

Getting to zero occupational lung diseases and tuberculosis infections in the South African mining industry

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ABSTRACT

Occupational lung diseases (OLDs) remain a significant public health challenge in the South African mining industry (SAMI), despite notable progress in disease reduction and dust control. This article reviews the current landscape, challenges, and best practices in OLD management, with a focus on tuberculosis (TB), silicosis, and coal workers' pneumoconiosis. It highlights recent data trends, evaluates the effectiveness of interventions, and proposes a roadmap for achieving zero OLDs in the mining sector.

INTRODUCTION

The mining industry is integral to South Africa's economic development, providing employment to hundreds of thousands of workers and contributing significantly to the nation's GDP. However, this economic progress comes with a substantial public health cost as the sector is associated with a high burden of occupational diseases. Among the most prevalent are OLDs, including tuberculosis (TB), silicosis, and chronic obstructive pulmonary disease (COPD). These conditions not only impact the health and livelihoods of mineworkers, but also affect their families and the broader communities in which they live.

South African mines face unique and complex challenges in managing and preventing OLDs. Hazardous dust exposure remains pervasive, with respirable crystalline silica (RCS) and coal dust representing key risk factors for the development of pulmonary diseases. The high prevalence of human immunodeficiency virus (HIV) exacerbates vulnerabilities, particularly in relation to TB, where coinfection rates remain alarmingly high. Additionally, the mining workforce is highly mobile, with workers often migrating between regions and countries, which makes ongoing health surveillance and consistent disease management more difficult.

Despite these challenges, the imperative to achieve zero OLDs in the mining sector is clear. It is an ethical responsibility to protect workers from preventable illnesses and premature death, as well as a critical public health objective that contributes to the broader wellbeing of society. Achieving this goal will require sustained commitment, innovative interventions, and collaboration among industry stakeholders, government, and labour. This article explores the current status of OLDs in the SAMI, reviews progress and persistent gaps, and sets out a roadmap for eliminating these diseases in the pursuit of a safer and healthier future for all mineworkers.

THE BURDEN OF OCCUPATIONAL LUNG DISEASES

TB: the burning platform

Tuberculosis remains the leading cause of death from a single infectious agent, worldwide, accounting for 1.25 million deaths in 2023, including 161 000 among individuals living with HIV.¹ Within the mining sector, TB is exacerbated by exposure to silica dust and elevated HIV rates, rendering miners particularly vulnerable. Disease management and control are further complicated by the prevalence of multidrug-resistant TB (MDR-TB) and extensively drug-resistant TB (XDR-TB).

Trends in disease reduction

From 2008 to 2024, the mining industry achieved substantial reductions in the incidence of OLDs.² Total occupational diseases decreased by 82%, pulmonary TB (PTB) by 84%, silicosis by 87%, and other lung diseases by 85%. Despite these successes, TB incidence in the gold sector remains high, with 420 cases per 100 000 individuals recorded in 2024, a rate comparable to the national average.

DUST CONTROL AND MILESTONES

Silica and coal dust

Efforts to minimise RCS and coal dust exposure have produced mixed outcomes. The gold and coal sectors have not consistently achieved the milestone targets established for dust concentrations in 2014 and 2024, emphasising the ongoing need for more robust dust suppression and monitoring strategies.

CHALLENGES AND OPPORTUNITIES

Disease management in mines

Key challenges in disease management include cross-border health issues, stemming from migrant labour, late reporting, medication stockouts for TB treatment, elevated rates of drug-resistant TB, and the presence of stigma and psychosocial barriers to care. Opportunities for improvement exist in the form of enhanced dust control measures, integrated TB/HIV programmes, improved screening processes (including for ex-miners), and comprehensive contact tracing.

Ex-miners and community outreach

Ex-miners continue to face significant risks and obstacles to accessing care. Best practice approaches include regular health screenings such as chest X-rays and spirometry, access to specialised occupational health clinics, legal support for compensation claims, pulmonary rehabilitation, psychosocial support, and strengthened community-based outreach and disease registries.

BEST PRACTICES AND INTERVENTIONS

Tripartite and industry initiatives

Collaborations among the Mine Health and Safety Council, the Minerals Council South Africa, government departments such as the Department of Mineral and Petroleum Resources (DMPR), the Department of Health (DoH), and other stakeholders have been instrumental in the progress that has been made. Initiatives include advancements in occupational hygiene and medicine, such as computer-aided diagnosis, the elimination of TB and HIV, research, and the establishment of new milestone targets for 2024, as well as integrated wellness programmes and monitoring tools.


KEY RECOMMENDATIONS

- Preventive practices: focus on addressing social determinants of health, including improving living conditions and nutrition.
- Infection and dust control: enforce the use of personal protective equipment (PPE), implement regular health screenings, and upgrade ventilation systems.
- Early detection and treatment: employ advanced diagnostic methods and ensure prompt initiation of treatment.
- Community engagement: educate and involve mineworkers and their families to reduce stigma and encourage treatment adherence.
- Cross-border health strategies: develop referral systems for migrant workers to improve continuity of care.
- Integrated wellness programmes: manage TB, HIV, silicosis, and other respiratory diseases through holistic approaches.
- Monitoring and evaluation: use data-driven methods to track health outcomes and inform policy decisions.

CONCLUSION

The SAMI has made notable progress in reducing OLDs. Nevertheless, persistent challenges require renewed commitment and innovative solutions. Achieving zero OLDs will depend on the acceleration of dust control efforts, strengthened collaboration between public and private sectors, integrated and person-centred care for current and former mineworkers, and robust systems for monitoring, evaluation, and policy alignment. The elimination of OLDs is attainable if all stakeholders unite to fast-track interventions and close the gap between mining operations and primary healthcare.

REFERENCES

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2. Mine Health and Safety Inspectorate Annual Reports. Pretoria: Department of Mineral Resources and Energy. Available from: <https://www.dmre.gov.za/mineral-resources/mine-health-and-safety/resource-center> (accessed 5 December 2025). 

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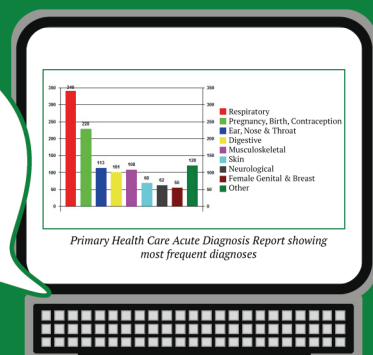
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