Reviewer’s report

Title: Restrictive spirometric pattern and true pulmonary restriction in a general population sample aged 50-64 years

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Reviewer: Robert L. Jensen

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Review of BMC Pulmonary Medicine manuscript "PULM-D-19-00625"

Title: Restrictive spirometric pattern and true pulmonary restriction in a general population aged 50-64 years
Authors: Kjell Toréna, Linus Schiölera, Jonas Brismanb, Andrei Malinovschic, Anna-Carin Olina,b, Göran Bergströmd, Björn Bakee

The manuscript is well written and concise, and this is an important issue. The study examines if spirometry, being easier and less expensive, can be used to evaluate restriction without resorting to the more complicated plethysmographic TLC measurements. A random sample of 2,243 was asked to participate, only 1,111 agreed and 983 had complet data to evaluate. Measurements were made in accordance with the ATS/ERS standards and analyzed with SAS.

General comments:
Could the authors show any measured bias from participants that agreed to participate and those who did not, as opposed to the general statement in the discussion. The authors should comment on the narrow age range (50-64) and if the results are possibly valid for anyone tested outside the study age range.
The authors define RSP as a normal FEV1/FVC with the FVC below LLN. This definition leads the authors to their conclusions that using only spirometry "... RSP has low validity for identifying true pulmonary restriction." There is evidence that if rather than simply using the FVC below the LLN that if one selects an RSP based on the FVC being < 50% predicted. In one small study almost a large percentage of the TLC restrictive patterns were identified when the FVC < 55% predicted. Could the authors also do one additional analysis using two additional thresholds, for three total, 1) their FVC < LLN criteria and 2) FVC < 60% predicted and 3) FVC < 50% predicted. Then doing the specificity and sensitively analysis for each. It should also be possible to optimize on a continuous change of percent predicted FVC, a % predicted threshold where there is acceptable sensitivity and specificity.
The authors mention that in a general population, where the incidence of restriction is low, that using RSP to diagnose would show many false positives. However, in a clinical population that has been referred for lung function testing, the incidence restriction may be relatively high and therefore the RSP may be more valid.
The authors do not mention the quality of the spirometry tests. It is typical that a review of the tracings and data is performed to clearly include or exclude spirometry "blows" for acceptability and grade the testing session as having useful data (good reproducibility, curve shape, no coughs, etc.) and excluding tests that fail quality standards and should be not be included in analysis. Exclusion of poor-quality tests reduces bias that these tests will introduce. Some quality control statements should be included in the manuscript for both TLC body box measurements and spirometry measurements. Lastly, was there daily calibration of the body box? If so it should be mentioned.
Did the authors examine the effect on their results if the VC (most likely as slow vital capacity)
obtained during the plethysmography TLC measurements was used to calculate the FEV1/FVC ratios and to determine RSP. Some discussion of the differences in VCpleth vs FVCspiro should be made to give the readers a sense that the different instruments are measuring the VC within normal subject variation and that there is not a bias between the different technologies.

Specific comments:
Table 1: The FVC & FEV1 %Pred for the three spirometry RSP definitions is fairly consistent, however these values for FVC & FEV1 %Pred differ significantly from the FVC & FEV1 %Pred values found in the body box measurements. Were the instruments capable of measuring a similar FVC & FEV1 in the same subject? Please check Table 1 for accuracy.
An additional table with data that contains mean +/- SD for key measurements showing results for positive restrictive pattern, no restrictive pattern and all subjects might be considered.

Are the methods appropriate and well described?
If not, please specify what is required in your comments to the authors.

Yes

Does the work include the necessary controls?
If not, please specify which controls are required in your comments to the authors.

Yes

Are the conclusions drawn adequately supported by the data shown?
If not, please explain in your comments to the authors.

Yes

Are you able to assess any statistics in the manuscript or would you recommend an additional statistical review?
If an additional statistical review is recommended, please specify what aspects require further assessment in your comments to the editors.

I am able to assess the statistics

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