Expert Review of Anti-infective Therapy

ISSN: 1478-7210 (Print) 1744-8336 (Online) Journal homepage: informahealthcare.com/journals/ierz20

The role of mining in the spread of TB in Africa: policy implications

Mark N Lurie & David Stuckler

To cite this article: Mark N Lurie & David Stuckler (2010) The role of mining in the spread of TB in Africa: policy implications, Expert Review of Anti-infective Therapy, 8:11, 1205-1207, DOI: 10.1586/eri.10.120

To link to this article: https://doi.org/10.1586/eri.10.120

Published online: 10 Jan 2014.

The role of mining in the spread of TB in Africa: policy implications

Expert Rev. Anti Infect. Ther. 8(11), 1205–1207 (2010)

Mark N Lurie

Author for correspondence: Department of Community Health, Brown University Medical School, Providence, RI, USA
mark_lurie@brown.edu

David Stuckler

Department of Sociology, University of Oxford and Christ Church, Oxford, UK and Department of Public Health and Policy, London School of Hygiene and Tropical Medicine, London, UK

"The risk of this mining activity to the population spread of TB is well-established. Miners in Sub-Saharan Africa have a greater incidence of TB than any other working population in the world..."

In his groundbreaking book '*White Plague, Black Labor*' Randall Packard chronicles the spread of TB in southern Africa following the discovery of gold and diamonds in South Africa in the late 1800s [1]. His research confirms the importance of circular migrant labor in the spread of TB from urban to rural areas. In short, men traveled to the mines where they lived and worked in conditions ideal for the transmission of TB, and returned home once a year thus facilitating transmission to rural areas. Today, little has changed, as mining activity continues to play a key role in the spread of TB throughout Africa [2]. In this article we review the evidence about the impact of mining activity on the TB epidemic in Sub-Saharan Africa and recommend policies that could significantly reduce the spread of TB among miners and their communities.

In 2007 there were an estimated 13.7 million chronic active cases, 9.3 million new cases and 1.8 million deaths due to TB, mostly in developing countries [101]. The burden of TB is especially high in Sub-Saharan Africa, where TB incidence has doubled in the last 20 years, from 173 to 350 per 100,000 population. In South Africa, TB incidence tripled between 1993 and 2007, from 305 per 100,000 to an astonishing 948 per 100,000 – 30-times the rate observed in North and South America combined. There are many factors that are driving these TB epidemics, including the concurrent HIV epidemic, which has a synergistic effect on both TB acquisition and transmission.

Rich in natural resources, many African countries contribute significantly to global mining production: 46% of all diamonds, 21% of gold and 62% of platinum in the world come from Africa. Minerals play a significant economic role in many African countries, accounting for between 50 and 95% of total export earnings for at least ten African 'mineral-dependent' countries [102].

The risk of this mining activity to the population spread of TB is well-established. Miners in Sub-Saharan Africa have a greater incidence of TB than any other working population in the world: some mines report an incidence as high as 3000–7000 per 1 million miners [3]. Underground conditions expose miners to a variety of toxins, including silica dust, which causes silicosis, a form of lung disease characterized by scarring of the upper lobes of the lung which can cause respiratory insufficiency. People with silicosis are at especially high risk of contracting TB. Aboveground conditions can vary from temporary tents to crowded single-sex hostels with 16 men living in one room. Migration of miners links geographical spaces and offers the opportunity for the wide dispersion of TB. The vast majority of mine workers throughout Sub-Saharan Africa are migrants.

As a result of these hazards above- and below-ground, miners in many parts of Africa are ten-times more likely to be infected with TB than nonminers living in the same geographical areas [3]. Among

Keywords: Africa • epidemiology • health policy • HIV • mining • tuberculosis

 10.1586/ERI.10.120 ISSN 1478-7210

44 Sub-Saharan African countries we examined, there was a strong and consistent relationship between mining production and TB, even when controlling for other confounders such as poverty and urbanization [2]. This reveals that a substantial share of TB cases in Sub-Saharan Africa are associated with mining and are driven both by high TB incidence among miners as well as transmission from miners to their families and communities.

What can be done to curtail the impact of mining on TB spread?

Several basic public health practices and policies could be implemented that would decrease mining-related TB transmission.

Aboveground: improving living & working conditions

Conditions on mines vary considerably but are atrocious in many places. A total of 16 men living in one room in a single-sex hostel is not uncommon. Overcrowding creates conditions conducive to the spread of TB and other infectious diseases. To date, mining companies have paid lip-service to introduce family friendly accommodation [4]. Remarkably, one set of mines in South Africa, where single-sex hostels have been abolished and replaced by family friendly accommodation, reports one of the lowest growth rates of HIV in the industry, with obvious benefits for TB transmission as well [103]. Mining companies can and must do more to improve the living conditions of their workers.

Underground: providing ventilation & internationally accepted dust levels

In addition to improving the aboveground conditions, mines also need to improve the working conditions that expose miners to a number of well-known toxins. Miners work up to 2 miles underground in extreme heat, frequently exposed to a variety of occupational toxins such as silica dust as a result of drilling into hard rock. Mining companies have made voluntary commitments to reduce dust exposure levels to internationally accepted benchmarks, but thus far have failed to significantly reduce silicosis.

Continuity of public health & medical services

Many miners are migrants. This means that even if they are correctly diagnosed with TB and put on the right medicine, if and when they leave the mines, they often have trouble accessing their medications in such a way that they do not miss doses or stop taking the medication altogether. Stopping and starting treatment – or simply stopping treatment before it is complete – is a major factor in the development of drug-resistant TB. Among the ways mining companies can ensure continuity of care would be by implementing a system whereby patients themselves carry their health cards with them. This would go a long way towards repairing this vulnerability. Mining companies, in collaboration with government health agencies, could do much more to ensure that their workers and former workers have uninterrupted access to the treatments they need.

