



EDITORIAL

Tuberculosis in prisons: anatomy of global neglect

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Infectious diseases can be transmitted readily within prisons due to close contact between prisoners. Tuberculosis (TB) and HIV/AIDS are two important causes of morbidity and mortality from infectious diseases worldwide [1, 2]; prisons have become reservoirs for these diseases in many settings. TB prevalence among prisoners worldwide can be up to 50 times higher than national averages [3, 4]. Prisons account for a substantial proportion of the TB burden in the USA [5] and TB in prisons poses a major problem in the rest of the world, especially in countries of the former Soviet Union [6, 7] and sub-Saharan Africa (SSA) [8, 9]. Co-infection with HIV in prisoners with active or latent TB is well documented [4, 10, 11] and this presents difficult diagnostic and management challenges to prison health systems.

Apart from immunosuppression due to HIV, the high concentration of TB in prisons is often related to prisoner-associated risk factors such as poor nutrition, stress, drug and alcohol abuse, malnutrition, and associated chronic illnesses [3, 4, 9]. In addition, poor prison living conditions and mass incarceration [12] with inadequate ventilation, in such congregate settings, promote the transmission of *Mycobacterium tuberculosis* between prisoners. Such host and environmental risk factors facilitate new *M. tuberculosis* infections to progress to active disease, or may cause re-activation of latent TB in prisoners, the risk of which is at least an order of magnitude higher in prisons than in the general community [3]. Prisons serve as reservoirs of drug-resistant TB [10–12] which is increasingly being reported from Eastern European [6, 7, 10, 11, 13] and SSA prisons [8, 9, 12, 14–16], where TB in prisons remains a neglected public health and human rights issue [15, 17–19]. However, the problem of TB in prisons is not only confined to Eastern European and SSA countries. In 1990–1991, alarming outbreaks of TB in New York State (USA) prisons recorded 171 prisoners with active disease, an incidence of 156/100,000 [20]. 39 out of the 171 prisoners had multidrug-resistant (MDR)-TB and, all but one, were infected

with HIV. There was a high mortality rate of 87%. The limited capabilities of the New York prison health services at that time resulted in the transfer of MDR-TB cases to a civilian hospital for further management, which resulted in the spread of MDR-TB. While effective control measures were instituted following this outbreak, TB in prisons still accounted for 4.2% (n=461) of the total TB burden in the USA in 2009 [5]. Of note, 94 cases of primary MDR-TB were reported in the USA in 2009 [5].

In the UK, TB has recently been recognised as an emerging health problem among prisoners [21, 22]. A retrospective 4-yr (2004–2007) study of 205 UK prisoners with newly diagnosed TB showed that over one-third of culture confirmed cases (48 out of 139) were resistant to isoniazid. The prisoners were more likely to be UK born (47% versus 25%), white (33% versus 22%) and to have pulmonary TB (75% versus 56%) compared with all other TB patients seen in the UK during that period (29,340 cases aged ≥ 16 yrs) [21]. The prevalence of TB in London prisoners is now 208 per 100,000; almost 15 times greater than the prevalence in the general population in the UK and almost five times that of the general population in London [22, 23]. Prisoners, homeless people and drug abusers collectively comprised 17% (321 out of 1,941) of TB cases and 44% (31 out of 71) of sputum-smear positive drug-resistant cases. There has been an almost 50% increase in the number of TB cases in London in the past decade, rising from 2,309 cases in 1999 to 3,440 cases in 2009, and there is growing concern over the return of the “white plague” (TB) to London [24].

TB in prisons poses a particularly challenging public health, economic and social problem in SSA countries [8, 9, 14, 15, 19] and countries of the former Soviet Union [7, 11, 12, 25, 26]. It is estimated that the total prison population in Europe is >2 million, with >10.5 million prisoners passing through the prison system each year [17]. The ratio of TB in prisoners to TB in the general community in Europe is estimated, on average, to be 15:1. Prisons in countries of the former Soviet Union have one of the highest prevalence rates of TB globally [2], with MDR-TB and its association with HIV/AIDS in prisoners and prison staff becoming a major public health concern [27]. The issue of drug-resistant TB in Europe, and its association with HIV, has been highlighted by a recent report of the European Academies of Sciences Advisory Committee (EASAC) on drug-resistant TB in Europe [13]. The report concludes that the EU has failed, so far, to respond adequately to the global TB threat and with the emergence of MDR- and extensively drug-resistant TB in Eastern Europe, the rest of Europe is at risk of an ominous drug-resistant TB problem.

