may occur. Class-3B lasers must be equipped with a key switch and a safety interlock.

Such a laser must be used only in areas where local rules and appropriate risk assessments produced in consultation with the LSO are in place and where an LPS

has been appointed. Such lasers must only be used strictly in accordance with the local rules.

Class 4 Lasers

Lasers of these classes have the highest potential to cause injury or harm. Such a laser must be used only in areas where local rules and appropriate risk assessments produced in consultation with the LSO are in place and where an LPS has been appointed. Such lasers must only be used strictly in accordance with the local rules.

Class 4 lasers include all lasers with beam power greater than class 3B. In addition to posing significant eye hazards, with potentially devastating and permanent eye damage as a result of direct beam viewing, diffuse reflections are also harmful to the eyes within the distance called the Nominal Hazard Zone. Class 4 lasers are also able to cut or burn skin. In addition, these lasers may ignite combustible materials, and thus represent a fire risk, in some cases. Class 4 lasers must be equipped with a key switch and a safety interlock.

Appendix B - New Laser/Ultraviolet (UV) / high risk optical device Equipment Checklist

When a new laser, piece of UV equipment or other hazardous optical device is being considered for purchase, demonstration or use the following issues must be considered before the equipment is brought onto Trust premises:

1.1 Staff Issues:

Consider who must be appointed to these roles:

- Operators - Clinical & Possibly Technical
- LPS
- Lead Clinician
- Responsible Manager
- Others in room (incl. trainees)

LSO/Medical Physics must be informed of equipment details, application & relevant dates in addition to any general new equipment requirements of HS11

1.2 The following documents need to be prepared

- Risk Assessment (LPS with LSO & Clinician)
- Local Rules (LPS approved by RSC)
- Training Logs (see below)
- Read & understood local Rules list.

1.3 Training Needs

All to read and sign Local Rules plus:

- Clinicians Specific laser operation, Clinical Application
and General Laser Safety (formal course to 80625 std)

- Operators Specific laser operation & General Laser Safety

- Others in Controlled area General Laser safety (includes trainees)
- Others in Vicinity Overview of laser safety by LPS

1.4 Procurement issues: ensure the following are covered in business case

- Main Laser/UV/high risk equipment purchase
- Dedicated consumables cost
- Service contract
- Calibration Contract (usually as part of service)
- Laser/UV/Optical Safety Contract (usually via TLSO & Physics)
- Consumables
- Room Modifications (Safety & Power & signage) – based on risk assessment
- PPE e.g. Goggles, Cases & storage
- Key security (dedicated key safe)
- Fire Extinguisher (must be local to any class 4 laser use)
- Locks/interlocks (Required on all doors according to risk assessment)
- Secure storage

Appendix C - Lower Risk Lasers (Class 1, 1M, 2, 2M)

Lasers in these classes will not normally cause injury when used in accordance with instructions. Risk may arise from the use of optional equipment or potentially if a person with a suppressed blink reflex, (for example a postoperative patient) is exposed to the laser. Risk may also arise if a laser is used in a way which distracts another individual.

Before introducing lasers in these classes, a risk assessment must be completed. If this shows no significant issues, the changes / purchases can go ahead. It is important to note that some imported lasers are being misclassified and/or not appropriately labelled. All purchases must be through reputable supply routes and must bear appropriate CE marking.

Lasers are classified by wavelength and maximum output power into the following safety classes:

Class 1: A class 1 laser is safe under all conditions of normal use. This means the maximum permissible exposure (MPE) cannot be exceeded. This class includes high-power lasers within an enclosure that prevents exposure to the radiation and that cannot be opened without shutting down the laser. For example, a continuous laser at 600 nm can emit up to 0.39 mw, but for shorter wavelengths, the maximum emission is lower because of the potential of those wavelengths to generate photochemical damage. The maximum emission is also related to the pulse duration in the case of pulsed lasers and the degree of spatial coherence.

Class 1M: A Class 1M laser is safe for all conditions of use except when passed through magnifying optics such as microscopes and telescopes. Class 1M lasers produce large-diameter beams, or beams that are divergent. The MPE for a Class 1M laser cannot normally be exceeded unless focusing or imaging optics are used to narrow the beam. If the beam is refocused, the hazard of Class 1M lasers may be increased and the product class may be changed. A laser can be classified as Class 1M if the total output power is below class 3B but the power that can pass through the pupil of the eye is within Class 1.

