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Worldwide: Incentives for Tuberculosis Diagnosis and Treatment

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Highlights

Many tuberculosis programs incorporate material (food) and financial performance-based incentives for patients, providers, or both.

Findings from a combination of rigorous evaluations and data from routine program monitoring suggest that performance incentives can improve both case detection and treatment adherence.

Performance incentives applied to tuberculosis contain lessons for treatment of other extended-duration and chronic conditions.

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Many tuberculosis (TB) control programs incorporate performance-based financial or material incentives, or both, for patients and providers with the intent of increasing the number of TB cases detected and ultimately cured. Patient incentives are frequently tied to actions that are closely linked to completing treatment. Provider incentives are tied to actions, outcome measures, or both. Findings from a few well-designed evaluations and routine reporting data from tuberculosis programs suggest that financial and material incentives can have a positive influence on the detection of tuberculosis cases and full adherence to TB treatment.

Tuberculosis remains a lethal threat to public health. The World Health Organization (WHO) estimated that nearly 9 million people developed active TB and some 1.6 million died from it in 2005. Ninety-eight percent of TB deaths occur in the developing world, and the majority of those affected are the poor and vulnerable, including those with compromised immune systems such as from HIV/AIDS and malnutrition (WHO 2007). Recently, TB has been declared an emergency in Africa, and it is a grave concern in parts of Eastern Europe and Central Asia for a number of reasons, including rising incidence, HIV-associated tuberculosis, and increasing prevalence of multidrug-resistant tuberculosis. In contrast, in most of Asia, the Middle East, the Americas, and Western Europe, economic development and stronger responses to TB have contributed to a decline in both prevalence and mortality.

To reach the Millennium Development Goal of reversing the incidence of tuberculosis and the Stop TB Partnership targets for 2015 of reducing mortality and prevalence rates by 50 percent, it will be necessary to nearly double the detection of TB cases in Africa, increase treatment success rates to at least 85 percent, and expand implementation of strategies to address HIV-associated and multidrug-resistant tuberculosis. A new Stop TB Strategy and the Global Plan to Stop TB 2006–2015 are providing the frameworks for scaling up these efforts. Evidence suggests that performance incentives can contribute to these goals.

Here we provide an overview of performance-based financial and material incentives that are being used in a range of countries to improve the detection of tuberculosis and the completion of treatment. We draw on the collaborative work of the Stop TB Partnership, the World Health Organization, the World Bank, the Rational Pharmaceutical Management Plus (RPM Plus) project managed by Management Sciences for Health, with financing by the U.S. Agency for International Development (USAID) and other sources.¹ Evidence is drawn substantially

1. For an overview, see www.msh.org/projects/rpmpplus/3.5.5.htm [October 2008].

from information collected through four surveys of TB incentive interventions conducted by the collaborative in 2001 and 2003 and the RPM Plus program in 2004 and 2005.²

Evidence suggests that incentives can be valuable in implementing the components of the Stop TB Strategy. Although it is difficult, given the available evidence, to attribute changes in performance fully to the incentives, experience indicates that performance incentives for patients and providers can help to support increased detection of cases and contribute directly to an improvement in treatment completion rates. Reviewing cases of performance incentives in TB programs reveals the importance of careful design and implementation, particularly involving the distribution of money or food.

For this discussion, *incentive* is defined as “all financial or material rewards that patients and/or providers receive, conditional on their explicitly measured performance or behavior.”³

Context of TB Control

Tuberculosis is predominately a disease of the poor, making adherence to the extended course of treatment a considerable challenge. Without effective strategies to ensure adherence to treatment and appropriate patient management, the danger of developing drug-resistant forms of tuberculosis increases. The newly enhanced Stop TB Strategy builds on knowledge of what is needed to deliver effective tuberculosis care in the increasingly complex environment of drug-resistant TB and HIV/AIDS co-infection.

Tuberculosis thrives in the context of poverty. In addition to its impact on an individual’s ability to work and earn a living, the costs of seeking accurate diagnosis and treatment can be considerable for low-income households. TB patients face substantial costs before diagnosis in that they often consult several public and private providers before and in the process of being diagnosed (Hanson, Weil, and Floyd 2006). Although most public services provide tests and TB drugs free of

2. This used the broader terminology *incentives and enablers* to categorize and analyze motivators for patients and providers to overcome obstacles to detecting TB and adhering to treatment. *Incentive* was defined as “incites someone to determination or action, introduces additional motivations to achieve existing performance objectives or to achieve higher performance standards.” *Enabler* was defined as “makes something possible, practical, or easy; allows action based on existing motivations or to achieve performance standards or goals within existing systems frameworks.” *Motivators* could be financial, material, nonfinancial, and nonmaterial.

