

Implementing Ultra Low Field MRI Neuroimaging for Cognition in a Non-MRI Research Institution in the UK

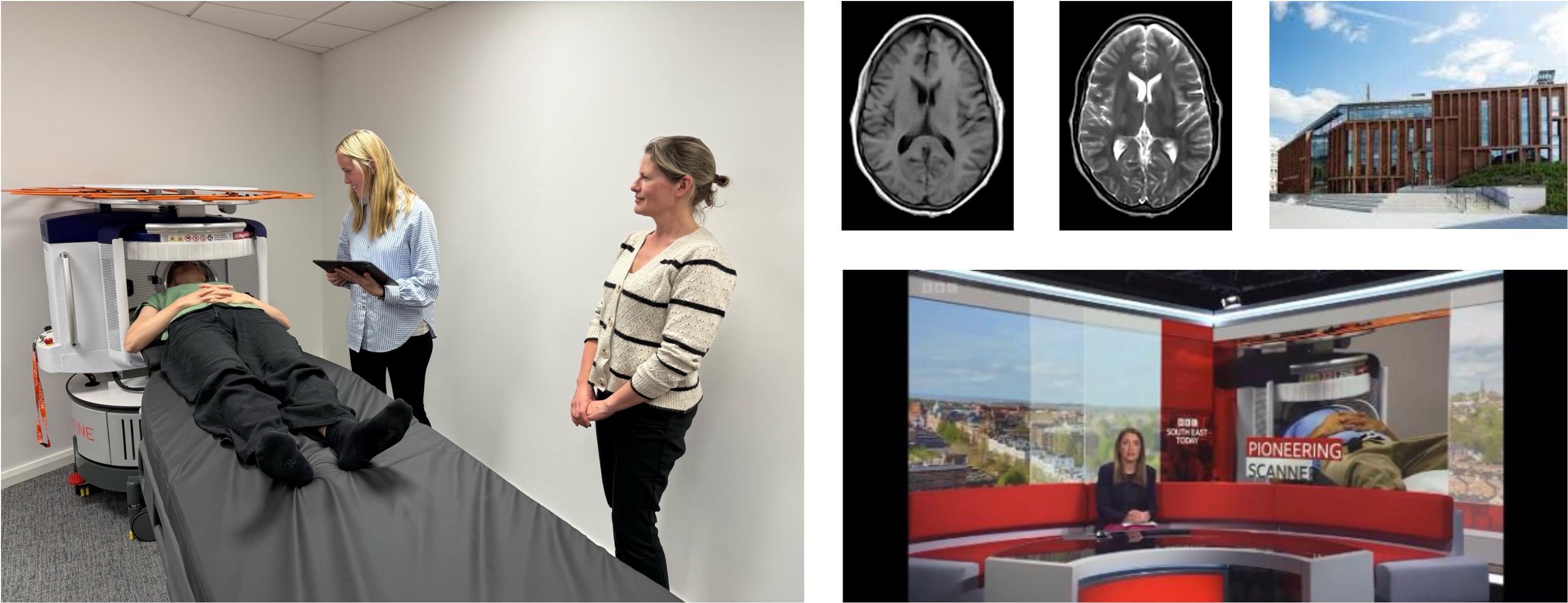
Joanne Rodda^{1,2}, Richard Weatherall³, Elizabeth Barrett⁴, Maria Liljeroth⁴, Wesley Pyke¹, Amy Hammond⁵, Alison Welfare-Wilson⁵, Sukhi Shergill¹

¹Kent and Medway Medical School, Canterbury, United Kingdom, ²Kent and Medway Mental Health NHS Trust, Maidstone, United Kingdom ³Canterbury Christchurch University, Canterbury, United Kingdom, ⁴Dartford and Gravesham NHS Trust, Dartford, United Kingdom, ⁵Royal Surrey NHS Foundation Trust, Canterbury, United Kingdom, .

BACKGROUND

Ultra-low-field MRI (ULF-MRI) is a portable imaging technology that could widen access to neuroimaging for dementia assessment and bring more affordable imaging closer to the point of care. Limited access to structural neuroimaging is a recognised challenge within dementia diagnostic pathways globally, contributing to delays and inequities in diagnosis. Although ULF-MRI systems are often described as requiring minimal infrastructure, most reported deployments to date have taken place within institutions with established MRI expertise or within bespoke implementation contexts.

