



Using Incentives to Improve Tuberculosis Treatment Results: Lessons from Tajikistan

March 2005



Tuberculosis Case Study

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Project HOPE's mission is to achieve sustainable advances in health care around the world by implementing health education programs, conducting health policy research, and providing humanitarian assistance in areas of need; thereby contributing to human dignity, promoting international understanding, and enhancing social and economic development. Project HOPE conducts medical training and health care education programs on five continents, including North America. Project HOPE is a member of the CORE Group.

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Acronyms and Terms

AFB	acid-fast bacillus
AED	Academy for Educational Development
BCC	behavior change communication
CAR	Central Asian Republics
CCM	Country Coordinating Mechanism
CDC	Centers for Disease Control and Prevention
DOT	directly observed treatment or therapy
DOTS	WHO standard strategy for tuberculosis control
DST	drug sensitivity test
FDC	fixed dose combination
FSU	former Soviet Union
GDF	Global Drug Facility
GDP	gross domestic product
IEC	information, education and communication
MDR	multiple drug resistance
MOH	Ministry of Health
NRCS	National Red Crescent Society
NTP	National Tuberculosis Program
PHC	primary health care
RTBC	Republican TB Center
TB	tuberculosis
TOT	training of trainers
UNDP	United Nations Development Program
USAID	United States Agency for International Development
WFP	World Food Program
WHO	World Health Organization

Executive Summary

Effectiveness of Incentives in Improving Tuberculosis Treatment Results in Tajikistan

Project HOPE implemented a four-year project in Tajikistan to control the tuberculosis (TB) epidemic there. Begun in 2001, the project had two principal objectives:

1. To implement an effective directly observed treatment, short course (DOTS) program in two pilot sites, and
2. To determine the impact of food supplements as an incentive for TB patients to complete their therapy.

In partnership with the Tajikistan National Tuberculosis Program (NTP), the World Food Program (WFP) and the International Red Crescent Society, the project worked to develop staff capacity for DOTS implementation at two pilot sites and to provide food incentives for vulnerable TB patients.

Lessons Learned

Project HOPE found that a food supplement incentive program can substantially increase TB treatment completion and cure rates among poor and vulnerable TB patients. The overall effectiveness of a TB control program, with or without incentives, depends on the incorporation of the full range of DOTS activities:

Project HOPE found that a food supplement incentive program can substantially increase tuberculosis treatment completion and cure rates among poor and vulnerable tuberculosis patients.

- **Training** consisting of careful communication of the details of DOTS.
- **Effective patient classification** based on standardized forms that carefully distinguish between new and previously treated patients.
- **Clear definitions and diagnostic procedures** to identify TB cases, emphasizing sputum microscopy rather than x-ray.
- High-quality and **dependable laboratory results** maintained by intensive quality control so that sputum positivity or negativity are valid and reliable facts.
- Actions to ensure that **TB drugs** are continuously **available**, preferably in highly **standardized and consistent formulations** such as fixed dose combinations (FDCs) that eliminate confusion among both providers and patients.

- Active **monitoring** of facility-level activities, with careful inspection of individual patient data sheets and forms, comparison between forms to ensure 100 percent consistency (e.g., laboratory versus clinical), detailed observation to ensure correct DOT performance, and in-depth review of laboratory procedures and individual slides, all using clearly defined checklists which require monitors to consider every function that is likely to go wrong.
- **Active support of facility and regional TB providers and managers** so that problems identified through monitoring are discussed with responsible staff and their solution actively supported by the monitor, to the extent of on-the-job training where needed to correct specific problems.
- **Regular (quarterly) cohort analysis** looking at the full range of data to identify unusual or unexpected numbers, then using these data as clues to the problems that cause them. By focusing on such downstream results including sputum conversion rates, treatment completion and cure rates, defaulter rates, and transfer rates, programs can ensure that managers do not become complacent in the face of unsatisfactory performance.
- Direct **management actions** based on cohort analysis results, **to identify** the implementation **problems** leading to performance aberrations, **and to solve those problems** by whatever means necessary.

Project Context

General Conditions

Tajikistan is the poorest of the 15 former Soviet countries, with per capita gross domestic product (GDP) reported between US\$180 (World Bank 2003) and \$286 (USAID 2003). Sixty to 80 percent of its 6.4 million people (UNDP Human Development Report 2004) live below an already low poverty threshold; 17 percent live in extreme poverty.

With only 5 percent of territory arable, agriculture requires irrigation to be dependably productive. Although the agricultural sector accounts for only 20 percent of GDP, the sector represents about 60 percent of employment; cotton, an agricultural product, shares top export status with aluminum. Substantial progress in privatization of agricultural land has resulted in two- to three-fold increases in productivity.

A destructive civil war from 1992–1997 prevented economic development immediately following independence in 1991. Significant growth began only in 1998–99, with current rapid GDP growth of around 9–10 percent per year. Much of this, however, benefits the elites, not the majority of the population, and an inflation rate of 16–35 percent per year further decays the already limited purchasing power of the poor. The country's external debt is huge—equal to or exceeding its GDP of \$1.2 billion. In 2002, more than 50 percent of total government revenues were paid to creditors. This situation significantly impedes Tajikistan's ability to combat or overcome poverty. Nearly the entire government investment budget is financed from external development assistance.

Arid conditions and lack of water present major challenges to health and survival. The literacy rate among persons over 15 years of age is a high 99.4 percent. But unemployment in excess of 30 percent, coupled with generally difficult living conditions in many parts of the country, have fueled both internal migration (from rural to urban areas) and external migration of the population.

Health Services Environment

Tajikistan's difficult living conditions and poverty have taken their toll on health. A recent national nutrition assessment found 17.3 percent of those surveyed suffering from acute malnutrition, 4.2 percent from severe acute malnutrition, and 38 percent with chronic malnutrition manifested as stunting. Tajikistan has the highest rate of infant mortality in Central Asia, with an estimated 116 deaths per 1,000 live births. Population growth is rapid at 2.14 percent per year (2004 est.), with a high total fertility rate of 4.11 children born per woman.

The health services infrastructure was damaged significantly in the civil war. Restoring and upgrading that infrastructure, both physical and human, has become an important focus of investment by donors. The U.S. Agency for International Development (USAID) is helping to strengthen the primary care system through training of family physicians and introduction of evidence-based medicine; the Centers for Disease Control and Prevention (CDC) activities have emphasized health statistics and related infrastructure to bring recording and reporting into line with international standards. Despite these efforts, the health services system remains severely handicapped.

Tuberculosis Situation

Related in part to ineffective health services, TB has become a major problem in Tajikistan. According to government statistics, the reported incidence of TB doubled between 1996 and 2001 (from 27.8 new cases per 100,000 population in 1996 to 55.6 in 2001), but these official figures probably fall far short of actual incidence. During the five-year period, no funds were available to purchase TB medications. The apparently moderate case notification rates for the region are likely the result of patients deserting their TB treatment.

