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| **Using wearables to characterise pulmonary exacerbation in cystic fibrosis** |
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| **Introduction/Aim:** Diagnosing pulmonary exacerbations in cystic fibrosis (CF) is challenged by heterogeneity in clinical presentations alongside a lack of universally accepted diagnostic criteria. Prompt recognition enables early treatment, lowering the risk of irreversible loss of lung function. Wearables are ubiquitous in society and facilitate real-time measurement of health parameters. The role of wearables in characterising changes in these parameters during pulmonary exacerbations is unknown. Our study hypothesises that a commercially available wearable can identify a composite predictor of pulmonary exacerbation.**Methods:** Forty individuals with CF were provided with a Garmin *Vivosmart 4* activity tracker for twelve months. Pulmonary exacerbations were recorded and defined as: “*Physician diagnosed exacerbation and/or self-commencement of antibiotics by an individual in agreement with a shared management plan with a specialist”*. Garmin measures included step count, heart rate, perceived measures of stress and fatigue and sleep characteristics. Heart rate variability measures were pre-processed from beat-to-beat interval data using a validated algorithm for novel beat classification. Exploratory analyses via graphical and summary statistics will be performed along with longitudinal modelling of daily Garmin measures to assess their relationship with defined pre/during/post-exacerbation and wellness periods.**Results:** 37 participants have completed the observation period to date, during which 78 exacerbations occurred. Data collection for remaining subjects will be completed by January 4th 2024. The median age of participants was 28 years and 34 (85%) had at least one F508del CFTR mutation. 31 (77.5%) participants were on CFTR modulator therapy, 23 (57.5%) of whom received elexacaftor/tezacaftor/ivacaftor (Trikafta). 35 (87.5%) had *P.aeruginosa* chronic infection. The median FEV1 was 50% predicted. Currently 5,254,198 million data points from the Garmin devices have been collected, alongside 3082 nights of sleep. **Conclusion:** We demonstrate the capability to aggregate millions of health-related data points, from which longitudinal analytics can further characterise the physiology of pulmonary exacerbation in CF.**Grant Support:** Graeme Mattison is supported by the Digital Health Cooperative Research Centre, which is funded by the Commonwealth Government through the Cooperative Research Centres Program. The funding source provides salary support only and had no input in the planning, writing or publication of this research. |