



## Community Infection Control in the Context of Injection-Free Regimen and Decentralised Ambulatory Care: Six Month Follow of DR-TB Cases in Decentralised Facilities eThekweni District, South Africa

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### ABSTRACT

**Introduction:** In July 2018, South Africa introduced the injection free bedaquiline based treatment regimen to replace the kanamycin-based regimen for Drug-Resistant (DR) TB. With support from the USAID Tb South Africa project, eThekweni district with the highest burden of DRTB in South Africa rapidly decentralised DR-TB care from an initial three centralised admission TB Hospitals to 18 peripheral districts, community health centres and clinics to improve access while focusing on ambulatory care as opposed to institutionalized hospital based care. The ambulatory model of care meant patients were managed within their households and thus communities while on treatment. An effective infection control in the household and community was implemented to prevent and control infections among families and close contacts. After six months, 98% of the patients remained in ambulatory care and no transmission recorded among close contacts. This publication shares interventions used and early outcomes from this intervention.

**Methods:** A DR-TB care package was developed and adapted to each of the identified decentralised facilities and implemented in three layers. This include an orientation package for facility leadership to ensure appropriate governance, leadership and management for DRTB care at facility level, DRTB care package for DRTB providers and facility teams (DRTB teams) and a DRTB service package for the community functionally linked to the facility interventions. Training, systems mentorship and support supervision were the main interventions implemented.

**Results:** Between Oct 2018-Mar 2019, 16 of the 18 decentralised sites in eThekweni district adapted the DRTB care package and constituted their DRTB teams. Within the six months a total of 142 patients were initiated on treatment of which 139 (98%) remained in ambulatory care by the end of March 2019. Three patients with advance disease died in the first month of enrolment. Of the 142 index patients, 211 contacts of were screened (44% at home 56% at the facilities), 85% of the patients culture converted in the first month, 3 contacts were diagnosed with TB (2 drug sensitive, 01 drug resistant). No transmission occurred in contacts after enrolment into DRTB care.

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**Conclusion:** The possibility of transmission of infection to DRTB contacts exist among patients placed in ambulatory care. However, among the patients that was provided with the DRTB care package in eThekweni District there was no transmission associated with the index patients. It is thus recommended that infection control interventions that starts from facility is extended to the communities using systematic and applied interventions specific to the communities and facilities be scaled as cost effective and efficient intervention for DRTB in high burden locations.

**Keywords:** TB; Infection control; Multi-drug resistant tuberculosis; Kanamycin; Community health

## INTRODUCTION

South Africa is one of the countries with the highest TB caseload in the world. According to WHO 2018 report, the country notified 227224 cases of drug sensitive TB and 7700 of drug resistant TB in 2017. The country piloted a decentralised MDR-TB care programme in 2008, in Kwa Zulu Natal and Western Cape, the two provinces with the highest incidence of TB disease. The successes and lessons learnt in these piloted programmes, as well as international experience, informed the national policy framework on “decentralised” and “deinstitutionalised” management of Multi-Drug Resistant Tuberculosis (MDR-TB) services launched in 2011. Since then South Africa has had a remarkable progress in operationalising the national policy framework of the decentralised MDR-TB services with over 651 MDR-TB treatment initiation sites 1 decentralized to date and the number of patients treated for MDR-TB increased from 5,313 in 2010 to 11,119 in 2016. The treatment success rate improved from just below 40% to 54% (2014 cohort). The implementation of the decentralisation programme is province specific, however, aligned to the national policy framework on decentralised and deinstitutionalised management of MDRTB.

Further, South Africa introduced the “injection free” bedaquiline based DR-TB treatment regimen that replaced the kanamycin-based regimen in July 2018. Shortly after this policy change, eThekweni district with the highest burden of TB, embarked on an aggressive expansion of DRTB care to improve both geographic and technical access, and availability at local health facilities. This was done in line with SA policy on decentralisation and institutionalisation of DRTB in the country. The district rapidly scaled DRTB care from the initial three sites (one centralised centre of excellence and two decentralised) with admission facilities to 16 facilities without admission facilities. This publication shares the approach used to strengthen infection control in the facility, homes and community in the context of ambulatory care. The goal was to prevent infection among close contacts through the provision of DRTB package of care, home visits and partnership with local community-based organisations and families.

## MATERIALS AND METHODS

The DR-TB care was introduced in decentralised facilities and implemented in three layers. Orientation package for facility management, DRTB care package for DRTB providers (DRTB teams) and DRTB service package for the community. Training,

mentorship and support supervision were the interventions implemented.

### Approach

To provide community infection control, four facility customised interventions were implemented.