Difficult living conditions, high unemployment and poverty, and a health infrastructure damaged by civil war have exacerbated the tuberculosis situation in Tajikistan.

Interventions and Activities

Project HOPE Activities to Strengthen Overall National TB Program: Initial Assessment

Project HOPE began its activities in Tajikistan in mid-2001. The World Health Organization (WHO) had initiated an effort in February 2001 to facilitate the Government of Tajikistan obtaining drugs from the Global Drug Facility (GDF)¹, and in June, Project HOPE carried out an assessment of the TB situation, the findings of which are described below. Pursuant discussions with leaders from the Ministry of Health (MOH) and National Tuberculosis Program (NTP) led to a plan for Project HOPE's intervention in Tajikistan with USAID support, from mid-2001 to mid-2004. In April 2004, USAID renewed its support for Project HOPE's activities, extending the project through 2008.

Facilities: The entire NTP system includes 64 active TB centers, among them one Republican TB Center, three oblast centers, one City Center (Dushanbe City), and 58 rayon centers. These 64 centers include 26 inpatient facilities with a total of 2000 beds, 700 of which are at the Republican Macheton Hospital.

Pilot Area Selection: Various areas were considered for Project HOPE activities. Kofarnihon rayon, with a population of 160,000, included the Macheton Republican TB Hospital. A site visit to that facility revealed a 700-bed capacity, divided into two wards, one for pulmonary TB and one for extra-pulmonary TB. However, at the time of the 2001 visit, the facility had only 130 inpatients, due to a lack of anti-TB drugs and the facility's poor state of disrepair. The laboratory, too, was in dire need of repair.

Due to security and political issues in the rayon, USAID advised against use of the rayon containing Macheton Hospital as part of a pilot area. Accordingly, following discussion with the NTP committee, Leninsky rayon hospital was identified as a potential alternative inpatient facility; a subsequent visit to that hospital provided further evidence that it would be suitable for pilot site activities. Located 10 kilometers from Dushanbe City and much smaller than Macheton, the hospital had 50 patient beds, with expansion potential to 75 beds. At the time of the visit, there were three TB physicians, three nurses and 36 inpatients. Situated within a small compound, the recently remodeled facility also had a bus stop within easy walking distance. The laboratory, however, needed major remodeling, and at the time of the visit was conducting no laboratory procedures, with laboratory work instead done in Dushanbe at the City TB Center laboratory.

1. The Global TB Drug Facility (GDF) is a mechanism of the Stop TB Partnership to expand access to, and availability of, high-quality TB drugs to facilitate global DOTS Expansion.

Leninsky rayon had been selected as a pilot rayon for World Bank primary health care support, raising the possibility of additional non-USAID external support for remodeling, if this site were selected.

Project HOPE ultimately agreed to commence work in a pilot demonstration area consisting of two sub-areas: (1) the capital city of Dushanbe with four rayons and the Republican TB Center (administrative) and (2) Leninsky rayon, including its small TB hospital. Both sub-areas are served by Macheton Hospital. Located 22 kms from Dushanbe city, this national TB hospital nominally serves the entire country. The pilot area would cover 13.7 percent of the total population of Tajikistan and 13 of the total 64 active TB facilities. Consistent with ongoing health sector reform, TB treatment would also gradually be integrated into primary care.

As DOTS strategy and modern TB treatment rely largely on outpatient treatment, discussions were held with the MOH to allow ambulatory treatment for as many patients as possible. For this reason and in light of the poor condition of the inpatient facilities, the MOH agreed that a small number of patients could be treated as fully ambulatory, though this was contrary to former Soviet protocols. About one-third or more of the patients would receive inpatient treatment at Leninsky TB Hospital during the intensive phase of their treatment, while two-thirds would receive treatment during the intensive phase on an outpatient basis. (When the security situation in Kofarnihon stabilized, the MOH insisted that the inpatient treatment be moved to Macheton Hospital.) Since the start of the project, approximately 50 percent of all patients have been treated as fully ambulatory, representing a successful beginning to the process of shifting a reluctant government toward fully ambulatory care.

At the initiation of pilot activities, the rate of new cases in the area was reported as 76.8 per 100,000 population. In light of patient disinterest in



Tajikistan is the poorest of 15 former Soviet countries.

seeking care because of lack of medicines and the absence of any efforts by the system to increase case finding, the rate seemed likely to rise as services improved.

Drugs: The pilot startup included extensive preparations in anticipation of incoming drugs from the GDF, including:

- detailed agreements regarding customs clearance and waiver of duty,
- quality certification for each drug,
- clear definition of where the drugs would be used (i.e., only in the DOTS pilot sites),
- warehousing at either a national warehouse which was in the process of privatization or at the warehouses at each of the hospitals,
- registration of these new drugs in the country,
- provision of all information regarding the drugs—labels, package inserts for doctors or patients—in Russian to prevent problems at all levels from inability to read a foreign language,
- calculation of the amount of drugs required based on statistics and population, and
- decision as to when the drugs should arrive (i.e., after training and provision of laboratory equipment).

It was noted that, in addition to TB drugs dispensed as part of treatment by government facilities, local pharmacies also sell TB drugs to the public. This situation resulted in inadequate treatment regimens (e.g., too few drugs, inconsistent treatment, treatment for less than the necessary number of months), which would likely result in the production of resistant mycobacterial organisms. However, since the NTP has no control or jurisdiction over private sector institutions, it has been unable to control or prevent this sale to the public. In addition, removing these drugs from the system when the government can offer no alternatives would be politically explosive and disregard the dangers of such a situation. Eventually, a reserve stock of drugs was discussed, with an agreement to place a three-month buffer stock of drugs at rayon level and a six-month buffer stock at the hospital/inpatient level.

It was agreed that drugs would be provided in 'patient kits' rather than as individual medicines: loose medicines comprising the total drug requirement for a single patient's six-month treatment would be packaged into a patient kit (Phase I and Phase II) and stored under a patient's name for dispensing gradually over the six-month regimen. In this way, each patient upon whom treatment was initiated could be ensured of having a continuous drug supply throughout the course of his or her treatment, even if loose drugs on the open shelf ran out. This also meant

By bundling drugs in a 'patient kit,' each patient who received treatment could be ensured of having a continuous drug supply throughout the six-month treatment course.

that treatment could not be initiated for a new patient unless the total six-month course of drugs, through a patient kit, was available.

Laboratories: All 12 polyclinics in Dushanbe were provided with binocular microscopes and supplies to become diagnostic centers with the assistance of Project HOPE and WHO. Project HOPE and USAID contributed to the development of a reference laboratory at the site of the Republican TB Center in Dushanbe.

The inpatient facility at Macheon Hospital, particularly the laboratory, required remodeling in order to implement DOTS. Specifically, lab revisions were needed to:

- reduce the orientation and dependency of the facility on bacteriology for diagnosis (culture), as part of increasing the emphasis on and use of microscopic sputum examination; and
- provide for the safety of the laboratory staff by increasing protection from the spread of bacteria. Bacteria are spread both through organisms aerosolized from coughing during the production of sputum samples for examination and by direct contamination that can result from handling and transfer of the infectious sputum during the examination process.

