Non-Ionising Radiation Safety Policy

Lead Manager | Scientific Director, Department of Clinical Physics and Bioengineering

Responsible Director | Director of Diagnostics
Policy Lead | Chief of Medicine, Diagnostics
Approved by | NHS GG&C Radiation Safety Committee
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Contents

1. Policy Statement
2. Scope
3. Roles and Responsibilities
4. Safety Aspects for Sources of Different Categories of Non-Ionising Radiations
   4.1 Lasers and Intense Pulsed Light (IPLs)
   4.2 Non-Coherent Optical Sources used in Medical Treatment and Diagnosis
   4.3 Optical sources used for applications other than patient treatment and diagnosis
   4.4 Magnetic Resonance Imaging
   4.5 Electromagnetic Fields arising from Other Sources
5. Radiation Equipment Policy
6. Incidents
7. Safety Training
8. Monitoring of Effectiveness of Policy
9. References

Appendices
Appendix 1: Contact Details for Safety Advisers
Appendix 2: The Functions and Responsibilities attached to the Appointment of the Laser Protection Supervisor
Appendix 3: Draft Letter of Appointment of Laser Protection Supervisors
Appendix 4: Draft Letter of Appointment of Clinical Laser Expert
Appendix 5: Draft Letter of Appointment of MRI Responsible Person
1. **Policy Statement**

NHS Greater Glasgow and Clyde (The Board) recognises its obligations under the Management of Health and Safety Regulations 1999 to assess the workplace risk to staff, patients, patients’ families, contractors and the public. Within the general principles of prevention, the medical use of non-ionising radiations presents an acceptable risk when used as an effective form of treatment or in diagnosis. This document sets out a framework to restrict the risks as far as is reasonably practicable while being consistent with a clinical outcome favourable to the patient.

The Board will ensure, as far as reasonably practicable, the health and safety of its employees, of patients undergoing treatment, of contractors working on the premises, and of members of the public who may be exposed to hazards arising from the use of non-ionising radiations. This includes optical radiations such as class 3 and 4 lasers and ultraviolet, used directly in treatment, other optical sources used for therapeutic or diagnostic purposes, or high intensity optical sources used for other applications within the Board’s premises. This also includes the hazards from magnetic resonance imaging (MR) used in diagnosis, and the electromagnetic fields arising from various therapies involving heating or removal of tissue and those arising from any other source within the workplace. Applications in the treatment and diagnosis of patients will only be undertaken where the procedures are clinically justified, appropriate assessment of the associated risks have been carried out, and the level of exposure has been restricted as far as is reasonably practicable for the achievement of the clinical purpose.

2. **Scope**

This policy sets out the framework to oversee health and safety relating to all uses of non-ionising radiation within the Board’s area. Compliance with the policy is mandatory for all Board staff in all locations.

References to lasers relate to Class 3B and 4 lasers only, and not to laser of other Class which for normal use are regarded as safe. Arrangements for use of laser pointers are covered by a separate Board policy.

The aims of the Non-Ionising Radiation Policy are:

2.1 To ensure that any existing non-ionising radiation sources used by the Board or within Board premises are subject to a risk assessment and appropriate controls.

2.2 To ensure compliance with general health and safety legislation and with specific legislation relating to non-ionising radiations, through adherence to relevant national guidance and appropriate national and international standards describing the safe use of different types of non-ionising radiations.

2.3 To ensure that any non-ionising radiation sources procured for or loaned to the Board are controlled and are subject to risk assessment and
appropriate controls.

2.4 To ensure that wherever non-ionising radiation equipment is used for the treatment or diagnosis of patients within the Board, roles and responsibilities are clearly established and risks to patients, staff and others are adequately controlled.

3. Roles and Responsibilities

Chief Executive of The Board: responsible for ensuring that there are policies and procedures in place to ensure the safety of staff and others exposed to non-ionising radiation.

Safety Committees: An Optical Radiation Safety Committee will oversee safety issues relating to radiation within the wavelength range of 100nm to 1mm whilst an MR Safety Committee will oversee safety issues relating to MR. Both Committees will report back to The Board Radiation Safety Committee (see section 8 of this policy).

