14. Use of medical devices in research

14.1 Background

Devices are used in research to either:

- **Support a study:** CE-marked medical equipment used as intended by the manufacturer as part of routine standard of care or used above the standard of care.
- **Be the focus of a study, that is a device-centred study,** which includes:
  - Clinical evaluations of CE-marked equipment, which is used as intended by the manufacturer to gather more data on, for example, the device's performance;
  - MHRA clinical investigations for commercialisation purposes; and
  - Pre-CE marking or for proof of concept (POC) studies to assess feasibility or intent – this may include using or altering CE-marked devices for a purpose not intended by the manufacturer outside its CE-mark indications. In these studies, there is no commercialisation intent, hence no MHRA involvement.

Medical Devices are utilised in research in several ways:

- Clinical Investigations and Clinical Evaluations may be conducted to test novel medical devices.
- Devices may be purchased or introduced on loan to enable research to be carried out.
- Existing devices may be altered for use in research or may be tested for a new purpose.
- Commercial devices may be tested for safety and efficacy as a potential means of improving practice.

The purpose of this policy is to ensure that:

- Devices used for research have undergone clinical physics governance and basic safety checks.
- Appropriate departments within Barts Health and Queen Mary are aware of and have approved the use of the device and the study.
- The risk associated with the use of experimental devices is minimised.
- Any incidents or near misses relating to experimental devices are reported using Barts Health incident reporting procedure.

This policy needs to be read in conjunction with the Trust's Decontamination of Medical Devices Policy[1]. Full details of Barts Health management of medical equipment can be found at: https://weshare.bartshealth.nhs.uk/trust-wide-policies

[1] Barts Health Environmental Cleaning and Decontamination of Medical and Non-Medical Devices Policy, December 2017: https://weshare.bartshealth.nhs.uk/trust-wide-policies

14.2 Background for Using Devices in a Clinical Setting

The Medical Devices Directive 93/42/EEC, the In Vitro Diagnostic Medical Devices Directive 98/79/EC, and the Active Implantable Medical Devices Directive 0/385/EEC have been implemented in the United Kingdom by the Medical Devices Regulations 2002 (SI 2002 No 618). [2]

The purpose of the medical devices directives is the harmonisation of technical standards and essential safety requirements to enable medical devices to be marketed freely throughout the European Economic Area.

Note: The current directives will continue to have effect in Great Britain after the transition period up until 2023, by which time a new regulatory system for medical devices (currently under development) will apply. For Northern Ireland and the EU, the new Medical Device Regulations 2017/745 (MDR) will apply from 26th May 2021. For further information, see https://www.gov.uk/guidance/regulating-medical-devices-in-the-uk.

Medical Device means "an instrument, apparatus, appliance, material or other article, whether used alone or in combination, together with any software necessary for its proper application, which:

a) Is intended by the manufacturer to be used for human beings for the purpose of:

- Diagnosis, prevention, monitoring, treatment or alleviation of disease.
- Diagnosis, monitoring, treatment, alleviation of or compensation for an injury or handicap.
- The investigation, replacement or modification of the anatomy or of a physiological process.
- Control of conception.

b) Does not achieve its principal intended action in or on the human body by pharmacological, immunological or metabolic means."

Scope of regulations

If a device is made by one legal entity for use on or by the patients of that same entity, there is no placing on the market and the Regulations do not apply.

When a health care establishment or other body manufactures devices intending to market them to another legal entity, as opposed to treating their own patients, MHRA would regard such manufacture as being covered by the Regulations.[3] This would include a transfer between Queen Mary and Barts Health. However, there are examples of medical devices being transferred between healthcare establishments where, although there is a transfer between legal entities, the product is not placed on the market.

Products manufactured in-house, in a healthcare establishment and undergoing testing for proof of concept, are considered medical devices. They are, therefore, subject to the provisions of the Medical Device Regulations. In circumstances where the in-house manufacture intends to commercialise the device, an application must be made (irrespective

[2] EU Directive 93/42/E of 14 June 1993 concerning medical devices In Vitro Diagnostic Medical Devices Directive 98/79/EC The Medical Devices Regulations 2002 No. 618

[3] The Medical Devices Regulations: Implications on Healthcare and other Related Establishments, Bulletin No. 18 Competent Authority (UK), February 2011.

of whether the manufacturer and subjects are part of the same legal entity).