Transportation: The initial assessment identified the need to enhance transportation arrangements, as required for transporting sputum from other sputum collection sites to the six laboratory diagnostic centers, for moving patients from the city to the somewhat distant inpatient center at the Macheon Hospital, and for distribution of drugs from the central storage facility to all of the treatment sites.

Red Crescent Partnership and Nurse Involvement: The 2001 assessment indicated that nutrition among TB patients was poor, and that support from the Red Crescent might be beneficial. Eighteen Red Crescent canteens in Tajikistan, of which six are located in Dushanbe City, are mainly used to provide food for the elderly, the disabled, and pensioners, as well as homeless members of the population. At the time of the assessment, Red Crescent was distributing packages of food to 50,000 persons every six months. Project planners raised the possibility of delivering nutritional supplements for TB patients through the canteens located in the city, and possibly during home visits as well. Red Crescent leaders agreed to open one canteen specifically for vulnerable TB patients. The nurse at the canteen distributed TB drugs and observed as the patients consumed them (DOT). After treatment was observed, the patient received a nutritious hot meal.

Convincing policy makers to allow for variations from the regulations required special effort. The project obtained official approval for Red Crescent nurses to deliver drugs within the DOTS program and to store drugs at the canteen.

Training: Several aid organizations had provided or supported previous DOTS training in Tajikistan, including Aga Khan Foundation, United Nations Development Programme (UNDP), USAID, CDC and Soros. From 1998-2000, 145 professionals received DOTS training in country, at Gorno-Badakhshan Autonomous Oblast, Dushanbe, and Khujand. In addition, a number of physicians, lab personnel and others trained abroad. Most of those trained continue to work with the TB program in Tajikistan. (See Appendix A for

the persons and locations of training identified from records and interviews during the HOPE assessment visit in 2001.)

Overall, however, the training produced little improvement in the quality and effectiveness of TB care in Tajikistan. Not only were both drugs and laboratory facilities lacking, but the Ministry failed to endorse and promote the DOTS strategy.

Implementation Plan: HOPE recognized the necessity for retraining and providing post-training monitoring and support for many of these professional as they initiated implementation of DOTS in the selected pilot areas. To lay the groundwork for trained personnel to implement DOTS

DOTS Implementation Plan*: Next Steps for DOTS program in Tajikistan, 2001

Action	Responsible	Target
<p>1. <i>Develop national TB guidelines</i></p> <ul style="list-style-type: none"> • Prepare the TB guidelines based on the WHO DOTS guidelines • Endorsement of the guidelines by the MOH. • Print the TB guidelines and distribute 	NTP team	Dec 2000 Q1 & Q2
<p>2. <i>Prepare TB drug and laboratory requirements</i></p> <ul style="list-style-type: none"> • Identify known suppliers/manufacturers and place the order. • Identify gap and raise complimentary support • Distribute TB drugs and lab equipment/supplies • Prepare a management system to monitor and procure TB drugs 	NTP team, WHO, HOPE, CDC	Dec 2000 Q1 & Q2
<p>3. <i>Prepare TB hospital register, TB lab register and forms (patient, identification, quarterly report on notification results and drug management)</i></p> <ul style="list-style-type: none"> • Print reporting system 	NTP team	Q1&Q2
<p>4. <i>Conduct 5-day training workshops for doctors and nurses from rayons polyclinics and TB center level in Dushanbe to introduce/refresh them on the national guidelines including recommendation on identification of TB suspects, diagnosis procedure, collection and referral of sputum specimen, DOT for smear positive and for orientation to forms, recording and reporting, management of TB drugs and supplies</i></p>	NTP team, WHO HOPE	Q2
<p>5. <i>Conduct 5-day training workshops or on-site training for laboratory technicians from 2 raion polyclinics and 1 TB center level in Dushanbe to introduce/refresh on laboratory recommended strategy including recommended collection of sputum specimen, referral of results, recording and reporting, management of lab supplies</i></p>	NTP team, CDC	Q2
<p>6. <i>Develop and implement a yearly plan of supervision of DOTS centers (12 rayon polyclinics and 1 TB inpatient center).</i></p>	NTP team HOPE	Q1
<p>7. <i>Supervise TB medical register, TB laboratory register and cross checking of both registers fortnightly.</i></p>	NTP team HOPE	Q2 onward
<p>8. <i>Produce a quarterly report on case notification and treatment outcome during the first week after the end of each quarter.</i></p>	Rayons	Q3
<p>9. <i>Hold countrywide TB Program Leaders meeting for all pilot rayons, 2 to 4 times per year</i></p>	NTP team HOPE/WHO	Q3 & Q4

*Adapted from NEXT STEPS in the WHO/HOPE Assessment Report—November 2000.

effectively, the project planned for several critical activities, including preparation/issuance of national level regulations and official treatment protocols and guidelines; official curricula for TB-related training courses; hospital registers and forms consistent with the DOTS analytical processes; establishment of implementation criteria; and the development of methods for monitoring, supervision, and on-the-job support of those trained. These activities aimed to operationalize a government commitment to DOTS. The table below summarizes the general DOTS implementation plan prepared in 2001 as part of the initial assessment.

Project HOPE Activities to Strengthen Overall NTP: Ongoing Activities

Project HOPE has worked to implement these plans during the three years since June 2001. As of the end of the first USAID-Project HOPE CAR TB project in March 2004, substantial improvement had been achieved in the following areas:

In its first three years, the project achieved substantial improvement in training, drug supply and program logistics, monitoring and evaluation and BCC activities.

- Developed DOTS training capacity through several training of trainers (TOT) seminars with support from a master trainer from HOPE's parallel project in Kazakhstan.
- Trained primary health care doctors and nurses as well as TB specialists (with post-training follow-up monitoring).
- Developed a learning center with printed resources (books, articles, CD-ROMs, and information, education and communication (IEC) materials) and a computer with Internet connection/access to many TB websites, available to NTP/MOH staff, students, and nongovernmental organization (NGO) staff.
- Developed IEC and behavior change communication (BCC) activities aimed primarily at patients and providers. Some activities target the general public in pilot areas to inform them that treatment is free and direct them to locations where it is available, in conjunction with World TB Day.
- Shifted drug formulations to fixed dose combinations (FDCs) to make consumption easier and to reduce variation in regimens.
- Ensured availability of needed TB drugs through improved distribution, inventory management, and 'patient kits'.
- Assured government transportation to enable all identified patients to readily reach the Machedon Hospital.
- Monitored and supported Red Crescent nurses who carry out DOT in soup kitchens.
- Improved the management of the TB control system through better recording, reporting, and analysis (cohort analysis) of program data based on the standard DOTS information system.

