James Paget University Hospitals NHS Foundation Trust (JPUH)

REQUIREMENTS SPECIFICATION

Diagnostic Imaging Managed Equipment Service (MES)

Contents

1. Introduction 3
2. Challenges 3
3. Equipment - General 4
4. Equipment - Specifics 5
5. Accommodation 6
6. IT (Information Technology) 7
7. Strategies 7
8. Support & Maintenance 8
9. BCDR (Business Continuity & Disaster Recovery) 10
10. Training 10
11. VFM (Value For Money) 11
12. Consumables 11
13. Risk Management 11
14. Insurance 12
15. Safety 12
16. Taxation 12
17. Project Management 12
18. Timescales 12
19. Finances 13
20. Configuration Management 13
21. Other 13
22. Document Version Control 13
23. Appendix A – Equipment List 14
24. Appendix B – MRI Demand 15
25. Appendix C – MRI Accommodation 16
26. Appendix D – MRI Scanner Specification 20

1. Introduction

The James Paget University Hospitals NHS Foundation Trust (JPUH) is investigating the feasibility and costs of managing key Diagnostic Imaging (Radiology) department equipment as a Managed Equipment Service (MES), in comparison to a conventional capital and revenue based model.

The outsourcing of non-core activities (typically equipment support & maintenance) is common in large organisations that seek to transfer risk to a third-party organisation better able to manage it. Moving to an MES enables the Trust management to concentrate on its core role of providing a high standard of clinical services to patients. An MES will ensure patients and clinicians have access to the highest standard of equipment, hence reducing clinical risk and increasing productivity.

The MES supplier will provide the expertise to purchase, install, train users, manage and maintain a portfolio of medical Radiology equipment on a long-term basis. The MES provider will own the equipment.

It is assumed the MES supplier will be able to provide a high standard of service at a cost effective price.

The MES supplier will finance the cost of the MES. The Trust will pay a single monthly unitary charge for the MES.

It is likely, though subject to agreement, that legacy Trust assets will be transferred to the MES supplier on the first day of the contract and at the end of the contract any remaining assets transferring to the Trust will be at their Net Book Value (NBV).

For modelling purposes the MES contract is assumed to start in 2019.

This document sets out the background, challenges, expectations and specific requirements of the JPUH in moving to an MES. As far as is practicable the requirements are written in terms of output specifications (i.e. the required outcomes or outputs, rather than the mechanics of delivery) to encourage the MES supplier to propose innovative solutions.

The requirements are prioritised using the 'MoSCoW' nomenclature:

M(o) = 'Must Have' – critical to the successful delivery of the MES.
S = 'Should Have' – important but not necessarily critical to the delivery of the MES.
C(o) = 'Could Have' – desirable, but not necessary for the delivery of the MES (included in MES if resources allow).
W = 'Won't Have' – not critical to MES delivery. Place holder, to be delivered later or not at all.

Clarification or useful information is shown as: INFO.

2. Challenges

The JPUH faces the following challenges:

- Continual growth in demand for Radiology services (especially MRI (Magnetic Resonance Imaging)).
- Insufficient capacity to handle current demand (especially MRI).
- Ageing equipment (especially MRI).
- Requirement for significant new build to provide an MRI suite.
- Limited capital.

The JPUH is seeking from the MES supplier:

- Equipment provision, replacement, support & maintenance, and training.
- Equipment lifecycle replacement aligned to appropriate guidelines.
- An investment plan to ensure financial stability.
- Reduced risk in terms of financial planning, equipment availability and support.
- Improvements in patient experience (up to date equipment, sufficient to address demand).
- Enhanced working environment (especially in relation to availability, support & maintenance).

The JPUH has identified the following Critical Success Factors (CSFs) for the MES contract:

CSF1 - Must meet current and future predicted demand. Including equipment/banding details.
CSF2 - Equipment (existing and new) provided under MES must interface with JPUH IT systems CRIS and PACS.
CSF3 - Contract must allow for changes in predicted demand and in equipment/banding. Requires bench-marking/market testing to be part of the contract.
CSF4 - Must include accommodation (limited to MR scanners).
CSF5 - 7-day cover (availability and support & maintenance) is required for some equipment.
CSF6 - Contract must include technology refresh (replacement) in line with best-practise/manufacturers guidance.
CSF7 - Contractually binding timescales/plans for equipment and accommodation to be part of the MES contract.
CSF8 - MES contract for 15 years.
CSF9 - Robust support & maintenance agreement in place.
CSF10 - MES must represent VFM for the Trust.
CSF11 - Must be able to specify exact equipment type where appropriate.
CSF12 - MES supplier must be reputable company.
CSF13 - Must be possible to novate existing contracts.

