

## Tuberculosis screening in asylum seekers in Germany: a need for better data

Screening for tuberculosis among asylum seekers is a cornerstone of tuberculosis prevention and control strategies in many European countries. Screening programmes need to follow Wilson and Jungner's classic screening criteria and should ensure that screening is based on evidence, monitoring, and quality assurance.<sup>1</sup> Asylum seekers constitute a dynamic population whose countries of origin, circumstances, and routes—and thus whose tuberculosis risk—vary over time. Therefore, health information systems should ideally produce nationally representative, timely, and reliable data for the yield and outcome of screening by country of origin to facilitate evaluation of screening performance, and to enable informed decision making at policy level. Nationwide data for the number of asylum seekers screened by country of origin are, however, scarce in Germany. This scarcity is mainly due to a fragmented reception and public health system: the 16 federal states organise reception and registration of asylum seekers according to their own policies, including screening for, and documentation of, tuberculosis. National law requires notification of tuberculosis cases only. Researchers and decision makers interested in performance, optimisation, and quality assurance of the screening intervention are thus forced to use either data with little geographic scope, or best available—but not always reliable—proxy data to calculate estimates of screening yield. Use of a proxy denominator (ie, an approximation of the total number of individuals screened) to overcome the limitations of the

fragmented system and to estimate national yields of screening<sup>2</sup> appears to be a pragmatic solution, but the validity of this approach remains uncertain. The absence of nationwide data raises several methodological, ethical, and public health related questions. These issues become obvious when comparing estimates, taken from recent<sup>2-5</sup> and earlier studies<sup>6</sup> in Germany (1992–2018), of the yield of tuberculosis screening in asylum seekers by country of origin depending on the denominators used, and by comparing these estimates with the WHO tuberculosis estimates.<sup>7</sup>

Currently, the resulting estimates of country-specific yields are characterised by considerable heterogeneity (figure). Moreover, considerable uncertainty surrounds all estimates (figure).<sup>8</sup>

Deviations of yield estimates from WHO estimates of tuberculosis incidence and prevalence pertaining to the country of origin appear more prominent in yield estimates based on proxy denominators. Wide and overlapping confidence intervals, especially for estimates based on factual denominators, render the existence of most differences between yield and WHO data highly uncertain. Notably, use of a proxy denominator results in considerably higher tuberculosis estimates in asylum seekers than when WHO data are used for six of 16 countries of origin (figure).

Overall, substantial heterogeneity and uncertainty accompany the estimates of country-specific yield of screening for tuberculosis among asylum seekers in Germany. Differences between studies that use factual and proxy denominators could potentially reflect a numerator-denominator bias, because tuberculosis and population data with proxy denominators were taken from different sources (ie, notification data and asylum registration). In 2015, the registration of asylum seekers

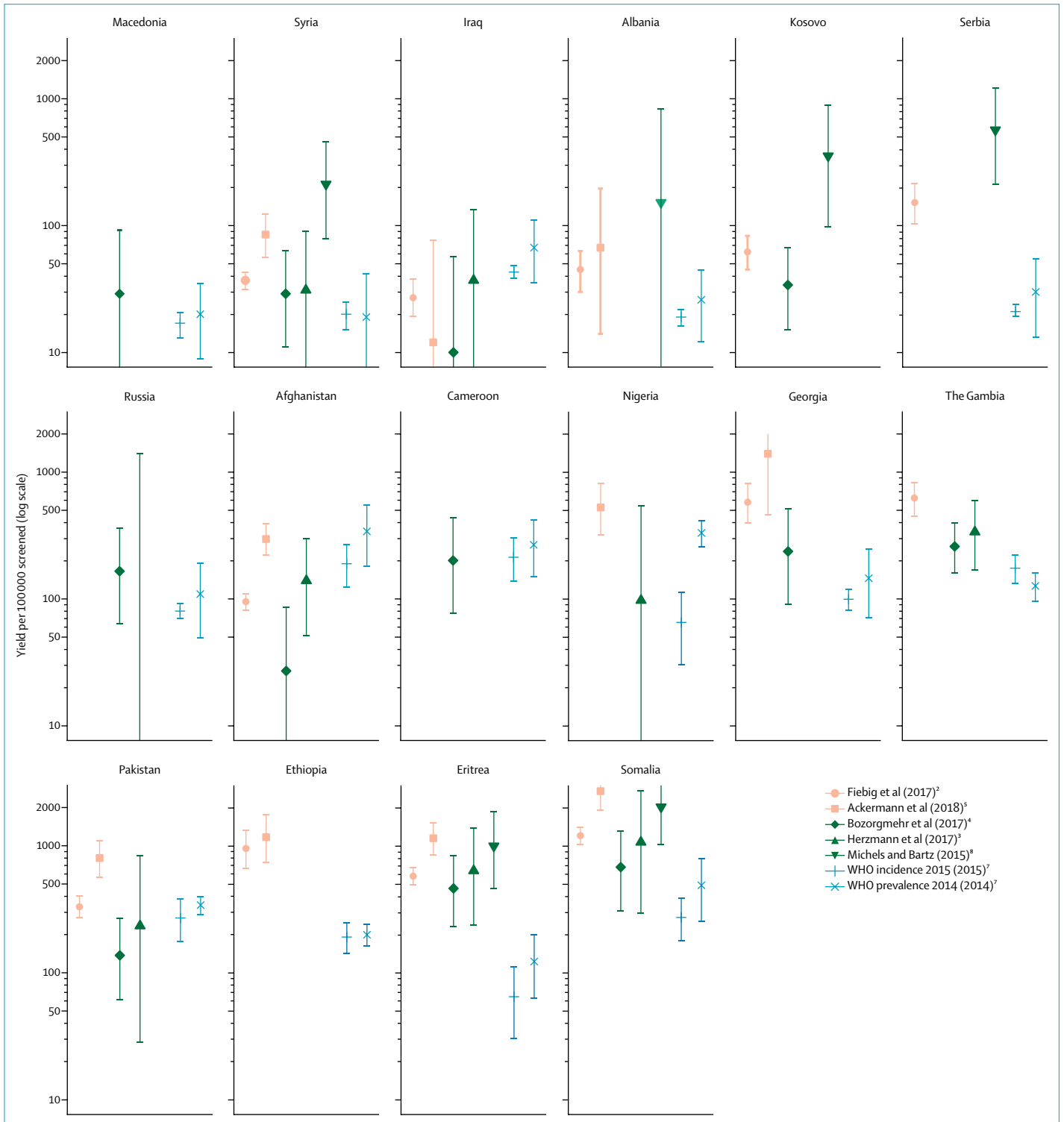
lagged behind mandatory screening by several months. Additionally, many individuals who were screened left the reception centres for other German states or other countries before they were registered as asylum applicants, resulting in high numbers of individuals lost to follow up.<sup>3</sup> Hence, more people might have been screened in 2015 than indicated by the numbers of individuals registered by Bundesamt für Migration und Flüchtlinge, leading to an overestimation of yield when using proxy denominators. Another source of heterogeneity could be differences in underlying age and sex distributions of the screened populations.