General Managers: responsible for ensuring that all sources of non-ionising radiation within their directorate are subject to the contents of this policy. Also for formally appointing Laser Protection Supervisors (LPS) to oversee safety aspects of the application of every class 3B or 4 laser used within their Directorate. A letter suitable for use in the appointment of an LPS is given in Appendix 3. The General Manager of Diagnostic Imaging is responsible for entitling the Responsible Person for each MR Unit (MRRP). The relevant General Manager is responsible for confirming the entitlement of MR Authorised staff, with the exception of medical and medical physics staff, at an appropriate level based on competency assessment by the MRRP.

Clinical Directors: responsible for appointing a Clinical Laser Expert for each therapeutic laser used within their Directorate to advise on clinical laser procedures and practice, and user competency. A letter suitable for use in appointment of a Clinical Laser Expert is given in Appendix 4. The Clinical Director of Diagnostic Imaging is responsible for confirming the entitlement of Medical Staff as MR Authorised, at an appropriate level based on competency assessment by the MRRP.

Scientific Director, DCPB: responsible for recruitment, appointment and entitlement of designated advisers on non-ionising radiation safety (LPAs, MRSEs, NIRPAs) and for ensuring that they are appropriately qualified, hold any necessary certificates of competence, and undertake appropriate continuing professional development in order to maintain their competence. The Scientific Director is also responsible for confirming the entitlement of medical physics staff as MR Authorised, at an appropriate level based on competency assessment by the MRRP.

Clinical Services Managers, Senior and Line Managers: responsible for managing the effectiveness of control measures put in place for use of non-ionising radiation sources; ensuring any recommendations from the relevant Safety Adviser are put in place and ensuring that risk assessments are undertaken for all non-ionising sources used; ensuring a planned maintenance regime is in place for all class 3B and 4 lasers, phototherapy equipment, MR equipment and other equipment emitting non-ionising radiation where this is
deemed appropriate; and for notifying the relevant safety adviser at an early stage when any purchase or loan of a Class 3B or 4 laser, or MR unit is being considered.

**Laser Protection Supervisors:** responsible for ensuring the safe use of all Class 3B and 4 lasers within their area. Functions and responsibilities of an LPS are given in Appendix 2.

**Clinical Laser Experts:** responsible for assessing and confirming the competence of all clinical therapeutic laser users within their area of responsibility prior to their approval as authorised laser users, and assisting in the supervision and training of clinical laser users.

**Authorised Users:** Authorised laser or intense pulsed light (IPL) source users must ensure that they are competent to undertake the procedures that they perform, and maintain a training log with components against which their training and experience can be verified and sufficient records of their subsequent practice to confirm their continuing competence.

The MRRP for each MR Unit is responsible for day-to-day MR safety. Their roles and responsibilities are detailed in document MRP-GUID-002. Formal entitlement of MR Authorised staff is undertaken by the MRRP based on a competency assessment and then Confirmed by the relevant General Manager, or the Clinical Director, Diagnostic Imaging or the Scientific Director, DCPB, as appropriate to the staff group. This Entitlement and Authorisation is recorded using document MRP-GUID-001.

The Board’s MRSEs are responsible for advising on the necessary engineering, scientific and administrative aspects of the safe clinical use of the MR devices including site planning, development of a safety framework, advising on monitoring the effectiveness of local safety procedures, procurement, adverse incident investigation and advising on specific patient examinations. Their roles and responsibilities are detailed in document MRP-GUID-004.

**Chief of Medicine, Diagnostics:** responsible to the Chief Executive for ensuring that the Board complies with the relevant regulations for non-ionising radiation. The Chief of Medicine will ensure that structures are in place for entitlement of non-ionising radiation duty holders, and for regular audit of compliance with these structures.

**Referrers for MR Investigations:** The Chief of Medicine, Diagnostics, will entitle as Referrers for MR investigations all medical practitioners, including those holding Honorary Board appointments. Medical practitioners working outwith the Board who refer to clinicians within the Board will also be entitled as referrers.

The Chief of Medicine will entitle other named registered healthcare professionals to act as referrers for a limited range of medical exposures, to fulfil a clinical need, according to procedures set out in Employer’s Procedures (EP2).