3. Equipment - General

The current and likely future Radiology department equipment is shown in Appendix A. The list includes indicative life and replacement dates for the equipment, and key service requirements.

The demand for MRI scanners is documented in Appendix B.

Ref	Requirement	MoSCoW
E1	The MES supplier will provide costed options for including some or all of the Radiology department equipment as part of an MES.	M

	As a minimum the following options MUST be provided: • 3 x MRI scanners – with and without MES supplier provided Radiology staffing. • All Radiology equipment – with and without MES supplier provided staff for the 3 MRI scanners, and including implementation approach ('big bang' or phased deployment into the MES contract). All options MUST include new MRI accommodation build for the three MRI scanners in a new MRI suite (see accommodation requirements in section 5).	
E2	Options identified in 1.1 must be detailed and costed for an MES contract running 10, 15 or 20 years.	M
E3	At the start of the contract the MES supplier detail how it will assist in identifying the equipment needs of the Trust. Each item of equipment will be allocated to an appropriate equipment 'band' (usually one of 4 bands – each representing a particular level of capability and together with details of the specific equipment makes and models available in each band).	M
E4	The MES supplier must detail how they will provide an innovative and efficient MES solution for the Trust.	M
E5	The MES supplier must detail how it will act as a partner to the Trust management and assist in recommending the most cost effective approach to managing the equipment base.	M
E6	The MES supplier must detail how it will provide a 'best of breed' solution at the start of the contract and at times of new or equipment refresh. Note// This implies, but does not necessarily require, a 'vendor independent' approach to equipment provision.	M
E7	Detail how generic equipment output based specifications will be jointly developed by the MES supplier and Trust to agree the level and type of technology required for any new and/or replacement equipment.	M
E8	Prior to commencing the service the MES supplier will provide an investment plan covering the life of the contract – this will identify all items of equipment, the technology band and the replacement dates.	M
E9	The MES supplier will detail how the Trust will have input to the decision making process on the specifics of new/replacement equipment selected. Note// The Trust will have the final decision on any new item of equipment.	M
E10	The MES supplier will detail how the MES contract provides for Benchmarking and/or Market Testing to ensure continued VFM.	M
E11	The MES supplier will detail how the Trust may go about requesting additional equipment or to change the band of an item of equipment. Including use of Benchmarking and/or Market Testing to ensure continued VFM for the Trust.	M
E12	When equipment is replaced, as determined by the investment plan, a new item will be selected from the currently available equipment in the same band. The investment plan must be flexible allowing the Trust to request new additional equipment or to change the band of an item of equipment.	M

4. Equipment - Specifics

ES1	MRI: Additional MRI equipment and MRI accommodation is a critical requirement for the Trust (see requirement E1). Results of analysing demand (Appendix B) indicates that the Trust will need 3 MRI scanners within 5 years and possibly a 4th MRI scanner within the life of the MES contract. The new MRI suite is to provide accommodation for 4 MRI scanners (3 + 1 spare for anticipated growth beyond the 5 years). An indicative specification for the new MRI scanners is detailed in Appendix D – but this is subject to agreement with the Trust as part of requirement E3.	INFO
ES2	Ultrasound (U/S): significant increase in obstetrics U/S – two new rooms may be required by end of 2019 – lack of space requires they may be positioned in the community e.g. GP surgeries. Other U/S modalities increasing at approximately 3% per annum.	INFO
ES3	X-Ray: significant demand on mobile fluoroscopy from theatres and endoscopy – extra machine may be required. Room 6 potentially becomes a Fluoroscopy room and this facility will be critical to the Trust. DEXA machine – x-ray tubes not currently included in support contract. Support for the majority of X-Ray equipment is with a third-party company – but not rooms 4 and 6.	INFO
ES4	X-Ray tubes (for DEXA and other machines) must be included as part of the MES support and maintenance contract.	M
ES5	Need for a dose management system solution. Such a system collects data directly from X-Ray equipment and enables clinicians to develop dose management practises, improve patient radiation dose levels during imaging, and permits statistics across the entire X-Ray equipment suite to be easily and rapidly obtained.	C
ES6	CT: 3rd scanner likely to be installed in 2019. Anticipate 3 CT scanners will provide sufficient capacity for 10 years. Accommodation for 3rd scanner undecided – perhaps make use of spare 4th MRI scanner position in new MRI suite. 3rd CT scanner needs to support whole brain perfusion.	INFO
ES7	Where possible it is preferably to have an engineer available when calling in with an incident/fault, rather than call centre staff.	S
ES8	Breast Imaging: demand relatively static. Consumables include: biopsy needles, gloves, etc.	INFO
ES9	Spare or loan BI probes to be readily available – as they degrade/fail whilst the machine itself is OK.	M

5. Accommodation

The new MRI Suite is intended to be part of the JPUH Site Development & Estate Strategy vision for an Outpatient Facility (Village). As a new build the MES supplier will be required to either: 1) provide a complete design and new build of the MRI Suite, or 2) fitting out only of a new building shell.

