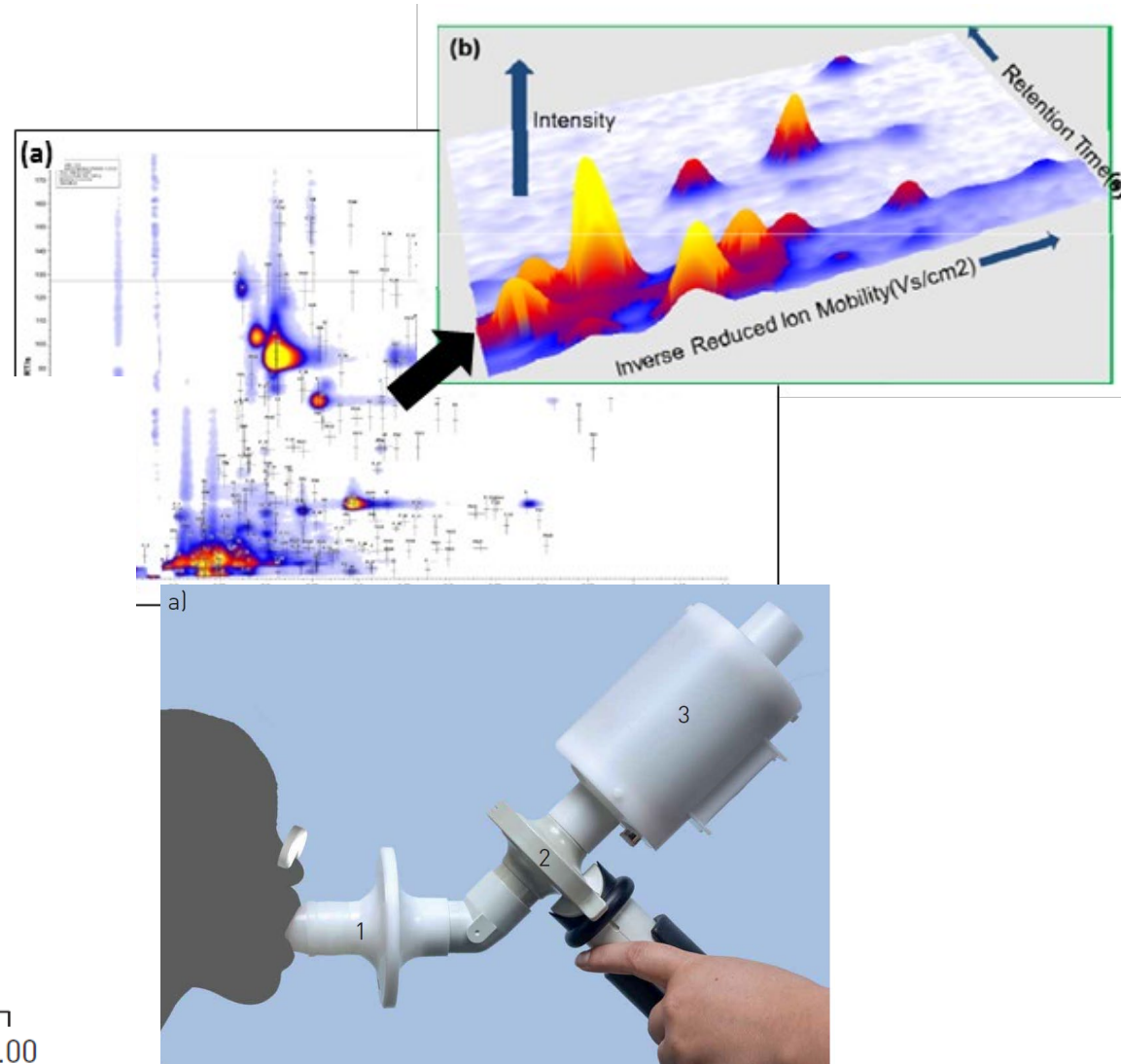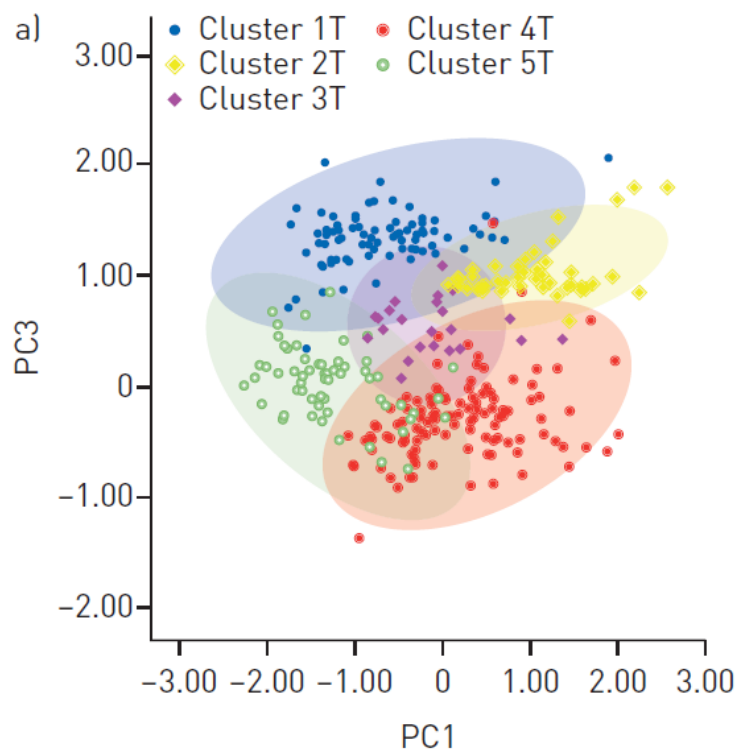# Breathomics in Airways Disease: A Perspective from Major Consortia

