I. Introduction

The international development community has turned its attention recently to social impact bonds (SIBs), a financing innovation that is being piloted in several high-income countries. In this innovation, governments pay social service organizations only if those organizations achieve predetermined outcomes. A financial intermediary helps social service organizations raise private capital to implement their programs, receive the government’s outcome-based payment, and repay investors. This mechanism accelerates the adoption of evidence-based practices into public policy by aligning incentives around outcomes and reducing the risk to governments.

This white paper describes one of several potential applications of social impact bonds to international development – the financing, adoption and scaling of evidence-based practices to improve tuberculosis (TB) treatment outcomes. TB makes an excellent case for a SIB because outcomes are easily measured, regularly collected and directly aligned with government cost-savings. I find that for South Africa alone up to $90 million can be saved annually by scaling evidence-based practices.

The paper proceeds as follows. Section 2 describes current gaps in TB treatment. Section 3 reviews promising evidence-based interventions. Section 4 proposes outcome metrics for the SIB and evaluation design. Section 5 compares SIB financing relative to alternative ways to finance TB treatment. Section 6 concludes by offering an illustration of how a SIB would be applied in South Africa, where TB is prevalent.

Instiglio is a nonprofit organization that empowers governments, service providers and social service organizations to discover, adopt, and scale innovative solutions to social problems. It does this by sourcing, designing and implementing social impact bonds in low- and middle-income countries.

For more information, visit www.instiglio.org or email us at info@instiglio.org.

1 Founding Partner, Instiglio. E-mail: Michael.Eddy@instiglio.org.
II. The Cost of Tuberculosis

In 2010, over 8.8 million people were diagnosed with TB, killing 1.4 million men, women and children and leaving 10 million children orphaned. Over the next ten years, TB will cost the world an estimated $1-3 trillion, with a disproportionate impact on developing countries which represent 98 percent of all TB deaths. The World Bank estimates that TB will decrease productivity by 4-7 percent of GDP in many developing countries.²

Although the international community has made significant progress against the TB epidemic, patient noncompliance with treatment has lead to two deadlier strains of the virus: multi-drug-resistant TB (MDR-TB) and extremely drug-resistant TB (XDR-TB). The emergence of these strains threatens to halt overall progress on TB.

MDR-TB is often 20 times costlier to treat than regular TB. While TB can be treated through outpatient clinics, MDR-TB requires two years of treatment, daily injections and often inpatient care. Over 650,000 persons are currently infected with MDR-TB.

XDR-TB, which is resistant to first- and second-line drugs, can be up to 1,000 times costlier to treat than TB. First detected in the 1990s, XDR-TB has now been reported in over 70 countries with over 60,000 cases in 2010.³

Effective first-line TB treatment is critical because it saves lives, avoids costly retreatment and reduces the emergence of MDR- and XDR-TB. The standard treatment therapy for TB, “Directly Observed Treatment, Short-Course” (DOTS), is administered over six to nine months. After one to three months on drugs, symptoms disappear and patients often lose motivation to continue the treatment plan. When patients stop taking their medications, TB can recur, often with drug-resistant strains. This, along with low quality drugs and improperly administered treatment regimens, fuels the spread of MDR and XDR-TB.

---

³ World Health Organization, Global TB Control 2011.
With full compliance, however, DOTS can achieve treatment success rates above 95 percent. The WHO target for treatment success rate is 85 percent. Yet only 56 percent of countries have reached this goal. These disparities suggest an important role for implementing and scaling evidence-based approaches to improve treatment success rates.

III. Evidence-based Interventions

The past ten years has seen an emergence of new research into behavioral science, economics and public health, opening the door for innovative tools to improve drug compliance and treatment success. These include:

1. **Incentives** – Small incentives can have an outsized impact on behavior change. A trial among low-compliance injection-drug users showed that monetary incentives increased TB completion rates form 4% to 53%. Another program giving $5 coupons to patients at risk of TB non-compliance in the US showed increased completion rates from 52% to 89%.

