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Socioenvironmental factors of communicable and non-communicable diseases

"Tuberculosis is a contagious disease. That simple fact is both indisputable and misleading."

David S Barnes, 1995, *"The Making of a Social Disease: Tuberculosis in Nineteenth-Century France."*

On Oct 1, 2016, a 31-year-old man was admitted to the emergency unit of the Rennes University Hospital (France) for high temperature and asthenia. Of Congolese origin, he had arrived in France in 2014, with no medical history or recollection of contact with tuberculosis. A CT scan revealed an aspect of miliary pulmonary infiltrate, with no sign of silicosis. Bronchoalveolar lavage cultures were positive for *Mycobacterium tuberculosis*, leading to the diagnosis of miliary tuberculosis and allowing for appropriate antibiotic treatment. The patient had no immunodepression risk factors. From 2011 to 2014, he worked in a columbite-tantalite (coltan) quarry in North Kivu (D R Congo), a region characterised by coltan-veined granitic soils. A specific questionnaire¹ confirmed his occupational exposure to crystalline silica in the quarry, and a para-occupational exposure to the same inorganic particles entailed by handling and washing work clothes.

Inhaling crystalline silica can be considered an independent risk factor for tuberculosis even in the absence of silicotic lesions.² The same pathways might be involved both in silica-driven macrophage alterations and impaired anti-tuberculosis defenses.^{3,4} Silica exposure could hence determine whether an inhaled tubercle bacillus can successfully establish active infection.

This case underscores the need to pay attention to specific socio-environmental living and working conditions, in health surveys and clinical examinations. Beyond the

myths surrounding coltan as a "war mineral" used in high-tech devices, the awful socioenvironmental conditions that accompany this ore's exploitation are well documented. Our case thus illustrates contemporary social risk factors of tuberculosis, with industrial fatigue in 19th century factories replaced by other forms of hardship today.

Through the Global Burden of Disease study,⁵ sociodemographic status appears to explain less than 10% of the variance in disability-adjusted life years (DALYs) for chronic respiratory diseases. We need new socioenvironmental variables to apprehend hazards in social contexts, beyond the traditional aggregate variables describing socioeconomic characteristics. Migrants' health is a primary issue.

This approach could help make understandable tuberculosis as a continuum between a latent and an active disease.⁶ It would also help with rethinking possible common environmental triggers of communicable and non-communicable diseases: necessitating a multidisciplinary research programme uniting epidemiology, medicine, and social sciences.

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