Professor Chris Brightling

NIHR Senior Investigator
Professor of Respiratory Medicine
Institute for Lung Health,
University of Leicester, UK

EMBER

Advion | The AHSN Network | BS Analytik | EPSRC Engineering and Physical Sciences Research Council | IBM | ILH INSTITUTE FOR LUNG HEALTH LEICESTER | UNIVERSITY OF LEICESTER | Loughborough University | maaRa | MRC Medical Research Council | Supported by NIHR | Owlstone Medical | British Lung Foundation

Breathomics- Biomarkers in severe Asthma

3TR/ADON-ERS

LEICESTERSHIRE

EMBER

BEAT-SA
Beat Severe Asthma

Rasp Refractory Asthma
Stratification Programme
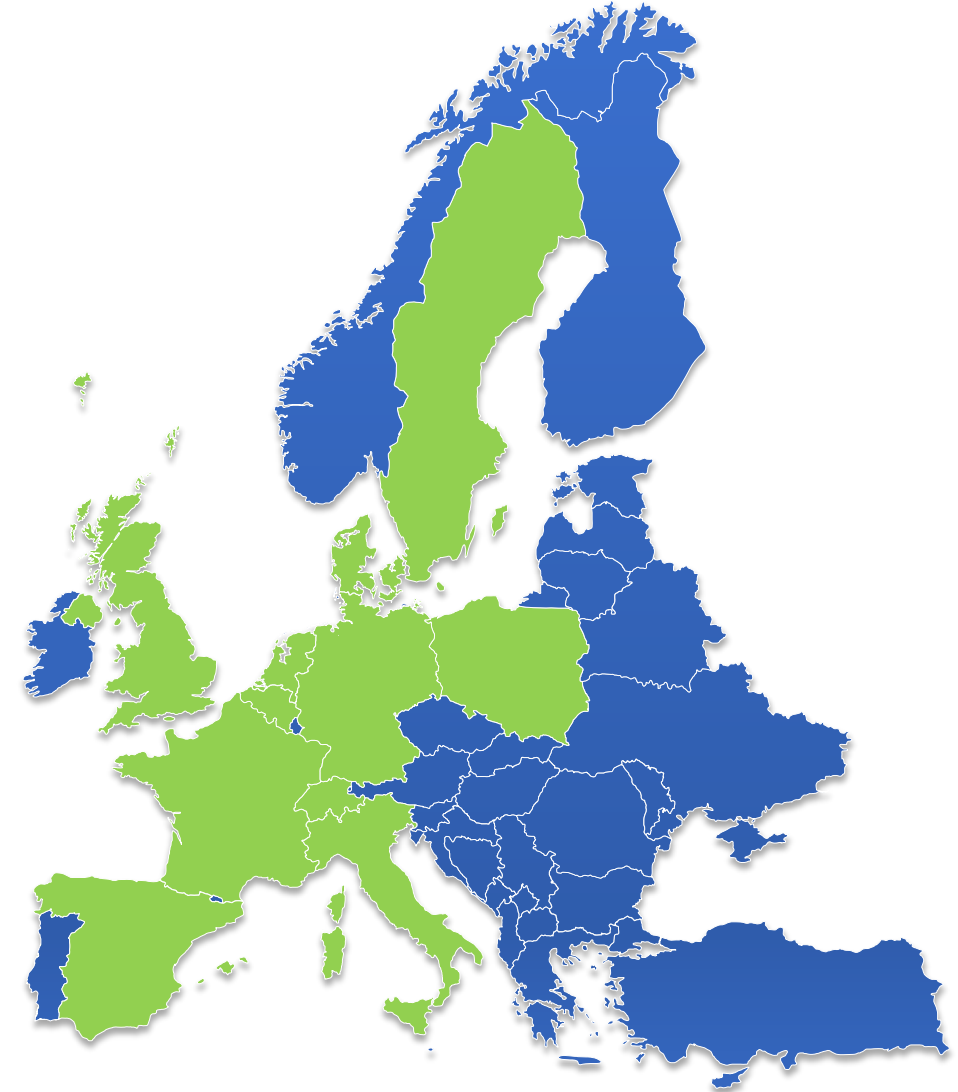
East Midlands Breathomics Pathology Node (EMBER)- Our Vision…….