2. **Lotteries** – Lotteries may be even more cost-effective than direct incentives in changing behavior. Drawing on a variety of established behavioral findings (frequent feedback, overestimation of small probabilities, and the motivating force of anticipated regret via loss-aversion), one study provided drugs through dispensers electronically tethered to a lottery system. Patients were entered into daily lotteries with prizes of $10 and smaller chances of winning $100. Lottery winnings however were taken away if their dispenser showed they failed to take the drug the previous day. The intervention reduced the likelihood of incorrect dosage from 22% to 3%.

3. **Commitment devices** – A commitment device is a way to voluntarily lock your future self into behavior that your current self desires. BRAC in rural Bangladesh used rural health workers and a commitment device of 200 taka (US$5), half of which was returned after successful completion of DOTS therapy. Results showed that the BRAC program improved case detection and cure rates.

4. **Process improvements** such as checklists, active reminders and late-patient tracers. These have been shown to be low-cost, high-impact interventions to improve compliance and success.

---

Despite well-established evidence on the effectiveness of these approaches, governments have been slow to adopt these interventions in part because they often remain outside of the “traditional” toolbox for public health. A social impact bond, therefore, has the opportunity to accelerate adoption by focusing on the results achieved, while reducing the risk to governments.

IV. Measuring Results

Since a social impact bond ties government payments to the achievement of results, choosing the right metrics and correctly measuring them is critical to a well-designed SIB. Fortunately, TB presents an ideal case where quantifiable metrics are regularly collected and are of both intrinsic importance to society and closely tied to government cost savings.

Choosing the right metric will affect the strength of the performance incentives and the amount of risk transferred to investors. An outcome metric that might be of more intrinsic worth to society (e.g. community-wide infection rates) opens up new avenues for intervention (mass media campaigns), but may also be harder to change (particularly in the short-term). The right outcome metric must appropriately balance these factors, while also being cognizant of evaluation design.

Exhibit 2: Potential outcome metrics\(^{10}\)

Evaluation Design

Most outcomes are not constant: they display trends even in the absence of a SIB-financed intervention. The ability to isolate the impact of the SIB intervention (and disburse payments) is therefore vital. When implemented well, a randomized trial can be one of the most rigorous ways to establish causality between the intervention and outcomes.

Depending on the intervention type and outcome chosen, an individual or cluster-randomized control trial may be appropriate. An individual randomized trial would be best suited for measuring individual-level outcomes (such as patient compliance or treatment success rates) in a short time-frame and without the need for an unduly large sample size. A clustered randomized trial would be better able to measure

\(^{10}\) The World Health Organization advises country governments to categorize all TB cases into one of five outcomes: cure, completed, died, failed or defaulted. These statistics are regularly collected by DOTS treatment facilities and reported to WHO through national TB control programs. The fact that this data is already collected can greatly reduce the costs of implementing high-quality impact evaluations.
community-level indicators (such as community-wide TB incidence) capturing the effect of spillovers and treatment externalities, but at the cost of needing a larger sample size.

While a randomized control trial (when implemented well) can be the most rigorous method of evaluation, it is not always the most cost-effective or the one accepted by all relevant stakeholders. Evaluations in other social impact bonds have relied on time-trend analysis and propensity score matching.\textsuperscript{11} Regardless of the particular evaluation method chosen, the important part is that the sponsor, intermediary and investors all agree beforehand on the method for calculating payments and that an independent and reputable third-party implements the evaluation.

V. The Value of a Social Impact Bond

Existing financing methods of paying for treatment programs include up-front payments or performance-based contracting to service providers. A social impact bond may be a more appropriate way to finance TB treatment compared to these options for the following reasons:

1. **Improved outcomes.** The use of outcome-based funding, rather than up-front investment into a program, may increase organizational incentives to deliver TB treatment more cost-effectively and to continuously monitor and adapt interventions as the causes of noncompliance and the surrounding environment changes.

2. **Financing interventions directly from cost-savings.** A disproportionately large proportion of many TB programs is dedicated to treating costly MDR-TB cases, reducing the budget available for proper first-line treatment. For example, in South Africa, MDR-TB makes up only 2% of actual cases, but requires 55% of the TB control budget.\textsuperscript{12} A social impact bond allows governments to delay payment and draw it directly out of the downstream budget savings that the SIB generates.

