



## Case study: TB control at AngloGold Ashanti Health – applying best practice

Taking into account that South Africa has one of the highest prevalence rates of HIV infection in the world, and is positioned seventh of the countries with the highest burden of tuberculosis (TB), it is not surprising that the South African gold mining industry, with risk factors of high HIV prevalence of about 30%, and the additive effect of occupational exposure to silica dust, has probably the highest known incidence of TB in the world. A well-managed and effective TB control programme is essential in such a setting and AngloGold Ashanti Health (AGA Health) has in place such a programme, which is nationally and internationally recognised for its effectiveness and sustainability.

The underpinning principles of the TB programme involve the incorporation of recommendations from the World Health Organisation (WHO), the South African National TB Control Programme guidelines, and the Guidelines for TB Control Programmes in the Mining Industry issued by the South African Department of Mineral and Energy Affairs. Compliance with the Occupational Diseases in Mines and Works Act, the Compensation for Occupational Injuries and Disease Act, the Mine Health and Safety Act, and the National Health Act of South Africa are built into the programme.

TB control programmes in high incidence settings should include proactively finding, rapidly identifying and diagnosing infectious cases, access to rapid bacteriological methods for culture, identification and drug sensitivity testing for TB bacteria, and provision for the rapid institution of appropriate therapy with quality drugs. In addition, the isolation of infectious cases, the administration of treatment via directly observed

supervision, and the confirmation of a bacteriological cure at the end of treatment are essential components. No programme can claim success without an adequate quality assurance and audit trail of how the programme functions. Lastly in the setting of high-HIV prevalence, no TB programme will be successful without an equally effective HIV programme administering active anti-retroviral therapy (ART) to those patients in need.

Each element above is in place in the AGA Health TB programme. Active case finding is supported by the twice-yearly occupational health chest x-ray screening of all employees working underground and in other 'dusty risk work' positions. The installation of digital x-ray technology at the Occupational Health Centre and the commissioning of two mobile digital x-ray units have improved the early detection of pulmonary disease. Symptom screening of patients at every health care contact, that is, asking direct questions about the presence of coughing for more than two weeks, night sweats and weight loss, facilitates the earlier identification of possible TB suspects, and their diagnosis and treatment.

A modern TB laboratory situated at the Vaal River operation's West Vaal Hospital processes the sputum microscopy and culture essential for the bacteriological confirmation of diagnosis and, on completion of the treatment, confirmation of the cure for Pulmonary TB (PTB) cases.

Quality combination drug therapy is started as soon as the diagnosis for PTB or other forms of TB is confirmed. Patients are educated about their condition and on the need to take their treatment properly for the entire duration of the treatment programme – six months for new cases and eight months for re-treatment cases. Directly Observed Therapy (DOT) is the strategy applied to the administration of TB treatment and involves the daily supervised administration of therapy either at one of the health care facilities or by a treatment supervisor. The underlying principle is that every daily dose of medication is seen to be swallowed. Using combination-drug therapy ensures that the patient receives all four drugs required for optimal therapy, combined in one tablet formulation.

Regular quality assurance, quarterly data analysis, and annual audits of the standard operating procedures applicable to all aspects of the TB programme ensure that the success or failure of the programme can be evaluated to optimise effectiveness. Benchmarking standards for TB control programmes are identified by both the WHO and the South African National TB Control Programme and have been met or bettered by the AGA Health TB control programme since 2001 on a quarter-by-quarter basis for both case-finding and successful outcomes.

Patients who have TB need to know their HIV status as each condition has an aggravating effect on the other. For TB patients who are co-infected with HIV, there is a need for proper assessment and the timely introduction of Highly Active ART. Improved outcomes, reduced mortality, more rapid return to health and earlier return to work are achieved by treating both conditions effectively. Yet despite these facts, there is still reluctance on the part of some TB patients to be tested for HIV, and they miss out on the synergistic benefits of treatment for both conditions.

For patients who have completed their TB therapy for occupationally related TB, a compensation medical examination is performed approximately six months after the completion date. Those patients considered to be suffering from disability as a result of TB infection are referred to the Medical Bureau for Occupational Diseases (MBOD) for assessment of compensation.

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Despite an effective TB programme, wherever TB exists and is treated there is always a risk of patients developing multi-drug resistant TB (MDR-TB). Approximately 4% of the total AGA Health TB cohort develops MDR-TB which on review is fairly evenly split between new TB cases and re-treatment cases. With the possibility of MDR-TB being spread from one patient to another, especially in the setting of high HIV prevalence, a MDR-TB unit was established at the West Vaal Hospital in late 2003 where patients are housed in an airborne infection isolation unit that can take up to 25 patients at a time. As MDR-TB carries a higher mortality and is more difficult and costly to treat, these patients spend prolonged periods of time in hospital, with the average stay being more than six months.

Unfortunately the clinical condition of some patients does not improve despite the use of MDR-TB treatment, as the TB bacteria develop progressive resistance to the MDR-TB drugs. This results in the development of extremely drug resistant TB (XDR-TB) a condition for which there are very few drugs currently available for treatment. XDR-TB carries a very high mortality and has been recognised within the AGA Health MDR-TB cohort of the AGA Health TB programme. Research into the genetic mechanisms of TB resistance is currently underway with the Division of Molecular Biology and Human Genetics at the University of Stellenbosch.

Both the AGA Health TB and HIV wellness programmes in South Africa, and the malaria programme for West and East Africa, were recognised in September 2007 at the ABSA Health Care Initiative Awards, which formed part of the Pan African Health Care Congress. Both programmes were winners in the category 'Listed Company/Multinational Organisation/Hospital Group', with AngloGold Ashanti also receiving the 'Most Sustainable Project and the Project with the Biggest Impact'.



## **MDR-TB and XDR-TB**

Multi-Drug Resistant TB (MDR-TB) and Extensively (or Extremely) Drug Resistant TB (XDR-TB) are not new diseases. MDR-TB occurs when the TB organism demonstrates resistance to at least Isoniazid and Rifampicin, two of the most effective first line anti-TB drugs available, while XDR-TB is diagnosed when the TB organism demonstrates resistance to one of the second line injectable drugs (Kanamycin, Amikacin, or Capreomycin) and to the Fluoroquinolones.

MDR-TB occurs in 102 of the 109 countries that report TB statistics to the WHO. The WHO estimates that 424,203 MDR-TB cases were detected in 2004, representing 4.3% of all new and previously treated TB cases. More than half of these were in China and India, while the highest estimated prevalence was in countries of the former Soviet Union and certain provinces of China. This represents a 55% increase over the estimates for 2000.

Resistance to the two first line drugs has been around ever since these medicines were first used as treatment for TB and reflects the ability of the organism to develop resistance to antibiotics. Cases of chronic non-responsive tuberculosis were identified in the 1980s and MDR-TB had been classified by 1988. Similarly, cases of XDR-TB have also been identified in the past 20 years as resistance developed to the second line drugs. AGA Health diagnosed its first case of XDR-TB in 1988 and labelled it chronic non-responsive tuberculosis but it has only been classified in the past four years or so and was only described in terms of the current definition by the WHO in October 2006. The recent rise to prominence of MDR-TB and XDR-TB is a result of the significant increases in such cases, largely as a result firstly of drug-sensitivity testing which has allowed the medical fraternity to identify them, and also as a consequence of the HIV epidemic which promotes the rapid spread of TB.