LEICESTERSHIRE

Loughborough University (LU)

University of Leicester (UoL)

University Hospitals of Leicester NHS Trust

INDUSTRY PARTNERS

OWLSTONE

BS Analytik

IBM

Advion
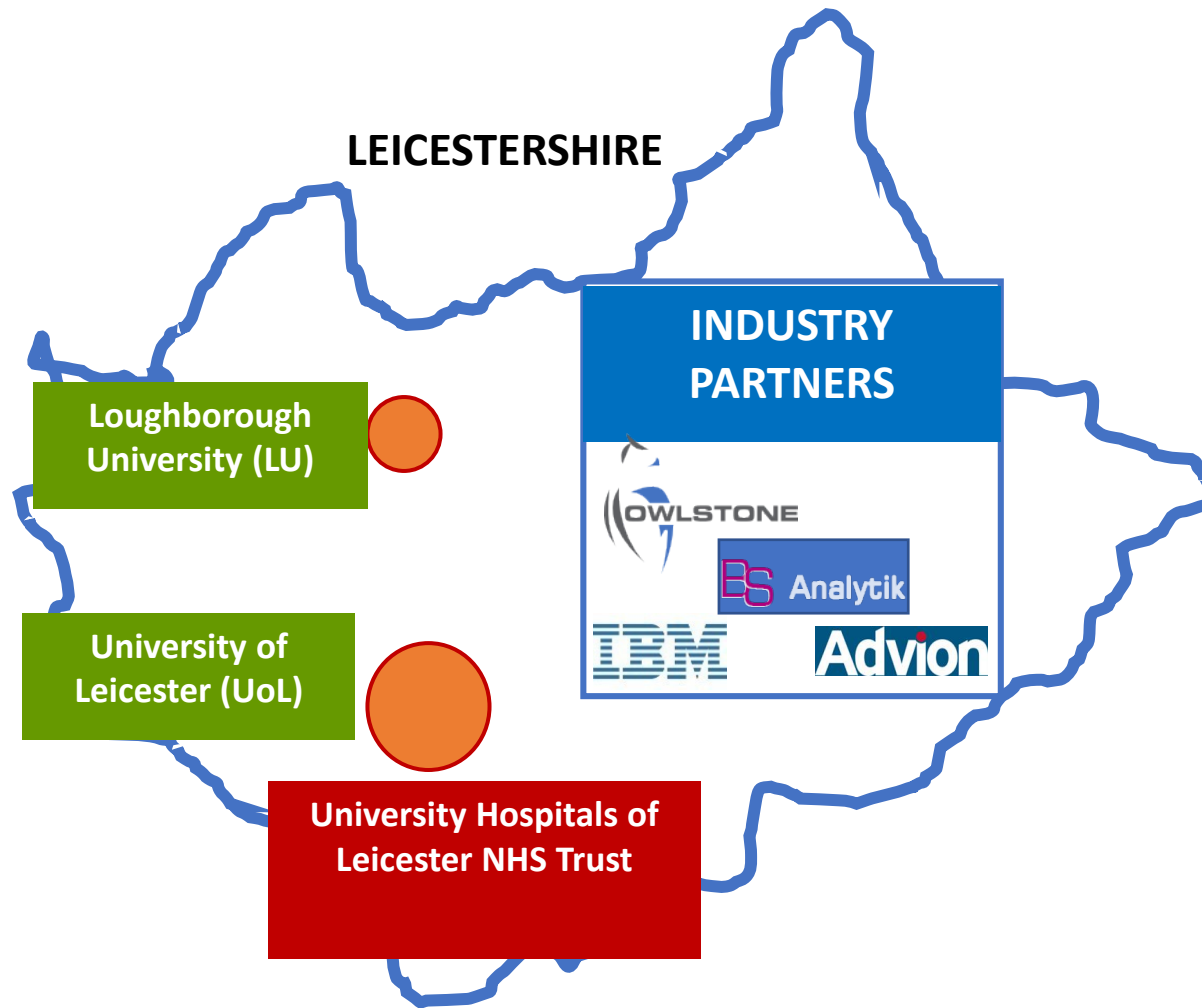
➢ National and International Breathomics Centre
➢ Capability to improve diagnosis, classification and stratification of patients
➢ Creation of a pipe-line for new, non-invasive, diagnostic tools
➢ Training in next-generation pathology.