- Trained and mentored NTP supervisors and program managers to use the results of these analyses for program management and performance improvement.
- Prepared improved monitoring and supervision checklists, facilitated government issuance of a *prikaz* (regulation) to require their use, and trained and mentored NTP managers in their use.
- Implemented active monitoring and supervision of clinical and laboratory DOTS activities, in partnership with the national monitoring team; includes support of facility staff in correcting problems/mistakes identified during monitoring, e.g., through in-service training and other on-site consultation, advice, and practical support.
- Developed and introduced methods for workforce safety, protection and infection control using new training methods.
- Improved laboratory support for DOTS diagnosis and monitoring of sputum conversion during treatment; improved quality control.
- Improved DOTS policy environment, including preparation of clinical and program guidelines. Supported the government in preparing a Global Fund proposal that included formation of a Country Coordinating Mechanism (CCM).

(Detailed results of the Tajikistan TB Program Support appear in Appendix B.)

Tajikistan has officially adopted the WHO TB forms for registration and reporting as well as the WHO strategy for clinical activities—reflected in the document “Guidance on Detection and Treatment of Tuberculosis”, a *prikaz* signed and issued by the Ministry of Health. The laboratories in the pilot area have been upgraded. As one indication of improved lab techniques and reported data, the percentage of smear positive sputum among all samples has increased from an estimated 1–2 percent² to 9.9 percent.

Coupled with improved case finding, these efforts are beginning to present a more accurate picture of the true TB burden in Tajikistan. New cases of all types in the pilot sites are identified at a rate of 65 cases per 100,000 population. New sputum positive cases are identified in the HOPE-supported sites at about 27 per 100,000, which is about half of the WHO estimation of new sputum positive cases (49/100,000). Thus the case detection rate in these sites is about 50 percent. WHO’s target for case detection is 70 percent.

Training and monitoring have contributed to substantial improvements in TB case management. Sputum smear conversion rates at 2–3 months of treatment in the Dushanbe pilot region reached a high 90 percent and have remained above 80 percent.

2. Though baseline data for Tajikistan is not available, the baseline rate in Kazakhstan was 4.4%, the rates in Uzbekistan and Kyrgyzstan were both 2.8% and the rate in Turkmenistan was 1.8%. Source: Project HOPE monitoring data.

Training and monitoring have contributed to substantial improvements in TB case management. Sputum smear conversion rates at 2–3 months of treatment in the Dushanbe pilot region reached a high 90 percent; they have remained above 80 percent—a measure of the effectiveness of DOT during the intensive phase of treatment. In the most recent report (4th quarter 2003), smear conversion was 91 percent in Dushanbe rayon, but had slipped to 77 percent in Rudaki rayon for unknown reasons. Cure rates are now at or close to the target 85 percent. For the cohort initiating treatment in the final quarter of 2002, cure rates were actually above the smear conversion rate for that cohort, indicating excellent adherence of patients to treatment and reflecting a high degree of active case management on the part of the treatment providers and DOT observers.

These excellent results may also reflect the impact of the food incentive intervention described in the next section of this case study. The severe underlying poverty of the Tajik population was likely to lead to multiple barriers causing poor compliance with treatment, as well as poor nutrition among the patients. Provision of food to both the TB patients and their families was deemed important, in part to improve the effectiveness of treatment and recovery from the consumptive effects of the disease, but also as an incentive to maintain continuous treatment throughout the six-month regimen and to provide the final sputum required to prove that a case was cured. Project HOPE staff partnered with the World Food Program (WFP) to make this nutritional incentive available in the pilot areas.

Food as an Incentive: Interventions and Activities

Separate from the Red Crescent canteen program, the Project HOPE-WFP “food as an incentive” intervention sought to achieve the following objectives:

- to enhance adherence to the treatment regimen,
- to enable patients to complete treatment without burden on their families, and
- to increase access to DOTS for the poor and vulnerable.

Methods: To identify the most vulnerable patients, the project employed a standardized instrument used routinely by WFP in its food distribution activities. Determination of vulnerability is based on how much arable land is owned by a family, how many animals the family owns, and the family’s monthly income. If arable land is more than a certain size, or if a patient has more than two cows or two sheep, the family will not qualify for food supplements. Prior to initiation of supplements, a home visit served to confirm the data reported in the form. Following initiation of supplementation, the non-supplemented group did not receive home visits. The supplemented group received only limited home visits after the food supplements were received.

To maintain quality control and avoid problems common with food distribution programs, Project HOPE decided to manage the food distribution itself, rather than work through the Red Crescent nurses (who were doing DOT). WFP delivers the food to the Project HOPE distribution site, from where Project HOPE schedules and manages the distributions.

The distribution takes place from one central location in each pilot rayon. HOPE schedules distribution approximately every two months, ideally at the end of the 2–3 month intensive treatment phase, midway between that point and the end of treatment four months later, and following provision of sputum to “prove cure.” Project HOPE reviews the treatment cards to



At left, a TB patient who has maintained close compliance with the required treatment regimen receives a ration of peas and other staples.

determine whether a patient is maintaining compliance. Food is distributed to those who have maintained close compliance with the required treatment regimen.

Food is provided for both vulnerable patients and their immediate family members. The value of the food supplement, including related program costs as well as food costs, was approximately \$172 for a patient and immediate family. For the average-size Tajik vulnerable family, that equals US\$29 per person for the six-month treatment course, or about US\$10 per two-month distribution. The daily supplement includes wheat flour (400 gms), vegetable oil (15 gms), pulses (40 gms), and salt (5 gms) to cover basic daily needs. Sugar (10 gms) was included early in the program, but not currently.

Project staff included the following food-related program costs in calculating the value (cost) of the food supplement as delivered:

WFP costs

- A WFP estimate for the cost of food per ton, including transportation costs

Project HOPE costs

- Salary of one full-time employee
- Fees paid by Project HOPE for unloading trucks
- Fees for workers to distribute food to the patients
- Some in-country transportation fees

Even with these associated costs, the estimates compare favorably with the cost of similar foodstuffs in the market. Initiation of food distribution started approximately five months after the initiation of DOTS-based treatment, a delay necessitated by WFP needing the program to accumulate enough patients to justify a shipment of food.

Adherence to treatment was monitored before a patient was approved to receive food distribution. Cohort analysis of treatment outcomes comparing treatment results for the supplemented group versus the non-supplemented group was the basic mechanism for evaluation of the program.

Project Results

Approximately 78.5 percent of the patients have been determined to be “vulnerable” according to WFP standards, and thus receive food supplements. To date more than 1300 TB patients and 6700 total recipients (patients plus their families) have received some form of food support. Through intensive monitoring, the WFP/HOPE project was able to track and identify treatment outcomes for 340 of those TB patient recipients/vulnerable persons. When compared with patients assessed as non-vulnerable and therefore not receiving food supplements, they had significantly better treatment outcomes. Though the numbers are small, the results indicate encouraging trends. A larger-scale study would be needed to confirm these trends.

