Tuberculosis continues to be a public health problem in South Africa from diagnosis to treatment

The latest Global tuberculosis report 2013 released by the World Health Organization indicates that South Africa, together with other African countries, is unlikely to meet the Millennium Development Goals (MDGs) set for 2015. The intrinsic impact of human immunodeficiency virus (HIV) control on the burden of tuberculosis is an important confounder for countries in sub-Saharan Africa. The prospects of an improved vaccine becoming available, as part of efforts to control tuberculosis, will take years to come to fruition. The primary strategy for control is likely to continue to rely on early diagnosis and initiation of appropriate treatment.

South Africa has led with the introduction and roll-out of new diagnostic tools to control tuberculosis. The recent introduction of the Xpert® MTB/RIF assay (that has revolutionised the diagnosis of tuberculosis) has been of significant importance, especially in people living with HIV/acquired immune deficiency syndrome.

The roll-out of this new tool across the country has been completed. Over 2-million tests have already been performed since the roll-out began. Early evidence of the impact is being seen. This has varied, depending on the epidemiological setting in which it was used. The greatest benefit appears to be in difficult-to-access communities. Point-of-care solutions have shown significant benefits.

This contrasts with the relatively poor impact on diagnostic yield in well serviced areas, where diagnostic tools, including culture and line probe assays, have been widely available. The reduction in laboratory turnaround times has been an important difference in these settings. However, the time to treatment, although reduced, has not been as dramatic as anticipated, reflecting health system issues which need to be addressed. If this is not carried out, it is unlikely that future interventions will have the desired impact.

Another area of great concern is drug-resistant tuberculosis. Increasing numbers of rifampicin-resistant tuberculosis are being diagnosed annually. The morbidity and mortality of this form of tuberculosis is several fold higher than that of susceptible tuberculosis, and is also strongly affected by the inability to provide early diagnostic information to guide treatment, together with the limited available treatment options.

Drug susceptibility testing of second-line antituberculosis agents is more complicated than first-line drug testing. The use of molecular diagnostics to reduce the time to results is still an important requirement. There are a few rays of hope. The Hain Life Sciences second-line assay is undergoing improvements, and Cepheid, the developers of the successful Xpert® MTB/RIF assay, are developing assays to meet this need. However, the diversity of agents and genetic drug targets poses a challenge to developers.

The use of whole genome sequencing of Mycobacterium tuberculosis strains is a rapidly emerging option for diagnosis. Prices of sequencing equipment and consumables are on the decline, and smaller benchtop options are now becoming available. An advantage of this technology is the ability to provide information on drug resistance against an array of drugs, molecular epidemiological information on transmission, as well as added information on potential biomarkers for diagnostics, drugs and vaccines. However, methods to directly perform whole genome sequencing from clinical specimens still need to be developed.

Current treatment options for tuberculosis are also limited, require lengthy treatment regimens and have serious adverse effects, all of which are barriers to public health measures. Bedaquiline was introduced in 2013 as a new class of antimycobacterial agent. This is a sign of change, after decades without the development of a new antituberculosis agent. The drug pipeline is expanding. The introduction of delamanid (another new agent to treat multidrug-resistant tuberculosis) is imminent, and it is showing considerable promise. Great new impetus was also generated by the donation by the Bill and Melinda Gates Foundation of approximately $200 million to biomarker discovery and vaccine development for tuberculosis control.

These new developments offer hope, but it will take several years for them to be fully integrated into tuberculosis control programmes. Thus, intensive efforts will need to be made to strengthen health systems for optimal achievement and to use what is currently available in order for the 2015 MDGs to be met by South Africa and other sub-Saharan countries. The strengthening of health systems is a critical step in establishing a public health environment that is conducive to achieving the desired goals of new developments, and ensuring that the 2050 targets are met ahead of schedule.

Nazir Ismail, MBChB, MMed, FCPath(SA), DTM&H, PDIC, Head Hendrik Koornhof, MBChB, DCP, DipBact, FRCPath, DSc, Senior Adviser Centre for Tuberculosis (incorporating the National Tuberculosis Reference Laboratory), National Institute of Communicable Diseases, National Health Laboratory Service, Johannesburg; University of the Witwatersrand, Johannesburg E-mail: naziri@nicd.ac.za

Correspondence to: Nazir Ismail, e-mail: naziri@nicd.ac.za