A1	The MES supplier will provide two MRI suite options: • A full design and build. • Fitting out only of a building shell.	M

A2	The MES supplier will detail how they will interface to the Radiology department management team to develop a detailed requirement for the MRI suite. Note// An initial high-level requirement for the MRI suite is detailed in Appendix C.	M
A3	The MRI suite must have the capacity for 4 x MRI scanners (exact specification of the equipment to be agreed as part of equipment requirements).	M
A4	The MES supplier will detail how the MRI suite design, planning and build will happen in the conjunction with the JPUH Estates department, taking due account of the JPUH Site Development & Estate Strategy.	M
A5	Based on the anticipated equipment requirements over the life of the MES contract the MES supplier must include, at no extra cost, any necessary building work/fitting out of the room where new/replacement equipment is to be located. Note// Apart from the MRI suite no other new build is anticipated during the life of the MES contract.	M
A6	Where a new building is required for a new item of equipment the MES supplier will detail the process to be followed, including Benchmarking and/or Market Testing to ensure continued VFM for the Trust.	S

6. IT (Information Technology)

IT1	Equipment must interface with Sectra PACS and Healthcare Software Solutions CRIS systems.	M
IT2	The MES supplier must detail how they will ensure all equipment conforms to the Trusts' IT security policy (this will require satisfactory completion by the MES supplier of the Trust's Cyber Security Compliance form).	M
IT3	For remote equipment diagnostics the MES supplier must detail how they will ensure all non-NHS staff, equipment, processes and procedures conform to the Trusts' IT security policy (this will require satisfactory completion by the MES supplier of the Trust's Cyber Security Compliance form).	M
IT4	The MES supplier will detail how they will ensure equipment is upgraded to the latest version of software, firmware and security patches in a timely fashion.	M
IT5	The MES supplier will ensure systems are in place for ensuring equipment upgrades are received and distributed promptly.	M
IT6	The MES supplier must detail the measures they will undertake to ensure cyber security. Specifically how they will ensure the protection of the MES equipment from theft or damage to their hardware, software and electronic data, as well as from disruption or mis-direction of the services they provide.	M

7. Strategies

The MES supplier is required to take account of the following strategic initiatives:

ST1	JPUH Diagnostic Imaging Department Strategy.	M

ST2	JPUH Site Development & Estate Strategy.	M
ST3	NIA (Norfolk Imaging Alliance).	M
ST4	JPUH Clinical Services Strategy.	M

8. Support & Maintenance

The MES supplier will be responsible for all equipment maintenance. It will put in place contracts for the supply of parts and preventative maintenance with the appropriate equipment manufacturers.

Where the MES provider carries out any maintenance itself, fully trained and certified personal must be used.

The details contained in this section, especially where they relate to response/KPI (Key Performance Indicator) times, are subject to negotiation and agreement.

SM1	The MES supplier must conform to an ITIL (Information Technology Infrastructure Library) aligned or equivalent process for service management.	M
SM2	The MES supplier will provide a single point of contact for all equipment incidents, problems and service requests.	M
SM3	The MES supplier must provide the following channels: • A single telephone number for logging calls. • A single email address for logging calls. • A Web Portal for logging and managing calls.	M
SM4	In line with the equipment specifications identified in sections 3 and 4 the MES supplier must offer the following hours of support: • 24x7 (365 days per year). • 08:00 to 18:00 Monday to Friday (excluding Bank Holidays). Other hours of support may be agreed. During these hours the full set of support services must be available.	M
SM5	Regardless of hours of support for a particular item of equipment, it must be possible to log a call using any of the methods described in SM3 24 hours a day, 7 days a week.	M
SM6	All calls are to be given an agreed priority in conjunction with the person reporting the incident. The priority levels are to be agreed, but as a minimum they will include: • Level 1: Critical incidents – equipment is unusable. • Level 2: Non-critical – equipment is usable but some functionality/capability is unavailable.	M
SM7	Where incidents are notified by telephone the following KPI applies: • 95% of calls will be answered within 10 seconds. • 100% of calls within 20 seconds.	M
SM8	Where incidents are notified by email or via the Web Portal the following KPI applies: • 95% will receive a response within 30 minutes. • 100% will receive a response within 60 minutes.	M
SM9	The MES supplier will ensure remote diagnostics for equipment is enabled and detail how they will ensure all non-NHS staff, equipment, processes and procedures conform to the Trusts' IT security policy (this will require	M