Molecular Pathology Nodes
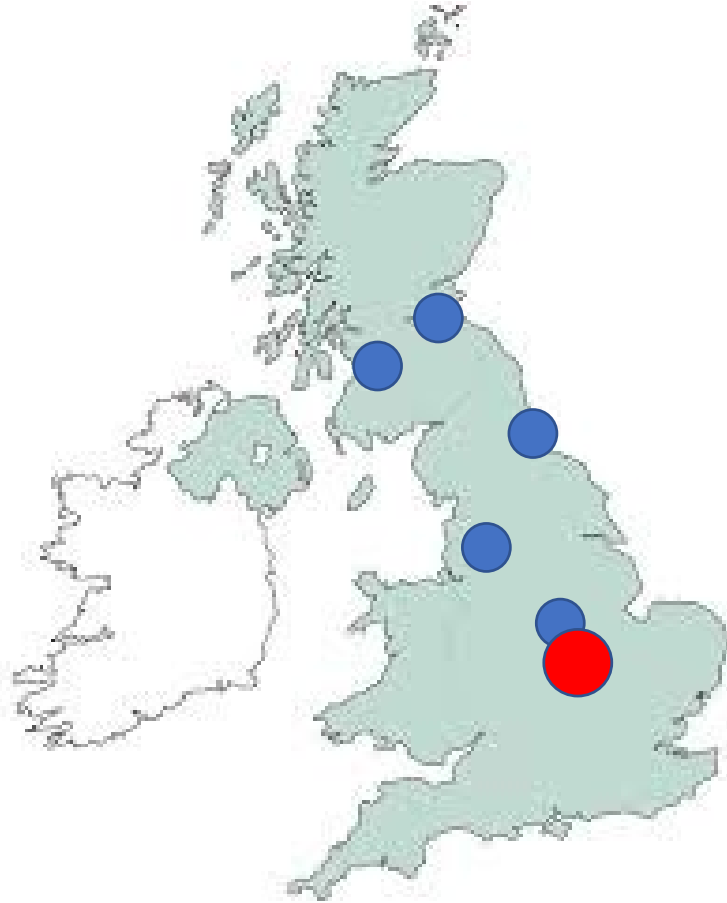
Edinburgh-St Andrews Consortium for Molecular Pathology, Informatics and Genome Sciences

Glasgow Molecular Pathology (GMP) Node

The Newcastle Proximity Laboratory

Manchester Molecular Pathology Innovation Centre

Nottingham Molecular Pathology Node (NMPN) for Integrated Multi-platform Biomarker Research and Knowledge Transfer

East Midlands Breathomics Pathology Node (EMBER) - Institutions University of Leicester, Loughborough University and University Hospitals of Leicester NHS Trust
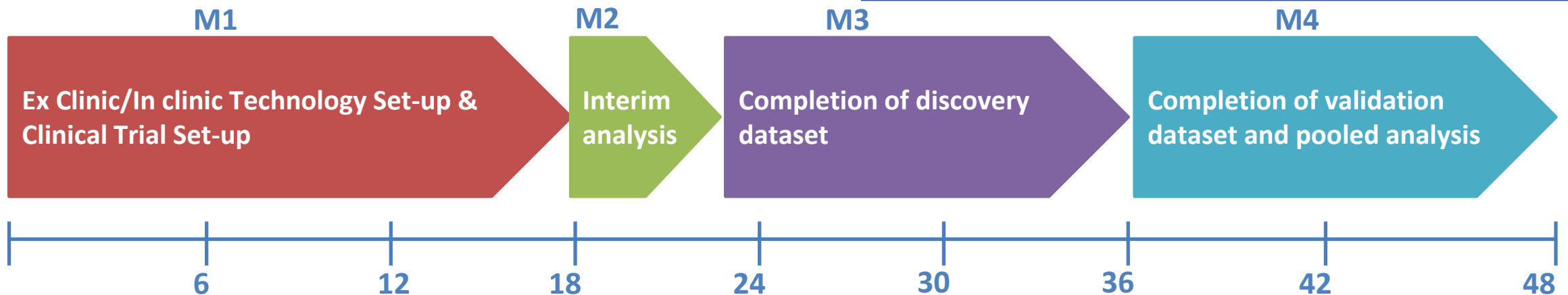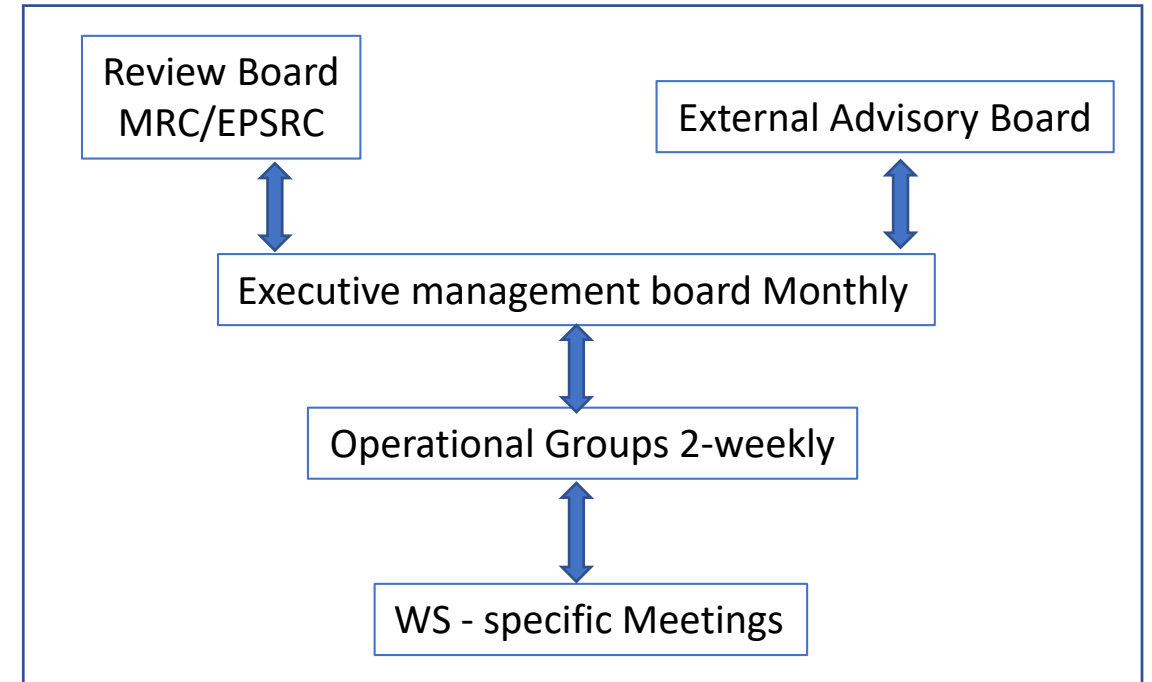
BIG Wins- IMPACT

