

IPCRG practice driven answers on COVID-19 and respiratory questions



Does spirometry really pick up all the people with COPD and should we keep using LLN given issues around this measurement?

What the research says

Current diagnostic criteria, which includes spirometric evidence in a person with relevant symptoms and risk factors, appear to be aimed mainly at those individuals with well-established disease (Sakhamuri & Seemungal 2019). Screening for COPD has been largely discouraged as it has not been shown to improve outcomes (Webber et al 2022).

GOLD 2022 guidelines advise that spirometry is required to confirm a diagnosis of COPD in the presence of persistent respiratory symptoms. GOLD guidelines suggest a fixed criterion – the presence of a post-bronchodilator FEV₁/FVC <0.70 (<70%) – to confirm the presence of airflow limitation. Other guidelines suggest a post-bronchodilator FEV₁/FVC ratio less than the lower limit of normal (LLN; estimated from a representative reference population directly or using a related 'surrogate' population) as the fixed cut-off does not reflect the influence of sex (women generally score lower on pulmonary function parameters than men) and age (Grafino et al 2021).

The different criteria to define airway obstruction appear to identify patients with COPD with different characteristics (Grafino et al 2021; Miller et al 2018) and more people

appear to meet the fixed cut-off criteria for COPD (Grafino et al 2021; Llordes et al 2020; Meteran et al 2017). The FEV₁/FVC varies with age (higher in younger individuals and lower in older individuals). Consequently, a fixed cut-off of 0.7 (70%) is susceptible to over-diagnosis of COPD among the elderly and underdiagnosis in those aged <45 years. For certain ethnic groups, current cut-offs may also result in under-diagnosis of COPD (Aiyer et al 2020; Sood et al 2022).

In order to improve diagnostic accuracy, GOLD recommend repeat spirometry if FEV₁/FVC is 0.6–0.8 in a person with relevant symptoms and risk factors (GOLD 2022). In a long-term follow-up of patients with COPD (Llordes et al 2020):

- Those with evidence of obstructive disease using fixed ratio criteria but not obstructive using LLN criteria lost more FEV₁/FVC over time than those with evidence of obstructive disease using both criteria.
- Those with evidence of obstructive disease using both criteria experienced more hospitalizations and had higher mortality than those with evidence of obstructive disease using fixed ratio criteria but not obstructive using LLN criteria.

This suggests that LLN criteria are more likely to accurately identify those with clinical COPD. The LLN criteria are increasingly available in the software of most commercially available spirometers and can be used where they are available at relevant. The European Respiratory Society (ERS) offer a tool to enable calculation of various spirometric values including LLN at <http://gli-calculator.ersnet.org/>.

What this means for your clinical practice

- Employ a holistic approach to the diagnosis of individual patients considering spirometry, respiratory symptoms, and risk factors
- For people presenting with respiratory symptoms suggestive of COPD and a history of relevant risk factors, spirometry should be performed to confirm fixed airflow obstruction without reversibility and formally diagnose COPD
- When interpreting spirometry results for older adults, be mindful of the potential for overdiagnosis when using a fixed FEV1/FVC cut-off of 0.7 (70%) and perform repeat spirometry in cases where the ratio is between 0.6 and 0.8. Conversely, be mindful of the potential for underdiagnosis in younger individuals as the FEV1/FVC may be higher than the 0.7 (70%) cut-off
- Where local reference values for LLN are easily available they should be used instead of the cut off of 0.7 (70%). Note that the likelihood for misdiagnosis using LLN increases in people where reference values are not available for ethnicity

Useful links and supporting references

Aiyer A, et al. Ethnic variance in prevalence of COPD among smokers in a real world setting. *Open Respir Med J* 2020;14:93–8. Available at:

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7931151/>. Accessed May 2022.

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Llordes M, et al. Diagnosing COPD in primary care: Long-term follow-up of EGARPOC Study. *Int J Chron Obstruc Pulm Dis* 2010;15:1403–13. Available at: <https://pubmed.ncbi.nlm.nih.gov/32606649/>. Accessed April 2022.

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Sakhamuri S, Seemungal T. COPD: Gaps in the COPD recommendations and related imperative research needs. *COPD* 2020;17:1–3. Available at: <https://pubmed.ncbi.nlm.nih.gov/31902259/>. Accessed April 2022.

Sood A, et al. Racial and ethnic minorities have a lower prevalence of airflow obstruction than non-hispanic whites. *COPD* 2022;19:61–8. Available at: <https://pubmed.ncbi.nlm.nih.gov/35099333/>. Accessed May 2022.

Webber EM, et al. Screening for Chronic Obstructive Pulmonary Disease updated evidence report and systematic review for the US preventive services task force. *JAMA* 2022;327:1812–6. Available at: <https://pubmed.ncbi.nlm.nih.gov/35536261/>. Accessed May 2022.

Authors

Dr Alan Kaplan (Chair Family Physician Airways Group of Canada) for and on behalf of the IPCRG practice driven answers review group.

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