	satisfactory completion by the MES supplier of the Trust's Cyber Security Compliance form).	
SM10	Depending on the type of incident, when an engineer is required on site or remote diagnostics are required the following KPI applies: • Critical incidents – engineer on-site/remote diagnostics start – 95% within 4 hours, 100% within 6 hours. • Non-critical incidents – engineer on-site/remote diagnostics start – 95% within 6 hours, 100% within 8 hours.	M
SM11	Rectification/fix time KPI: • Critical incidents – 95% fix within 4 hours, 100% within 6 hours. • Non-critical – 95% fix within 6 hours, 100% within 8 hours.	M
SM12	Where an item of equipment cannot be repaired within a reasonable time (equipment unavailable > 2days) and is identified in section 3 (Equipment) as being suitable, a loan item will be provided of similar specification and performance.	S
SM13	The availability of each item of equipment KPI is defined as: • >98% availability during support hours (excluding planned downtime), measured over one reporting period (typically 1 month).	M
SM14	Planned downtime KPI is defined as: • <5% of availability during support hours, measured over one reporting period (typically 1 month).	M
SM15	Where a new item of equipment has been installed and has >=6 breakdowns in any one reporting period, or not achieved its Availability figure for two consecutive reporting periods, within a period of 3 consecutive reporting periods from new the equipment will be replaced with an identical new machine at the MES suppliers' expense. Except where the manufacturer's terms exceed these requirements – in which case the manufacturer's terms will apply for faulty new equipment.	M
SM16	Preventative maintenance KPI: • 95% of planned maintenance must be completed within the scheduled month. • 100% of planned maintenance must be completed within the month immediately following the scheduled month.	M
SM17	The MES supplier must maintain service records and make these available to the Trust if required.	M
SM18	The MES supplier, as part of the ITIL methodology, will operate a Continuous Service Improvement (CSI) process using a metrics driven approach to identifying opportunities for service improvement and to measure the impact of improvement efforts.	M
SM19	The MES supplier will provide regular service reports (aligned with reporting periods) to the Trust and organise and attend service management meetings. The report will detail as a minimum: • Up to date asset list of all MES equipment. • Availability, planned downtime and unplanned downtime of each item of equipment. • Performance against KPIs. • Statistics relating to incidents, problems and other service requests.	M

	• Any service credits due to the Trust. • CSI update.	
SM20	The MES supplier will detail the service credits due to the Trust where any of the service KPIs are not achieved.	M
SM21	The MES supplier must ensure all hardware and software updates are applied in accordance with manufacturer's requirements.	M
SM22	The MES supplier must comply with applicable legislation, regulations, standards and Trust policies and procedures. This is particularly important for MES supplier or sub-contract staff on site at JPUH premises.	M
SM23	Where the Trust believes support is inadequate the MES supplier must detail their management escalation path, including names, responsibilities, telephone and email contact details.	M
SM24	The MES supplier must indicate how they will ensure support, as part of an MES contract, is as timely as that directly available from the equipment manufacturer i.e. during warranty period.	M
SM25	X-Ray tubes (for DEXA and other machines) must be included as part of the MES support and maintenance contract.	M

9. BCDR (Business Continuity & Disaster Recovery)

BCDR1	The MES supplier must, within 3 months of contract agreement, develop, review, test and maintain a BCDR (Business Continuity & Disaster Recovery) plan in respect of all items of MES equipment and the services it provides as part of the MES contract e.g. help/service desk.	M
BCDR2	The MES supplier must detail how this BCDR plan will interoperate with any relevant BCDR plans of the Trust and any sub-contractors.	M
BCDR3	The BCDR plan must as a minimum: • Describe how the BC and DR elements link to each other. • How the BCDR plan is invoked. • Communication paths in the event of a BCDR event. • How services are to be provided at all times during and after the BCDR event. Including details of alternative processes and equipment. • The various levels of BCDR events and action to be taken.	M
BCDR4	The BCDR plan must be amended and updated as a result of changes to the MES contract and equipment.	M

10. Training

TR1	The MES supplier must provide training to Trust employees in the use and safe operation of any new or replacement MES equipment.	M
TR2	The MES supplier will detail how they will support the Trust in ensuring staff using the equipment are trained to the necessary standard.	M
TR3	The MES supplier will maintain training records for staff of the Trust.	M
TR4	Where incidents are logged as a result of poor or inadequate training the MES supplier, in conjunction with Trust management, will identify and address the problem.	M

11. VFM (Value For Money)

VFM1	The MES supplier must detail evidence that will allow the Trust to assess the VFM on offer for this MES contract i.e. optimal use of resources to achieve the intended outcome. Specifically, the Trust is seeking evidence of: • Economy – minimising the cost of resources used or required (spending less). • Efficiency – the relationship between the required services from the MES and the resources required to produce them (spending well). • Effectiveness – the relationship between the intended and actual results of the spend and outcomes (Spending wisely).	M

12. Consumables

The MES supplier will be responsible for the stock management of all consumable items required for the equipment under the MES contract.