1. **Clinicians-** with improved diagnostics and biomarkers,

2. **Patients-** by improved clinical decision making with near-patient, non-invasive technologies that are widely applicable,

3. **Health care providers-** decision making for optimising allocation of resources,

4. **Pharmaceutical industry-** 'breathomics' as an outcome in early phase development, stratification, companion diagnostic in the clinic,

5. **Platform technology industries-** improvements in the development of novel devices with clinical applications and the embedding this new molecular pathology in health care.

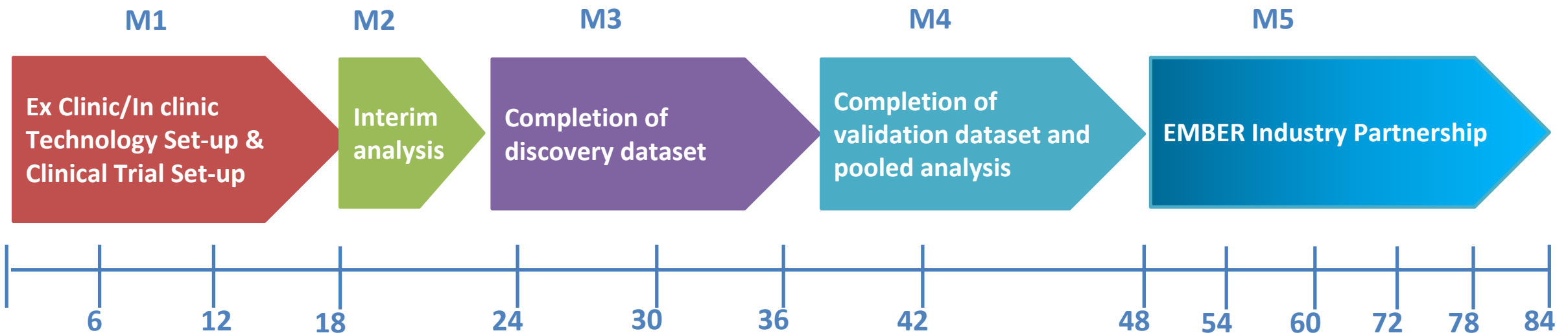# EMBER Workstreams & Milestones

- WS1. Innovation management- **Chris Brightling**

- WS2: Ex-clinic 'breathomic' systems- **Paul Thomas**

- WS3: In–clinic 'breathomic' technologies- **Paul Monks**

- WS4: Clinical disease cohorts- **Salman Siddiqui**

- WS5: Training- **Jacqui Shaw**

- WS6: Dissemination, Exploitation, and implementation- **Aarti Parmar**

Review Board MRC/EPSRC

External Advisory Board

Executive management board Monthly

Operational Groups 2-weekly

WS - specific Meetings

M1   **M2**   **M3**   **M4**

Ex Clinic/In clinic Technology Set-up & Clinical Trial Set-up

Interim analysis

Completion of discovery dataset

Completion of validation dataset and pooled analysis

| 6 | 12 | 18 | 24 | 30 | 36 | 42 | 48 |

EMBER Milestone 5

- To expand the integration of clinical and research data within the partnership which will support the IT infrastructure

- To provide an external facing IT platform that will enable knowledge transfer between EMBER to new industry partnerships

- To develop new communications with industry partners on a range of opportunities identified from the first two aims.