### The DRTB Care Package

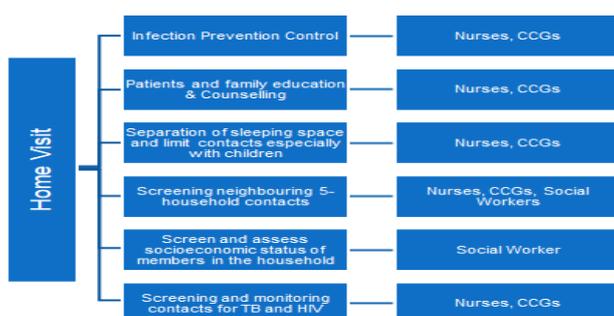
The operational package defines the roles of site, providers and teams as a whole based on the conventional health and community systems strengthening approach, including strengthened governance, management, leadership and coordination of DRTB care. The DRTB teams are provided with skills and experience to conduct DRTB clinical audit on regular basis. The package provides for the education and empowerment of the index patient on DRTB, ambulatory care, HIV care (if applicable), infection control and interaction with contacts [1]. This package has ten components and targeted the facility, management, health care workers, specifically DRTB team and community health workers and the index patient. The intervention package provided facility managers with skills and knowledge of DRTB outline specific roles in implementing DRTB and identified resources required to support DRTB implementation [2]. It provided DRTB implementation teams (physicians, nurses, social workers, dieticians, physiotherapist, pharmacist, clinical associates, data capturers and community health workers) capacity to strengthen DRTB services; systems orientated operational package to systematically manage MDRTB patients, utilise available resources and infrastructures, develop site-specific functional and bi-directional referral pathways that enabled a continuum of response based on the DRTB care cascade from above site and into the community. The package also enabled information management through appropriate documentation in the clinical records, correct registration and reporting and translating manual records into an electronic Drug-resistant web-based register (Figure 1) [3].

Baseline and quality assessment  
 Management support  
 DR-TB implementation and operations team  
 Model of standard of care  
 Referral pathways design (Up and Down referral)  
 Community linkage (Project funded NGO, WBOTs, Other CBOs)  
 Monitoring, evaluation and reporting (primary data sources – tools, EDR, Web registration)  
 Quality assurance and improvement  
 Infection prevention control  
 Psychosocial support to children “Buddy Beat TB”  
 Pharmaceutical and therapeutic services  
 Capacity building interventions (Mentoring and support)

**Figure 1:** The DRTB care package.

### The Home Visit

Home visits provide a crucial step in controlling infection control in the household and immediate neighbourhood. This activity is coordinated by a TB focal nurse in the team and involves nurses, social worker and community health workers. Six critical activities are implemented, which includes infection control in the household, separation of sleeping space for patient, screening and monitoring of contacts for TB and HIV, assessment of social and economic status and needs, education and counseling of family and screening of neighbours. The assessment is conducted in the household, and at least five neighbouring houses to the north, south, west and east. This is done in accordance with the department of health guidelines on infection control in the urban community setting and different team members play roles depending on the intervention (Figure 2) [4].



**Figure 2:** The home visit.

### Partnership and Strengthening of Structures in the Community

This intervention is used for tracing DRTB cases lost to follow-up, contact tracing, infection control, screening and monitoring contacts for HIV and TB, family counselling and education and screening neighbours and ensuring separation of sleeping spaces at home [5]. In 12 facilities, the DRTB teams included Community Health Workers (CHWs) who worked within the community to ensure the continuity of care. In two sites, the Community Caregivers (CCGs) from community-based organizations linked the facility services in the community they serviced. Both CHWs and CCGs have the same scope of work [6]. Those recruited by Government and placed at facilities are referred to as CHWs and those based in the community organisations are referred to as CCGs. Thus, the approach remained similar whether the CHWs or CCGs were deployed to ensure continuity of care in the communities. Coordinated by TB focal nurse, the DR-TB cases for tracing and home visits are identified by the facility and list given to the CCGs/CHWs during the weekly briefing and debriefing session. During these sessions, the tasks were assigned, and feedback is provided [7].

## RESULTS AND DISCUSSION

Sixteen of the planned 18 DRTB sites in eThekweni district were functionally decentralized between October-December 2018. Of the 16 facilities, four were hospitals and 12 Primary Health Care (PHC) centers. Cumulatively, by the end of March 2019, a total of 142 patients had been initiated on treatment with a retention rate of 98% (2 died in the first month, one defaulted at 4 months) [8]. Despite four sites not having participated in the home visit, 91% of the enrolled patients were visited at home and provided DRTB service package of care for a home visit [9].

By March 2019, these new decentralised sites initiated and monitored 142 patients, with 98% of them placed on ambulatory care [10]. The patients remained in their homes and communities throughout the treatment period. Community infection control was the central in ambulatory care and was provided implemented from the facility through to community. The 6 months result is summarized in the Table 1 below [11].