Class 2: A Class 2 laser is safe because the blink reflex will limit the exposure to no more than 0.25 seconds. It only applies to visible-light lasers (400-700 nm). Class-2 lasers are limited to 1 mw continuous wave, or more if the emission time is less than 0.25 seconds or if the light is not spatially coherent. Intentional suppression of the blink reflex will lead to eye injury. Many laser pointers are class 2.

Class 2M: A Class 2M laser is safe because of the blink reflex if not viewed through optical instruments. As with class 1M, this applies to laser beams with a large diameter or large divergence, for which the amount of light passing through the pupil cannot exceed the limits for class 2.

Laser Pointers Safety Information

Laser pointers are covered under the regulations and have the potential to permanently damage your eyesight if misused. Although no risk assessments are required for the use of laser pointers (unless classified 3R) the users of such devices must ensure they read and follow these safety precautions when using laser pointers.

- Before turning on the laser pointer, always be sure that it is pointed away from yourself and others for example point directly at the screen before switching on
- Never look directly into a laser pointer
- Never direct a laser pointer at another person
- Follow the same rules for direct reflections of laser light from reflective surfaces.

Appendix D - Minimum Precautions for Significant Risk Equipment

For all laser and UV therapy equipment where significant risk cannot be ruled out following risk assessment the following systems must be in place as a minimum requirement:

- A laser or ultraviolet protection supervisor must be appointed in writing and confirmed by the Radiation Protection Group.
- A controlled area must be designated and marked with appropriate signage enclosing all areas of risk. The Trust Laser Safety Officer (LSO) should approve signage for Laser and UV controlled areas.
- Local Rules covering the safe use of the equipment must be prepared, authorised by the Trust Radiation Safety Group and read by all staff that need to enter the controlled area. The preparation and maintenance of these rules are the responsibility of the directorate manager supported by the LPS/UVPS and LSO.
- All staff must receive and maintain appropriate training as defined elsewhere in this policy and records must be kept of this training.
- Any changes to equipment or location must be notified to both the LSO and the clinical engineering department to ensure both inventory and safety audits are kept updated.
- A safety audit must be performed annually by the LSO or nominee.

For all other high risk equipment (i.e. not laser or UV therapy equipment) where significant risk cannot be ruled out following risk assessment; systems equivalent to those above must be put in place and in addition the advice of a suitable qualified and experienced safety advisor must be obtained.

Appendix E - Risk Assessment for Ultraviolet Devices

If the device is designed so that no person may be exposed to the ultraviolet radiation (i.e. fully enclosed light source with interlocked openings) then this can be recorded on the risk assessment and the device may be used in accordance with manufacturer's instructions. Servicing and repairs must only be carried out by suitable trained personnel.

In all other cases further action is required including a detailed risk assessment, contact the Health and Safety team in the first instance or the Trust Laser Safety Officer (LSO) if complex technical advice is required.

Appendix F - Protocol for Purchase / loan / demo / alteration of Class 3R, 3B, 4 Lasers, UV equipment or the environments these are used in.

1.0 Before introducing a UV device or class 3R, 3B or 4 lasers or equipment with these classifications or making changes that might affect the safety of such laser/UV device, detailed consideration of safety arrangements is required as follows:

- Contact the Trust LSO at an early stage in the development of any proposals for advice.
- Ensure laser/UV safety issues are included in any business case including costs capital and revenue costs for engineered safety controls, training costs, costs of personal protective equipment (PPE) and any other revenue costs.
- Ensure that the need to have local rules (except 3R lasers) and the need for LPS/UVPS is identified in the proposal.
- Ensure that the LSO has been asked to comment on necessary safety arrangements for the proposed device or change and to confirm that the proposed device is suitable for its intended use
- Ensure that any equipment trials or demonstration in advance of selecting a product are carried out as described below.

When new laser/UV equipment is being considered for purchase, demonstration or use, the following issues must be considered before the equipment is brought onto Trust premises:

Staff Issues:-

Consider who must be appointed to these roles:

- Operators (Clinical & possibly Technical)
- LPS/UVPS
- Lead Clinician
- Responsible Manager
- Others in room (including trainees)

LSO/Medical Physics must be informed of equipment details, application and relevant dates.