- Recruitment into additional trials linked to EMBER using in-clinic offline and online technology

M1 — Ex Clinic/In clinic Technology Set-up & Clinical Trial Set-up

M2 — Interim analysis

M3 — Completion of discovery dataset

M4 — Completion of validation dataset and pooled analysis

M5 — EMBER Industry Partnership

6 12 18 24 30 36 42 48 54 60 72 78 84

Burden of Acute Breathlessness

- Acute breathlessness caused by cardio-respiratory disease is associated with a significant proportion of acute hospital admissions

- Large scale population studies have identified biomarkers predictive of the diagnosis of acute breathlessness e.g. BNP[1], CRP[2]

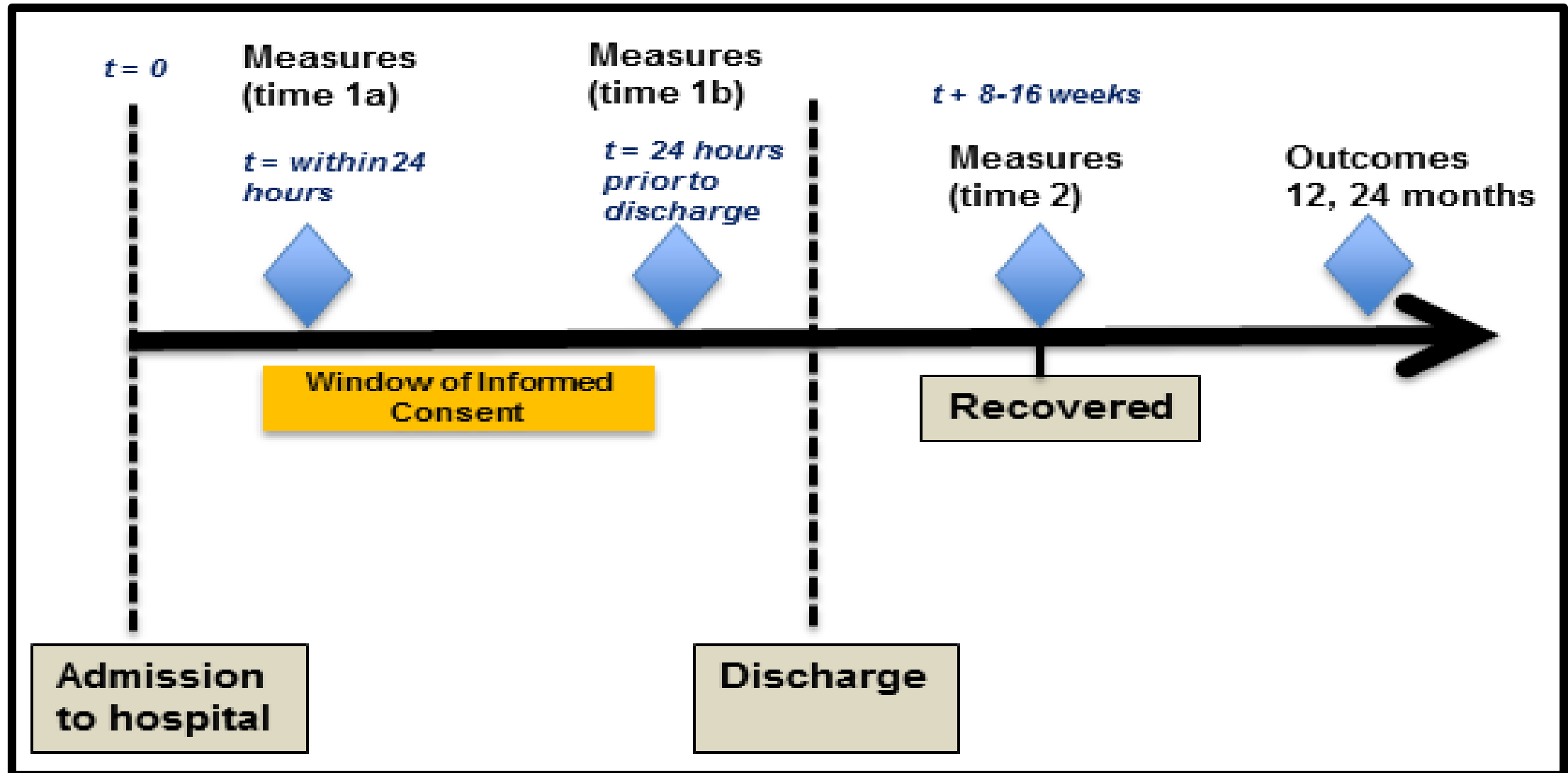- Diagnostic uncertainty remains in ≈ 30% and is associated with adverse outcomes[3].

