

# POLICY BRIEF:

## mHealth for TB in South Africa:

In 2018/2019 a review of existing mHealth solutions was conducted to inform the next steps for unlocking the potential of mHealth to strengthen the TB response.

**What is mobile health? How does mobile health differ from e-health and digital health?** Mobile health or mHealth is defined as the use of mobile wireless technologies for health and is a subset of eHealth which refers to the “use of information and communications technology in support of health and health-related fields.” eHealth is in turn a component of digital health which encompasses eHealth as well as the use of advanced computing sciences for health.<sup>1</sup> All digital health systems, including mHealth, need to complement and enhance the health system, and are not a substitute for a functioning health system.

**What does mHealth for TB refer to?** With the very high reach of mobile phones, mHealth has the potential to support TB control efforts. This could apply along the pathway of care -spanning education, prevention, case-finding to diagnosis, treatment and adherence. For the most part, the TB field has not used mHealth at scale to support the TB response, though many pilot studies have been conducted throughout the world. For example, in Pakistan mobile phones have been successfully used for case finding through incentive driven mass TB screening and education. In Malawi a pilot study demonstrated that mobile phones used by community health care workers improved communication leading to time and financial savings, and increasing Community Health Worker (CHW) capacity<sup>2</sup>. In India and Myanmar, adherence monitoring has been piloted where medication packaging has phone numbers for the patient to call when s/he has taken medication and health care providers can view patient dosing histories. Electronic dose monitors using pill blisters sends data on patient dosing history to providers, while Video Observed Treatment has been used in resourced settings to reduce time and costs of traditional DOTS.<sup>3</sup>

**What are the challenges of mHealth in resource constrained environments?** Challenges in settings such as South Africa that need to be considered when designing an m-Health solution include: sharing of mobile phones limiting phone limiting privacy; infrastructural issues including lack of connectivity and electricity for charging phones; low literacy levels; language barriers; limited funds for pre-paid data; mobile phone theft and phone number changes. Finally, the high costs of data in South Africa, borne by services or users is an additional barrier.

**What are criteria for a desired mHealth solution in South Africa?** The National Department of Health has indicated it seeks mHealth solutions for TB that fulfil the following criteria:

- Covers areas of the TB cascade for which there is a demonstrable need
- Compliant with existing standards +
- Easily purposed for other related diseases or patient groups
- Integrated with major existing public health information systems (NHLS, ETR.net, DHIS)
- Scalable and sustainable
- Likely to have demonstrable impact

The National Department of Health mHealth Strategy proposes that CHWs communicate and send/receive data via cell phones to promote integration of TB treatment, care and support with PHC services<sup>4</sup>



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### National Department of Health mHealth Strategy 2015-2019 key principles:

- Adherence to standards given in the NDOH Health Normative Standards Framework
- Simplicity in design and development of mHealth interventions
- Build sustainable partnerships
- Strengthen the capacity to use mHealth by seeking to converge mHealth initiatives with other ICT initiatives.
- Look for points of intersection with other eHealth programmes

**How did the review investigate existing mHealth for TB solutions?** The following approaches were used:

- A focused review of the literature combining published and grey literature
- Key Informant Interviews with selected experts
- In-depth Interviews with nine organisations that have developed mHealth solutions.
  - + National Health Normative Standards Framework for Interoperability in eHealth in South Africa March 2014 CSIR GWDMS Number: 240075; CSIR, NDOH and Protection of Personal Information Act.

Purposive sampling was conducted based on NDOH and TB Think Tank knowledge of existing mHealth applications. Based on the data collected above, we analysed a selection of the current solutions in relation to the abovementioned criteria and developed recommendations from this analysis.

**What did the review find?** The solutions reviewed and the elements of the TB cascade that they seek to address is provided in Table 1 below:

Table 1. mHealth solutions and areas addressed along the TB cascade

mHealth Projects	Promotion / Education	Screening / Prevention	Diagnosis	Treatment Initiation	Treatment Adherence	Comments
i-Beat-TB	X	X	✓	✓	X	Pilot and evaluated
PHRU	✓	X	✓	✓	X	Pilot, RCT planned
ConnectTB	X	✓	X	✓		Pilot, RCT planned
TreatTB	X	X	✓	✓	X	Focuses on DR-TB
miLinc	X	X	✓	✓		Pilot completed, focus on DR-TB
NMC application	X	X	✓	✓	X	Piloted, launched in 2018, links to online TB surveillance dashboard; plans for ID hotspots for contact tracing.
Philani	X	✓	✓	✓	✓	Piloted, not yet evaluated
TB HIV Care	X	✓	✓	✓	X	Pilot conducted within an RCT; no further funding
Hello Doctor	✓	X	X	X	X	limited
DTHF	X	X	X	X	✓	Limited

**Fulfilling the NDOH criteria** None of the solutions that were part of this review fulfilled all the NDOH criteria outlined above however several showed much promise. (see Table 1) Sustainability was compromised by the lack of funding beyond the pilot phase for several solutions.