There is limited published work describing the practical, regulatory, and governance considerations required to establish ULF-MRI within highly regulated health and research systems in settings without prior MRI facilities. We summarise the first UK experience of implementing ULF-MRI within a university environment with no existing MRI infrastructure.



KEY LEARNING

Implementing a ULF MRI scanner outside a conventional imaging unit requires navigating a complex landscape of regulations, governance processes, and technical decisions that most institutions will not have encountered before. Our scanner is sited in a university, whilst we work closely with several NHS Trusts.

Biggest challenges: Regulatory frameworks are written for high-field MRI and do not map onto ULF systems in a straightforward way. Early on, we needed to source people with the right expertise both to meet regulatory guidance and to translate high-field safety regulations to a ULF system. These included MR Responsible Persons and MR Safety Experts, which were new roles in our organisation. Additional areas requiring specialist knowledge included making technical decisions around image acquisition protocols, data storage, and sharing.

What worked well: Cross-organisational working, while challenging, allowed us to build relationships with colleagues across institutions and develop local skills and expertise. Generous support from colleagues across a range of organisations with relevant experience was invaluable. The successful implementation of neuroimaging research has expanded what we are able to offer participants and opened new possibilities for our research programme. Perhaps most unexpectedly, it has captured the imagination of colleagues who had not previously seen themselves as involved in research, helping to develop the local research culture and motivate broader engagement.

What we would do differently: Early on, there were many “unknown unknowns”. Starting with a clearer picture of the full range of processes, authorisations, and regulatory requirements across all involved organisations would have would have reduced delays and allowed the right expertise to be identified and engaged sooner. We hope this work will support others starting this journey and are happy to share our learning and experiences.

THE SETUP PROCESS

■ Planning & Infrastructure ■ Governance & Safety ■ Workforce ■ Data & Technology

Procurement & Contracting - Procurement route and service contracts - Clarifying responsibilities between institution and manufacturer - Insurance, liability, and maintenance arrangements - Agreements regarding software updates	Site Identification - Access for staff and patients - Space requirements and footprint (including door width and space for bed) - Environmental considerations (power, access, ventilation, internet)	Scanner Setup - Procuring appropriate bed / trolley - Accessibility and manual handling considerations - Infection control and cleaning processes - Comfort, monitoring, and tolerability - Patient/participant waiting area and navigation from building entrance
Regulatory Compliance - MHRA safety guidelines for MRI equipment in clinical use - Appointment of an MR Responsible Person (per MHRA guidance) - Involvement of an MR Safety Expert in approving the setup - Definition of controlled areas - Emergency procedures and oversight arrangements	Local Governance, Risk & SOPs - Health and Safety at Work compliance - Local risk assessments and institutional governance approvals - Development of local MRI rules - SOPs for scanning, screening, incidents, and maintenance - Screening criteria: metal implant risk and patient size/access	Workforce & Training - Defining eligibility criteria for scanner operators (e.g. role/grade) - Boundaries of role and escalation pathways - Training and competency sign-off processes - Ongoing support and refresher training
Data Acquisition & Management - Image acquisition, formats, and outputs - Data transfer from the scanner - Secure storage arrangements - Data protection and governance compliance	Image Viewing, Sharing & Interoperability - PACS integration or secure alternative viewing platform - Data sharing agreements with collaborators - Secure sharing mechanisms - Access controls, audit trails, and permissions	Image Analysis & Interpretation - Setting up (or establishing remote access to) automated analysis pipelines - Processes for visual evaluation of scans - Quality assurance processes - Management of incidental findings

CONCLUSIONS

ULF-MRI can be implemented successfully outside traditional MRI centres and offers a promising route to expanding neuroimaging capacity relevant to dementia research and future diagnostic pathways. Transparent reporting of the practical considerations involved is essential to support wider adoption and to realise the potential of ULF-MRI to reduce inequalities in access to dementia-related neuroimaging.

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