

Title: Cost of digital technologies and family-observed DOT for the 9-month injectable-containing MDR-TB regimen

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On behalf of the STREAM collaboration

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Background:

In 2017 WHO recommended the use of digital technologies, such as medication monitors and video observed treatment (VOT) for directly-observed treatment (DOT) of drug-susceptible TB, with no policy recommendations for multidrug-resistant TB (MDR-TB), which imposes considerably higher patient-costs. Given the COVID-related demand on health systems, the benefits of transitioning towards more patient-centred approaches are increasingly relevant.

Design/Methods:

A decision-tree model was developed to explore the cost-effectiveness of several DOT replacement approaches including VOT, 99DOTS and family-observed DOT. Assuming a 9-month, injectable-containing regimen (as evaluated within the STREAM trial), we constructed base-case models to reflect the standard-of-care in Ethiopia, India, and Uganda. The model used STREAM data supplemented with published studies, with sensitivity analyses conducted on key parameters.

Results:

Modelling suggested that standard-of-care is the most expensive strategy in India and Uganda, with considerable direct- and indirect-costs incurred by patients. In Ethiopia, implementing VOT and 99DOTS increased health-system costs by US\$402 and US\$17 respectively, but patient-costs

remained lower than for standard-of-care. These higher health-system costs were largely caused by up-front technology expenditure, with 80% of Ethiopians not owning a smartphone.

Sensitivity analyses showed costs were sensitive to both loss-to-follow-up and relapse rates. However, only the VOT strategy in Uganda exceeded standard-of-care DOT costs, by US\$70 per patient, when the relapse rate was equalled to the upper-bound of the confidence interval.

Modelling suggested each of VOT, 99DOTS, and family-observed DOT would halve patients' out-of-pocket costs. Taking a patient perspective, each strategy appeared highly cost-effective across all countries, even if implemented solely in continuation phase.

Conclusions:

While data on the costs and efficacy of switching MDR-TB treatment management to new technologies are lacking, our modelling suggests alternative DOT support strategies can significantly reduce patient-costs. Health-system costs however are more country-specific, depending heavily on both internet availability and smartphone penetration within the population.