3. This definition is similar to that of Robert Town and his colleagues (2004). It has been adapted slightly to fit the TB control context.

charge, other direct and opportunity costs pose barriers to accessing TB services and treatment, especially for poor rural and marginalized urban patients (such as slum dwellers, migrants, the homeless). In many cases, patients resort to borrowing money or selling assets (Nhlema and others 2004, cited in Stop TB/WHO 2006). Many of the performance-based financial and material incentive schemes targeted at patients are designed to help compensate for these costs, thus overcoming a considerable obstacle faced by poor patients.

Adherence to at least six months of treatment is a challenge. Tuberculosis can be cured with a cocktail of three or four drugs that cost as little as \$14 to \$18 per patient. However, adherence often poses a challenge because treatment for patients with drug-sensitive disease is six to eight months and involves repeated interactions with health services. Challenges are on both the patient (demand) and provider (supply) sides. Without proper health education on the risks of stopping treatment early and other motivators to encourage continued treatment, patients may stop taking drugs when they start to feel better. Unreliable drug supply, poor prescribing practices, and inadequate patient management can also result in inappropriate TB treatment.

Drug resistance is an increasing concern. In addition to failing to cure the patient, poor adherence contributes to development of strains of the bacterium that are resistant to treatment. Strains that are resistant to at least the two core anti-TB drugs, called multidrug-resistant tuberculosis, are an increasing threat to global efforts to control tuberculosis. Although it is a more severe problem in some countries, multidrug-resistant TB has been documented in nearly every country in the world, with nearly half a million cases each year (Stop TB/WHO 2006). Drug-resistant TB is usually treatable but requires two years of treatment that is far more expensive and potentially toxic to patients.⁴

Core Elements

The core elements of an effective TB control program are well established. In 2000 the WHO World Health Assembly agreed on 2005 targets for both detection of cases (70 percent of new smear-positive cases) and completion of treatment (successful treatment of 85 percent of those detected) with the goal of decreasing the global TB burden. Where HIV is absent, reaching these targets should lead to a substantial decrease in prevalence rates and an annual decrease in incidence of about 5 to 10 percent (Stop TB/WHO 2006).

4. See WHO fact sheets, www.who.int/mediacentre/factsheets/fs104/en/#hiv [October 2008].

DOTS—directly observed treatment/therapy short course, the internationally recommended approach to controlling TB—underpins efforts to improve tuberculosis control worldwide and reach these targets. Since 1995, DOTS has been scaled up globally, with more than 20 million patients treated under this approach by the end of 2004. It incorporates five elements: political commitment, case detection through quality-assured bacteriology, short-course chemotherapy and patient support, a regular supply of quality-assured drugs, and routine systems of reporting, monitoring, and impact evaluation. At the end of 2003, more than three-quarters of the global population lived in countries that had adopted DOTS (Stop TB/WHO 2006).

In 2006, building on the successes of DOTS, the World Health Organization launched an expanded strategy called the Stop TB Strategy, which incorporates additional policy and implementation innovations to address TB/HIV, multi-drug resistance, and the challenges of reaching new populations and providers, empowering communities, and promoting research. The Stop TB Strategy and Global Plan 2006–2015, which aims to reduce the suffering associated with TB and increase equitable access to care, dovetails with the objectives of universal access for HIV prevention, treatment, and care.

In this context, performance incentives can have an impact on both the supply side and the demand side of TB care, treatment, and prevention. Incentives can be applied to improve public health outcomes by helping to cure infectious patients and increase access and by reducing the suffering of affected individuals by encouraging and enabling patients to seek care early and get effective care.

Directly observed treatment is a core element of TB control programs. The DOT standard requires that a health worker, community volunteer, or family member supports and observes patients taking their anti-TB medicines. This need emerged from experience in South Asia, the United States, and elsewhere, where high default rates and the risk of drug-resistant disease attributable to intermittent or incomplete treatment led to concern that more direct support was needed. Effective DOT can ensure patient adherence and cure and does reduce the risk of multidrug resistance, but it entails a high level of patient-provider contacts, which can impose substantial costs on the patient.

Treatment Options

There is a range of approaches to treating and managing tuberculosis. In some countries, patients are hospitalized during the first two months of treatment and attend health services on an ambulatory basis for the remaining six months. In

most of the world, however, TB patients receive treatment on an ambulatory basis. During that phase, patients can attend a clinic or, as many increasingly are, participate in a community-based program in which community workers, volunteers, or family members provide the necessary support to ensure that the patient adheres to the treatment schedule. Because the success of this approach and the DOT model rely on the patient and provider sustaining certain behaviors over the course of the treatment, performance incentives are a promising strategy.

