to the underlying disease than to haemoptysis itself, these results must be taken into account and suggest that follow-up after the initial haemoptysis needs to be sustained [1].

Awareness of the likelihood of cancer associated with haemoptysis is of course central. However, our study also provided important information regarding the epidemiology of less frequent aetiologies of haemoptysis. For example, among them, we demonstrated that the prevalence of tuberculosis associated with this symptom was around 3%, but seems to have decreased steadily between 2008 and 2012 (from 3.4% to 2.5%). We believe our results bring important and, until now, unknown information about high-income countries. We feel that the association of large retrospective but comprehensive cohort studies [1] and smaller but prospective [6] studies will help to better characterise this ominous symptom.

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Haemoptysis associated with high 3-year in-hospital mortality in large retrospective cohort study in France http://ow.ly/UeyV9

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Received: Sept 02 2015 | Accepted: Sept 03 2015

Conflict of interest: None declared.

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Eur Respir J 2016; 47: 350–351 | DOI: 10.1183/13993003.01461-2015 |

Lung function defects in treated pulmonary tuberculosis patients

To the Editor:

In their study, Amaral *et al.* [1] have nicely demonstrated the association of obstructive and restrictive lung function defects in patients with a past history of tuberculosis (TB). However, a few points regarding these tubercular sequelae need to be discussed in order for the results to be fully understood.

Verbal confirmation of past TB, which was performed in the study, is accompanied by the inherent drawback of "recall bias". This major limitation was not mentioned in the study. Scrutinising past medical records and/or obtaining a plain chest radiograph along with verbal confirmation might have consolidated the diagnosis.

As this was a cross-sectional study, the time elapsed since the occurrence of TB seemed to be a major factor in deciding the occurrence of TB sequelae. Therefore, this confounding factor should be adjusted for before interpreting the results. Associating the time duration with lung function defects might also have

established the temporality of the disease events, which was otherwise lacking in the study. The overall burden of disease (number, duration and severity of TB relapse) and respiratory morbidity in childhood [2] are other potential confounding factors that were not considered in the study.

Radiologically, healed pulmonary TB can present with cicatrisation, fibro-cavitory disease, end-stage lung destruction, pulmonary calcification, bronchiectasis, trachea-bronchial stenosis *etc*. [3]. With such diverse and mixed presentations, combined obstructive and restrictive defects seem highly probable, but were not observed in the study.

In general, asymptomatic lung function defects in patients with past TB do not require any treatment. The study would have been clinically more relevant if the authors had given the percentage of previously treated TB patients with symptomatic lung function defects, particularly airway obstruction, who were likely to utilise medical resources in future.

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Healed pulmonary TB often presents with residual lung function defects which may require further treatment http://ow.ly/TXfLm

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Received: Aug 10 2015 | Accepted: Aug 13 2015

Conflict of interest: None declared.

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Eur Respir J 2016; 47: 351–352 | DOI: 10.1183/13993003.01320-2015 | Copyright ©ERS 2016

From the authors:

We are grateful to Aggarwal and colleagues for their interest in our paper [1]. They are correct to point out the limitations of cross-sectional studies, particularly when they rely on recalled information, and we discussed these at some length in the paper. However, evidence needs to be evaluated in the round. Not all error is biased; the outcomes (lung function) that we used were measured objectively and, as the results were not shared with the participants at the time, are unlikely to have influenced their answers to questions about a past history of tuberculosis. We agree, of course, that objective measures of tuberculosis would have been preferable, but it seems more likely that these would have reduced random error and so strengthened the current findings. We hope to add these to future investigations in the Burden of Obstructive Lung Disease (BOLD) cohort.

We also discussed at some length the problem of inferring causality from cross-sectional studies when the order of events is unclear. In this case, reverse causation (low lung function causing tuberculosis) seems unlikely, but finding that the tuberculosis preceded the lung function decline would have only slightly reduced, and not excluded, the possibility of both being explained by a third, unmeasured, variable. The argument against this rests largely on the strength of the association and the failure to account for it by adjustment for other known factors.

Having raised a concern over recall errors, Aggarwal and colleagues suggest we should have used time to "lung defects" after the occurrence of tuberculosis and "total burden" of disease as exposure variables. In the BOLD study, we do not have this information but it would likely be even less reliable than the information on history of tuberculosis itself.

We did have information on childhood hospitalisation for respiratory disease. We did not report this in the paper, largely because of the strong possibility of recall bias in this variable among those with symptomatic disease. However, adjusting for this variable does not alter the association between lung