

Annually, 1% of gold miners die – 4% sent home sick



What was believed to hold high promise in bringing down the tuberculosis (TB) prevalence among highly migratory gold miners, wide-scale prophylactic drug intervention among asymptomatic (dormant) carriers has now been found to have little protective effect.

This is according to Prof. Gavin Churchyard, CEO of the non-profit, gold-sector, public health benefit Aurum Institute. This has far-reaching and sobering implications for the ongoing nationwide spread of TB, of which the incidence (new cases over time) is driven by HIV. Churchyard reiterates that the moment a TB carrier (i.e. dormant) becomes HIV-positive and their immune system is progressively compromised, their risk of developing active TB increases.

The prevalence of undiagnosed TB disease is the driving force of TB transmission at a population level and has changed little at gold mines, based on two surveys a decade apart. The first Aurum Institute survey, in 2000, including some 2 000 gold miners, revealed that 2.5% of them had undiagnosed active TB. The second probe in 2011 (this time of 13 000 gold miners), done as part of Churchyard's latest research and recently published in the *New England Journal of Medicine*,^[1] uncovered a prevalence of 2.3% – in spite of widespread campaigning for and administration of prophylactic isoniazid preventive therapy (IPT).

This is cold comfort to those revelling in nationwide HIV successes, including an antiretroviral treatment (ART) programme now reaching 2.3 million people in South Africa (SA) (up from 923 000 in 2009). HIV prevalence in the mining sector is currently



Professor Gavin Churchyard, CEO of the Aurum Institute. Pictures: Chris Bateman.

unclear – the last survey in 2000 put it at 30%, almost triple the national average. Churchyard takes boasts of a 10% or lower HIV prevalence from some mining houses with a pinch of salt, observing that these are often based on ‘unreliable and typically unrepresentative’ samples. He concedes that the mining sector led the way in the national ART roll-out, but says current individual mining house HIV prevalence measurements are shaky. ‘Representative HIV prevalence surveys done by independent research bodies and supported by labour are required to monitor the impact of HIV programmes on the HIV epidemic’, he emphasises.

Gold miners, because of their long-term exposure to silica dust deep underground, are highly prone to developing silicosis with attendant TB (latent or active). They make up 32% of all miners in the country.

Debate on laws limiting exposure

Debate in mining medical circles currently centres on whether legislation should require mining houses to limit the number of years a worker spends underground to 10 or 15 years (Brazil has set the ceiling for certain job categories at 10 years). Churchyard said silicosis prevalence ‘jumped dramatically’ among gold miners after 15 - 20 years of underground work, but described reducing this time frame as a currently ‘un-validated intervention’. A full 41% of gold mine workers are found to have active TB upon autopsy.

Meanwhile one in every 100 gold miners in SA has been dying annually for at least the past 10 years – and the mortality rate, fed by the HIV/TB epidemic, shows no sign of changing anytime soon. An additional 4% of gold miners are repatriated home (medically boarded) every year owing to ill health (mainly lung disease) – roughly 5 times the national workforce average.

This is according to both Churchyard and Dr Thutula Balfour-Kaipa, the South African Chamber of Mines (COM)’s Chief Health Officer, who add that historic upheavals (like the infamous Marikana Mine protest killings on 16 August 2012) and the ongoing inter-union strife, significantly affect essential health monitoring and research. The silicosis-driven death rate on gold mines is underscored by one of SA’s most successful litigants on behalf of silicosis and asbestosis-affected current and former mineworkers, Richard Spoor. He told *Izindaba* that among just the 30 000 gold miner clients currently cited in what could be a seismic, landscape-altering wider class action, 300 men die annually. ‘We’re losing 300 of our clients to

silicosis-linked TB or HIV every year, which is entirely consistent with the figures you’re reporting on,’ he added.

Labour objections complicate HIV monitoring – Chamber

Balfour-Kaipa said HIV surveillance on the mines was ‘very much determined by the approach and attitude of the relevant union’. While it was understandable that many unions were uncomfortable with the idea of linking an HIV test to someone, mining houses made a strict distinction between occupational health and primary healthcare. ‘The occupational health officer who determines your fitness to work doesn’t know your HIV status, but there are still pockets where the union does not support testing’. She said the current volatile union environment, ‘doesn’t help – when unions are struggling for survival, issues like health tend to take a back seat’.



Dr Thutula Balfour-Kaipa, Health Officer for the South African Chamber of Mines.

An added complication in measuring HIV prevalence was workers who belonged to a medical aid being tested privately. In spite of this, anecdotal evidence was that HIV rates had stabilised along with those in the general population. She said mining houses with the largest numbers of migrant workers (gold and platinum) had the highest levels of HIV and were therefore above the national average. ‘You may find prevalence at 18% on a gold or platinum mine but as low as 12% in the coal sector (low migrancy)’. Balfour-Kaipa said a final tally currently being completed on 2013’s fatal mine accidents ‘looks like it’s going to be under 100 workers, making it a landmark year, given that in 2012 there were 123 deaths (excluding the 34 Marikana killings)’.

The COM believed that health on mines had ‘improved overall – TB is a huge part of this, so even a small improvement there helps a lot. The concern now is silicosis; we’re not really happy with progress on this. Silicosis is the product of both concentrations of dust and length of exposure. We assume mines are doing everything possible to get dust levels as low as possible but the length of exposure is our biggest challenge.’ She admitted that there were no national guidelines on duration of exposure. If government, labour and the employers decided to ‘go this route, we’d have to be very clear on what happens to a person and their job’. Balfour-Kaipa said there was no active discussion on this ‘yet’. ‘We’d like to see stability at union level so that we can focus on health. With all these political battles, strikes, and membership strife, health and safety come last.’ Churchyard said no hard data existed on national medical boarding rates, but when pushed, estimated the figure at ‘around 0.1% or 0.2% of the national workforce’. The gold mining sector medical boarding rate is 1%, making it a possible 5 - 10 times higher.