Compensation: new laws & enforcement of existing law

Since 1911, laws have been in place in South Africa that compensate miners and former miners for occupational lung disease, including TB and silicosis. For many generations, compensation payments were racially discriminatory. The Occupational Disease in Mines and Works Act of 1973 requires mines to compensate current and ex-miners for a variety of occupational diseases, including TB.

Yet several studies have shown the difficulties former miners face in accessing this compensation [5–8]. Trapido and colleagues quantified the prevalence of lung disease and compensation among former mine workers living in one rural South African district, and found that 24% of study participants were eligible for compensation but only 2.5% of those eligible had been paid in full and were entitled to no additional compensation [5]. The vast majority of those eligible had never received compensation (63%) or had been compensated but their disease had progressed and they were in fact entitled to additional compensation, which they had not received (35%). In a more recent study among former gold miners with silicosis, Maiphetlho and Ehrlich found that only 20% of claims were successful, and that the compensation system largely failed to "ensure that former mineworkers secure their rights timeously" [6].

> "...several studies have shown the difficulties former miners face in accessing this compensation."

By failing to compensate miners who are eligible according to the law, mining companies externalize a major cost of production so that a large proportion of the costs of mining-related occupational disease are being borne by the rural labor-supplying communities, families and overburdened healthcare systems. Technically, mining companies do not pay compensation directly; they pay a levy into the government-run compensation fund, which makes the payments. Both government inefficiency and mining company influence has resulted in the denial or withholding of compensation for the majority of miners and former miners who are eligible. Trapido *et al.* conducted a detailed analysis of the costs of occupational lung disease associated with gold mining among miners and ex-miners employed in South Africa between 1973 and 1997 and estimated that among that population of 2 million people, there are approximately 480,000 cases of compensatable silicosis and 226,000 cases of gold mining-attributable TB [9].

To change this inequitable situation, we recommend two steps: first, many African countries do not have laws requiring mining companies to compensate their injured workers, and this legislation is desperately needed. Yet, even when there are laws on the books – like in South Africa – mining companies have made it difficult for eligible workers to receive that compensation [5]. And, second, in South Africa, concerned researchers, advocates and human rights groups need to put more pressure on mining companies to adhere to existing laws and compensate mineral workers who are eligible.

Acknowledgements

The authors wish to thank Rodney Ehrlich and Brian Williams for helpful comments on a previous draft.

Financial & competing interests disclosure

The authors have no relevant affiliations or financial involvement with any organization or entity with a financial interest in or financial conflict with the subject matter or materials discussed in the manuscript. This includes employment, consultancies, honoraria, stock ownership or options, expert testimony, grants or patents received or pending, or royalties.

No writing assistance was utilized in the production of this manuscript.

References

1 Packard R. *White Plague, Black Labor: Tuberculosis and the Political Economy of Health and Disease in South Africa.* University of California Press, Berkeley, CA, USA (1987).

2 Stuckler D, Basu S, McKee M, Lurie M. Mining and the risk of tuberculosis in Sub-Saharan Africa. *Am. J. Public Health* DOI: 10.2105/AJPH.2009.175646 (2010) (Epub ahead of print).

3 Ministry of Health, South Africa. *Tuberculosis Strategic Plan for South Africa, 2007–2011.* Ministry of Health, Pretoria, South Africa (2007).

4 Gebrekristos H, Resch J, Zuma K, Lurie M. Estimating the impact of establishing family housing on the annual risk of HIV infection in the South African mining communities. *Sex. Transm. Dis.* 32(6), 333–340 (2005).

5 Trapido AS, Mqoqi NP, Williams BG *et al.* Prevalence of occupational lung disease in a random sample of former mineworkers, Libode District, Eastern Cape Province, South Africa. *Am. J. Ind. Med.* 34, 305–313 (1998).

6 Maiphetlho L, Ehrlich R. Claims experience of former gold miners with silicosis – a clinic series. *Occup. Health South Africa* 16(2), 10–16 (2010).

7 Steen TW, Gyi KM, White NW *et al.* Prevalence of occupational lung disease among Botswana men formerly employed in the South African mining industry. *J. Occup. Environ. Med.* 54(1), 19–26 (1997).

8 Roberts J. The Hidden Epidemic Amongst Former Miners: Silicosis, Tuberculosis and the Occupational Diseases in Mines and Works Act in the Eastern Cape, South Africa. *Johannesburg: Health Systems Trust and the South Africa Department of Health* (2009).

9 Trapido A, Goode R, White NW. Cost of occupational lung disease in South African gold mining. *Minerals Energy Raw Mater. Rep.* 13(2), 26–33 (1998).

Websites

101 World Health Organization. Global tuberculosis database. 2009 www.who.int/tb/country/global_tb_database/en/index.html?language (Accessed October 5 2010)

102 Coakley GJ, Michalski B, Mobbs PM. 1996. The mineral industries of Africa and the Middle East. United States Geological Survey http://minerals.usgs.gov/minerals/pubs/country/1996/africa96.pdf

103 Deliotte and Touche. Deliotte on Mining and Metals. Let's call a spade a spade: taking the gamble out of mining related risk. Johannesburg, 2006 www.deloitte.com/assets/Dcom-SouthAfrica/Local%20Assets/Documents/Deloitte%20on%20Mining%20&%20Metals.pdf (Accessed October 5 2010)