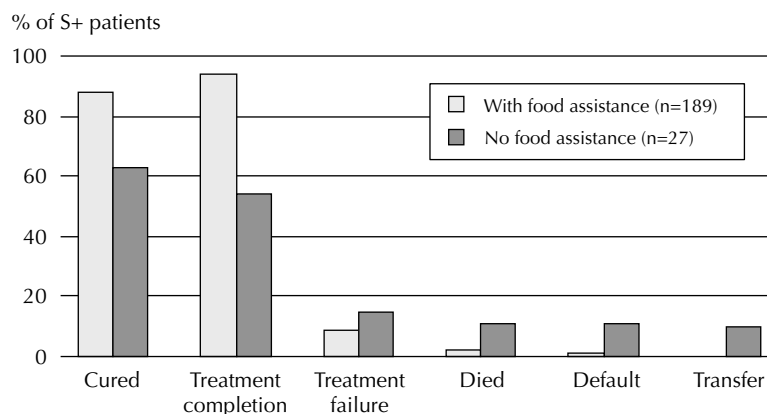
Patients receiving food supplements achieved higher cure rates, as illustrated in the figure below showing results for all patients registered in the project through the third quarter of 2003. Among *new sputum positive* patients, 88 percent of those receiving supplements completed treatment and were cured, as demonstrated by a negative sputum examination at the time of completion of treatment, compared to 63 percent in the non-supplemented patients. There was a complementary reduction in percentages of treatment failures: 9 percent in the food supplement group versus 15 percent in the comparison group. A smaller percentage of patients were classified as having died: 2 percent versus 11 percent. As might be expected with the improved cure rates, the food supplement group showed substantially lower default rates (1% versus 11%).

**Treatment results of all new patients registered through 3rdQ 2003
(Food supplement group vs non-food supplement group)**

	n=	Cured	Treatment Completion	Failed	Died	Default	Transfer
Patients who received food assistance (n=435)							
New S+:	189	167 (88%)		17(9%)	3 (2%)	2 (1%)	
New S-:	106		100 (94%)	3 (3%)	2 (2%)	1 (1%)	
Extrapulmonary:	140		134 (96%)	2(1%)		4 (3%)	
Patients who did not receive food support (n=109)							
New S+:	27	17 (62.9%)		4 (14.9%)	3 (11.1%)	3 (11.1%)	
New S-:	41		22 (53.7%)	5 (12.2%)	2(4.9%)	4 (9.7%)	4 (9.7%)
Extrapulmonary	41		28 (68.3%)	4 (9.7%)	4 (9.7%)	4 (9.7%)	1 (2.6)

Treatment results for new sputum positive cases: Patients who received food vs. those who did not receive food supplement, Project HOPE Tajikistan, all patients registered through the 3rd Q 2003

Among new sputum positive cases, the food supplement group achieved higher cure rates.



For the most recent patients for whom cohort analysis data is available (the 97 patients registered during the third quarter of 2003), 96 percent of those with *new sputum positive* disease who received supplements were cured, with only two treatment failures (4%) and no defaulters, deaths, or transfers. Among *retreatment* sputum positive cases, the cure result in the supplemented group was substantially lower—only 69 percent; however, in the non-supplemented group it was far lower at 30 percent.

In *new sputum negative* and *extrapulmonary* patients the disparity between food supplement and non-food supplement groups was even greater, favoring those enrolled in the food supplement program.

There were times during the data-gathering period when food support was not available, both during start-up and at other times due to logistical problems with supply and distribution. It was noted during these periods that default rates were 1.9 times higher than during periods when food support was available (3.3% of patients versus 1.7%). As a whole, 60 percent of all 33 defaults from the DOTS program occurred during the time when food was not available to provide the supplements/incentives.

Treatment outcome for new sputum positive cases (New S+), Project HOPE, 3rdQ 2003

	'Vulnerable' patients food supplement group (n=49)	Non-supplemented patients (n=2)
Proven cured	47 (96%)	2 (100%)
Failed treatment	2 (4%)	0
Died	0	0
Defaulted or transferred	0	0

Retreatment sputum positive cases ('Others' S+), Project HOPE, 3rdQ 2003

	Food supplement group (n=36)	Non-supplemented group (n=10)
Proven cured	25 (69%)	3 (30%)
Failed treatment	2 (6%)	1 (10%)
Died	4 (11%)	2 (20%)
Defaulted	5 (14%)	3 (30%)
Transferred out	0	1 (10%)

Success Factors and Lessons Learned

It is not surprising that the provision of food as an incentive to the most vulnerable and poverty stricken patients was successful in improving adherence to the difficult six-month TB treatment regimen. A large number of published references attest to the effectiveness of incentives in improving adherence to TB treatment (see Appendix C). Given differences in study protocols, in environment and economic situation of patients, and in the type of incentives offered, however, these studies do not allow confident general conclusions that incentives will always succeed. Many of these studies originated in developed countries, and some used incentives for treatment of latent TB rather than active disease. Nevertheless most illustrate significant improvement in adherence to treatment with the use of incentives. Similarly, the improved adherence found by this project in a cohort of vulnerable TB patients who received food supplements as incentive suggests that these incentives are effective in this population. A more complex study would be needed to prove this with confidence.

In some countries positive incentives of various sorts have become standard practice. A recent paper in the *American Journal of Public Health*³ surveyed 50 states and the District of Columbia regarding the use of incentives. Not only did the survey results indicate that public health departments in almost all states are implementing incentives as advocated by TB experts; the paper concluded that the implementation of these incentives might be the most important reason why the

incidence of TB resumed its long-term decline in the United States during 1993 after a decade of resurgence. It appears that even in the relatively wealthy U.S. population (compared to Tajikistan) incentives have so effectively improved completion rates for the TB treatment regimen that they have become nearly standard practice there, and are considered by some to be the explanation for a decline in overall TB incidence.

“It is the health system, not the patient, which is responsible for the patient completing the treatment regimen. When the patient defaults, it must be the health system that takes action to facilitate the patient completing treatment.”

—Statement from the core TB training course materials

3. Buchanan, R. J. Compliance with tuberculosis drug regimens: Incentives and enables offered by public health departments. *American Journal of Public Health*. 1997; 87(12) 2014–2017.



Direct observation of treatment (DOT) itself functions as a kind of incentive. In this photo, a nurse observes as a patient takes his tuberculosis treatment according to schedule.

Directly observed treatment (DOT) itself functions as a kind of incentive. The ‘carrot and stick’ approach—establishing expectations for patient adherence, while assuring regular contact with a caring provider, regular attention and the provision of a listening ear on a regular basis three times a week or more—exerts a powerful influence on patient behavior. This is the rationale for DOT becoming a requirement in the WHO DOTS-based tuberculosis control strategy.

