RESEARCH TOPIC CLI5

Building a European Clinical Care Network for Bronchiectasis: centre classification, quality of care, and disease activity assessment within the EMBARC framework

Research area
Medical Area

Clinical Unit name
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Abstract
Project Summary
Bronchiectasis is a chronic inflammatory airway disease characterised by persistent infection, recurrent exacerbations, progressive lung damage, and impaired quality of life. Over the last decade, the field has undergone a major transformation, driven by the expansion of international registries such as EMBARC (https://bronchiectasis.hicservices.dundee.ac.uk), the publication of the 2025 European Respiratory Society (ERS) Clinical Practice Guidelines, and the emergence of disease-modifying therapeutic strategies. In parallel, bronchiectasis care is increasingly recognised as requiring structured, multidisciplinary, and standardised models of delivery across healthcare systems.
Despite these advances, there is still substantial heterogeneity in how bronchiectasis care is organised and delivered across Europe. Access to diagnostic pathways, respiratory physiotherapy, microbiological monitoring, long-term therapies, and specialist follow-up varies widely between and within countries. The EMBARC-4 Clinical Care Network (CCN) has been designed to address this unmet need by developing a European framework for classification and certification of bronchiectasis centres (Level I–III), aligned with ERS guidelines and embedded within the EMBARC infrastructure.

However, current models of care are largely based on structural and organisational criteria, with limited integration of dynamic disease processes into clinical pathways. In particular, the concept of disease activity—reflecting ongoing inflammatory and infectious burden, exacerbations, symptoms, and short-term clinical trajectories—remains poorly defined and inconsistently assessed in clinical practice. While disease severity captures accumulated damage, disease activity represents the modifiable component of bronchiectasis and is likely to be a key determinant of progression, treatment response, and healthcare utilisation.

This PhD project is embedded within the EMBARC-4 Clinical Care Network and aims to

combine organisational research with clinical and translational investigation to address two complementary and interdependent objectives:
1. To develop and implement a European framework for classification, certification, and quality assessment of bronchiectasis centres; and
2. To define, operationalise, and translate the concept of disease activity into clinical practice, using it as a guiding principle for standard operating procedures (SOPs) across Level II and Level III centres.

The project will also use observational and translational methodologies within the CCN to: characterise variability in care delivery; develop quality indicators and standards of care; investigate how disease activity is currently assessed across centres; identify its key clinical and biological components; and ultimately integrate disease activity into structured care pathways. The central premise is that a Clinical Care Network should not only standardise where care is delivered but also define what aspects of disease need to be measured dynamically to guide clinical decision-making.
By linking centre organisation with the ability to assess and manage disease activity, this project will provide a novel framework in which structural excellence and biological understanding converge. The expected outcome is a European model of bronchiectasis care that is both standardised and dynamic, capable of supporting high-quality clinical practice and future research in precision medicine.

Scientific Background and Rationale
Bronchiectasis is increasingly recognised as a major contributor to chronic respiratory morbidity, with growing prevalence and substantial healthcare burden across Europe. The EMBARC registry has provided a comprehensive epidemiological and clinical characterisation of the disease, highlighting its heterogeneity in terms of aetiology, microbiology, exacerbation patterns, and outcomes. In parallel, the ERS 2025 guidelines have established a structured approach to diagnosis and management, emphasising the importance of multidisciplinary care and long-term follow-up.
However, while both research and guidelines have advanced significantly, a critical gap remains between evidence generation and care delivery. Current practice is still largely variable, and there is no unified European framework defining how bronchiectasis care should be organised across different levels of expertise. The EMBARC-4 Clinical Care Network addresses this gap by proposing a structured classification and certification system for bronchiectasis centres, linking organisational features with expected functions and care pathways.
At the same time, an equally important gap exists at the clinical and biological level: the lack of a clear and operational definition of disease activity. Bronchiectasis management is still largely guided by static measures of disease severity, which reflect irreversible damage rather than ongoing disease processes. In contrast, disease activity captures the dynamic component of the disease, including exacerbations, symptom burden, infection status, and airway inflammation. These processes are directly relevant to patient outcomes and are potentially modifiable through treatment.

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Emerging evidence suggests that disease activity is associated with clinical progression and may be linked to underlying inflammatory mechanisms, including neutrophilic airway inflammation. However, it is currently not systematically measured, and there is no consensus on how it should be integrated into routine care or clinical pathways.
This creates a unique opportunity within the EMBARC Clinical Care Network. By studying how centres differ in their ability to assess and monitor disease activity, and by linking this to organisational structure and resources, it becomes possible to define disease activity not only as a research construct, but as a practical tool to guide care. In this framework, disease activity can serve as a bridge between clinical epidemiology, translational research, and health-service organisation.

