Preventing tuberculosis among high-risk workers

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Tuberculosis control programmes focus on case identification and treatment. Therefore, opportunities to prevent disease onset are often overlooked. New strategies are needed to further reduce global incidence and mortality of tuberculosis to achieve the visionary goal of a tuberculosis-free world. Prevention of tuberculosis among miners and other workers exposed to silica offers one such opportunity.

The UN is holding its first high-level meeting on tuberculosis in the General Assembly this year to focus on solutions. Heads of state should therefore embrace strategies to prevent tuberculosis before it occurs by controlling risk factors. Primary prevention to reduce exposure to silica dust in the workplace should be considered an important tool in responding to this epidemic, particularly among individuals working in dusty environments. Workplace dust controls and appropriate regulations can be implemented without taking away resources from conventional approaches.

While the price of gold and other precious metals has more than doubled in the past 15 years, mining employment has grown substantially. Much of this growth has been in the informal sector, in what WHO classifies as countries with a high burden of tuberculosis. Mining communities, and other occupations with elevated exposure to silica dust, in these countries often have the highest reported incidence of tuberculosis.

For more than 100 years, studies have linked silica dust in the workplace with increased risk of tuberculosis.[1] Beyond mining, workers in construction, pottery, marble stone industries, and sand extraction have high rates of tuberculosis. For individuals with confirmed silicosis, the risk of active tuberculosis increases by more than three-fold, whereas for individuals with HIV, the risk increases by five-fold. Among workers with HIV and silicosis, the risk increases synergistically by more than 15 times making this one of the deadliest combinations in high-burden countries.[2] A legal settlement in South Africa costing US$400 million highlighted the impact of silica dust exposures in compensating miners and former miners with tuberculosis and not just silicosis.

Tuberculosis programmes are investing billions of dollars annually to identify and treat individuals with active tuberculosis. Despite these investments, tuberculosis incidence is declining slowly in many countries. Ministries of Health and their donor partners should develop new mechanisms to address determinants of tuberculosis to reduce disease incidence.

Few strategies prevent active tuberculosis, but studies done in the USA, Italy, and South Africa have shown a decrease in tuberculosis incidence among workers after dust exposures were reduced.[1,3,4] Even in low-resource settings, hazards from respirable silica dust can be reduced by 80% with wet spray misting.[5] At no additional cost, these investments have the potential to reduce the incidence of silicosis, lung cancer, and other diseases in mining communities worldwide.

Engineering controls to reduce silica dust exposures have been shown to be the most cost-effective measures to prevent disease in the workplace, even without the benefits of reducing tuberculosis and lung cancer incidence.[6] The rate of return for investments in primary prevention (eg, workplace dust controls) is higher than for secondary prevention programmes that identify and treat cases of tuberculosis—interventions that prevent exposures before they cause disease have clear benefits (ie, improved ventilation).[7,8]

More than 230 million individuals are exposed to silica in the workplace. When calculating the public health impact, it is important to consider that many workers migrate to job sites and return home with tuberculosis and therefore pose a disseminating threat to millions more.[9,10] Because silica exposures in mining and other occupations substantially impact public health worldwide, global health funders should develop action plans to reduce exposure to silica dust in high-risk communities. Governments should adopt regulations to control silica dust and, along with multilateral aid agencies, include silica dust control plans in public sector infrastructure programmes. The International Commission on Occupational Health has outlined comprehensive recommendations to implement these measures.[11]

Tuberculosis disproportionately affects the poorest and most vulnerable populations, including individuals with the highest dust exposures in the workplace. Without waiting on any new treatments or technology, a key risk factor for tuberculosis (ie, silica dust exposure) can be substantially reduced. By investing in simple

dust control measures, high-burden countries and their donor partners can save thousands of lives and millions of dollars.

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