Existing incentives, however, can discourage the actions necessary for full TB treatment. One of the many reasons that TB programs do not always achieve performance targets is that the many people who form a tuberculosis control system may not contribute effectively to case detection, treatment completion, and cure. That is, providers may not always follow guidelines for appropriate detection and treatment, even when they have the knowledge, tools, and environment to do so. Confounding the problem is that patients may not always seek care or stay on the recommended treatment regimen, even when drugs are available and the importance of completing treatment has been communicated and is clear.

Patient barriers to accessing, initiating, and completing TB treatment are a greater challenge for the poor, for whom performance-based financial or material incentives such as food, transportation subsidies, and money may be effective at reducing the direct and opportunity costs of treatment. By reducing obstacles, performance incentives encourage individuals to seek care and follow treatment.

Various factors may motivate (or demotivate) providers. Providing TB services is demanding because the extended course of treatment requires substantial efforts from health workers to ensure that patients adhere to the treatment schedule. Several factors discourage providers from providing effective diagnosis and care of tuberculosis patients.

—The salaries of public sector health workers often do not depend on the quality of their work, the quantity of services provided, or the results achieved. The resources needed to reach out to community members or to follow up on defaulters are often not available.

—In settings where public sector providers also run private clinics, tuberculosis patients may be unappealing to treat because they are less likely to pay fees when drugs are available in public facilities at no charge.

—Private for-profit providers in developing countries often receive fees for each service they provide. This may drive them to keep a fee-paying patient with

tuberculosis rather than refer the patient to other providers to be accurately diagnosed and treated.

—At the level of health institutions (clinics and hospitals), funding is often based on a budget that covers the costs of inputs rather than being linked to health results achieved. Such an incentive justifies expenditures rather than demonstrates results.

Improving Incentives

A range of performance incentives, both financial and material, has been used successfully to improve TB results. They focus on the design of incentives, implementation, evaluation, and evidence of impact.

Patients

Patient incentives include direct payment, deposit return, food (hot meals, dry rations, or food vouchers), transportation subsidies (reimbursement, tokens, passes, or vouchers), vouchers for material goods other than food, and packages of personal hygiene products, such as shampoo. Tuberculosis patients in the United States, where the majority are low income, socially disadvantaged, and sometimes homeless, have long received financial and material incentives. In developing countries, some projects specifically target the poor (Tajikistan) or marginalized populations (Orel and Vladimir oblasts in Russia), whereas others cover all TB patients within a given region or country (Cambodia).

Patient incentives are based on performance when they depend on some required, measurable action, most commonly steps in the treatment process rather than treatment outcomes. Examples include providing food or money to patients who regularly attend a clinic to receive treatment under DOT and who complete treatment. A few patient incentive schemes require patients to assume some financial risk.

To take one example, the Bangladesh Rural Advancement Committee implemented a patient incentive scheme from 1984 to 2003 in which patients made a deposit when beginning treatment. A portion of the deposit was returned when treatment was completed. The balance was retained by the volunteer health worker who provided DOT support to the patient during treatment. The incentive program was changed in 2004, however. The patient now receives the entire deposit when the treatment is completed, and the program pays the worker.

In another case, the Perkumpulan Pemeberantasan Tuberculosis Indonesia-Jakarta program provides patients with free drugs once they begin treatment.

A patient must sign a contract agreeing to pay the full cost of drugs taken if she or he defaults, thus providing a strong incentive to complete the treatment (Beith and others 2001).

Performance-based incentives can be designed to influence provider behavior at the levels of both the individual worker and the institution. At the individual level, incentives are aimed at improving the quality of diagnosis, expanding access to treatment by promoting outreach, reducing default rates, and encouraging completion of treatment. Incentives aimed at the team or institution level are oriented toward improving teamwork and stimulating systemic changes to improve outcomes. Payment usually is based on clearly defined measures of process or outcome, such as number of cases detected, referrals of suspected cases, patients completing treatment, or patients cured.

In the public sector, goals are to promote the extension of DOTS services beyond public facilities to ensure greater access and increased adherence. Examples of incentives targeting individual public health workers include direct payment, food packages, vouchers, and other material goods (such as briefcases, watches, soap, and so on).