The following documents need to be prepared:-

- Risk Assessment (LPS/UVPS with LSO & Clinician)
- Local Rules (LPS/UVPS approved by RSC)
- Training Logs (see below)
- Read and understood Local Rules list

Training Needs:-

All to read and sign Local Rules, plus:

Clinicians- Specific Laser/UV device Operation, Clinical Application and General Laser/UV Safety (Formal course)

Operators- Specific Laser/UV device Operation and General Laser/UV Safety

Others in Controlled area- General Laser/UV Safety (includes trainees)

Others in Vicinity- Overview of Laser/UV Safety by LPS

Procurement Issues. Ensure the following are covered in business case:-

- Main Laser/UV equipment
- Service contract
- Calibration Contract (usually as part of service)
- Laser/UV Safety Contract (usually via LSO & Physics)
- Consumables
- Room Modifications (Safety & Power) – based on risk assessment
- Goggles, cases & storage
- Key security (dedicated key safe)
- Signage
- Fire Extinguisher (must be local to any class 4 laser use)
- Locks/interlocks (must be required on all doors in most cases)
- Laser/UV device storage & security

1.1 Laser/UV Equipment on Loan, Trial or Demonstration

All elements of this policy apply to any equipment brought into the Trust on loan or trial or for demonstration purposes.

Laser classes 1, 1M, 2, 2M - The risk assessment tool in [Appendix A](#) must be completed before loan, trial or demonstration lasers are used.

Laser Classes 3R, 3B, 4 -The LSO must be contacted before Trust employee agrees to receive a laser in these class 3R, 3B or 4 on loan or demonstration. This includes demonstration or trial of lasers that are equivalent or considered “like for like”, even if they have the same specifications or performance as the existing laser. Local rules

are written for a single make and model and must NOT be considered interchangeable without confirmation from the Trust LSO. The only exception to this is where an existing laser is replaced with a loan laser of an identical make and model with identical laser specification.

UV devices -The LSO must be contacted before Trust employee agrees to receive a UV device on loan or demonstration unless risk assessment has demonstrated no potential for human exposure. This includes demonstration or trial of devices that are equivalent or considered “like for like”, even if they have the same specifications or performance as the existing device. Local rules are written for a single make and model and must NOT be considered interchangeable without confirmation from the Trust LSO. The only exception to this is where an existing device is replaced with a loan device of an identical make and model with identical specification.

The employee requesting the trial must allow sufficient time for the LSO to investigate safety issues and provide appropriate advice. Where a loan laser is “like for like”, the LSO must give very simple recommendations and rapid authorisation for the loan to go ahead. New or very different lasers may require significant changes or additional safeguards.

Use of the loan laser must not go ahead until the risk assessment and local rules have been completed and all additional safety arrangements or changes have been made.

1.2 Risk Assessments

For lasers in classes 1, 1M, 2, 2M a simple risk assessment ([appendix C](#)) is sufficient, unless this indicates the need for a detailed risk assessment.

Where detailed risk assessments are required (as described above for UV and laser classes 3R, 3B and 4) they must address the following:

- Preventing injury to any person
- Any constraints on access to / time restrictions within locations
- Preventing distraction to any person, with particular attention given to people who might be driving or operating dangerous equipment
- Storage and security of laser when not in use
- Competent users and training arrangements
- Need for engineered safety controls
- Safe operating procedures
- Need for PPE
- Training requirements
- Action to take following incidents
- Planned preventative maintenance of lasers and safety equipment

1.4 Other Risks Associated with Laser/UV Use

Apart from the specific risks associated with the UV light, laser beam energy and direct injury or harm, laser/UV use may be associated with other risks that need to be assessed. Important examples include:

- Distraction risk can be associated with all devices emitting visible light. The magnitude of the distraction risk depends upon who might be distracted and what they might be doing. Preventing distraction is especially important for people carrying out safety critical tasks such as performing surgery, driving or operating dangerous equipment. The risk assessment must identify who might be distracted and controls required to prevent this happening.
- Exposure to hazardous substances (e.g. smoke plumes) during laser cutting or ablation. Local smoke evacuation may be required, standard theatre vacuum and/or theatre masks are not sufficient protection in such cases. See Local Rules for details.
- Ergonomic risks may arise from movement of equipment or controls if there are significant postural constraints or manual handling issues.
- Trip hazards and high voltage hazards, visual display hazards, etc. must also be considered.

2.0 Local Rules

Local rules are compulsory for each laser in class 3B or 4 and for Therapeutic UV devices.

Laser local rules must describe the hazards, controls and safety procedures for each specific laser area and each specific laser (including trial and/or demonstration lasers). Local rules must be written in consultation with the Trust LSO and the LSO must report adequacy of the local rules to the RPC. The LPS must ensure that local rules are in place and followed and that any breaches of local rules and any incidents occurring are reported.