**Evaluation** Very few solutions had been formally evaluated at the time of the review and only one i-Beat TB, had published findings.

**Functionality across the TB care cascade** No solutions covered all aspects of the TB care cascade with Philani covering the majority. Linking TB diagnosis to identifying hotspots for intensified contact tracing was conducted by planned by Connect TB, and in the planning phases for NMC and PHRU. Many solutions did not integrate with electronic records and databases,

including DHIS, ETR.net and PHIS. Exceptions were Philani, TB HIV Care and NMC. mHealth solutions interface with different elements of the health system. For example, some linked clinics to patients through mobile technology, while others linked to community health care workers who interfaced with community members. Several solutions were designed to shorten the communication pathways in the system, hence decreasing time to diagnosis and time to treatment initiation. Philani in the Western Cape, partnered with health services from clinic to provincial level, and has developed a system where information from patient or community health workers' mobile phone/device is integrated with electronic clinic records and the provincial health information system. This enables linking of screening, diagnosis, treatment initiation, adherence and cure.

Collaboration and co-ordination While several innovative solutions have been developed in South Africa some of which have been pilot tested, there is very little knowledge exchange or sharing of lessons learnt. Similarly, there is a notable lack of collaboration between organisations working on developing mHealth solutions for TB. This 'silo' approach is at least in part driven by a lack of co-ordination/collaboration by funders on investments in new solutions, and/or expanding promising solutions. This contributes to fragmented and piecemeal development, testing and implementation.

## mHealth partnerships to promote integration into health information systems

### Philani/Catch and Match

**Setting:** Urban setting, Western Cape, implemented within District Health System, clinics are computerised.

**mHealth features:** CHW uses smart phone for home visits, supervisors of CHW have devices; CHW linked to clinic/health centre and to NHLS, provincial HIS. Data captured on CHW phone transferred to HIS at clinic and provincial levels. Text reminders to patients; CHW prompts if referred patient doesn't go to health facility: decrease in loss to follow-up and loss to treatment initiation; Designed for other health priorities such as HIV and MCH. Planned for interoperability with the Western Cape Provincial data warehouse, DHIS2 and NHLS. Limitations: Still being strengthened/piloted, and not yet evaluated. Lessons applicable to other provinces but not ready for scale up.

**Partnerships:** Provincial and District Health Departments, UCT, NGOs (Philani and Jembi )

What can be concluded? mHealth holds much promise to strengthen the national TB response along the TB cascade and may be cost-effective particularly if data costs decrease and simple, user-friendly solutions are adopted. Future investments need to focus on solutions that demonstrate evidence of strengthening contact tracing, decreasing time to treatment, promoting adherence and integrating with the wider health system and health information systems. mHealth education that emphasises the importance of adherence and contact tracing as well as carries destigmatising messages is important. Specific solutions tailored to Drug Resistant TB require attention given the low cure rates and high mortality for Drug Resistant TB. While multiple individual pilot projects that are not scalable have limited value, research on promising mHealth solutions are required to generate evidence that these are efficacious, effective, and cost-effective so that they can be taken to scale and are sustainable. Solutions that interface with national structures such as NHLS and NICD could lead to rapid scale up and integration, and may have cost advantages since core resources are already allocated. Implementation studies of solutions that have been launched nationally are necessary. Future investments need to be made in collaboration with and/or by the NTP, considering the NDOH criteria for mHealth which require formalisation.

### What are the next steps?

1. The NDOH criteria need to be agreed upon and formalised into a guidance document that sets out the requirements for mHealth projects at pilot and scale up phases. These would include interoperability and the ability to link with one

coherent architecture to promote integration with existing health systems, including health information systems.

2. With leadership from the National TB Programme, greater collaboration, co-ordination, monitoring and evaluation of mHealth solutions for TB is required so that an optimal blend of solutions that strengthen the TB response can be scaled. Learning and knowledge sharing through seminars and online platforms will progress the field.
3. To achieve 2 above, an ICT plan and management committee within the National TB Programme needs to be established that clearly links to the NDOH IT plans and structures.
4. Internal partnerships within the relevant health services and governance structures, notably health information systems, need to be in place from the outset to facilitate uptake with routine health systems. External partnerships with relevant research, IT and community organisations are similarly important.
5. Ongoing evaluation research both to assess effectiveness and implementation needs to form part of mHealth solution planning and design. Findings from evaluations that are planned or underway need to be tracked and considered by the NTP.

### References

1. WHO guidelines: recommendations on digital interventions for health system strengthening. Geneva: World Health Organization; 2019:CC BY-NC-SA 3.01G0
2. Dekinger CM, J. Grenier A. K. Stratis et al 2013. Mobile health to improve tuberculosis care and control: A call worth making. *Int J Tuberc Lung Dis* 17(6):719–727
3. TB Reach Wave 6. Improving TB Treatment Adherence and Outcomes. Stop TB Partnership.(undated)
4. National Department of Health. mHealth Strategy. 2015-2019.