Private providers have not until recent years been incorporated into a country's tuberculosis control program and have had few incentives to follow national tuberculosis guidelines. As a result, there has been considerable concern about tuberculosis drugs not being prescribed appropriately by private providers (Uplekar and others 1996; Lönnroth, Uplekar, and Blanc 2006) and about the tendency of private providers not to monitor treatment or maintain records (Lönnroth 2000; Uplekar, Pathania, and Raviglione 2001).

There is growing recognition, however, that the first contact a tuberculosis suspect has with the health care system is often with a private (whether for-profit or nonprofit) provider. This has motivated the development of public-private mix models of care including nonmonetary incentives to encourage private providers to refer suspects, or diagnosed cases, to the public health system or to supervise treatment (Ambe and others 2005; Lönnroth and others 2004; see box 12-1).

Performance-based financial and material incentives are also used to motivate provider teams or, at the organization level, to increase the number of cases detected and people cured. The theory is that incentives at the team or organization level inspire discovery and innovations at the system level, which strengthen organizations and improve effectiveness. Effectiveness depends on quality of design, management, and monitoring. Experience from existing performance-based incentive initiatives suggests some lessons about the importance of appropriate design, implementation, and evaluation of the scheme (see box 12-2).

Box 12-1. Soft Contracts with Private Practitioners to Improve Tuberculosis Outcomes

World Health Organization researchers reviewed fifteen public-private mix models in TB control involving national tuberculosis programs in partnership with private care providers or with not-for-profit umbrella organizations that worked with individual providers. They examined the nature of contractual relationships, quality of care, and results. In nearly all models, private providers received no formal financial payments, although they did enter contracts that enabled them to receive public sector TB drugs for free distribution to patients as well as continuing education, associated their work with a reputed national program, and ensured that they followed national guidelines and reported results to the national tuberculosis program. There were no competitive tenders. Treatment success rates were above 80 percent in thirteen initiatives and on a par with or better than national averages. TB case detection rose 10 to 36 percent. The review yielded three key conclusions:

- High treatment success rates are possible for patients receiving treatment from private providers following international standards of TB care, linked within a national DOTS-based TB program, and providing TB drugs free of charge to patients.
- Engaging private providers can increase TB case detection rates, another measure of performance in TB control.
- Informal, well-defined drugs-for-performance contracts (without direct financial payments) are a possibility when involving individual private practitioners in TB program implementation. They act as incentives for participation and are associated with good performance and improved patient and public health outcomes.

Source: Lönnroth, Uplekar, and Blanc (2006).

Stakeholder involvement is critical in the design process. Evidence suggests that consulting with patients to better understand the obstacles they face in being diagnosed and completing treatment, and with providers to better understand what is impeding them from performing optimally, may contribute to better design and increased buy-in among stakeholders. For example, in St. Petersburg, Russia, a needs assessment approach was essential to designing the incentive. Prisoners with tuberculosis who were soon to be released were asked what would motivate them most to adhere to treatment once they were back in the community. The most highly valued incentive for prisoners was assistance with obtaining a national identity card. Lack of such a card in Russia means that an individual loses opportunities for work, housing, and access to public services and has a greater likelihood of police harassment and reincarceration.⁵

5. Personal communication, Kaveh Khoshnood, Yale University, October 2004.

Box 12-2. *Incentives for Health Workers and Institutions*

The following countries offer incentives aimed at individual health workers:

—In Romania, public health workers receive gift tickets conditional on measures such as the number of new cases confirmed by microscopy and the rate of DOT in sputum-positive patients (Mookherji and Beith 2005).

—In Honduras, public health workers receive material incentives (soap, hats, bags, towels, and so on) when program objectives are reached, such as patients regularly attending clinic-based treatment (Honduran National Tuberculosis Program response to 2004 RPM Plus survey; Mookherji and Beith 2005).

The following programs offer incentives aimed at private health care providers:

—In China, village doctors (community health workers) receive a fee for each new sputum-positive smear case that is enrolled in treatment, another when a smear exam is performed following two months of treatment, and a third when patients complete treatment (Beith and others 2001; Mookherji and others 2005; Mookherji and Beith 2005).

—In India and the Philippines, national tuberculosis control programs supply private providers with anti-TB drugs at no cost on the condition that patients pay nothing for the drugs. Dispensing free drugs is an incentive for providers because they can charge consultation fees. In addition, providers who are known to cure TB patients develop a strong reputation as healers, which can result in higher client demand for all services.