C1	The MES supplier will detail the arrangements for the management of all consumables associated with the MES equipment and used by the Trust staff in day-to-day operation.	M
C2	Optimum stock levels are to be maintained.	M
C3	The MES supplier will provide advice and guidance to the Trust to ensure the efficient use of consumables.	M
C4	The MES supplier will manage the consumable suppliers.	M
C5	The MES supplier will detail to the Trust how consumables are to be managed to ensure the MES contract is tax efficient i.e. saving of VAT implications.	M

13. Risk Management

R1	The MES supplier must detail the risks transferred from the Trust to the supplier as a result of establishing the MES. These are likely to include, but not be limited to: • Changes in cost of equipment or maintenance. • Equipment availability and uptime. • Ensuring safety notices are correctly actioned. • Maintaining accurate equipment records. • Cost of spare parts. • Recruitment and retention of expert staff (where appropriate). • Building specification, design and project management. • Quality or suitability problems. • Payment to equipment suppliers and other third-parties.	M
R2	The MES supplier must detail those risks that remain with the Trust once the MES is in place and what action the Trust can take to mitigate such risks.	M

14. Insurance

I1	The MES supplier must detail the insurance in place for the MES contract, including but not limited to: • Equipment loss or damage. • Third-party and employee liability. • Professional indemnity (for advice provided to the Trust by the MES supplier).	M

15. Safety

S1	The MES supplier to confirm that they adhere to all relevant safety standards applicable to the MES equipment and any services as part of the MES contract. These standards as listed or provided by, but not limited to: equipment manufacturers, NHS, The Royal College of Radiologists, The Society of Radiographers and the Health and Safety Executive.	M

16. Taxation

TX1	In identifying various MES options the MES supplier must provide expert guidance to the Trust to ensure the contract is tax efficient, especially with regard to the possibility of reclaiming VAT (Value Added Tax). This includes maximising VAT recovery, to ensure VAT compliance and to minimise the risk of any VAT penalties being imposed upon the Trust.	M

17. Project Management

The MES supplier will be responsible for project managing the entire lifecycle of the project to establish, operate and finally close the MES contract with the Trust.

PM1	The MES supplier must conform to a PRINCE2 aligned or equivalent process for the project management of its resources and deliverables.	M
PM2	As part of the project management methodology, the MES supplier will ensure: • Detailed plans are produced. • Governance arrangements are clearly stated, including escalation paths. • Regular reporting on progress to Trust representatives. • Establishment of issue and change management processes.	M
PM3	The MES supplier will work closely with Trust teams (Trusts' own project management team, legal, procurement and Radiology departments) and other departments and third-parties as required.	M

18. Timescales

T1	The MES supplier will provide plans for the negotiation, agreement and operation for the MES service with the Trust.	M

T2	Within two years of contract signing the additional MRI capability must be in place and available to the Trust to use.	M

19. Finances

F1	Procurement of all equipment forming part of the MES will be undertaken by the MES supplier.	M
F2	The MES supplier will detail their MES investment plan covering the full duration of the MES contract including how they intend to secure the necessary funding (own resources or borrowing).	M
F3	The MES supplier will detail how any financial risks associated with the investment plan are to be handled e.g. any loans under-written by major financial institution.	M

20. Configuration Management

CM1	The MES supplier will maintain full documentation of all MES equipment and configuration.	M
CM2	The MES supplier will maintain a database of assets, tracking their movements and maintenance history.	M
CM3	The MES supplier will undertake regular audits to ensure the configuration data is reliable.	M

21. Other

O1	Where appropriate the MES supplier will undertake the novation of support and maintenance agreements for existing Trust equipment that will form part of the MES contract.	M
O2	The MES contract should be flexible to allow additional equipment to be added without financial penalty (including equipment from other Trusts) at a later time.	M
O3	The Trust must be able to terminate the MES contract at any time by giving appropriate notice. Reasons for termination will include, but not be limited to: inadequate or non-performance by the MES supplier. The Trust may require the MES supplier to assist the Trust in the seamless and effective transition to alternative arrangements.	M

