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Invited Editorial

## Prioritising universal access to respiratory diagnostics

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A timely and accurate diagnosis of respiratory diseases is fundamental for correct treatment to be started leading to improvement in symptoms, quality of life, morbidity, and mortality. Yet, lengthy delays and errors in diagnosis remain too frequent, even for common lung conditions.<sup>1,2</sup> In the UK, difficulties in making a diagnosis have been compounded by inconsistent and inequitable access to respiratory investigations.<sup>3</sup>

### Importance

Respiratory diseases are the fourth greatest cause of death worldwide and have the third largest impact on quality of life.<sup>4</sup> Living with a lung condition can be frightening and unpredictable for individuals and their families. Respiratory illnesses are a major reason behind the winter pressures experienced each year, with respiratory hospital admissions 80% higher during winter months compared to springtime.<sup>5</sup> Lung disease is also strongly associated with health inequalities, being more prevalent, but often diagnosed later and associated with worse health outcomes, in areas of socioeconomic deprivation.<sup>6</sup>

Being unable to access necessary respiratory investigations can delay making a correct diagnosis, extend the time to treatment, and risk of a lung attack. For patients, diagnostic delay results in restrictions to daily life, the wrong treatment being trialled and unnecessary worry and uncertainty.<sup>7</sup> Health professionals also deal with uncertainty, supporting patients to weigh up the best course of action knowing that tests are inaccessible or will take months to be completed.<sup>3</sup>

## Spirometry is required to diagnose Chronic Obstructive Pulmonary Disease

Chronic Obstructive Pulmonary Disease (COPD) can only be diagnosed using spirometry.<sup>8</sup> Despite the requirement for diagnosis, the National Asthma and COPD audit found only 11.5% of patients diagnosed with COPD in the two years before the COVID-19 pandemic had a record of the gold standard test, falling to 1.9% during the pandemic (April 2020 to July 2021).<sup>9,10</sup> In their qualitative study of clinician and commissioner stakeholders in England, Doe *et al.*, report barriers to providing spirometry in primary care and opportunities for improvement.<sup>11</sup> Before the COVID-19 pandemic, challenges included a lack of clear and consistent funding for providing spirometry services, variation in the quality of spirometry performance and interpretation, and an imperfect accreditation process for achieving competency in spirometry.<sup>11</sup>

With spirometry halted during the pandemic, a huge backlog of cases increased pressure on existing services, adding to pre-pandemic challenges.<sup>12</sup> Some services never re-started. In September 2023, data suggested primary care spirometry was generally unavailable or inconsistently provided within 11 of England's 42 Integrated Care Boards.<sup>3</sup> The findings from Doe *et al.*, provide possible reasons, including guidance for restarting spirometry perceived as confusing and service providers overwhelmed by the number of competing priorities post-pandemic.<sup>11</sup> Similarly, in Scotland, time constraints, not being paid to perform spirometry and limited training opportunities have led to reluctance to re-start spirometry in primary care.

## Implementing spirometry

Doe *et al.*, also gained views on what a good spirometry pathway should involve.<sup>11</sup> Spirometry delivered close to patient's homes, by trained, competent professionals was widely sought after.<sup>11</sup> In England, Community Diagnostic Centres were recommended to increase capacity for diagnostic testing in convenient locations for patients.<sup>13</sup> 108 centres have opened, though some sites are within hospitals, which has raised questions about whether centres are truly community based.<sup>14</sup> Examples of excellent, innovative service provision are evident across the UK, including spirometry testing in supermarkets, shopping centres, a mobile diagnostics van and spirometry cabins providing additional space.<sup>12</sup> Existing services have also increased capacity in some areas, for example, by opening at weekends. However, for respiratory inequalities to be addressed, quality assured spirometry must be accessible universally.<sup>12</sup>

## Technological solutions

Technical innovation also has a role in improving respiratory diagnostics, enabling greater accessibility, supporting interpretation of results, and developing new tests such as oscillometry or breathomics. To improve access, portable spirometers can be conducted in patient homes and produce comparable FEV1 and FVC readings to laboratory performed testing, though currently, not all devices meet quality standards.<sup>15</sup> Smartphone microphones can be used to generate spirometry measurements and are ubiquitously available, but so far have only been evaluated in pilot studies.<sup>15</sup> Regarding interpretation of results, novel methods, including Artificial Intelligence (AI) are available.<sup>15</sup> To be acceptable for clinicians, Doe *et al.*, found that AI supported interpretation of spirometry should be accurate, validated, trustworthy, cost effective, and in keeping with existing clinical workflows. New technologies can reduce health disparities, but may also inadvertently widen, or create new inequalities. For example, one topic not reported by Doe *et al*, but inherent in many AI systems is algorithmic bias, which can lead to inaccurate predictions and discrimination based on, for instance, sex, sociodemographic status, or ethnicity. Therefore, developers must prioritise equity when designing new technologies, to ensure algorithms such as AI spirometry interpretation systems do not unintentionally reinforce inequality.

## Summary

Taking action to address respiratory diseases can reduce health inequality, winter pressures, and improve patient lives and is made possible through timely and accurate diagnoses. Universal access to respiratory diagnostics, including quality assured spirometry is an essential component of managing respiratory conditions and deserves to be urgently prioritised.

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