

Correspondence

Will the bleach method keep its promise in sputum smear microscopy?

Ängeby and colleagues should be congratulated on their review of publications regarding the bleach concentration method, as well as their survey among National Tuberculosis Programme (NTP) managers.¹ They conclude that the method's improved sensitivity for detection of acid-fast bacilli (AFB) has been well established, that operational difficulties for its introduction in routine work are not insurmountable, and that the lack of a recommendation from the World Health Organization (WHO) and/or the International Union Against Tuberculosis and Lung Disease (Union) has been the main reason preventing managers from its adoption in their NTP.

While we are not in a position to issue official recommendations on behalf of the Union, we would like to advance some thoughts that have emerged in discussions at the Union secretariat.

The method entails more work as well as additional supplies, and every change in an existing technique needs effort in training all those concerned. The potential gain should thus be unambiguous. We believe that this is not the case, for the following reasons:

- 1 Although statistically significant, the increased sensitivity was modest in some of the studies, and exhibits remarkable variations. This is obvious from the authors' figure. Moreover, in the Honduras study covered in the review,¹ three times less incremental yield was obtained on transferring the method from an experimental to a routine setting. This suggests that the method cannot be recommended indiscriminately, at least until the mechanisms underlying these differences have been elucidated.
- 2 In some studies, poor quality direct Ziehl-Neelsen (ZN) examination may have been responsible for most of the gain obtained by bleach concentration. Compared to the gold standard (culture in reference 2, fluorescence microscopy in reference 3), a yield for ZN of 31% and 43%, respectively, of confirmed cases is unusually low for a high-prevalence country.
- 3 The Bangladesh study reviewed⁴ reported a loss of sensitivity in follow-up sputum, and Garay warns of a loss of sensitivity in non-purulent specimens using ammonium sulphate and NaOH sedimentation.⁵ These methods might thus be unsuitable for poor quality watery specimens, possibly because of a lack of protein needed for co-flocculation of the bacilli. Deficient application, i.e., due to excessively long exposure to bleach, might also result in false-negative results.

- 4 Reusing centrifugation tubes and water for dilution carries a danger of false-positive results due to carry-over or colonisation with environmental mycobacteria.
- 5 The operational requirements for the adoption of the technique may not seem to be excessive, but they are nevertheless in addition to the present needs, which are not yet being met everywhere. Moreover, the sputum preparation time is by definition prolonged.

In summary, our concerns are mainly operational. While we do agree that the bleach method holds considerable promise, the conditions in which it truly increases the sensitivity of ZN, and its possible pitfalls, need to be studied further. Only then can good indications for its use be identified. These should be population-based, i.e., high HIV prevalence, rather than specimen-selective, which would introduce an unacceptable complexity. The bleach method could then be recommended, provided that in these populations the incremental gain offered over good direct ZN outweighs the operational burden imposed by the technique, as well as the risk of false-positive error.

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- 3 Habeenzu C, Lubasi D, Fleming A F. Improved sensitivity of direct microscopy for detection of acid-fast bacilli in sputum in developing countries. *Trans R Soc Trop Med Hyg* 1998; 92: 415-416.
- 4 Van Deun A, Kya Maug A, Cooreman E, et al. Bleach sedimentation method for increased sensitivity of sputum smear microscopy: does it work? *Int J Tuberc Lung Dis* 2000; 4: 371-376.
- 5 Garay J E. Analysis of a simplified concentration sputum smear technique for pulmonary tuberculosis diagnosis in rural hospitals. *Trop Doct* 2000; 30: 70-72.

In reply

We have read with great interest the comments by Drs van Deun, Kim and Rieder on our review of the