Central Hypothesis
A structured European Clinical Care Network for bronchiectasis will enable standardisation of care delivery across centres, and the integration of a multidimensional definition of disease activity into clinical practice will improve the ability of centres—particularly Level II and Level III—to monitor, stratify, and manage patients.
Observational and translational research within the CCN will allow identification of the key components of disease activity and their variability across centres and will support the development of SOPs in which disease activity becomes a central driver of clinical decision-making.

Overall Aim
To develop and implement a European Clinical Care Network for bronchiectasis within EMBARC, and to define and translate disease activity into a structured framework that informs quality standards and standard operating procedures across bronchiectasis centres.

Specific Aims
Aim 1: To characterise the organisation and delivery of bronchiectasis care across European centres participating in the EMBARC CCN.
Aim 2: To develop and validate a European classification and certification framework for bronchiectasis centres (Level I–III), aligned with ERS guidelines.
Aim 3: To define and validate quality indicators and standards of care linked to centre level and organisational structure.
Aim 4: To define and operationalise disease activity in bronchiectasis using a multidimensional, clinically applicable framework.
Aim 5: To investigate how disease activity is assessed across centres and how this varies according to organisational level and resources.
Aim 6: To translate disease activity into SOPs for Level II and Level III centres, integrating clinical, microbiological, and (where feasible) biological components.

Research Plan
Work Package 1: Organisational epidemiology of bronchiectasis care across Europe
Work Package 2: Development and validation of centre classification, certification, and quality indicators

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Work Package 3: Observational research on disease activity, including development of a harmonised framework based on clinical and microbiological variables
Work Package 4: Translational substudy in selected centres focusing on airway inflammation and biomarkers of active disease
Work Package 5: Integration of disease activity into SOPs and care pathways within the EMBARC Clinical Care Network

Translational Dimension
The translational dimension of this project represents a key integrative component that bridges biological research, clinical practice, and healthcare organisation. Rather than being conceived as an isolated laboratory-driven effort, the translational programme is embedded within a broader clinical and organisational framework, originating from a clear unmet need at the European level: the lack of a standardised, clinically meaningful definition of disease activity in bronchiectasis and its integration into routine care pathways. In this context, the project adopts a bidirectional translational approach. On one side, it seeks to link clinical manifestations of disease activity—such as exacerbations, symptom burden, infection status, and functional decline—with underlying biological processes, particularly airway inflammation. Selected centres within the EMBARC Clinical Care Network, particularly those with advanced infrastructure (Level II and III), will contribute to biomarker-oriented analyses, including sputum-based inflammatory markers and other feasible translational readouts. These data will not be generated in isolation, but will be interpreted in the context of real-world clinical phenotypes captured across the network. On the other side, and most importantly, the project aims to translate these biological and observational insights into actionable clinical frameworks. The ultimate goal is not biomarker discovery per se, but the development of a robust, multidimensional definition of disease activity that is supported by both clinical and translational data, and that can be operationalised within standard care. In this sense, translational research becomes the scientific foundation upon which healthcare organisation is built. This approach allows the project to move across the full translational spectrum: from biological signals (e.g., airway inflammation) to clinical phenotypes (disease activity), and from these to healthcare delivery models (standard operating procedures and quality standards within the Clinical Care Network). By doing so, the project embodies a comprehensive translational continuum, in which observational and biological data directly inform how care is structured, delivered, and standardised across Europe. Ultimately, this represents a distinctive and innovative aspect of the PhD. The project does not simply integrate translational research into clinical investigation; it uses translational evidence to shape and guide healthcare organisation, ensuring that models of care are aligned with the biological and clinical reality of the disease. This convergence of translational science, clinical epidemiology, and healthcare structuring underlines the completeness and strategic relevance of the project within the EMBARC Clinical Care Network and the broader European respiratory research landscape.

Expected Impact
This project will deliver:
– a structured European Clinical Care Network for bronchiectasis

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– a validated classification and certification framework for centres
– a set of quality indicators and standards of care
– a clinically relevant and operational definition of disease activity
– and the integration of disease activity into SOPs for bronchiectasis care
By combining organisational innovation with clinical and translational research, the project will contribute to a shift from a static, severity-based model of bronchiectasis to a dynamic, activity-driven model of care, aligned with the evolving landscape of precision medicine.

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