Duties of Referrers are specified in EP2. In addition, Referrers for MR Investigations are responsible for providing accurate information on implanted medical devices, as part of the medical handover, as these devices may be
contra-indicated for MR exposure.

**Employees:** All staff members are responsible for making themselves aware of any hazard associated with non-ionising radiation emitted from equipment that they operate, and following associated local rules and safety procedures established by the employer. Staff also have the responsibility of alerting their line manager if any potentially hazardous source of non-ionising radiation is brought to the department, and reporting all incidents involving non-ionising radiation sources.

### 4. Safety Requirements for Different Categories of Non-Ionising Radiation

Exposure limits have been set for all artificial optical radiation sources in the workplace which apply to all staff. Specific requirements for different types of optical sources are summarised in Sections 4.1, 4.2 and 4.3.

#### 4.1 Lasers and Intense Pulsed Light (IPLs)

A system of classification has been implemented for lasers to indicate the degree of hazard and level of precautions that should be taken. A comprehensive summary of the laser class definitions is given in the MHRA document “Lasers, intense light source systems and LEDs – guidance for safe use in medical, surgical, dental and aesthetic practices”.

The following are required by departments using class 3B and class 4 lasers and IPLs. N.B. It is the manufacturer’s responsibility to classify a laser based on the output.

- Risk Assessments and Local rules must be in place for all lasers and IPLs used in treatment and diagnosis.
- Each laser or IPL has an appointed Laser Protection Supervisor who has day to day responsibility for overseeing laser safety.
- Each laser or IPL has an appointed Clinical Laser Expert who has responsibility for assessing and confirming the competence of all clinical therapeutic laser users within their area of responsibility.

The use of laser pointers for presentations is covered by a separate Board policy.

#### 4.2 Non-coherent optical sources used in medical treatment and diagnosis

The hazards from ultraviolet radiation are a risk of skin erythema and cataract from exposure of the eye. There is also a small increased risk of skin cancer in the longer term.

Treatments of patients with ultraviolet phototherapy, photodynamic therapy and other non-coherent optical sources will be optimised in order to minimise the risk of short term effects on the eye and skin, while maximising the clinical benefit to the patient.

Assessment of acceptable levels of exposure of staff, students or outside workers applying optical radiation techniques must be maintained below
specified minimum permissible exposure limits. Risk assessments must be carried out and appropriate controls identified should be put in place to ensure that all staff exposure to optical sources is maintained at a safe level.

4.3 Optical sources used for applications other than patient treatment and diagnosis

Exposure limits exist relating to all artificial optical radiation sources in the workplace and these apply to all workers. This places an obligation on the Board to assess the risk from any optical source which potentially could present a hazard.

Risk assessments must be in place for all optical sources used for patient treatment. Risk assessments must also be in place for all other optical sources although for the majority of sources these may be generic because of the low level of hazard, but this may not be true for all sources used by the Board.

4.4 Magnetic resonance imaging

Magnetic Resonance Imaging (MR) equipment exposes patients and staff to significant static and time varying magnetic fields and also radiofrequency fields. Ferromagnetic materials brought into the proximity of the magnet can become potentially lethal missiles. Electromagnetic interactions with implants and other metal objects such as monitoring wires can cause malfunctions and burns. Other hazards include acoustic noise; low temperature liquefied gases (cryogens), causing: asphyxiation in oxygen-deficient atmospheres; cold burns, frostbite and hypothermia from the intense cold; and explosion following over-pressurisation from the large volume expansion of the liquid following evaporation.

All patients and staff attending an MR unit have to undergo an extensive safety checklist to ensure they have no contraindications for exposure to static and time-varying electromagnetic fields.

Local rules have been compiled for each MR Unit in line with the MHRA’s Safety Guidelines for Magnetic Resonance Imaging Equipment in Clinical Use, 2015, and must be available at each MR Unit. Safe systems of work are detailed in the Local Rules in order to manage complex hazards. Local Rules are documented in Diagnostic Imaging’s Q-Pulse Quality Management System.

