- 7 Krueger KP, Nelson AC. Economic considerations in the treatment of invasive aspergillosis: a review of voriconazole pharmacoeconomic studies. *Clin Outcomes Res* 2009; 1: 35–43.
- 8 Aguilar Aragón JA, Cabrera Rivero JL, Cornejo García J, *et al.* Prevalencia de hemoptisis luego de la cura bacteriológica en pacientes dados de alta del Programa de Control de Tuberculosis del Hospital Nacional Cayetano Heredia. [Haemoptysis prevalence after bacteriological cure in discharged patients from the Tuberculosis Control Programme from Hospital Nacional Cayetano Heredia.]. *Rev Medica Hered* 2003; 14: 167–174.
- 9 World Health Organization. Global tuberculosis report 2013. Geneva, World Health Organization, 2013.
- 10 Walls T, Shingadia D. The epidemiology of tuberculosis in Europe. *Arch Dis Child* 2007; 92: 726–729.

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From the author:

We thank A. Proaño and co-workers for their important comments on our cost analysis of tuberculosis (TB) in the European Union [1]. As pointed out in our study, the cost calculation only refers to direct treatment costs of the disease itself under the implicit assumption that treatment success has either been gained over 24 months or, alternatively, that according to the official World Health Organization data a minor percentage of patients (shown separately for fully susceptible TB and multidrug-resistant (MDR)-TB) will die immediately afterwards. In addition, to our knowledge, the disability weight of 0.271 used to calculate disability-adjusted life years includes only the clinical stage of TB disease without considering any sequelae after treatment.

We fully agree with A. Proaño and co-workers that sequelae of TB should be included in cost calculations as far as possible to further enhance the economic weight of that disease. In terms of costs, however, we have to differentiate between radiographic abnormalities, as described by Kim *et al.* [2], and clinical consequences *sui generis* that need to be treated in the long run. Thus, for bronchiectasis, from an economic point of view the question that has to be answered is how many patients with radiological signs of bronchiectasis simultaneously suffer from chronic lung disorders, characterised by cough, sputum production and recurrent respiratory infections and/or frequently associated chronic obstructive lung disease? The latter group of patients seems to differ from other patients with bronchiectasis in terms of disease severity, more frequent detection of *Pseudomonas aeruginosa* and other potential pathogenic microorganisms, more frequent exacerbations and increased mortality [3–5]. However, the major burden of clinically manifest bronchiectasis may be managed in the outpatient setting by primary care physicians and pulmonologists in private practice and, thus, neither the prevalence of bronchiectasis in general nor TB-induced bronchiectasis is accurately known.

In our patients, most of whom are immunocompetent, pulmonary aspergillosis as a complication of TB is rare and only occasionally found in cavities of the destroyed lungs of mismanaged MDR-TB patients. In addition, haemoptysis, which occurred in ~14% of patients following TB, as stated by A. Proaño and co-workers, may be seen as an eventual indicator of untreated manifest disease rather than as a post-treatment complication.

Nevertheless, there are also additional consequences predisposed by prior TB disease, such as infections with non-tuberculous mycobacteria [6] or lung cancer, of which the latter is seen in an ~11-fold higher incidence in TB patients [7] *versus* the general population bringing with it significant costs. We would like to take advantage of this opportunity to state that we intend, in the near future, to conduct a systematic follow-up of German TB patients to catalogue the modern clinical consequences of this ancient disease and the respective costs. We respectfully agree with our distinguished colleagues that such studies are needed.

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Significant post-treatment costs may arise due to tuberculosis sequelae, but these still have to be determined <http://ow.ly/xbwHW>

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References

- 1 Diel R, Vandeputte J, de Vries G, *et al.* Costs of tuberculosis disease in the European Union: a systematic analysis and cost calculation. *Eur Respir J* 2014; 43: 554–565.
- 2 Kim HY, Song KS, Goo JM, *et al.* Thoracic sequelae and complications of tuberculosis. *Radiographics* 2001; 21: 839–858.
- 3 Martinez-Garcia MA, de la Rosa Carrillo D, Soler-Cataluna JJ, *et al.* Prognostic value of bronchiectasis in patients with moderate-to-severe chronic obstructive pulmonary disease. *Am J Respir Crit Care Med* 2013; 187: 823–831.
- 4 Martinez-Garcia MA, Soler-Cataluna JJ, Donat Sanz Y, *et al.* Factors associated with bronchiectasis in patients with COPD. *Chest* 2011; 140: 1130–1137.
- 5 Ringshausen FC, de Roux A, Pletz MW, *et al.* Bronchiectasis associated hospitalizations in Germany, 2005–2011: a population-based study of disease burden and trends. *PLoS One* 2013; 8: e71109.
- 6 Schönfeld N, Haas W, Richter E, *et al.* Empfehlungen zur Diagnostik und Therapie nichttuberkulöser Mykobakterien des Deutschen Zentralkomitees zur Bekämpfung der Tuberkulose (DZK) und der Deutschen Gesellschaft für Pneumologie und Beatmungsmedizin (DGP) [Recommendations for diagnosis and treatment of nontuberculous mycobacterioses of the German Central Committee against tuberculosis and the German Respiratory Society]. *Pneumologie* 2013; 67: 605–633.
- 7 Yu YH, Liao CC, Hsu WH, *et al.* Increased lung cancer risk among patients with pulmonary tuberculosis: a population cohort study. *J Thorac Oncol* 2011; 6: 32–37.

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