Socioenvironmental factors of communicable and non-communicable diseases
Catherine Cavalin, Alain Lescoat, Odile Macchi, Matthieu Revest, Paul-Andre Rosental, Patrick Jego

To cite this version:

HAL Id: hal-01516025
https://hal-univ-rennes1.archives-ouvertes.fr/hal-01516025
Submitted on 2 Jul 2018

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L’archive ouverte pluridisciplinaire HAL, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d’enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

Distributed under a Creative Commons Attribution - NonCommercial - NoDerivatives| 4.0 International License
Socioenvironmental factors of communicable and non-communicable diseases

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


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 anti-tuberculosis treatment. The patient had no immunodepression risk factors. From 2011 to 2014, he worked in a coltan-tantalite (coltan) quarry in North Kivu (D R Congo), a region characterised by coltan-veined granitic soils. A specific questionnaire 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. The same pathways might be involved both in silica-driven macrophage alterations and impaired anti-tuberculosis defenses. 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 socioenvironmental 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, 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. 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.

We declare no competing interests. Our contract grant sponsor is the European Research Council (ERC)/SILICOSIS project, Centre for European Studies, Sciences Po (Paris, France), contract grant number: ERC 2011-ADG, 201104067*Project ID: 295817. CC and AL are joint first authors. P-AR and PJ jointly supervised the work.

Copyright © The Author(s). Published by Elsevier Ltd. This is an Open Access article under the CC BY-NC-ND license.

*Catherine Cavlain, Alain Lescoot, Odile Macchi, Matthieu Revest, Paul-André Rosental, Patrick Jégo catherine.cavlain@sciencespo.fr

SILICOSIS project, ERC Advanced Grant, Centre for European Studies, Sciences Po (Paris, France) (CC, OM, P-AR); Laboratory for Interdisciplinary Evaluation of Public Policies (LIEPP), Sciences Po, Paris, France (CC); Centre for Employment Studies, Noisy-le-Grand, France (CC); UMR INSERM U1085, Research Institute in Health, Environment and Occupation/Institut de Recherche sur la Santé, l’Environnement et le Travail (IRSET), University of Rennes 1, Rennes, France (OM); Infectious Diseases and Intensive Care Unit, CHU Rennes, France (MR); UMR INSERM U1230, University of Rennes 1, France (MR); and National Institute for Demographic Studies (INED), Paris, France (P-AR).