Health services can take other actions that ‘enable’ patients, in addition to DOT. A report from Delhi⁴ related information collected from in-depth interviews with patient defaulters and from non-participant observation in clinics and in DOT centers. What emerged from these discussions and observations was a list of patient needs not met by the health system, including convenient clinic timings, arrangement for the provision of treatment in the event of a family emergency, and special provision and response for complicated cases such as TB in alcoholics. The report also cited provider factors that contributed to default, such as poor interpersonal communication by the health staff, lack of attention and support at the clinic, difficulty for patients who miss a treatment to reenter the system, and long distances to the clinic. By responding to these described needs, and correcting negative factors, health systems can facilitate patient adherence to treatment, thus “enabling” low default rates.

As a formerly Soviet country, Tajikistan has a long history of impersonal, regimented health services in which providers do very little to respond to patient needs. In some countries of the former Soviet Union this has begun to change, at least in the TB arena. In Georgia, nurses managing DOT have established community locations to meet particular patients so that transportation costs and time can be reduced, such as meeting regularly at a restaurant or bar to provide an observed treatment. Some patients in Moldova have been offered incentives of free tickets for their children to the indoor swimming pool during winter, which appears to have been effective in facilitating continuation of treatment.

In Tajikistan, however, where only some 10 percent of the cost of the TB program is paid for by the government, it may be difficult to convince public officials that incentives such as these food supplements are in fact

4. Jaiswal A, Singh V, Ogden FA, Perter JD, Sharma PP, Sarin R, Arora VK, Jain RC. Adherence to tuberculosis treatment: lessons from the urban setting of Delhi, India. *Trop Med Int Health*. 2003 Jul; 8(7):625–33.

critical and inherent components of a successful treatment program. There appears to be strong preservation of the top-down mentality of the past, which presumes that if the health system prescribes, the patient will follow orders. Unfortunately, as the data assembled by Project HOPE demonstrate, a variety of actions are needed to achieve high sputum conversion and cure rates. Incentives such as the provision of the WFP food supplements to those patients most likely to default—the most poor and most vulnerable—would appear to be a powerful factor in bringing about satisfactory cure and treatment completion rates.

Project HOPE staff recommend the following potential improvements to the current program.

- *Time food distribution to directly correlate with treatment milestones.* Currently, the food is kept in a WFP warehouse, and provided to Project HOPE for distribution at a single time unrelated to milestones in the patient's treatment. DOTS staff report data regarding patient adherence to those who provide the food, and the patients recognize that the food provision depends upon their continuation in treatment. Nevertheless, providing the food in a way more directly connected to treatment-related actions by the patient could have a more powerful psychological effect. This would probably require warehousing the food in a Project HOPE warehouse, a facility not yet available to the program.
- *Increase convenience of obtaining food for isolated patients.* Patients in rural areas may need to travel up to 50 kilometers to pick up their food. The cost of returning home with the food could approach the worth of the food itself. Distributing from more readily accessible locations could reduce the inconvenience to patients of obtaining the supplement. The Project HOPE Program Director notes that other changes such as setting distribution times earlier, and fully informing doctors and patients about distribution times could also make the supplements more convenient for patients.
- *Coordinate food distribution with patient education.* This would ensure that patients receive more information, and Project HOPE could learn more about the needs of the patients.

Food distribution is notorious for the prevalence of “diversion”—food ending up in the market, or otherwise diverted from its intended target. Indeed, corruption almost universally accompanies food distribution programs. The management of food incentive programs such as this can thus be very difficult, as the level of temptation for corruption is quite high. This program has not been immune to these problems.

One cannot conclude that the incentives program is solely responsible for the dramatic improvements in treatment success in the pilot areas in Tajikistan. Project HOPE has found in all five CAR countries, including Tajikistan, that a set of careful program support components is critical for obtaining effective results. A partial list of these critical components follows:

- **Training**, consisting of careful communication of the details of DOTS.
- **Effective patient classification** based on standardized forms that carefully distinguishes between new and previously treated patients.
- **Clear definitions and diagnostic procedures** to identify TB cases, emphasizing sputum microscopy rather than x-ray.

- High-quality and **dependable laboratory results** maintained by intensive quality control so that sputum positivity or negativity are valid and reliable facts.
- Actions to ensure that **TB drugs** are continuously **available**, preferably in highly **standardized and consistent formulations** such as fixed dose combinations (FDCs) that eliminate confusion among both providers and patients.
- Active **monitoring** of facility-level activities, with careful inspection of individual patient data sheets and forms, comparison between forms to ensure 100 percent consistency (e.g., laboratory versus clinical), detailed observation to ensure correct DOT performance, and in-depth review of laboratory procedures and individual slides, all of this using clearly defined checklists which require monitors to consider every function that is likely to go wrong.
- **Active support** of facility and regional TB **providers and managers** so that problems identified through monitoring are discussed with the responsible staff and their solution actively supported by the monitor, to the extent of on-the-job training where needed to correct specific problems.
- **Regular (quarterly) cohort analysis** looking at the full range of data to identify unusual or unexpected numbers, then using these data as clues to the problems that cause them. By focusing on such downstream results including sputum conversion rates, treatment completion and cure rates, defaulter rates, and transfer rates, programs can ensure that managers do not become complacent in the face of unsatisfactory performance.
- Direct **management actions** based on cohort analysis results, **to identify** the implementation **problems** leading to performance aberrations, **and to solve those problems** by whatever means necessary.

In brief, an effective program requires intense attention to the details of implementation, and rapid action to correct problems when identified. Instilling such an aggressive proactive approach presents challenges when counterparts are accustomed to routine TB program responsibilities. The program in Tajikistan (actual treatment delivery) is only about two years old, and continued problems in the Leninsky rayon attest to the incomplete solution of implementation problems there. Therefore, it remains to be seen how rapidly the DOTS activities initiated in these two pilot sites can be expanded to cover the rest of the country. The government of Tajikistan has begun to expand DOTS on its own in an additional rayon, with only indirect involvement by HOPE. As the government proceeds to expand DOTS to the remaining three-fourths of the country's population, careful monitoring may reveal ways that HOPE can assist the scaling up process.

An effective program requires intense attention to the details of implementation, and rapid action to correct problems when they are identified. Incentives can also contribute to improvements in treatment success.

Conclusion

The description and data presented in this case study suggest strongly that food supplements provided to poor patients in Tajikistan improve adherence to the six-month TB treatment regimen. An increase in numbers of patients, and inclusion of a control group not receiving supplements would increase confidence in this conclusion. But from a practical point of view, the apparent positive effect on adherence and the role of food in TB recovery are sufficiently convincing that these results can be utilized to support continuance of incentives in HOPE's program as well as to support advocacy to the Tajikistan government for incentives of this sort.

At the same time, however, it is important to note that these activities were carried out in the context of a comprehensive program supporting DOTS in all its aspects, from diagnosis, laboratories and record keeping to direct observation of treatment and patient counseling, to cohort analysis and active management of identified problems. Direct observation of treatment alone doubtless played a powerful role in increasing the effectiveness of DOTS in this setting; good recordkeeping is critical to linking the provision of food incentives with adherence to treatment.

We conclude that the use of incentives can further enhance the ability of a strong or improving DOTS program to improve performance, but we doubt that incentives alone would be able to bring about the high levels of treatment completion and cure which were demonstrated in this situation.