Each MR unit has an identified ‘Responsible Person’ (MRRP) who has day-to-day responsibility for MR safety. Formal delegation of these functions is made by a letter from the General Manager of Diagnostic Imaging.

Each MR Unit has an identified MR Safety Expert (MRSE) to advise on issues related to patient and staff safety, including the varied electromagnetic interactions, the complex MR environment, and the optimal operation of the equipment.

4.5 Electromagnetic fields arising from other sources

Significant electromagnetic fields are present in the immediate vicinity of
therapeutic diathermy equipment. It is normally sufficient to ensure that staff do not stand within 1m of the electrodes and patient when such is being used for treatment.

Fields from surgical diathermy and other therapy equipment are lower and hazards correspondingly less.

Staff using any type of equipment that has an associated electromagnetic field must be aware of the level of hazard.

5. Radiation equipment policy

5.1 Responsibility for ensuring that all non-ionising radiation equipment is installed, commissioned and maintained to satisfy non-ionising radiation safety requirements and is included in the equipment replacement programme of the Board will lie with the relevant director. All documentation relating to the service history for the equipment should be kept within the department.

5.2 Responsibility for maintaining an inventory of all non-ionising radiation equipment used for medical exposures will lie with the Scientific Director of DCPB through existing Board equipment management structures and procedures.

5.3 All non-ionising radiation equipment purchases will be routed through appropriate committees established by the Board. In conjunction with the relevant Safety/Protection Adviser (see section 10), these committees will ensure that equipment purchased is designed, constructed and installed so that it is capable of restricting exposure in line with the intended clinical purpose, and that all technical information relating to use and safety requirements, including source details, are provided by the supplier or manufacturer.

5.4 Prior to installation and clinical use of any equipment delivering non-ionising radiation to patients for therapeutic purposes (including loan equipment), the appropriate safety adviser will be consulted and appropriate risk assessments and control measures implemented.

5.5 Responsibility for ensuring that relevant staff receive appropriate training in use of non-ionising radiation equipment, including relevant safety training, will lie with the relevant clinical director for medical staff, the director of DCPB for Physics staff and the appropriate general manager for other healthcare professionals.

5.6 Only approved service personnel with relevant training must undertake maintenance or servicing of equipment emitting non-ionising radiations.

5.7 If any source of non-ionising radiation is damaged in a manner that could lead to potential overexposure, it is the responsibility of staff using that source to ensure it is made safe, and to inform the local manager, so that arrangements are put in place either for its repair, or its removal from service and disposal.

6. Incidents

Any incident which leads to an unintended exposure of patients, staff or members of the public that could potentially be harmful must be dealt with according to the Board Incident Management policy, which can be found in the Health and Safety section of Staffnet. It must be reported through the Datix.
incident recording system and to the appropriate clinical director and general manager. The Head of the Clinical Service and Clinical Director will be responsible for ensuring that an investigation is undertaken and evaluating the information obtained.

Incidents which require to be notified to external agencies will be reported by the General Manager to the appropriate Clinical Director, who will be responsible for making the external report.

Incident reports will be considered through the Directorate structures and by the Optical Radiation Safety Committee or MR Safety Committee as appropriate.

7. Safety Training

Laser Protection Supervisors should be familiar with the ‘Core of knowledge’ for laser safety (MHRA Guidance notes), and be able to provide evidence of suitable training. They should attend LPS update courses at intervals of three to five years.

Authorised Laser or IPL Users should have sufficient supervised clinical training before undertaking any procedures involving a therapeutic laser or IPL device (MHRA Guidance notes). Authorised Laser Users should be familiar with the ‘Core of Knowledge for laser safety, and be able to provide evidence of suitable training. This may be achieved through specific practical courses attended, but will in many cases take the form of supervised clinical sessions in the use of their specific laser or IPL for the procedures to be undertaken.

Non-clinical users should have received appropriate departmental safety training prior to acting as technical users.

Nurses and other staff administering phototherapy must have appropriate training in UV safety.

Entitled MR Authorised staff must have appropriate training in MR safety as detailed in Safety Guidelines for Magnetic Resonance Imaging Equipment in Clinical Use, MHRA, April 2015. The competency requirements for MRRPs are detailed in document MR-GUID-003.