If a clinical investigation is to be carried out, the investigator must ensure the Competent Authority is notified of a proposed clinical investigation. MHRA guidance notes [4] clearly set out procedures. Advice and guidance should always be sought from the JRMO.

The full details of Barts Health management of medical equipment can be found at: https://weshare.bartshealth.nhs.uk/trust-wide-policies

Barts Health and Queen Mary (through the JRMO) will review the Medical Device production and research activities to decide whether or not they are covered by the Regulations.

The JRMO in conjunction with the Clinical Physics Department will decide whether regulations apply. The following should be considered:

- Whether the product falls within the definition of "device".
- Whether the product is at such an early stage of development that the scope of its application and therefore its intended purpose has yet to be precisely defined.
- Whether the body making or developing the device falls within the definition of "manufacturer" in relation to that particular product.
- Whether the device is being "placed on the market".

For any activity that is identified as subject to the provisions of the Regulations, all relevant obligations must be identified and complied with. Even if it is decided that the activities in question are not subject to the Regulations on medical devices, there are Institutional responsibilities under the general law (including consumer protection legislation) and a responsibility to ensure the safety of patients, users and any relevant third party.

14.3 Policy

This policy is designed to ensure that Barts Health and Queen Mary meet their legal obligations concerning the use of medical devices in Clinical Research.

This policy follows Barts Health's existing guidance in the context of devices used in research. This policy applies to Barts Health and Queen Mary personnel using medical devices in research, regardless of the type of participant or setting.

It should also be noted that any devices that are developed 'in house' for research and are not on the market are not covered by any Medical device regulations and therefore, it is the responsibility of Barts Health or Queen Mary researchers to ensure that their use is safe and appropriate.

14.4 General Points

- All research that intends to use human subjects must have appropriate sponsorship, ethical and HRA approvals.
- MHRA regulated research must have the appropriate MHRA approval.
- All medical devices, whether used to carry out the research or developed as the

[4] MHRA-EC Medical Devices Directives Guidance Note 1 (Guidance for Manufacturers in Clinical Investigations to be Carried out in the UK, February 2012).

subject of research, must be registered with Barts Health Clinical Physics Department and JRMO.

- All medical equipment used in Clinical Trials of Medicinal Investigational Products (CTIMPs) must be registered with Barts Health Clinical Physics Department and JRMO to ensure that the equipment used is appropriately recorded and maintained.
- Any research involving Barts Health patients or staff using medical devices must seek advice and guidance from the JRMO and Barts Health Clinical Physics Department, who will on a case-by-case basis provide risk management and safety reviews.
- The Clinical physics department will keep a log of all medical equipment they test.
- Clinical Boards and Faculties must ensure that Clinical Physics are notified if the equipment is re-located.
- All experimental equipment intended for clinical investigations must be clearly labelled and registered as “Exclusively for clinical investigation” or 'For research only.'
- Medical equipment intended for research must not be used in routine clinical practice without the written approval of Clinical Physics.

14.5 Purchasing Equipment for Research

All equipment purchased for use in research, either by Barts Health or Queen Mary must go through the approved Barts Health or Queen Mary Procurement Process. This is designed to ensure that consideration of installation, consumables, training, staffing, maintenance and disposal costs are considered before a device is purchased. The selection process should also consider any risks associated with the use of the equipment. Additional risks could be introduced by equipment diversity i.e. where users are not trained to operate the range of equipment in use. Purchasers should aim to standardise the number and range of equipment in use. Decontamination processes and cross infection risks must also be considered. Researchers should always seek advice from Clinical Physics and Clinical Risk Departments before introducing a new piece of equipment.

Where a tendering process is required, Clinical Physics should be informed, and a tender specification approved. The department should also be involved in the final selection process.

Before any order is made, the Supplies Manager must ensure that a completed Pre-Purchase Questionnaire has been obtained from the Supplier and has been approved by Clinical Physics.