The substantial uncertainty regarding screening yield appears unacceptable, especially given that screening for tuberculosis is compulsory, and Germany is the country with the highest number of asylum applicants in Europe. About 1.42 million asylum seekers were screened between January, 2015, and April, 2018, in Germany, assuming all applicants underwent screening. Better yield estimates would require standardised data collection, which is hampered by Germany's decentralised public health and asylum system operating without nationally binding and consented guidelines. Amendments to the national laws (ie, the Infection Protection and Asylum Act) that stipulate compulsory screening are urgently needed. These amendments should ensure that data for the number of individuals screened are reliable and accurate, including collection of their country of origin, age, and sex. Valid and reliable data for screening are an ethical and economic imperative, particularly when the number of individuals affected by mandatory screening is as high as several million people.

We declare no competing interests. KB acknowledges funds from the Federal Ministry of Education and Research (FKZ01GY1611).



Published Online  
July 10, 2018  
[http://dx.doi.org/10.1016/S2468-2667\(18\)30132-4](http://dx.doi.org/10.1016/S2468-2667(18)30132-4)



**Figure: Estimates of screening yield by country of origin of asylum seekers.**

Estimates are derived from studies with proxy (orange) and factual (green) denominators in Germany and are compared with WHO tuberculosis estimates (blue). WHO estimates of tuberculosis incidence (2015) and prevalence (2014) are from the WHO global tuberculosis database.<sup>7</sup> Country-specific yield estimates and CIs are from primary studies.<sup>2-5,8</sup> When no CIs were provided,<sup>8</sup> we calculated Clopper-Pearson intervals on the basis of detected tuberculosis cases (numerator) and numbers screened (denominator).

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- 1 Andermann A, Blancquaert I, Beauchamp S, Déry V. Revisiting Wilson and Jungner in the genomic age: a review of screening criteria over the past 40 years. *Bull World Health Org* 2008; **86**: 317–19.
- 2 Fiebig L, Hauer B, Andrés M, Haas W. Tuberculosis screening in asylum seekers in Germany, 2015: characteristics of cases and yield. *Eur Respir J* 2017; **50**: 1602550.
- 3 Herzmann C, Golakov M, Malekzadeh F, Lonnroth K, Kranzer K. Radiological screening of refugees in Germany. *Eur Respir J* 2017; **49**: 1602487.
- 4 Bozorgmehr K, Joggerst B, Wagner U, Stock C. Yield of tuberculosis screening in asylum-seekers by country of origin: analysis of screening data in a German federal state (2002–2015). *Eur Respir J* 2017; **49**: 1602327.
- 5 Ackermann N, Marosevic D, Hörmansdorfer S, et al. Screening for infectious diseases among newly arrived asylum seekers, Bavaria, Germany, 2015. *Euro Surveill* 2018; **23**: 17–00176.
- 6 Bozorgmehr K, Razum O, Saure D, Joggerst B, Szecsenyi J, Stock C. Yield of active screening for tuberculosis among asylum seekers in Germany: a systematic review and meta-analysis. *Euro Surveill* 2017; **22**.
- 7 WHO. Tuberculosis (TB). <http://www.who.int/tb/country/data/download/en/> (accessed Dec 3, 2018).
- 8 Michels H, Bartz C. Tuberculosis screening as part of the hygiene examination of asylum seekers in Rhineland-Palatinate, Trier. *Epidemiologisches Bulletin* 2015; **11/12**: 88–90.