22. Document Version Control

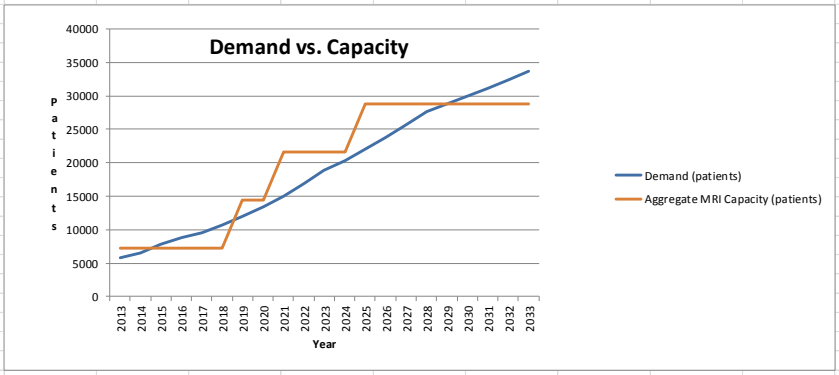
Version	Date	Author	Reason	Distribution
0.1	31/8/18	S Johnson	First draft.	
0.2	4/9/18	S Johnson	Various amendments.	Project team.
1.0	5/9/18	S Johnson	First issue. Various changes following review by project team.	Project team + external.

23. Appendix A – Equipment List

Please see separate list of equipment (‘MES Equipment List 10’).

24. Appendix B – MRI Demand

Year & Demand:				Main MRI:					Scanners:
MES Contract	Year	Demand (patients)	% increase on previous year	1st MRI Capacity (patients)	2nd MRI Capacity (patients)	3rd MRI Capacity (patients)	4th MRI Capacity (patients)	Aggregate MRI Capacity (patients)	Number MRI scanners required
	2013	5753		7200				7200	
	2014	6569	14%	7200				7200	
	2015	7755	18%	7200				7200	
	2016	8838	14%	7200				7200	
	2017	9545	8%	7200				7200	
	2018	10690	12%	7200				7200	
Year 1	2019	11973	12%	7200	7200			14400	2
Year 2	2020	13410	12%	7200	7200			14400	2
Year 3	2021	15019	12%	7200	7200	7200		21600	3
Year 4	2022	16822	12%	7200	7200	7200		21600	3
Year 5	2023	18840	12%	7200	7200	7200		21600	3
Year 6	2024	20347	8%	7200	7200	7200		21600	3
Year 7	2025	21975	8%	7200	7200	7200	7200	28800	4
Year 8	2026	23733	8%	7200	7200	7200	7200	28800	4
Year 9	2027	25632	8%	7200	7200	7200	7200	28800	4
Year 10	2028	27682	8%	7200	7200	7200	7200	28800	4
Year 11	2029	28790	4%	7200	7200	7200	7200	28800	4
Year 12	2030	29941	4%	7200	7200	7200	7200	28800	4
Year 13	2031	31139	4%	7200	7200	7200	7200	28800	4
Year 14	2032	32384	4%	7200	7200	7200	7200	28800	4
Year 15	2033	33680	4%	7200	7200	7200	7200	28800	4



Assumptions

1. Previous 5 years analysed (2013 to 2018).
2. Demand = number of patients referred for MRI scan.
4. House of Commons/NHS Key Statistics/England May 2018. Page 18: number of MRI tests has increased by 59% in 5 year period.
5. Report form the Clinical Imaging Board/Magnetic resonance imaging (MRI) equipment, operations and planning in the NHS. April 2017. The mean anticipated increase in workload is 13%.
6. STP Capital Scheme Bid. MRI STP average 5 year growth rate 13.9%. MRI England average 5 year growth rate 9.7%. Predicted to continue next 3 to 5 years.
7. Use 12% as annual growth figure for MRI scans 2019 to 2023. 8% 2024 to 2028. 4% 2029 to 2033.
8. Main MRI scanner can handle 20 patients per day. Typically = 420 pts/month (21 day month) = 600 pts/month (30 day month).

25. Appendix C – MRI Accommodation

OUTLINE MRI ACCOMMODATION SPECIFICATION

1. Introduction

This document is a very high-level draft outline specification for the accommodation suite requirements of the JPUH MRI scanners developed as part of the proposed move of the Diagnostic Imaging/Radiology department to an MES (Managed Equipment Service).

Its intended use is purely to assist potential MES suppliers in developing indicative costs and timescales for input to the business case. This specification is not meant to replace a fully specified building requirement or design.

It is subject to change without notice.

2. Core Requirements

The new MRI suite will be designed and built in accordance with the relevant building standards and regulations. These include NHS Estates Health Building Notes (especially HBN6 – Facilities for diagnostic imaging and interventional radiology).

Designed in accordance with JPUH Estates strategy.