The following programs offer incentives aimed at teams and institutions:

—In Bolivia in 2004, the goal of a national program was to inspire team-based solutions to improving program results. Payment depended on reaching service targets in rural areas, defined as the number of cured patients, home visits conducted (three per patient), community education sessions attended, and effective supervision of health promotion workers (Bolivian National Tuberculosis Program response to 2004 RPM Plus survey; Beith and others 2004; Mookherji and Beith 2005).

—In Brazil in 2000, municipalities were paid for each patient cured and for providing access to DOT. One level of payment was for patients who self-administered the TB medicines and the other, higher amount was for those who were supervised (Beith and others 2001).

—In the Czech Republic, nongovernmental organizations receive a monetary incentive once diagnostic tests are performed on TB suspects (L. Trnka, National Tuberculosis Program, Czech Republic response to 2005 RPM Plus survey; Mookherji and Beith 2005).

—The Fund for Innovative DOT Expansion through Local Initiatives to Stop TB project aims to stimulate innovative approaches to increase case detection by awarding projects with second-year financing conditional on achieving scores demonstrating that patients who had had limited access were reached (personal communication, I. D. Rusen, Rena Eichler, and Alexandra Beith, June 2006).

The devil is in the details of implementation. The details of operationalizing an incentive scheme are important for programs to be able to expand to scale, ensure impact, and be sustainable. Once a performance incentive is chosen, it is critical to plan all the levels of implementation:

—Communicate the performance-based incentive scheme to recipients. Effectively communicating the new program to the people whose actions are intended to be affected is critical to success. If they do not understand it, they are unlikely to respond. For example, in El Salvador, providers did not fully understand the purpose of the patient food support, viewing it more for its nutritional benefit than for its ability to influence behavior. As a result, instead of tying it to patient adherence to treatment, they provided food to all patients, regardless of adherence (Mookherji and others 2005; Mookherji and Beith 2005).

—Decide how performance will be monitored, how performance will be reported, measured, and monitored, and who is responsible for each role. This may involve assistance to build capacity if, for example, a government department will be taking on a new function.

—Plan how the incentive will be managed. Once performance is verified, the process to move the money or material goods is critical. Schemes break down when the performance incentive is not available as promised or when recipients begin to doubt the credibility of the provider of the incentive. The Cambodia example highlights the complexity of managing food programs (see box 12-3).

—Monitor and evaluate regularly. Continuing to evaluate a scheme's effectiveness is important, as the impact of incentive schemes may wane, resulting in a need for revision. It is also critical to continue to monitor whether any unintended effects of the scheme have surfaced.

Unintended effects can be minimized with careful design and regular monitoring. One danger of offering money or food as an incentive to encourage patients to be tested or to continue treatment is that the extreme poor may react by engaging in practices that allow them to continue to qualify. Considering these potential unintended effects and establishing an ongoing monitoring system to identify and correct them are an important part of design and implementation.

In India, monitoring revealed that some patients attempted to prolong the treatment period by avoiding medicines so that they could continue to receive a monthly payment. As a result, the scheme was revised restricting payment to include a maximum six-month period from the date treatment began (Urban Poverty Alleviation Department, Cochin, India, in response to 2001 Stop TB, WHO, World Bank, and RPM Plus survey).

Box 12-3. Cambodia: Managing Food Distribution

Food has been provided to TB patients in Cambodia since 1994. Food packages from the World Food Program of canned fish, vegetable oil, and rice generally arrive on a monthly basis for eight months. In 2002 nearly 18,000 individuals benefited from this program. Until the end of 2002, most TB patients were hospitalized for the first two months (the intensive treatment). They received food packages weekly from the World Food Program if they remained in the hospital and continued to follow treatment. The program offset the family's costs of having to provide meals in the hospital. Outpatient patients received food support conditional on making required visits and adhering to treatment under DOT.

Cambodia has since moved to a fully ambulatory system. Food packages are conditional on continued attendance at the clinic for treatment. Some programs distribute food every month, some every two weeks.

Food Distribution

The World Food Program handles procurement and first-level distribution, and the Ministry of Health handles distribution to patients. A local firm, Khmer Express Transport, moves the food from Phnom Penh to two provincial warehouses. World Food Program staff deliver the food to outpatient departments, referral hospitals, and former district hospitals (now health centers). Health centers along the delivery routes are sometimes serviced directly. The delivery point for food is not always the same as that for medicine, and thus accessing food support implies that the patients incur additional costs. When it does not have a provincial warehouse, the World Food Program delivers the food directly from the national warehouse to the outpatient departments and referral hospitals. TB staff at health centers and former district hospitals are responsible for collecting food from health service delivery sites. The delivery point for food is the same as for TB medicines.

