Breathomics in Airways Disease: A Perspective from Major Consortia

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Breathomics- Biomarkers in severe Asthma

Vries et al ERJ 2018
3TR/ADON-ERS

LEICESTERSHIRE

EMBER

BEAT-SA
Beat Severe Asthma

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

- 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**
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
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\(^3\).

Acute Platform(s)

- **$t = 0$**
  - Measures (time 1a)
    - $t = within 24$ hours
  - Measures (time 1b)
    - $t = 24$ hours prior to discharge

- **$t + 8-16$ weeks**
  - Measures (time 2)
  - Outcomes 12, 24 months

- Window of Informed Consent

- Admission to hospital

- Discharge

- Recovered
• Europe’s largest scientific & clinical organisation in respiratory medicine founded in 1990

• Platform for over 32,000 members worldwide from over 160 countries
“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)

- **CADSET**
  - Airway diseases
- **NEUROCOUG**
  - Interstitial lung diseases
- **EARCO**
  - Paediatric respiratory diseases
- **SHARP**
  - Pulmonary vascular diseases
- **ARIANE-IPP**
- **INCIRCLE**
- **SPACE**
- **ChILDEU**
- **PEX-NET**
- **WEANSAFE**
- **EMBARC**
- **ENIRRIs**
- **TBnet**
- **ESADA**
- **ICE**
- **RATIONAL**
- **Respiratory critical care**
- **Respiratory infections**
- **Sleep and breathing disorders**
- **Thoracic oncology**
• 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

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**Logos:**
- Advion
- IBM
- AHSN Network
- EPSRC
- ILH
- Analytik
- University of Leicester
- British Lung Foundation