14.6 Equipment Loaned for Research

Although there is no prohibition on accepting loans, it is important that the arrangements are transparent and do not carry a longer-term commitment by Barts Health or Queen Mary or to the organisation making the loan. It is also important to understand and be clear about any expectations from the company that accompany the loan. Therefore, before entering into any agreement, researchers must consult the JRMO and Clinical Physics Department and:

(i) Ensure there is no commitment to buy or pay rental at the end of a specific period and that the company is aware that Queen Mary or Barts Health undertakes no commitment to purchase, even if the equipment proves itself in use.

(ii) Be clear about whether or not Barts Health or Queen Mary must pay for wear and tear. If expected, the amount should be specified in advance

(iii) Be clear about whether Queen Mary or Barts Health is expected to pay for any damage to the equipment whilst on loan and the maximum liability

(iv) Consider the cost of consumables and or maintenance etc. If revenue costs are how they will be funded must be clarified

(v) Be clear about other commitments from the loan, including time spent in talking/demonstrating the "product" to other potential purchasers and also the medico-legal, confidentiality and insurance issues associated with such practice.

(vi) Consider the overall value for money.

(vii) Follow Barts Health or Queen Mary Standing Orders on tendering and quotations for any purchases of consumables or associated items.

(viii) Clarify the position at the end of the loan period.

(ix) Be clear about the medico-legal position particularly on any additional risks to individuals, Barts Health or Queen Mary.

(x) Discuss and secure the agreement for the loan with the relevant Clinical Director and General or Institute Manager.

(xi) Ensure the equipment is clearly labelled as "on loan & from whom" and does not become confused with Barts Health assets. It must not be included on the Barts Health or Queen Mary asset register.

(xii) Ensure appropriate indemnity cover is in place for any loan devices. Loan indemnity cover can be obtained via two routes:

a. Master Indemnity Agreement (MIA) – this has been set up by the Department of Health who maintains a register of approved suppliers. For further details, see https://www.gov.uk/government/publications/master-indemnity-agreement-mia. A copy of any completed forms should be sent to Clinical Physics (research.clinicalphysics@nhs.net).

b. Model Clinical Trial Agreement (mCTA) - If a supplier is not on the MIA register and does not want to join it but still wants to supply the Trust with loan equipment, contact the JRMO office to check if the equipment used is covered within appendix 7 of the mCTA.

If there is no indemnity cover (either via the MIA or Appendix 7 of the mCTA), contact the JRMO for advice.

(xiii) Any loan items **must** be returned to the supplier at the end of the study and Clinical Physics informed so records can be updated.

Finally, it is important to undertake a full evaluation of the equipment to assess its effectiveness and suitability. A report should be compiled for the benefit of other staff both in the directorate/ institute and other directorates/institutes that might be interested.

If subsequently the decision is taken to purchase the equipment or enter into some other financial arrangement, then Barts Health or Queen Mary's business case rules apply.

14.7 Safety Testing for clinical research in a hospital setting

Any requests for safety testing should first be sent to Clinical Physics who will first review the study. Once the review has been performed and safety testing is indicated, any new portable devices for use in Barts Health or on Barts Health patients or staff must be delivered to the relevant Clinical Engineering Workshop. Non-portable equipment should be delivered to the user site and Clinical Physics informed. Electrical safety testing will be performed on any

new medical equipment that is electrically powered and the device(s) will be registered on the service's equipment database. Depending on capacity and capability, any relevant function testing may be performed. This will be carried out in-house. If Clinical Physics is unable to perform any functional testing, researchers are expected to contact the Supplier/Manufacturer to carry out the appropriate tests. Any tests and checks performed by Clinical Physics will be documented and held by Clinical Physics.

14.8 User Training

Before equipment is used the Investigator must ensure that all staff are adequately trained in its use and this training is documented. They must also ensure that user manuals and operating instructions are available locally. No member of staff should use the equipment until they are declared competent to do so. If user instructions are produced by the Clinical Board or Faculty rather than the manufacturer, their adequacy must be checked by Clinical Physics (depending on capacity and capability).