Meanwhile, Spoor revealed that if a class legal action (the 30 000 miners cited are one-tenth of the numbers who could potentially benefit) was allowed – and succeeded – ‘outlier’ or marginally profitable mines could go out of business after paying attendant health damages. In terms of a ruling by Gauteng’s Deputy Judge President, Justice Mojapelo, in the South Gauteng High Court in November last year, SA’s gold mines have until May this year to file answering papers to a tripartite miner application to have their class action ratified. The three law firms representing the miners must then respond by the end of August. If certified, the class action that ensues (probably in early 2015), would cover all gold miners past and present who contracted silicosis as a result of their work on the gold mines; almost certainly resulting in a paroxysm of nervous coughing on the Johannesburg Stock Exchange.

While Spoor concedes that SA’s gold mines have unique ventilation problems because of their unparalleled depth and shaft diameters, he says a class action win will ‘make it more expensive to let people get sick and die, and lead to rational employers investing in improved safety measures’. He says it seems the industry has recognised that a class action is more pragmatic than being inundated with thousands of different claims, ‘or suffering death by a thousand cuts’. ‘I think they’ll support the action, but drag it out as long as possible,’ he believes.

Meanwhile Yale University’s Law School and its School of Public Health, have jointly

just released a searing indictment of SA's century-old legal compensation system for occupational lung disease. Labelling the compensation system 'grossly underfunded, inadequate and poorly implemented,' the review, which compares SA unfavourably with a host of other mining countries, recommends major legal reform, with short-term overhaul of an administrative system which currently underpays a minority of legitimate claimants (in some medical incapacity cases payouts are as low as R1 000 for every year worked).

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Spoor, whose out of court settlements from asbestos mining houses total R1.1 billion since 2003, won a Constitutional Court battle two years ago in which the 1911-initiated Occupational Diseases in Mines and Works Act was found to trample common law rights. A 2009 collaborative study by the University of the Witwatersrand and University College, London, estimated that there are to be 288 000 cases of compensable silicosis in SA, which put unpaid liability at R10 billion in 1998 values (R27 billion in today's values).

Phasing out of single-sex hostels a 'huge relief'

When both mining health executives were asked about changes in accommodation for miners (the proportion of miners in single-sex hostels was 90% in early 2000), they said this had dropped to 'well below 50%,' a hugely positive HIV and TB transmission risk reduction. Other positives included the sharing of HIV/TB health services between richer and poorer mines.

Churchyard said one of the most dramatic changes in national health policy recently

was the introduction of continuous IPT for immunocompromised people for three years, making SA one of the first countries worldwide to add IPT to ART for longer than six months. He explained that IPT was 'like an umbrella – it only protects you from the rain (of TB disease) for as long as you keep it up.' Adding IPT to the ART regimen meant that the national TB incidence could be kept down, thus reducing the pool of TB infectious people and having an overall population level impact.

From less than 1% of all HIV-infected South Africans on IPT five years ago, which he called 'inexcusable' at the time, more than 370 000 of the 2.3 million people on ART were now on IPT. Churchyard revealed that the national TB rate had peaked in 2008 and has started to decline; but even with a slight drop, SA has the second highest TB rate or epidemic in the world (one in 100 people). Gold mine TB rates stand at three in 100 workers, platinum 1 - 2 in 100 workers, while coal mirrors the national rate with the diamond-mining sector even lower.

HIV drives not only TB, but (according to a major paper on SA miners which Churchyard contributed to in the American journal, *Clinical Infectious Diseases*),^[2] bacterial pneumonia, cryptococcosis, enteritis, bronchitis, urinary tract infections and soft tissue infections. Cryptococcosis (a fungal infection leading to lesions or abscesses in the brain and central nervous system) caused 44% of deaths in HIV-positive patients, the study found.

Balfour-Kaipa said data from the Department of Mineral Resources showed that occupational TB reported by gold mines had dropped from 4 500 in 2007 to 2 838 in 2012. Churchyard added a caveat, suggesting official underestimation; he said these figures came from routine data collection and recorded only cardiopulmonary TB in miners who had done risk work (defined as more than 200 risk shifts).

Balfour-Kaipa said analysis of annual reports from the majority of SA mining

companies showed that TB rates had declined from 1 387 cases per 100 000 workers in 2010 to 1 031 cases per 100 000 in 2012. Silica dust was responsible for TB in the gold sector being up to three times the average SA rate over 'the past several decades'.

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The take home message ...

The Health Executives' main take home message? Very similar to that of the National Health Minister, Dr Aaron Motsoaledi, actually: go back to basics; scale up HIV testing; speed up access to ART; initiate ART earlier (at a CD4⁺ cell count level of 500, not 350); rapidly scale-up the use of new TB diagnostic technology (e.g. GeneXpert); and limit miners' exposure to dust.

Taken together these measures would have a major impact on TB rates and HIV infections.

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2. Corbet E, Churchyard G, Charalambos S, et al. Morbidity and mortality in South African gold miners: Impact of untreated disease due to human immunodeficiency virus. *Clin Infect Dis* 2002;34(9):1251-1258. [<http://dx.doi.org/10.1086/339540>]

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