Monitoring

Decentralization and an increased number of food service delivery points are challenges that merit careful attention. Regular coordination between the Ministry of Health, National Tuberculosis Program, and the World Food Program has been critical. The World Food Program conducts monthly monitoring visits to check food distribution and stock levels, verify new patient lists, and review stock balance sheets. Field monitors make random spot checks during food distribution, at which time they check food ration cards against the TB register to ensure that false patients do not receive food supplements. Reporting systems related to food support (that is, keeping track of beneficiaries and leakage) follow World Food Program requirements. National coordination meetings are held on a regular basis to address operational and management concerns and to identify collaborative solutions.

Mobilizing local resources to fund timely and efficient distribution of food to peripheral health centers has become more difficult in recent years. In one province (Kampong Speu), a system has been established that uses Ministry of Health facilities and DOTS delivery points by allocating part of the budget for operating costs obtained through user fees. Health facility directors in other provinces have shown interest in this approach.

Sources: Mookherji (2005); Mookherji and Weil (2005); Mookherji and others (2003).

In Haiti, where a patient food package scheme was implemented, there was evidence of patients in control areas (without food) pressuring providers to transfer them to food support areas. This resulted in some failures since some patients were referred to pilot centers located far from their residence (Midy, Exume, and Celestin 2004; Mookherji and Beith 2005; E. Nicolas, National Tuberculosis Program, Haiti, in response to 2005 RPM Plus survey). In addition, providers involved in the patient food support scheme began to demand food, so providing food to health care workers was ultimately included in the scheme to avoid pilferage (Midy, Exume, and Celestin 2004).

In Cambodia, there were problems with “ghost” patients (treatment cards being used to obtain food packages for patients who did not have tuberculosis or were dead). The problem was overcome through effective communication and coordination among partners, more training and supervision, and tighter monitoring (Mookherji and Weil 2005).

Impact on Outcomes

The majority of tuberculosis programs known to be using performance-based financial or material incentives assess the impact of these incentives as part of regular program monitoring. Because tuberculosis programs use a standard recording and monitoring system built on routine service-based data that has been institutionalized worldwide, they have access to better information with which to monitor results than most other public health programs. Nearly all countries in the world have the estimated number of potential new tuberculosis cases and the actual number of new cases detected. Of patients who initiate treatment, those who complete it and are cured are tracked, as are those who default. This implies that TB programs can track progress in case detection and treatment completion using institutionalized information from routine monitoring.

Evaluating impact with the use of routine monitoring systems has a number of weaknesses, however. One is that multiple program-strengthening interventions may be implemented simultaneously, making it hard to attribute changes in performance fully to the incentives. Evaluations that include a control group that receives all strengthening interventions except for the incentive may be a way to overcome such weaknesses, although even these evaluations can face challenges.⁶

6. In Haiti, where a patient food package scheme was implemented in some areas, there was evidence of patients pressuring providers to transfer them from control areas, where no food was provided, to intervention areas, where food was provided (Midy, Exume, and Celestin 2004; see also Mookherji and others 2005; Mookherji and Beith 2005).

Because there are many variations on the design and implementation of incentive schemes for both providers and patients, understanding more of the details of each program and aspects of each design that contribute to success or failure is extremely useful. Few programs complement quantitative with qualitative analysis.

Evidence from Studies

A few more rigorous evaluations have been conducted in which routine monitoring data were used as well as retrospective analysis to assess the impact of performance-based incentives on TB program outcomes. These evaluations attempted to design studies that would distinctly identify the impact of incentives on performance. However, attribution is difficult because of design and implementation challenges as well as the problem of attributing changes in performance to the incentives, which is common to retrospective analyses of routine reporting data. On the patient side, findings from three evaluation studies suggest positive impacts from the incentives.

In three Russian oblasts (Ivanovo, Orel, and Vladimir), a package of interventions (food and, in some cases, travel support, clothing, or hygienic kits) was given if the patient did not interrupt treatment (see box 12-4). Default rates dropped from 15–20 percent to 2–6 percent.

In Tajikistan, vulnerable patients were given food, conditional on their adherence to treatment (see box 12-5). A treatment success rate of 89.5 percent was achieved (versus 59.4 percent for the comparison group).

In Kazakhstan, a study compared the impact of three interventions on patient adherence: patient monetary payment, hot meals for patients, and nurse outreach.⁷ No single intervention was significantly more effective than another, but the combination of interventions improved treatment success by 4.7 percent.