Any contractors, trainees or other non-Health Board workers who may have involvement with the use of Class 3B or 4 lasers, phototherapy equipment or MR equipment must be given training appropriate to their role.

All the above training must be documented and available for audit purposes.

8. Monitoring of effectiveness of policy

The Board’s Optical and MR Radiation Safety Committees will meet every six months. Monitoring the effectiveness of this policy will be a requirement of these committees.

Annual Audit of laser/IPL safety compliance must be undertaken and the results of which should be reported back to the Optical Radiation Safety Committee.
9. References


The Health & Safety at Work Act 1974, HMSO London

The Management of Health & Safety at Work Regulations 1999

The Personal Protective Equipment Regulations 1992

Health & Safety (Safety Signs and Signals) Regulations 1996


Safety of laser products. Equipment classification and requirements BS EN 60825-1:2007


The Control of Electromagnetic Fields at Work Regulations 2016


Filters and equipment used for adjustment work on laser radiation. BS EN 207:2009


Safety of laser products – a user’s guide (N.B. for all lasers not only medical). PD IEC 60825 –14:2004


Tracheal tubes designed for laser surgery. Requirements for marking and accompanying information. BS EN ISO 14408:2009
Appendix 1

Laser Protection Advisers and Optical Radiation Safety Advisers

Dr David Gentle 0141 211 3432 david.gentle@ggc.scot.nhs.uk
Dr Michael Watt 0141 211 3433 michael.watt@ggc.scot.nhs.uk
Shellagh Milligan 0141 211 3387 shellagh.milligan@ggc.scot.nhs.uk

Magnetic Resonance Safety Experts, formally Magnetic Resonance Safety Advisers

Dr John Foster  gg-uhb.mrsafetyexpert@nhs.net
Dr John McLean
Dr David Brennan
Dr Rosario Lopez

Scientific Director of Clinical Physics & Bio-Engineering:

Prof Andrew Reilly 0141 451 6383 andrew.reilly@ggc.scot.nhs.uk
Appendix 2

The Functions and Responsibilities Attached to the Appointment of Laser Protection Supervisor

The prime function attached to this appointment is:

To exercise close supervision of the work with a laser or lasers within their area or Department, to ensure that the requirements of the MHRA document “Lasers, intense light source systems and LEDs – guidance for safe use in medical, surgical, dental and aesthetic practices”, other associated guidance and the 'Local Rules' are implemented in practice. The Laser Protection Supervisor will have responsibility for supervising the overall safety of the laser environment but the clinician carrying out the procedure remains responsible for the safety of the patient.

Any concerns that cannot readily be resolved must be raised with the Departmental Manager and the Laser Protection Adviser (LPA).

In addition, the Laser Protection Supervisor will be expected to take responsibility, working in conjunction with the Departmental Manager and LPA, for the following:

1. To draw up, in collaboration with the Laser Protection Adviser a set of 'Local Rules'. This must detail the principles and the working practices to ensure safe use of the laser facility, and must be kept under continuous review.

2. To ensure that procedures are carried out in a safe manner and, with the assistance of each laser operator, adapt the procedures to ensure safe operation. Any problems or potential problems with regard to laser safety that cannot readily be addressed should be drawn to the attention of the LPA.

3. To notify the LPA of any forthcoming change in the work or the facilities wherever these may have significant bearing on laser safety and, with advice from the LPA, to carry out an appropriate prior risk assessment. Changes would include the purchase of new equipment or delivery systems, modifications to old equipment, or the need to carry out procedures in a new location.

4. With the assistance of the laser operator involved, to undertake an initial investigation into the circumstances of any reported or suspected incident as a result of the work with lasers within the Department and to report the findings to the Departmental Manager and Laser Protection Adviser. (See MHRA Guidance).

5. To ensure in collaboration with the LPA, laser operator and the employing authority, that all employees and authorised visitors receive such information on laser safety, instruction and training as appropriate.

6. To ensure that all members of staff involved in the work of the Department have read the 'Local Rules’ and have signed a statement acknowledging this.
7. To maintain the registers of personnel authorised to operate each laser, and of those who may assist in the operation of the laser.

