Understanding tuberculosis transmission might be the gamechanger we need

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Despite being a familiar and ancient disease, tuberculosis has the ignominy of also being the leading infectious cause of death.[1] Although there are many complex reasons for this unenviable position, a notable one is that much about it is still unknown. The main thrust of the response to the tuberculosis epidemic has been attempts to refine existing therapies and to develop new drugs and diagnostics. However, another key pillar in tackling any epidemic is arresting transmission, but measures to interrupt the transmission of tuberculosis have proven more elusive than might have been expected for a disease that has been around for so long.[2] Coinfection with HIV, a recent development in the long history of tuberculosis, has further complicated attempts to understand and control the disease. In a new three-part Series in *The Lancet Infectious Diseases*, Julian Peters and colleagues,[3] Palwasha Khan and colleagues,[4] and Patrick Cudahy and colleagues[5] review tuberculosis transmission in HIV-endemic settings.

In the first paper in this Series, Peters and colleagues explore advances in the understanding of transmission in these settings. They outline that interventions to curtail the transmission of tuberculosis have been slow to emerge and have been substantially complicated by HIV. HIV co-infection has remained an important driver of the tuberculosis epidemic across African countries. In general, efforts to reduce transmission have been largely unsuccessful because of a limited understanding of how transmission occurs and how HIV alters the dynamics. Peters and colleagues highlight a key factor that might hasten success: intensifying integration of HIV and tuberculosis control programmes.

In the second paper, Khan and colleagues review the effects of drug resistance on transmission. Controlling transmission is further complicated by resistance to antituberculosis drugs, which does not only diminish the effectiveness of existing drugs, but also, in extreme examples, renders these drugs ineffective. In the case of drug-resistant tuberculosis, HIV infection is a many-faceted complication: in addition to changing the transmission dynamics, it also potentially contributes to the acquisition of resistance in the first place.

In the third paper, Cudahy and colleagues describe the application of spatially targeted screening to reduce transmission. They explain that existing control strategies have been insufficient and, despite increased investment in the development of new diagnostics, little evidence of a notable epidemiological effect exists. They suggest that strategies that target incidence hotspots might improve local control and create indirect reductions in prevalence in the surrounding community by reducing transmission spillover. However, confidence in spatially targeted screening is also tempered by a scarcity of empirical evidence.

To truly get the tuberculosis epidemic under control it is essential that the disease is tackled holistically. So, in addition to treating those with the disease, understanding how the disease moves within and between communities is crucial. Advancing the understanding of tuberculosis transmission dynamics, particularly in HIV-endemic settings, is a daunting undertaking, but it might be the final piece in the puzzle that will allow for substantial progress in tackling this ancient foe.

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