13-valent pneumococcal vaccines have substantially reduced meningitis and septicaemia in children. Comprehensive disease surveillance with continued development and implementation of vaccines against additional pneumococcal serotypes and serogroup B meningococcal disease will be needed to further improve control of these serious bacterial infections.

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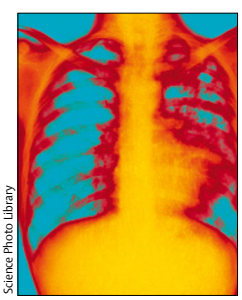
Is tuberculosis elimination a reality?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Multidrug-resistant (MDR) tuberculosis is a public health emergency and a challenging scenario for both patients and clinicians.[1,2] In 2012, there were more than 450 000 incident cases and 170 000 deaths worldwide.[3]

Treatment of MDR tuberculosis is complex and expensive (€100 000 or more for drugs for one patient), especially its most severe, extensively drug-resistant forms.[1,2,4] Treatment is long (at least 2 years), the drugs are toxic (specific expertise is needed to manage adverse reactions), and the outcomes are poor (with low success and high death rates).[1,2]

New drugs will soon be available that will probably shorten and simplify treatment for MDR tuberculosis and increase effectiveness, and public health strategies have been developed to prevent the occurrence of drug resistance.[5–7] The traditional approach of national tuberculosis programmes, focused on tuberculosis control (ie, rapid diagnosis and early, effective treatment of newly detected infectious cases), which was advocated by the WHO Stop TB Strategy, will soon be replaced by the post-2015 strategy focused on the concept of tuberculosis elimination (ie, fewer than one new sputum smear-positive tuberculosis case per 1 million population).[8,9]

Whereas traditional contact tracing (eg, looking for the contacts of individuals with tuberculosis and MDR tuberculosis in progressive circles[10]) recommends identification and treatment of latently infected individuals and additional tuberculosis cases, new approaches recommend genotypic identification of the causative strain, monitoring of the epidemic, and initiation of adequate measures to manage it.

One such approach is mycobacterial interspersed repetitive-unit-variable-number tandem repeat (MIRU-VNTR) strain typing. In *The Lancet Infectious Diseases*, Laura F Anderson and colleagues[11] report an assessment of transmission of MDR tuberculosis in the UK between 2004 and 2007, using the 24-loci MIRU-VNTR method together with epidemiological data collected through the national surveillance system and an ad-hoc cluster investigation questionnaire. The scope was to identify the relative frequency of MDR tuberculosis cases transmitted nationwide. 204 patients were diagnosed with MDR tuberculosis in the study period of whom 189 (92·6%) had an MIRU-VNTR profile. 15% of these cases were clustered. Furthermore, Anderson and colleagues analysed the risk factors associated with MDR tuberculosis transmission: being born in the UK (odds ratio 4·81; 95% CI 2·03–11·36,

p=0·0005) and having a history of illicit drug use (4·75; 1·19–18·96, p=0·026) significantly increased the probability of transmission. Most cases (21 of 22) were transmitted in the household. The occurrence of MDR tuberculosis transmission in the UK is lower than in other European and non-European settings, probably as a consequence of scarce transmission occurring between specific population groups.

The study is an excellent example of nationwide implementation of one of the European Centre for Disease Prevention and Control (ECDC) recommendations to eliminate tuberculosis in the European Union.[12–14] Moreover, the identification of risk factors allows the prioritisation of the public health investigations, reducing the probability of transmission related to health-care system delay.

The core strength of the study is the high proportion of MDR tuberculosis cases assessed with the novel diagnostic approach (ie, 24-loci MIRU-VNTR) and the ability to increase sensitivity compared with the traditional epidemiological investigations. However, other more sensitive techniques such as whole genome sequencing analysis could also have increased the ability to identify additional epidemiological links, which means that a potential underestimation of MDR tuberculosis transmission should be considered. Low culture confirmation (about 60% in the UK) could also have underestimated the true prevalence of transmission.

Molecular methods have several public health applications, including identification of outbreaks, population groups at highest risk of transmission, transmission across jurisdictions, transmission chains, reinfected and relapsing cases, and laboratory cross-contamination.[12] However, several technical problems currently hinder their integration into national tuberculosis programmes, including the absence of a gold standard to effectively assess their discriminatory power.

The ECDC recommends[12–14] monitoring and assessment of transmission of drug-susceptible and drug-resistant mycobacterial strains by adoption of sensitive and specific molecular methods. Molecular fingerprinting, alongside classic epidemiological studies, will be helpful to discriminate real clusters of tuberculosis cases (ie, individuals infected by the same genotypes) and to (indirectly) assess the efficacy of a tuberculosis control programme implemented at a national or regional level.

If we are to make tuberculosis elimination a reality, this UK experience needs to be followed up in other European Union countries. The implementation of molecular methods with increased sensitivity allows the bypassing of low discriminatory power associated with traditional contact tracing procedures, scaling up part of the European Union's tuberculosis elimination package.[9,12–14]

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