On the provider side, findings from the few known evaluation studies also suggest a positive impact of performance incentives on referrals of suspected cases, detection of cases, and completion of treatment. Again, however, it was not possible to identify the distinct contribution of the financial and material incentives to improved performance because the studies evaluated the impact of a package of interventions.

In Bangladesh, a cost-effectiveness study of the Bangladesh Rural Advancement Committee scheme showed that TB case management using community health workers, of which the patient deposit-provider incentive payment was one

7. The latter, however, does not fit the definition of *incentive* used here.

Box 12-4. *Evaluations from Russia*

Since 2000, TB outpatients in the Russian oblasts of Orel and Vladimir have been provided a combination of food packages, hot meals, transport reimbursement, hygiene packages, and clothing based on their continued clinic attendance and observed treatment. When patients interrupt treatment for seven days or more, they are denied the incentive package for a week or a month depending on the territory. In 2005 the management and financing of the incentive programs were transferred to the local oblast administration.

In Vladimir (population 3,200),

- All TB outpatients receive food packages following DOT of prescribed TB drugs,
- All new TB patients are compensated for travel expenses to places of treatment depending on their clinic attendance, and
- All new TB patients receive bonus incentives (clothing, hygienic kits, and so on) when they complete an uninterrupted treatment schedule.

In Orel (population 1,200),

- TB patients in urban areas receive a hot meal or food parcels following DOT of prescribed TB drugs,
- TB patients in rural areas receive food parcels once every two weeks following two weeks of uninterrupted treatment,
- Especially vulnerable patients (70 percent of all TB patients, including the unemployed, former prisoners, migrants, homeless, those with two or more minor children, and students) receive additional food parcels every two weeks after two weeks of uninterrupted treatment,
- All patients receive hygienic kits conditional on clinic attendance and adherence to treatment, and
- Some ambulatory patients receive reimbursement for transport expenses based on clinic attendance and adherence to treatment.

Default rates in Orel and Vladimir were between 2 and 6 percent in 2004, down from between 15 and 20 percent when the program began in 1999.

The full package of social support decreased default outcomes, but the contribution of financial and material incentives cannot be distinguished from other interventions. (A recent retrospective study that included new pulmonary smear-positive and smear-negative TB patients from six Russian regions, including Orel and Vladimir, used multivariate analysis to identify the contribution of the social support package of interventions to decreasing default rates. The analysis also included other predictors of default, such as employment status, alcohol abuse, and homelessness.)

Expanding this approach nationwide may not bring similar results given that the present model is implemented in small regions with strong TB management teams that do not exist in much of the rest of the country. In addition, most regional administrations have no budgets for food and transportation subsidies for TB patients, and there are procedural and regulatory obstacles.

Box 12-5. *Evaluations from Tajikistan*

The program focuses on vulnerable patients and their families. From its initiation in 2002 until the end of 2004, the program used standard World Food Program criteria to determine who qualified as vulnerable. Criteria included the amount of arable land and number of animals owned by the family as well as the family's monthly income. Project HOPE conducted random home visits to confirm patient reports on the number of family members and the household conditions of the patient. In practice, very few TB patients were disqualified as being "not vulnerable." Moreover, the program felt that many patients who were classified as "not vulnerable" based on World Food Program criteria were vulnerable, and since 2004 the program was expanded to cover almost all TB/DOTS patients.

A population of 3,838 is served as follows:

- Food packages are provided to vulnerable patients and their families on a bimonthly basis conditional on adherence to treatments.
- Providers maintain and review treatment cards to determine adherence. Food packages contain wheat flour, vegetable oil, pulses, and salt.
- The package value is approximately \$172, which, for the average-size Tajik family, is equal to about \$29 per person for the six-month course of treatment.

An evaluation of the scheme, from initiation in 2002 through the second quarter of 2004, compared treatment results of new patients registered in the program ($N = 459$) with a cohort that did not receive food support ($N = 39$). Results show the following:

- Cure rates were higher for the vulnerable group that received food support: 89.5 percent versus 59.4 percent,
- Treatment failure was 3.9 percent in the food support group versus 15.6 percent in the comparison cohort,
- 2.9 percent of patients in the food support group died versus 12.5 percent in the comparison group,
- Default rates were considerably lower for the food support cohort: 3.7 percent versus 9.4 percent, and
- The program recognized that a larger-scale study is necessary to confirm positive findings.

Source: Mohr and others (2005); Mookherji and Beith (2005); Project HOPE/Tajikistan response to RPM Plus 2005 survey; personal correspondence, Tom Mohr, Tatyana Vinichenko, and Otabek Rajabov of Project HOPE/Tajikistan, June 2006.

part, increased case detection (90 percent compared with the national average of 82 percent) and cure rates (from 33 to 60 percent). This study did not distinguish the impact of the incentive, but it did find that the community-based approach to DOTS was more effective than the government's facility-based approach (Islam and others 2002; Mookherji and Beith 2005).