Appendix A:

DOTS Training Inventory

Table 1 Programs for DOTS training in Tajikistan

Funding Organization	Year of Training	# of People Trained	Site of Training	Faculty for Training
Aga Khan Foundation	1998	35	GBAO	Local faculty
UNDP	1998	5 lab drs	Dushanbe	
USAID	1999	35	Dushanbe	Local Faculty
CDC	2000	35	Khujand	Local Faculty
SOROS	2000	35	Khujand	Local Faculty

Table 2 Professionals trained by WHO, CDC, and Project HOPE/USAID inside Tajikistan and abroad known to the RTBC

Name	Profession	Institution	City	Where Trained	Training Organization	When Trained
1996						
Azizi Nurzod	No longer working in TB	MOH	Dushanbe	Kyrgyzstan	WHO	1996
Masharipov A	TB Dr	TBC	Kurgan-Tube	Kyrgyzstan	HOPE	1996
Sirojiddinova U	TB Dr	TSMU	Dushanbe	Kyrgyzstan	HOPE	1996
Zokirova K. A.	TB Dr	RTBC	Dushanbe	Kyrgyzstan	HOPE	1996
1997						
Imomnazarova	TB Dr	CTBH	Dushanbe	Poland	WHO	1997
Saidaliev	TB Dr	CTBC	Dushanbe	Poland	WHO	1997
1998						
Makhsumov	No longer working in TB	TBC	Sogd Oblast	Kyrgyzstan	HOPE	1998
Metarshoev	TB Dr	TBC	GBAO	Kyrgyzstan	HOPE	1998
NorovTB Dr	RTBC	Dushanbe	Kyrgyzstan	HOPE	1998	1998
Pashkova	Lab	RTBC	Dushanbe	Kyrgyzstan	HOPE	1998
Radjabov	TB Dr	TBC	Kulob	Kyrgyzstan	HOPE	1998
SaidovTB Dr	TBC	Kulob	Kyrgyzstan	HOPE	1998	1998
Suleimanov	TB Dr	RTBH	Macheton	Iran	WHO	1998
Uldashev	TB Dr	RTBH	Macheton	Kyrgyzstan	HOPE	1998
UmarovTB Dr	TBC	Sogd Oblast	Kyrgyzstan	HOPE	1998	1998
1999						
Akhmedova	TB Dr	TSMU	Dushanbe	Dushanbe	USAID/HOPE	1999
Dusmatova	TB Dr	TSMU	Dushanbe	Dushanbe	USAID/HOPE	1999
Imomnazarova	TB Dr	CTBH	Dushanbe	Dushanbe	USAID/HOPE	1999
Jumagulova	TB Dr	TSMU	Dushanbe	Dushanbe	USAID/HOPE	1999
Kholilova	TB Dr	CTBC	Dushanbe	Dushanbe	USAID/HOPE	1999
Kurbonalieva	TB Dr	TSMU	Dushanbe	Dushanbe	USAID/HOPE	1999
Mirzoeva	TB Dr	MoI	Dushanbe	Dushanbe	USAID/HOPE	1999
Mulomalikov K	TB Dr.	RTBC	Dushanbe	Dushanbe	USAID/HOPE	1999
Nazarova	Inspector TB	MOH	Dushanbe	Dushanbe	USAID/HOPE	1999
Nikolaeva	Lab	CTBC	Dushanbe	Dushanbe	USAID/HOPE	1999
Shamsieva	TB Dr	MoI	Dushanbe	Dushanbe	USAID/HOPE	1999
Sirojiddinova U	Clinical	TSMU	Dushanbe	Dushanbe	USAID/HOPE	1999
Suleimanov	TB Dr	RTBH	Macheton	Dushanbe	USAID/HOPE	1999
Uldashev	TB Dr	RTBH	Macheton	Dushanbe	USAID/HOPE	1999
Usupjanova	Faculty	PGMI	Dushanbe	Kyrgyzstan	HOPE	1999
Usupjanova	Faculty	PGMI	Dushanbe	Dushanbe	USAID/HOPE	1999
Zokirova K. A	Clinical	RTBC	Dushanbe	Dushanbe	USAID/HOPE	1999
2000						
Cerun	Lab	RTBH	Macheton	Alma-Aty/Tashkent	CDC	2000
Kholov	TB Dr	Hospital	Lenin rayon	Uzbekistan	CDC	2000
Murodova	TB Dr	CTBC	Dushanbe	Poland	WHO	2000
Nikolaeva	Lab	CTBH	Dushanbe	Alma-Aty/ Tashkent	CDC	2000
Pashkova	LAB	RTBC	Dushanbe	Alma-Aty/ Tashkent	CDC	2000
Usupjanova	Faculty	PGMI	Dushanbe	Tashkent	CDC	2000

Appendix B: Results of Tajikistan TB Program Support—2001–2004

Objective 1: Increase Utilization, Quality, And Successful Completion Of DOTS

A. Develop DOTS training capacity and provide training

1. Develop improved training materials for DOTS training and training of trainers
2. Carry out training of trainers (TOT)
3. Direct DOTS training of health professionals and support counterpart trainers
4. Develop pre-service DOTS-related curricula with partner institutions and pilot test materials

<p>Materials:</p> <ul style="list-style-type: none"> • DOTS manual for national TB program specialists • DOTS training manual for PHC professionals • DOTS training manual for nurses • Retraining manual for TB and PHC specialists • Manual for AFB smear microscopy • Instruction for biosafety in smear microscopy • Plan for rayon DOTS implementation • Guidelines for DOTS program implementation • Manual for DOTS implementation in TB services • Manual for DOTS implementation and primary medical services • Training materials for basic and retraining courses for TB & PHC specialists, nurses 	<p>Training Outputs—TOIs:</p> <p>Programs and people trained as follows:</p> <ul style="list-style-type: none"> • TOT conducted in Dushanbe; 29 candidates selected for further education; all but 4 have now received certificates. • Project HOPE worked with the following teaching institutions: Tajikistan Postgraduate Institution, Tajikistan State Medical University; Republican Nursing Center. 	<p>Training Outputs—Pre- and In-Service Training:</p> <p>Programs and people trained:</p> <ul style="list-style-type: none"> • Basic training for 735 PHC specialists in Dushanbe and Rudaki rayons • Basic training for 55 TB specialists in pilot sites • Basic training for 70 nurses in pilot sites • Training for 10 SES specialists • Training for magistrates from Tajikistan Medical University with 8 successfully finishing course • Training for 34 laboratory specialists from pilot sites • Refresher training in 2003 for 162 medical specialists • Collaborative training seminars for Merlin/Sino/ Zdrav plus for 67 personnel • In-service training provided by Project HOPE and national and local specialists during monitoring trips. Nine local monitors trained with total monitoring trips of about 220. 	<p>Training—Development of Pre-Service Professional Training:</p> <ul style="list-style-type: none"> • With Tajikistan State Medical University, developed a curriculum for 6th year students of the Medical Institute. • A manual for nurses was developed and tested in collaboration with the Sino Project. • The draft manual for monitoring procedures was prepared; to be introduced in the near future.
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Objective 1 (continued)

B. Design, implement, and monitor IEC and BCC activities at selected sites in several countries

1. Develop detailed IEC plan and instruments
2. Carry out research activities in several sites
3. Launch and monitor/evaluate IEC/BCC activities

IEC plan and instruments:

- Detailed quarterly work plans based on program needs and cohort analysis results led to production of IEC materials, including brochures, posters and T-shirts; also supplementary materials developed for children, such as bookmarks with TB information.