**Table 1:** Findings in DRTB patients initiated at decentralised sites in 3-6 months.

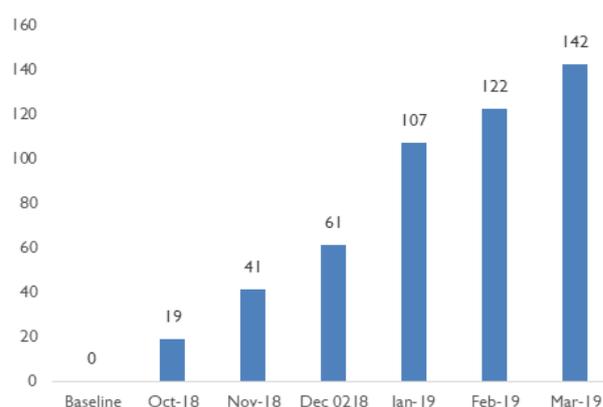
Indicator	Number	Percent
Total DRTB diagnosed	142	-
No. initiated DRTB treatment	142	100%
No. admitted	3	2%

No. retained on treatment	139	98%
No. of patients with cough suppressed in the first week	119	84%
Cough suppressed in first month	136	96%
Culture conversion in first month	121	85%
No. conducted home visits	129	91%
No. of contacts screened	211	100
No. of contacts screened at home	92	44%
No. of contacts screened at the facility	119	56%
No. of contacts diagnosed DSTB	2	0.90%
No. of contact diagnosed DRTB	1	0.45%
No. of contacts diagnosed infected after initiating DRTB treatment in 3-6 months	0	0%

Decentralisation in eThekweni District has increased access to care for MDR-TB patients and expanded MDRTB care into communities [12]. DRTB care expanded to 16 of the 18 health facilities and improved access to DR-TB treatment, care and support from the local facility by 89% and ambulatory care to 98% of patients. Unlike PHCs, the hospitals do not have a direct link to the community and lack CHWs in their staff compliment to conduct the home visits [13]. Thus, the hospitals refer patients to the feeder clinics (Community Health Centre and Clinics), who in turn take responsibilities to conduct home visits. Access to DRTB service package of care to the family and community was important for infection control interventions and retention of patients into care.

The risk of transmission of TB to contacts was very low and all three contacts (one drug-resistant and two drug-sensitive TB) who were infected, occurred prior to treatment of index patients [14]. The transmission, therefore, occurred prior to the initiation of treatment. The contacts were followed over 3-6 months and no further transmission have been registered. The absence of transmission in patients on treatment is explained by several factors. First, all patients who were diagnosed were placed on treatment. Since the diagnosis is by Genexpert, these patients were initiated early on treatment and therefore provided early infection control interventions (Figure 3) [15].

Number of DRTB Patients Initiated on Treatment at New Decentralized Sites at eThekweni District KZN Oct 2018 - Mar 2019



**Figure 3:** The number of DRTB patients initiated on treatment at new decentralized sites at eThekweni district.

Secondly, these patients received injection free regimen of seven drugs, which comprise four core drugs (bedaquiline, clofazimine, levofloxacin, linezolid) and three companion drugs (high dose isoniazid, ethambutol, pyrazinamide). All the core drugs in the regimen are bactericidal and sterilising and in addition, bedaquiline actively penetrates lung cavities. Along with companion drugs, the regimen kills and clears bacilli from the lungs in a few days and renders patients non-infective despite coughing. The regimen suppressed cough in 84% of patients in the first week and 85% of the DR-TB patients culture converted in the first month. The early suppression of cough as well as the culture conversion played an important part in the curtailing transmission to contacts. Secondly, implementing DRTB home visit service package provided the families with interventions like infection control, family education and counselling, contact screening and separation of sleeping space that reduced the risk through behavioural change and practices. Lastly, the home

environment provided an open space for the family to spend time outside. The outside environment is supported by nature, specifically wind and sunlight to disperse and kill bacilli respectively. The risk of transmission of TB is significantly reduced in a home setting and encourages ambulatory care [16].

## CONCLUSION

The results confirmed that the risk of transmission of infection is low among DR-TB patients in ambulatory care. The implementation of DRTB service package of care from the facility (early diagnosis, prompt initiation of treatment, infection control etc.) to DR-TB home visit service package in the house household and community are complementary in ensuring a reduction in the transmission of infection. Therefore, decentralised DRTB services should focus on ambulatory care, but ensure infection control through a specific facility and home-based care package. The package provides holistic DRTB care by building the capacity of the community and health institutions, health care workers, patients, families and communities.

## RECOMMENDATIONS

We recommend systematic implementation of DRTB care package and DRTB home service care package interventions to achieve community infection control in ambulatory care settings. This approach strengthens both facility and community systems through a series of locally adapted interventions that control TB infection and reduced transmission to contacts.

## CONFLICT OF INTEREST

None.

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