14.9 Maintenance

Researchers must be clear who provides maintenance for any equipment used in research. Costs of maintenance of equipment should be sought from the funder. Maintenance will normally be carried out to the manufacturer's recommendations. Where maintenance is carried out to a lower level than specified by the manufacturer, the reasons for the change should be documented and a risk assessment carried out. All external organisations providing maintenance services must be accredited to a recognised quality assurance standard by an appropriate accreditation body. Details of all maintenance should be recorded, and records kept for a minimum of 11 years after the disposal of the equipment or 25 years after the end of the research, depending on which period is longer.

14.10 Risk Management

All equipment to be used in clinical interventions must be capable of disinfection unless it is designated as single use. No single-use item may be re-used under any circumstances. Researchers are advised to seek advice from Sterile Services in this respect.

All experimental devices, that is, new products or amended existing products, must be subject to a review by Clinical Physics, who will, on a case-by-case basis perform risk management and safety reviews. It is strongly recommended that investigators/researchers involve Clinical Physics from the concept forming phase of research to minimise delays (and the risk of rejection).

In the event of an incident or near-miss involving research equipment, the Clinical Risk Department must be notified through the normal channels. Where the device is the subject of the research, the Ethics Committee and the JRMO should also be informed. Barts Health and Queen Mary incident reporting policies should be followed.

14.11 Storage of Devices

Custodians of equipment and investigators should ensure that medical devices are stored according to the manufacturer's instructions. Where a device is experimental, advice on storage should be sought from the Clinical Physics Department. No experimental devices should be stored in a way that may lead staff to believe they are for routine clinical use, i.e. they should be clearly identified as being for research purposes only and be stored separately.

14.12 Disposal of Devices

Medical Equipment that is no longer in use or has been replaced should be disposed of through Clinical Physics / Equipment. It should also be removed from the equipment inventory. Any radioactive substances should be disposed of according to the Radioactive Substances Act, 1993 and the Radiation Protection Officer advised.

14.13 Requirements for Clinical Investigations and Clinical Evaluations

- All research studies which may be Clinical Investigations or Clinical Evaluations must be notified to the JRMO GCP team.

  Note: As defined in the EU Medical Device Regulations (MDR 2017/745):

  - 'Clinical evaluation' means a systematic and planned process to continuously generate, collect, analyse and assess the clinical data on a device to verify the safety and performance, including clinical benefits, of the device when used as intended by the manufacturer;

  - 'Clinical investigation' means any systematic investigation involving one or more human subjects, undertaken to assess the safety or performance of a device.

  Such studies apply to:

  - a medical device that does not have a CE-mark or UKCA-mark.
  - a medical device for a novel purpose not covered by its existing CE-mark or UKCA-mark.
  - the generation proof-of-concept data about a medical device that will be used to commercialise the device or obtain a CE/UKCA-mark for the device.

- When setting up a research study involving a medical device, the Chief Investigator must provide sufficient documentation to evidence that MHRA approval is not required, or else set up the study as a Clinical Investigation/ Clinical Evaluation.

- The JRMO GCP team must be notified of grant applications for proposed Clinical Investigations and Clinical Evaluations before the grant is submitted. This is to ensure that all of the costs required for regulatory compliance can be included in the grant budget.

- Before initiating a Clinical Investigation or Clinical Evaluation, the Chief Investigator or device manufacturer must maintain a technical file with all of the necessary pre-clinical development and testing and other documentation necessary for the device to obtain a CE/UKCA-mark after the Clinical Investigation has been completed.

- All Clinical Investigations must have a statistician and a non-academic study coordinator on the study team for the duration of the study.

- All Clinical Investigations must have a named device manufacturer. Neither Barts Health nor Queen Mary may act as a device manufacturer, so an external collaborator must be contracted to take on the role of the device manufacturer.

- Clinical Investigations must be run in compliance with ISO 14155 GCP. All staff working

on Clinical Investigations must complete ISO 14155 GCP training before commencing work. All staff must refresh their training every two years while working on a Clinical Investigation.

- All relevant JRMO SOPs must be followed to set up and manage the Clinical Investigation or Clinical Evaluation.

This policy applies to both Barts Health and Queen Mary.