In India, the evaluation of a private provider payment scheme to refer suspected cases to microscopy centers and subsequently provide DOT revealed that case detection increased overall, the default rate was almost zero, and cure rates were the same as for public sector programs. These findings were attributed to a variety of factors that included the financial incentive.⁸

Evidence from DOTS and Providers

Evidence from routine monitoring data suggests that performance incentives for patients contribute to increased case detection and completion of treatment. In the Czech Republic, vouchers for material goods were given to homeless persons suspected of having tuberculosis who presented for testing. This resulted in case detection rates five times higher after the intervention.⁹ It is possible, however, that because NGOs also receive an incentive for finding active cases, the increase in case detection might be in some part attributable to the patient incentive, the provider incentive, or both. In Romania, where support for patient travel was piloted, adherence increased to 95 percent. When the pilot program ended, rates decreased to 80 percent.¹⁰ In Tajikistan, during periods when food support was not available, the patient default rate was 1.9 times higher than when food was available (Mohr and others 2005). In Moldova, food and hygienic articles may have been part of the reason for an increase in treatment success from 62 to 68 percent.¹¹

On the provider side, findings from routine DOTS monitoring data also suggest that financial incentives contribute to improved performance. For example, in China, case-finding payments to village doctors may be behind increasing levels of case detection (Mookherji and Beith 2005). As mentioned, in the Czech Republic, NGOs received a case finding fee. This alone, or with the patient incentive, may have contributed to the fivefold increase in case detection rates.¹²

It is not possible to conclude unambiguously that performance incentives lead to better performance, although evidence from evaluations and from routine reporting do indicate promise. In addition, available evidence does not enable the impact of financial and material incentives to be separated from that of the

8. V. Inamdar in response to 2005 RPM Plus survey.

9. L. Trnka, National Tuberculosis Program, Czech Republic, in response to 2005 RPM Plus survey.

10. L. Ditiu, National Tuberculosis Program, Romania, in response to 2001 Stop TB, WHO, World Bank, and RPM Plus survey.

11. D. Laticevschi in response to 2005 RPM Plus survey.

12. L. Trnka, National Tuberculosis Program, Czech Republic, in response to 2005 RPM Plus survey.

package of other program-strengthening interventions that are implemented simultaneously.

Conclusions

Evidence of the contribution of performance incentives to increasing case detection and improving treatment completion rates suggests that incentives should be considered an integral element of a tuberculosis control strategy. For patients, financial or material incentives may be more effective when the transfer is conditional on some action correlated with tuberculosis control goals. For providers, performance incentives can be used in the public and private sector and at the individual and institutional levels. By understanding the existing environment within which the providers operate, we can design performance incentives to change behavior to achieve TB control goals.

Applying performance incentives to other disease interventions is also promising. Because treatment of drug-sensitive tuberculosis takes six to nine months, lessons about the impact of performance incentives to improve the results of TB programs may inform the management of other chronic health conditions. HIV/AIDS and TB are similar. They are communicable, effective treatment requires providing support to ensure patient adherence, and poor adherence can contribute to drug resistance. Noninfectious chronic conditions such as diabetes and hypertension also pose considerable challenges to patient adherence and the public health. Given commonalities in the service providers and mix of incentives, lessons about what motivates providers to diagnose and manage the treatment of tuberculosis can inform the design and implementation of these programs.

Experiences of performance-based incentive programs reveal key lessons for design and implementation:

- As part of the design process, consult with stakeholders to understand what motivates them.

- Consider how to communicate objectives of the program to the providers and patients who are both recipients and implementers.

- Include appropriate measures to track and monitor performance and put in place a process to assess and refine the approach as evidence is gathered and new lessons are learned.

- Anticipate potential complications of managing the distribution of money and food by studying challenges encountered in past programs.

Because the collection of routine monitoring data has been institutionalized in TB control programs around the world, program performance can be tracked on cases detected and treatment completed. This also facilitates comparison with national level information on performance and targets that have been established by the WHO. However, in both routine data and more rigorous studies, it is difficult to determine the unique contribution of performance incentives to improving the performance of tuberculosis programs because other interventions are implemented simultaneously. Although more evidence is needed on the precise impact of a menu of incentives, existing evidence suggests that carefully considered performance-based incentive programs can contribute to achieving TB program results.

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