Potential to accommodate 4 MRI scanners (though not all scanners will be installed from day one).
Cater for in-patients, out-patients, adults and children attending Radiology clinics.
Physically attached to the JPUH main building to allow trolley and wheelchair access between departments.

Fully compliant with anti-discrimination law (Disability Discrimination Act 1995/Equality Act 2010).

3. Rooms/Areas

The following may be separate rooms or areas within the new MRI suite:

3.1 Reception desk room/area
- With access to private room/area for discussing sensitive/difficult matters.
- Include storage area for patient records.

3.2 Main and sub-waiting room/area for patients
- Min 10 seated + 3 wheelchair.
- Separate bed wait area – min 3 beds.
- This could be shared across all 4 scanners or separate waiting areas for each scanner.

3.3 Patient preparation room/area
- Patient preparation/anaesthesia and recover area/room – for those patients requiring heavy sedation or anaesthesia.
- Patient changing facilities, including disabled.

- Lockers available to patients (if required to change clothing), with MRI-safe keys which can be retained by the patient when in the examination/scanning room.
- Located close to examination/scanner rooms.
- A separate facility may be required for children.
- To accommodate how many individuals at any one time – tbc.

3.4 Control room/area

- To house the Radiographers and other healthcare professionals during patient scanning.
- To house the computer screens and equipment for the operation of the scanners. And RIS and PACS systems.
- Ability to see down the centre of the scanner and the whole of the room via RF-window.
- Located adjacent to the examination/scanning rooms.
- This could be one control room for all 4 examination/scanning rooms, or 4 separate control rooms.
- To accommodate how many individuals at any one time – tbc.

3.5 Examination/scanning rooms (Magnet rooms)

- 4 rooms, one per MRI scanner.
- Designed in accordance with appropriate MRI standards/guidelines.
- Facilities for cryogenic magnets.
- Storage for receiver coils.
- Gas alarms.
- Faraday cage, RF and magnetic shielding.
- Design must allow for the installation and removal of the entire scanner.
- Airflow/ventilation systems.
- Ability for the patient/Radiographer to converse during the scanning. Including patients with hearing impairment.
- Music/TV systems for the patient during prolonged periods of scanning.
- Maximum eight people in the room – tbc.

3.6 Engineering/technical/plant room/area

- Including but not limited to gradient coil cabinets and RF generator.
- Located adjacent to the examination/scanning rooms.
- To accommodate how many individuals at any one time – tbc.

3.7 Reporting room/area

- Facilities for the clinical interpretation of the images obtained.
- To house the reporting computer screens and equipment.

3.8 ‘Hot desk’ room/area

- For visiting healthcare professionals.

3.9 Administration/Managers room/area

- Number of staff in this room – tbc.

3.10 Counselling/Interview room/area

- Could be combined with the private area for Reception desk room/area – tbc.

3.11 Storage room/area

- Storage of wheelchairs and trolleys (mixture of MRI-safe and non MRI equipment)

3.12 Other

- Patient and staff w/c, including disabled.
- Cleaners store cupboard.
- Hand-wash facilities.
- Storage for supplies.
- Controlled drugs store/cupboard.
- Piped medical gases.
- Electrical power sockets, intercom, network and telephone points.
- Water supply and sluice/waste facilities.
- Power for MRI scanners.
- Linked with JPUH infrastructure services.
- Linen store.
- Cannulation area/room.
- Staff room + lockers.
- Staff changing room.
- Vented helium store.
- Resuscitation bay – incorporate with Patient preparation area/room – tbc.

4. Room Sizing

Suggested room sizes are shown in the following table:

Room description	Width (m)	Depth (m)
Examination (magnet) room	6	10
Engineering/plant room	5	3.5
Control room	5	4
Waiting room	6	12
Bed wait	5	12
Reception and appointments	4	7
Cannulation room	4	5
Controlled area	3	18
Anaesthetic room and store / resus	10	5
M&SE store	3	4
Drug storage	2	1.5
Linen store	2	1.5
w/c	2	1.5
w/c disabled	2	2.5
Changing cubicle	2	2
Changing cubicle disabled	2	3
Interview room	3	3.5
Reporting room	2.5	3
Reporting room and library	4	5
Sluice and waste	5	2

Management office	4	3
Staff room and lockers	4	5
Staff w/c	2	1.5
Staff changing	3	2
Secure vented helium store	5	3
Corridors	-	-

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26. Appendix D – MRI Scanner Specification

MRI (Magnetic Resonance Imaging) Requirements

1. MRI requirements

The JPUH MRI unit provides services for our own in and out-patients as well as to our local primary care providers. We also receive significant numbers of referrals from tertiary centres as patients who are under their care prefer to have their scans locally.