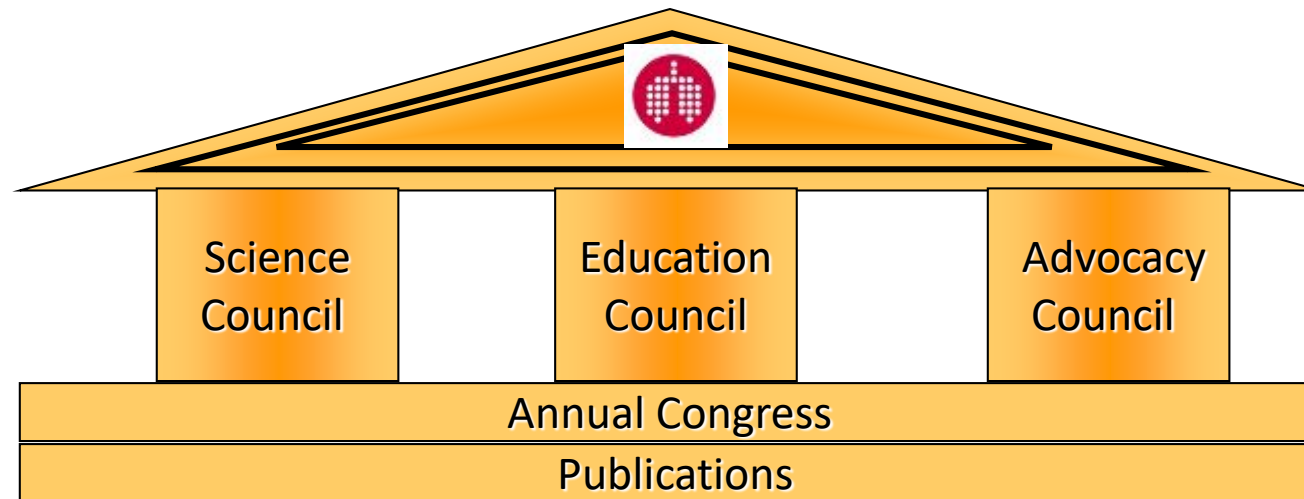[1] Maisel AS *et al*, NEJM 2002,   [2] Van Guyt S *et al*, BMJ 2013   [3] Lam L *et al*, Ann Int Med 2010,   [4] Green SM *et al*, Arch Intern Med 2008

Acute Platform(s)

THE ERS in brief

- Europe's largest scientific & clinical organisation in respiratory medicine founded in 1990

- Platform for over 32,000 members worldwide from over 160 countries

SCIENCE

EMBER

"PROMOTING THE BEST SCIENCE IN RESPIRATORY MEDICINE AND FUNDING PROJECTS OF EXCELLENCE"
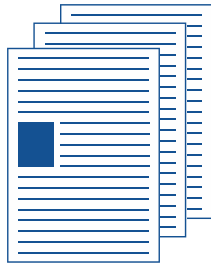
Publications

Fellowships

Guidelines and statements
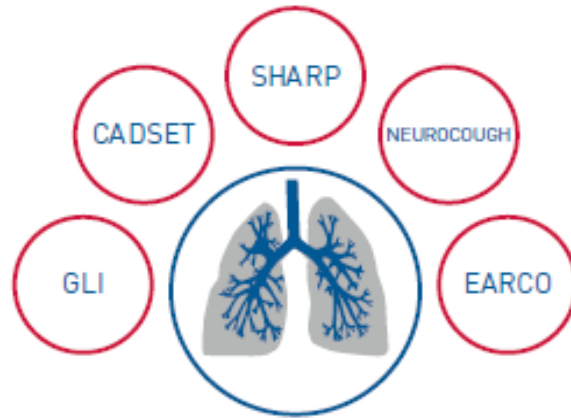
Research Seminars and Lung Science Conference
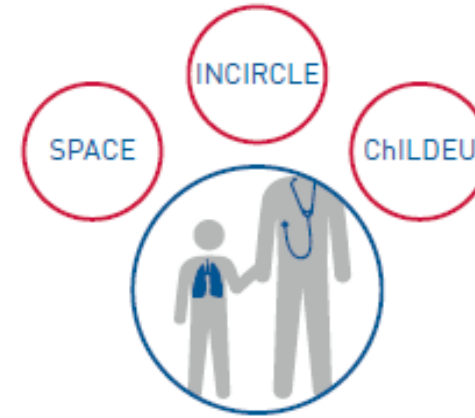
Clinical Research Collaborations

