

## 5.02 Utilising digital technology in the diagnosis of patients with suspected asthma

Patrick J Kerr<sup>1,2</sup>, Ciara Ottewill<sup>1,2</sup>, Christina Campbell<sup>1,3</sup>, Vincent Brennan<sup>1,3</sup>, Ben McGinn<sup>2</sup>, Lorna Lombard<sup>1</sup>, Helen Doherty<sup>1</sup>, Orla Smith<sup>1</sup>, Elaine MacHale<sup>1</sup>, Richard W Costello<sup>1,3</sup>

1. Royal College of Surgeons in Ireland, Dublin, Ireland
2. Bon Secours Hospital, Dublin, Ireland
3. Beaumont Hospital, Dublin, Ireland

**Background:** Diagnostic accuracy is a challenge in asthma management. Many individuals are treated for asthma without having confirmatory physiological testing due to disease variation and limited access to diagnostics. We hypothesise that longitudinal, digitally measured lung function and treatment use could improve the assessment of diagnosis and control of asthma.

**Methods:** Participants with a clinical diagnosis of asthma were recruited. Spirometry and type-2(T2) biomarkers were measured at 4-weekly intervals over 12 weeks. Remote monitoring of lung function and inhaler use was performed concurrently. Methacholine challenge testing (MCT) was arranged for any individual without a definitive diagnosis of asthma by their study completion. At least two respiratory specialists reviewed all results to establish the diagnosis.

**Results:** Data from 61 participants are included. Complete data are available on 43. Spirometry and Fraction Exhaled Nitric Oxide (FeNO) confirmed asthma in 18% of cases at enrolment (N=11). Repeated measures confirmed asthma in a further 15%(N=9). The remaining participants were referred for MCT, where 30% (7/23) tested positive.

Improvement in T2 biomarkers was noted in participants with asthma (N=27); median FeNO=32ppb at enrolment, median FeNO=19ppb on completion ( $p<0.05$ ). Fourteen participants with asthma remained physiologically uncontrolled at completion, with elevated diurnal variation, T2 biomarkers. Two of these were non-adherent, but twelve demonstrated refractory disease despite good adherence to high-dose ICS/LABA. Unnecessary steroid/bronchodilator treatment was discontinued in sixteen individuals without asthma.

**Conclusions:** Multiple objective tests are often required to diagnose asthma accurately. Additionally, longitudinal digital monitoring can allow early identification of patients refractory to inhaled therapy.

**Keywords:** asthma, diagnosis, spirometry, adherence

### Disclosures

**Funding:** This study is funded by Royal College of Surgeons in Ireland (RCSI) through the StAR MD research programme.

This study is funded by an investigator-initiated project grant from GlaxoSmithKline.

***Conflict of Interest:*** Richard Costello has patents on the use of acoustics to assess inhaler errors and adherence, a method to quantify adherence, predict exacerbations, has received grants from Aerogen and GlaxoSmithKline; and speaker fees for Aerogen, AstraZeneca and GlaxoSmithKline.

**Corresponding author:** Patrick J Kerr <https://orcid.org/0000-0002-5419-9794>

**Clinical Trial Registry:** NCT05357274 <https://clinicaltrials.gov/>