Local rules must be readily available and a list of authorised operators must be kept with the local rules for each laser.

2.1 Hierarchy of Controls

Control measures need to be appropriate for the degree of risk. For the higher risk lasers/UV devices, every device and associated area will require its own controls. These must need to be developed and included in the local rules with advice and guidance from the Trust LSO.

As with all safety risks, wherever possible control measures must include “designed in” or engineered controls.

Engineering controls that are fixed and cannot easily be circumvented are preferred to controls that can be disabled or which need to be operated.

Barriers or guards are often required to prevent unintended exposure of individuals to high risk lasers. This includes controls to prevent exposure through windows or via openings.

Controls that protect all people in the area are preferred to controls that protect a single individual.

Training must be completed and documented prior to first use and include safety features and engineering controls.

3.0 Personal Protective Equipment (PPE)

PPE may be necessary, but it must be considered as a last resort, only to be used if there is no practicable way of implementing more effective controls. PPE is not preferred as a first line control because it requires user compliance, protects individuals rather than the whole area and is subject to issues like availability and fit.

In practice PPE is also required as an additional safeguard in case of failure of other controls for almost all class 3B and class 4 lasers.

For UV devices both eyes and skin may need protection. Normal clothing may provide an adequate barrier for much of the body supplemented by face, head and hand protection. Consideration must include protection of lower leg, feet and lower arms.

Appendix G - Laser Equipment used by contractors on RWT premises

The Trust will require organisations who need to use lasers as part of work on Trust premises to have their own laser safety policy, appropriate to the degree of risk and to comply with the principals set out in BS EN 60825.

Where other organisations use lasers, they must be expected to comply fully with this policy or a laser policy that provides at least an equivalent level of safety if:

- The laser might be used outside a secure enclosed building site or secure workspace allocated entirely for use by that organisation.
- If the laser beam might cause a distraction effect to people outside the site or designated workplace.
- If there is any other risk arising from the laser to any Trust employee, patient or visitor.
- Arrangements for laser safety must be included in risk assessments, methods statements and licence applications.

Appendix H - Training Schedule

Staff working with Lasers/UV/High risk optical devices must be trained to the standards below as a minimum and the Trust must hold records of the training.

For any other high risk optical devices the training principles must be in line with those laid out below and defined as part of the controls in the initial risk assessment.

Where staff have been in post for a considerable time preceding the introduction of this policy it is accepted that obtaining records may present a problem. In such cases where approved by LPS/UVPS and directorate manager/Clinical director the member of staff may self-certify competence in one or more elements of the formal training. They must still read and comply with the local rules.

In all cases where specified below local rules must be read annually and safety training refreshed at least once every three years.

Role	Definition	Training Requirement
Laser Users	Any person who controls the delivery of the laser radiation to the patient / working area	Read and Signed Local Rules; Use of Equipment; Safety Training on approved course for LPSs or equivalent; Clinical training in procedure;
Laser Operator	Any person who operates laser controls	Read and Signed Local Rules; Use of Equipment; Safety Training at local level;
UV Operator	Any person who controls the delivery of the ultraviolet radiation to the patient / working area	Read and Signed Local Rules; Use of Equipment; Safety Training Safety Training at local level or on appropriate course; Clinical training in procedure;
Laser Protection Supervisors (LPS)	The local laser safety officer. This is a designated person who has authority to supervise, monitor and enforce the control of laser safety in the local working environment of specific lasers, on behalf of the equipment manager.	Read and Signed Local Rules; Understand Use of Equipment; Safety Training on approved course for LPSs; Understand Clinical procedure;
Ultraviolet Protection	The local ultraviolet safety officer. This is a designated	Read and Signed Local Rules; Understand Use of

<p>Supervisors (UVPS)</p>	<p>person who has authority to supervise, monitor and enforce the control of ultraviolet safety in the local working environment of specific lasers, on behalf of the equipment manager.</p>	<p>Equipment; Safety Training on appropriate course; Understand Clinical procedure;</p>
<p>Trust Laser Safety Officer (TLSO)</p>	<p>This is the Trust wide laser safety officer. The LSO is the designated person with the authority to monitor and advise on the control of laser and therapeutic UV safety across the Trust.</p>	<p>Read and Signed Local Rules; Safety Training on approved course for Laser protection advisors.</p>