We provide services to a full range of patients including paediatrics and the elderly. Although we are able to provide MRI under general anaesthetic for claustrophobic or uncooperative patients, we are aiming to install scanners which will allow us to minimise the use of this facility.

We are planning a department equipped with three wide bore whole body scanners, two 1.5T scanners and one 3T scanner, installed in a new build over a period of 2 years.

2. Magnet and associated systems

All three scanners are expected to be 70cm bore diameter, short bore, actively shielded magnets.

All systems must be capable of scanning up to a 50cm field of view.

The systems must include a recycling coldhead with zero helium boil-off in normal use.

An ergonomic, easy to use dockable table capable of transporting patients up to 200kg is a requirement on all scanners.

All parts of the system must be designed to facilitate easy cleaning and prevent (as far as possible) infection control hazards, especially ingress of potentially infectious material into the system.

3. Gradient system

In order to maximise resolution and minimise echo times and breath-holds, all systems are expected to have high specification gradient systems (likely to be a minimum 40mT/m gradient system with 200T/m/s slew rate). This will also support cardiac capability on all systems.

4. RF system

- Matrix-type coil system.
- Full body coverage without the need to change coils during an examination.
- Adequate channels to allow full use of coil elements within a 50 cm field of view.
- Where the use of parallel imaging limits the use of coil elements, details must be given.
- To facilitate scanning patients with conditional implants, a Tx/Rx head coil is required for at least one of the wide bore 1.5T systems in addition to the standard array coil.
- In-room digitisation of signal.
- Robust RF coil connectors which minimise dirt contamination of the sockets.
- Parallel RF transmission on 3T system.

5. Software

All systems will use similar, intuitive user interfaces.
The interface will allow both user-defined, protocol-based scanning with guidance for less experienced users as well as more advanced control over parameters for more experienced users.

An interface which guides users through protocols (especially the more complex techniques) is expected.

Automatic alignment of slices to anatomy is also expected, especially in the head and spine.

It is recognised that sequences available will vary between manufacturers. Our basic requirements are listed below. We would expect a wide range of techniques to be available to allow imaging of challenging patients.

Head

- Full range of neurological examinations (with the exception of DTI).
- Isotropic 3d imaging.
- Perfusion (including ASL).
- Non-EPI diffusion (for cholesteatomas).
- Automatic slice positioning.

Spine

- Adequate whole spine imaging must be possible in two positions.
- Spine diffusion imaging.
- Automatic slice positioning.

MSK

- Examinations of full range of joints (including high resolution, small field of view imaging of small joints).
- Robust metal artifact reduction techniques.
- Cartilage imaging.

Torso and whole body

- High resolution imaging of pelvic cancers including diffusion.
- Rapid breath-hold and non-breath-hold imaging of the abdomen with minimum breath-hold times. Non-breath-hold dynamic imaging of the liver is expected.
- Whole body imaging including diffusion.
- High quality small bowel imaging.

Breast

- Minimum 8 channel breast coil with adequate coverage of the axilla.
- High spatial resolution imaging with robust fat suppression over large fields of view.
- High temporal (c. 40s per phase or less) and spatial resolution for dynamic sequences.
- Silicon imaging.

Vascular studies

- Contrast enhanced angiography with bolus tracking facility.

- Non contrast time of flight and phase contrast angiography.
- High resolution non-contrast angiography, particularly of the renal and peripheral vessels.

Cardiac
The MRI unit will need to support a cardiac MRI service. At present, the scope of this service has yet to be decided. However, it is considered essential that both 1.5T and the 3T systems have hardware of a high enough specification to support high quality cardiac scanning. The system must have a simplified tool which allows less experienced radiographers to perform cardiac examinations.

Robust fat saturation techniques including CHESS, inversion recovery techniques, water excitation and Dixon (on both gradient echo and spin echo sequences).

Readout segmented epi diffusion or equivalent to minimise distortions in diffusion imaging.

Clear display of estimated SAR and B1+ rms values before each sequence starts.

A significant proportion of patients are frail and have difficulty tolerating MRI scans. We are therefore looking for all possible options to minimise scan times (for example, to minimise breathhold times) with minimal effect on image quality and to minimise motion artifacts on non-compliant patients.

Motion resistant sequences (e.g. radial acquisitions) must be available, at least for head and abdominal imaging.

6. Ancillary equipment

Automatic contrast injector for each scanner.

Patient monitor.

Ferromagnetic metal detection devices.

Patient transport devices (two MRI trolleys and two wheelchairs, conditional up to at least 3T).

Spare dockable table and additional head and spine coils to improve throughput in the 1.5T scanners.

7. Workstation

Workstation software including cardiac review software.