Worldwide, TB is considered the leading infectious cause of death for people living with HIV, and is responsible for an estimated

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30% of AIDS deaths [1, 28]. HIV infection and associated immune suppression is a major risk factor for the development of active TB in those who acquire new *M. tuberculosis* infection or have latent *M. tuberculosis* infection. Data from SSA show that HIV prevalence in prisons is more than twice the HIV prevalence of the general community [29]. Since TB and HIV epidemics are closely related, health services for prisoners must be aligned synergistically so that management with anti-TB drugs and antiretroviral therapy can be monitored effectively.

A 10-fold difference in the TB incidence between prison and civilian populations has been reported from SSA where prisons have clearly become reservoirs for drug-resistant TB [3, 9]. High TB and HIV/AIDS endemicity in SAA countries means high rates of HIV co-infection in patients with TB: a potential time bomb for disrupting the recent progress made in TB and HIV control [30]. This is an area that must be urgently prioritised by politicians and international funding agencies. This urgency should not be underestimated given that the current data on drug-resistant TB in SSA prisons may be a gross underestimate due to a lack of resources and limited capability for effective drug-resistance screening [9]. Prisons globally share generic problems of poor accommodation, poor ventilation and inadequate healthcare facilities [3, 4, 6, 9, 10]. These tend to be more pronounced in middle- and low-income countries where the budgetary resources for the correctional system are much lower than that of high-income countries. Conditions experienced by those in prisons in the UK [21, 22, 31], USA [5, 32] and Western Europe [17, 33] are comparatively better than the difficult conditions prisoners face in SSA countries [14, 18, 19, 34] and parts of Eastern Europe [7, 11, 12].

The failure of TB control in prisons consequentially impacts on the community in general through visitors to prisons, prison staff and prisoners discharged into the community, therefore, improving TB control in prisons impacts on TB control in the community [30]. General guidelines (*e.g.* World Health Organization (WHO), Centers for Disease Control and Prevention (CDC), International Standards for Tuberculosis Care (ISTC) and National Institute for health and Clinical Excellence (NICE)) for TB identification, management and control in prisons need to be implemented in all prisons [4, 30, 35–40]. In high-income countries there should be management guidelines for prisoners with TB. In the UK, the NICE guidelines [38] emphasise the provision of education and support to the prisoner during treatment. Discharge planning is recommended and should be initiated in sufficient time before release or transfer of individuals from prison. A better liaison between the prison TB nurse or medical officer and local health authorities or primary care physician for continuity of treatment management should occur through follow-up appointments monitoring compliance, clinical recovery and treatment completion. It is suggested that the patient should be given TB information leaflets and a discharge letter which states the TB results, treatment accorded, and address of the local TB referral clinic. While guidelines exist, they are difficult to implement in practice as illustrated by ANDERSON *et al.* [21] who showed that only 48% of prisoners diagnosed with active TB completed treatment and 20% were lost to follow-up.

In the current economic situation, many middle- and low-income countries, particularly Eastern Europe and SSA, have inadequate budgets for provision of quality and effective

health services and they continue to rely on donor funding for support. This results in a lack of accurate data and information on the true scale of the problem of TB in prisons. Poor prison health services and inadequate laboratory diagnostics facilities for detecting TB and MDR-TB result in non-existent or poor data records. To justify specific requests for extra donor funds to improve health services for prisoners, it is essential that an evidence base is obtained through properly designed research into several important aspects of TB in prisoners and prison staff and their impact on TB control in the community. Such research must, however, not take advantage of the vulnerable prison population. Prisoners face restrictions on their liberty and autonomy, and have limited privacy and inadequate healthcare [36, 41]. Thus, they require specific protection when requested to participate in research, and any proposed research requires careful scrutiny by ethics committees and prison authorities. Adherence to the highest ethical values and the preservation of human rights is critically important in designing and conducting research involving prisoners [36, 41]. The acquisition of voluntary informed consent, protection of privacy and access to healthcare independently of consent to research, are crucial considerations. No official recommendations for ethical research in prisons are currently available in the majority of poor Eastern European and SSA countries and these must be developed.

Multiple factors fuel the transmission of TB, HIV and other infectious diseases within prisons. There is an urgent need to accurately define the factors driving TB in prisons, the magnitude of the problem and priorities for funding. Recommendations can then be made to governments and funding agencies to invest in the neglected area of health services for prisoners. A systematic approach to managing TB in prisons will lead to better optimised and cost-effective screening methods for TB, HIV and other infections, and ensure timely, rapid and accurate diagnosis and treatment of TB and HIV. Unless this is performed urgently, TB in prisons will remain a neglected global problem.

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STATEMENT OF INTEREST

A statement of interest for R. Atun can be found at www.erj.ersjournals.com/site/misc/statements.xhtml

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