8. To approve the competence and knowledge of clinical laser users, in collaboration with the Clinical Laser Expert, prior to approving their addition to the register of authorised users.

9. To ensure, with advice from the LPA, that protective eyewear is appropriate to the type of laser used, that all Personal Protective Equipment (PPE) is stored and labelled correctly and that staff are fully trained in its use.

10. To examine all Personal Protective Equipment (PPE), warning signs and lights, and other safety features at regular intervals for damage and correct function and to keep a record of such checks.

11. To check with the Departmental Manager that the annual review of the risk assessment for laser work has been completed. To carry out an annual review of laser safety, including a review of the relevant risk assessments.

12. To be prepared to attend the Optical Radiation Safety Committee when requested.
Appendix 3

Draft Letter of Appointment of Laser Protection Supervisors

From General Manager:

Dear [INSERT name of Laser Protection Supervisor]

Greater Glasgow and Clyde Health Board has endorsed the recommendation that you be appointed Laser Protection Supervisor for:

Hospital: [Insert name]
Department: [The Department where the functions and responsibilities will apply]
Laser(s): [Specify the laser(s) for which the responsibilities will apply]
Clinical Laser Expert(s): [Insert name(s) of all CLEs in area] (Responsible for advising on clinical aspects of laser procedures and practice)

The prime function attached to this appointment is:

To exercise close supervision of the work with the lasers listed above within the Department specified to ensure that the requirements of the MHRA document “Lasers, intense light source systems and LEDs – guidance for safe use in medical, surgical, dental and aesthetic practices”, other associated guidance and the 'Local Rules' are implemented in practice. Copies of the MHRA guidance may be obtained free of charge from https://www.gov.uk/government/publications/guidance-on-the-safe-use-of-lasers-intense-light-source-systems-and-leds

The Laser Protection Supervisor will have responsibility for supervising the overall safety of the laser environment but the clinician carrying out the procedure remains responsible for the safety of the patient.

Any concerns that cannot readily be resolved must be raised with the Clinical Laser Expert, Departmental Manager, and/or the Laser Protection Adviser.

More information on your functions and responsibilities as a Laser Protection Supervisor is contained in the accompanying sheet.

I should be grateful if you could confirm in writing your willingness to accept this appointment.

Yours sincerely,
Appendix 4

Draft Letter of Appointment of Clinical Laser Expert

From: Clinical Director

Dear [INSERT name of Clinical Laser Expert]

Greater Glasgow and Clyde Health Board has endorsed the recommendation that you be appointed as Clinical Laser Expert for:

Hospital: [Insert name]
Department: [The Department where the functions and responsibilities will apply]
Laser(s): [Specify laser(s) for which the functions and responsibilities will apply]
Laser Protection Supervisor: [Specify LPS responsible for supervision of safety]

The prime functions and responsibilities attached to this appointment are as follows.

To exercise supervision of the clinical work with lasers within the Department specified above.

To advise other users on clinical aspects of laser procedures and practice

To assist in the supervision and training of clinical laser users.

To advise on suitable training for clinical uses of lasers within your area.

To confirm the competence of all clinical laser users within your area of responsibility prior to their approval as laser Authorised Users by the Laser Protection Supervisor.

To ensure that authorised laser users within your area maintain their competence.

Any concerns that cannot readily be resolved must be raised with the Departmental Manager, Clinical Director, and/or the Laser Protection Adviser.

I should be grateful if you could confirm in writing your willingness to accept this appointment.

Yours sincerely,
Appendix 5

Draft Letter of Appointment of MR Responsible Person

From: General Manager, Diagnostic Imaging

Dear [INSERT name of Responsible Person]

Delegation of the day-to-day responsibility for MR safety to a specified MR Responsible Person

The MHRA in its Safety Guidelines for Magnetic Resonance Imaging Equipment in Clinical Use, April 2015, recommends that the chief executive or the general manager delegate the day-to-day responsibility for MR safety to a specified MR Responsible Person.

I therefore formally delegate these MR safety responsibilities to you for the following site:

[INSERT site]

Yours sincerely,

General Manager
Diagnostic Imaging
Greater Glasgow and Clyde Health Board