Research Agency

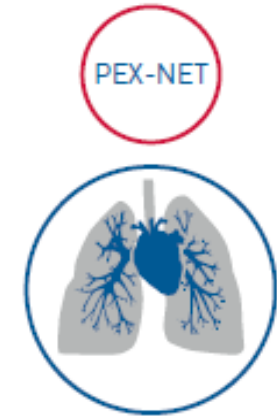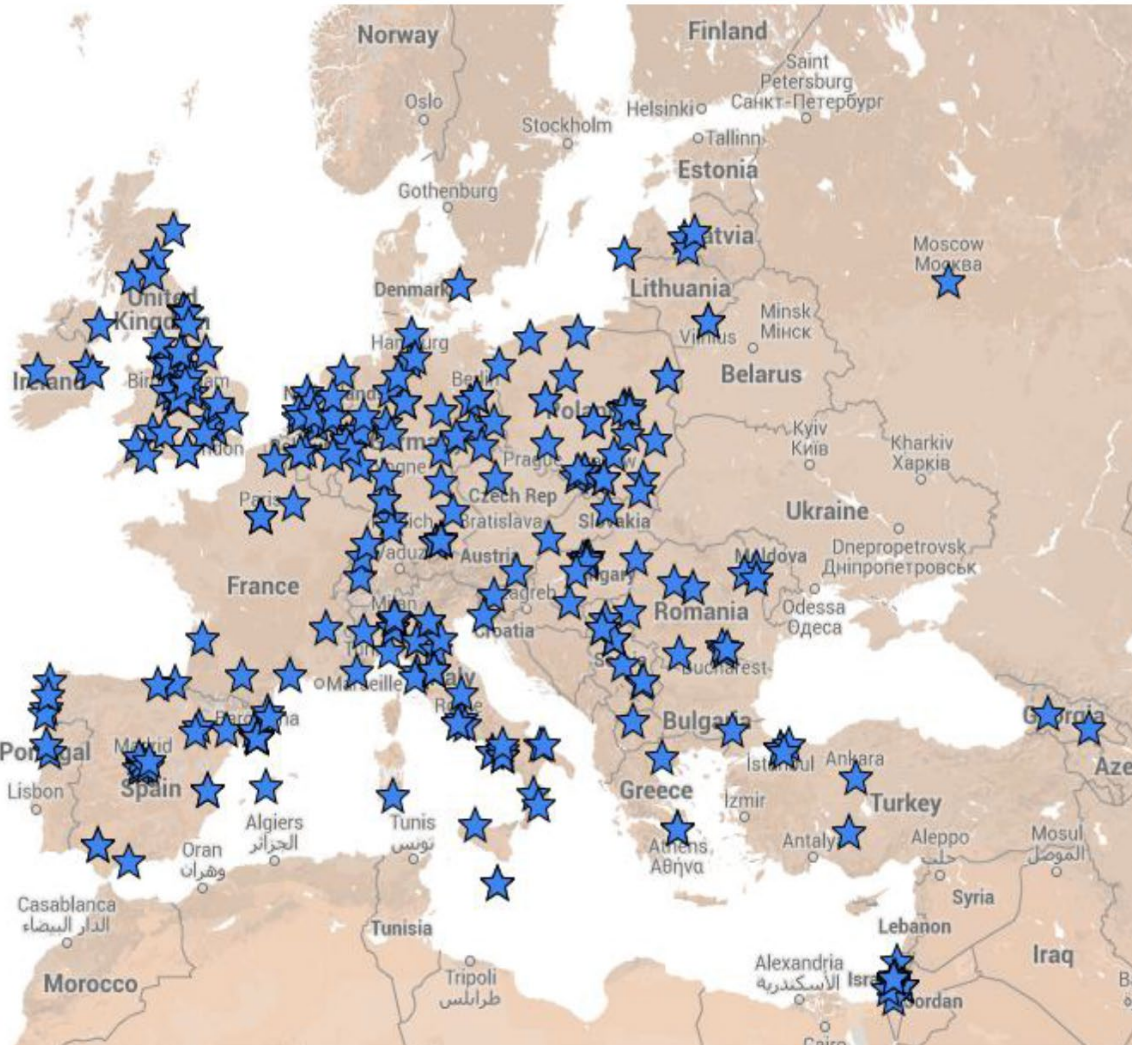# ERS Research Agency & Clinical Research Collaborations (CRC)
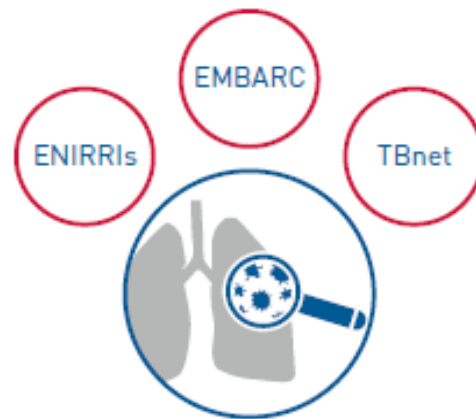
- To create the EMBARC registry, a European bronchiectasis registry to facilitate research and quality improvement initiatives across healthcare systems.

- To build a network of researchers and clinical experts in bronchiectasis to guide future research and clinical priorities

- To attract new researchers and clinicians to the field of bronchiectasis

- To support and encourage early career researchers in the field of bronchiectasis through involvement in network activities

- To facilitate applications to industry and European Union funding sources to build bronchiectasis research capacity in Europe.

4,000 patients

23 countries

10,000 patients by 2019

Acknowledgments

Paul Thomas
Paul Monks
Salman Siddiqui
Jacqui Shaw
Aarti Parmar
Caroline Beardsmore
Erol Gaillard

Neil Greening
Tim Coates
Amisha Singapuri
Dahlia Salman
Dorota Ruszkiewicz
Andria Hadjithekli
Amisha Manek

Abigail Joyce
Rob Free
Bo Zhao
Rebecca Cordell
Mike Wilde
Luke Bryant
Liesl Carr

Wadah Ibrahim
Matt Richardson
Beverley Hargadon
Sheila Jones
Bharti Patel
Asia Awal
Rachael Phillips

Graham Fowkes
Teresa McNally
Clare Foxon