NIHR | HealthTech Research Centre
Emergency and acute care

NIHR HRC Healthcare Professional/Academic Placement Scheme – Project Proposal Form

HRC Theme:	**Theme 2: Secondary care** **Theme 3: Understanding the problem**
Project Title:	Can bedside ultrasound of skeletal muscle in critically ill adults predict long-term functional recovery from sepsis

Practice Supervisor	
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Background and Project Details:

Sepsis and serious infections remain a leading cause of mortality, morbidity, and healthcare utilisation across the NHS, accounting for approximately 245,000 UK cases and 48,000 associated deaths annually (Szakmany 2025). Patients who survive sepsis commonly develop functional and cognitive impairment (Prescott 2018). Patients treated for sepsis typically develop one to two new limitations in activities of daily living following hospital discharge, including difficulty managing finances, washing or toileting independently (Iwashyna 2010). Underlying this trajectory is rapid skeletal muscle loss, driven by systemic inflammation, immobility, and organ dysfunction, which contributes to ICU-acquired weakness and poor functional recovery (Puthucheary 2013).

Muscle wasting occurs early in critical illness with adults losing ≈10% of arm and thigh muscle thickness during their hospital stay (Hadda 2018). Bedside ultrasound quantifies muscle mass non-invasively with good inter- and intra-observer reliability. Early reduction in muscle thickness predicts in-hospital mortality, ICU-acquired weakness and poor 90-day outcomes (Hadda 2018). Point-of-care assessment of peripheral muscles predicts short- and long-term mortality and correlates with frailty and functional status (Skoczynski 2025). Preserved skeletal muscle during sepsis may predict long-term functional recovery and could guide stratified rehabilitation (Weinel 2019; Venco 2024).

The overall research aims are to:

1. Develop a targeted approach to follow up critically ill adult patients with sepsis using muscle ultrasound, to focus rehabilitation on patients with the greatest need.
2. Develop muscle ultrasound as an early diagnostic marker to predict long-term functional outcomes for use in experimental medicine trials.

The **research aim** of the placement scheme project will be to conduct a structured scoping review that maps what outcomes have been reported in clinical studies of skeletal muscle ultrasound in critically ill adults particularly focusing on sepsis. Studies reporting clinical and functional outcomes reported alongside skeletal muscle ultrasound measurements in critically ill adults will be mapped in the review. Outcomes will include short-term clinical outcomes, such as mortality,

ventilation duration, ICU length of stay, ICU-acquired weakness, and long-term functional outcomes, such as frailty, performance status, re-admission rate and quality of life. Findings will be presented as a description of outcomes.

The **training aims** of the placement are to undergo structured practical training in muscle ultrasound under the direct supervision of Prof Jamie McPhee and his team at Manchester Metropolitan University. Training will cover important anatomical landmarks to identify key muscle groups, technical aspects of ultrasound image acquisition and measurement as well as principles of inter-observer reliability. During the placement there will be an opportunity to collaborate with Siemens UK, based in Manchester, to gain experience of point-of-care imaging with a commercial partner.

The placement will be based with Prof Jamie McPhee at Manchester Metropolitan University and the Respiratory Infection group based at Wythenshawe Hospital and The University of Manchester. Time will be spent within both research groups to gain generic research skills and exposure to a mix of research techniques and methodologies. The Respiratory Infection Group has an established sepsis PPIE group that will be engaged around this project.

Potential Outcomes / Impact:

- High-quality scoping review providing a map of outcomes used in clinical studies of skeletal muscle ultrasound in ICU and sepsis populations which will be suitable for peer-reviewed publication.
- Identification of the key methodological gaps in the existing literature establishing the case for future work and strengthening future funding application (e.g. NIHR Pre-Doctoral and Doctoral Fellowship application).
- A clinician trained in bedside muscle ultrasound technique who can collaborate on future studies in critical care.
- An understanding of NHS-industry collaboration.

How does the project support the priorities of the NIHR HRC?

HRC Themes: The project aligns with Theme 2 (Secondary Care) and Theme 3 (Understanding the Problem) by describing the current evidence around muscle ultrasound in secondary care.

NHS 10-Year Plan. Analogue to Digital: The project utilises bedside ultrasound, a digital technology, to assess patients replacing subjective assessments.

NHS 10-Year Plan. Treatment to Prevention: The ultimate goal of this project is to improve care for acutely unwell patients with sepsis preventing long-term morbidity and mortality.

Develop HealthTech Community / NHS-Industry Collaboration: The industry involvement in the project will give first-hand experience of a developing academic-NHS-commercial collaboration.

Inclusivity and Addressing Health Inequalities: Sepsis disproportionately affects older people, those from deprived communities and patients with multi-morbidity. This project supports resource allocation to those most in need.

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Sepsis Modern Service Framework: This project follows the PIER framework (Prevention, Identification, Escalation, Response) core to the sepsis Modern Service Framework.

JLA Sepsis Priority Setting Partnership Priority 2: “What are the long-term effects on the body from sepsis (sometimes called post-sepsis syndrome)? How are these long-term effects best treated and managed?" (McPeake 2025).

Who would be suitable for the placement?

Nurses, Physiotherapist, Radiographers. Familiarity with working in a critical care environment would be desirable.

Are there any pre-requisites that are required in advance of the placement?

None. Previous experience of using ultrasound would be desirable.

What skills will be developed by the trainee during the placement?

- Scoping review methodology including conducting database searches, screening published studies and extracting relevant data.
- Critical appraisal of the evidence
- Bedside muscle ultrasound
- Collaborating with commercial partners
- Dissemination
- Working with PPIE contributors

What training and support will be offered to the trainee during the placement?

- Weekly supervision meeting with Practice Supervisor (Dr Hansel)
- Bi-weekly meeting with Academic Supervisor (Prof McPhee)
- Attend bi-weekly respiratory infection group meeting
- Scoping review methodology training (Dr Hansel)
- Muscle ultrasound training (Prof McPhee and his research team at MMU)
- Facilitated industry visit
- Good Clinical Practice training (if not already completed)
- Support with dissemination activities
- PPIE (HRC team)

Proposed Placement Timeframe:

12 weeks FTE

Could a flexible placement approach be supported where required?

Yes, a flexible placement can be accommodated with part-week delivery.

Proposed Start Date:

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No later than January 2027.
Where will the placement participant be based during the placement?
• Adult ICU, Wythenshawe Hospital, MFT • Manchester Metropolitan University • Commercial partner site • Working from home (literature screening etc)

*Please submit form to Lisa Murray, Education and Training Lead at lisa.murray@mft.nhs.uk by **Monday 22nd June 2026.**