3. **Accelerating adoption of innovative, evidence-based interventions by transferring risk to those who can best manage it.** Traditionally, risk-averse governments take on the implementation risk that money invested in programs does not translate into outcomes. In performance-based contracts, implementation risk is transferred to service providers, whom as non-profits are also generally risk-averse and have difficulty raising the up-front capital to finance projects. Social impact bonds transfer risk to those best able to manage it: investors. This enables greater experimentation with new approaches to improving TB treatment.


VI. A Tuberculosis Social Impact Bond in South Africa

South Africa is classified as high-burden TB and MDR-TB country with 490,000 new cases of TB and almost 10,000 cases of MDR-TB diagnosed in 2010. This amounts to 1% of the population being diagnosed with TB each year. Yet only about 72% of the total estimated cases are detected. Among newly detected smear-positive cases, treatment success rate is 73 percent, well below the WHO target of 85 percent. Treatment success rates decline in MDR-TB and XDR-TB cases, with respectively only 47 and 28 percent of cases succeeding.13

TB treatment drains the national health budget. The South African government bears the full cost for its entire US$300-400 million national TB program.14 55% of that budget goes towards MDR-TB even though it makes up only 2% of cases. While first-line TB treatment costs only $437 per case, a 2010 study showed that MDR-TB treatment costs $17,164.15

Financial Benefits

In the long term, achieving the WHO target of an 85% treatment success rate by scaling evidence-based interventions nationally could create almost $90 million of direct financial benefits. This represents only direct budgetary cost savings from preventing costly retreatment of TB and MDR-TB. It does not reflect lives saved and many of the other reasons why a government would want to scale-up cost-effective interventions.

Another important note is that these are only one side of the cost-benefit equation. Additional analysis would compare benefits (below) with intervention costs in order to calculate the financial return on investment. Ultimately part of this return on investment will need to be shared with investors in order to compensate them for taking on risk.

Exhibit 3: Estimated Financial Benefits of a South Africa TB SIB

<table>
<thead>
<tr>
<th>Population</th>
<th>New cases per year</th>
<th>Impact per annual cohort (successful cases attributable to the intervention)</th>
<th>Financial benefit per annual cohort (US $ in averted retreatment)</th>
</tr>
</thead>
<tbody>
<tr>
<td>eThekwini (Durban)</td>
<td>40,000</td>
<td>4,680</td>
<td>$7,290,078</td>
</tr>
<tr>
<td>eThekwini + Cape Town + Joburg</td>
<td>93,000</td>
<td>10,881</td>
<td>$16,949,432</td>
</tr>
<tr>
<td>All of South Africa</td>
<td>490,000</td>
<td>57,330</td>
<td>$89,303,457</td>
</tr>
</tbody>
</table>

Model assumes improvement in success rates from 73% to WHO target of 85% and does not take into account the evaluation design. Full model and assumptions available upon request.

14 Donors provide additional funding for research, health systems strengthening and other programs.
15 Schnipple, 2012.
Institutional Structure

A social impact bond for TB control in South Africa would be a joint effort between the national government, impact investors, service providers, and an intermediary such as Instiglio. Donors may also play a role as co-sponsors of a SIB alongside the government.

Exhibit 4 below shows the flow of funds in a social impact bond.

Impact investors (such as KL Felicitas, Omidyar and Rockefeller Foundations) would provide the up-front working capital through an intermediary, like Instiglio. Instilgio would then work with service providers to scale-up evidence-based interventions such as those described above, monitoring performance and engaging in in-course corrections as necessary. Service providers would be private clinics and non-profit providers of DOTS treatment already licensed under South Africa’s policy of public-private mix (PPM) TB care. After an independent evaluation, the payer (in this case, the government of South Africa with perhaps donor co-sponsorship) would pay Instiglio based on the outcomes achieved, enabling Instiglio to return principal plus interest to its investors.

Exhibit 4: A Social Impact Bond for TB Control in South Africa

The proposed process for creating this social impact bond involves at least the following steps:

1. Sourcing government champions in South Africa and working with them to design the social impact bond structure;
2. Designing, negotiating, and signing a pay-for-success contract between the payers (government and/or donor) and an intermediary.
3. Raising funds from philanthropic and private investors;
4. Selecting, managing and scaling-up social service organizations delivering TB treatment over the lifetime of the SIB program.