Research activities:

- An intake survey was carried out to gather information about TB suspects and newly identified patients

IEC/BCC activities:

- Pamphlets, booklets, flyers, calendars, posters released each year of the grant. World TB Day organized in cooperation with the MOH and other international and local NGO partners. Conferences, roundtables, poster competitions conducted in all pilot areas.
- No monitoring or evaluation of IEC/BCC processes was done at this stage.

C. Ensure availability of needed TB drugs

1. TB drugs
2. Technical assistance to improve drug supply management
3. Drug supply for MDR-TB

TB drugs:

- GDF supplied TB drugs for pilots covering 13% of the population. Recently, additional drugs were provided to cover additional pilots. In areas not covered by the DOTS strategy, TB drugs are available in private pharmacies without quality control.
- Project HOPE, with MOH and GDF, arranged packaging of GDF drugs into patient-specific kits sufficient for full treatment of both the intensive and continuation phases of each patient.

Drug supply management:

- In 2001 all clinics suffered drug stock-outs. In 2002 and 2003 no clinic suffered a drug stock-out.
- Oblast clinics did not have sufficient drugs in stock to cover prospective needs for six months due to differing notions about drug requirements. Second line drugs were not available in pilot clinics.
- Project HOPE specialists provided in-service training in drug supply/management. Drug management was taught and included in training materials for TB specialists in their DOTS implementation course.

MDR-TB drugs:

- Second line drugs were appropriately not available in pilot sites from sources controlled by government. Unfortunately, the private pharmacies had second line drugs available for the population.

Objective 2: Improve The Management Of The TB Control System

1. Collaborate with CDC to improve information system
2. Train TB program managers in use of data for program management
3. Improve monitoring performance for problem identification, solving deficiencies, and improve monitoring procedures
4. Develop standardized checklists and manual to support monitoring system

<p><i>Information system:</i></p> <ul style="list-style-type: none"> • CDC was only at the earliest stage of developing information systems. At the end of the project there is no electronic system for reporting of cohort results in Tajikistan. • Project HOPE monitoring team constantly supervised quality of collected data for the national information system. In 2002 and 2003 5 checklists, 3 copies per monitoring visit, were completed with approximately 3300 total copies distributed. In the pilot areas the data collection system for cohort analysis works well. 	<p><i>Program manager training:</i></p> <ul style="list-style-type: none"> • Developed a refresher course for cohort analysis linked to changes and adjustments in plans and activities of managers; this proved to be a highly positive influence. • TB program managers from all administrative levels were trained through workshops and seminars to use recording and reporting data for sound program management. • About 40 coordination committee meetings (with TB managers, national and international partners, and a rayon and an oblast representative) were held to review cohort data for better management decisions. • Tajikistan senior managers attended 6 manager training sessions organized in Warsaw, Poland and Almaty, Kazakhstan. Lab specialists also attended these sessions, as their inputs are crucial to the DOTS data system. 	<p><i>Improved monitoring:</i></p> <ul style="list-style-type: none"> • Reinforced by proper monitoring procedures, from 2002 to the end of the grant, all medical facilities in Project HOPE pilot sites in Tajikistan adopted the monitoring and information system. They showed improved and timely use of reported data and reached 100% rates in the timely recording of data on sputum conversion. Monitoring team reports have been analyzed and implemented by both local and national partners. • Monthly presentation of results at the Coordinating Council, and quarterly presentation at operational meetings, has demonstrated the use of monitoring as an important tool for improved management. 	<p><i>Manual for monitoring system:</i></p> <ul style="list-style-type: none"> • The monitoring manual and checklists were developed. Prikaz #78 and #51 specified use of the manual as standard procedure in the whole country. • This progress was built from a base of zero use of checklists in 2001 to full use by Project HOPE teams in 2002, to wider adoption in 2003.
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Objective 3: Develop Approaches To Bring DOTS To Special Populations

1. Pilot effective DOTS program in one prison
2. Pilot approach to rural DOTS using community DOTS supporters as treatment observers
3. Monitor and improve TB infection control among healthcare workers

Prison Pilot:

- Not included in activities during grant

Rural DOTS Pilot:

- Rural DOTS issue was present only in Rudaki rayon. Community supporters were not used.
- Incentives to TB workers were provided to improve follow-up of patients during the continuation phase of treatment (report in Project HOPE office, Tajikistan).

TB Infection Control among Health Workers:

- During training sessions, methods of self-protection and issues of infection control were discussed in detail.
- Checklists and indicators used in monitoring documented knowledge, attitude change and practical implementation by health workers on infection control issues.
- 100% of polyclinics were in full compliance with program standards for staff safety at the end of the grant. No hospitals comply with the standards.

Objective 4: Improve Laboratory Support To DOTS

1. Equip and supply laboratories
2. Assess capacity and performance of culture and sensitivity for drug resistance detection

Laboratory equipment and supply:

- All the pilot area laboratories were equipped with binocular microscopes, lab supplies and reagents.
- Project HOPE specialists conducted on-the-job training on maintenance and use of the equipment.
- Project HOPE specialists conducted several trainings for 22 lab technicians in 13 of the laboratories to help with quality of organization and performance. Training resulted in a 9% increase in smear positive case detection.

Bacteriology capacity and performance assessment:

- Appropriately, data from laboratories showed that neither culture nor MDR/DST tests were performed.
- Monitoring and coaching of staff in laboratory facilities assisted their capacity and performance and facilitated problem solving.
- Project HOPE supplied equipment and reagents needed for a national reference laboratory, done in consultation with WHO and CDC.
- Project HOPE started renovation of the national reference laboratory.
- Activities in prison labs were not included in the Tajikistan program grant.

Objective 5: Facilitate Policy Environment Through Dissemination Of Results And Lessons Learned

1. Utilize Regional conferences to share information
2. Initiate cross-country sharing of experience
3. Establish learning centers
4. Publish results and models testing
5. Advocate improved TB policies and protocols

<p><i>Regional conferences:</i></p> <ul style="list-style-type: none"> • Tajikistan officials benefited from the regional conferences in Almaty and Warsaw. 	<p><i>Cross-country sharing:</i></p> <ul style="list-style-type: none"> • Two TOT specialists from Project HOPE/Kazakhstan visited Tajikistan to help develop local candidates as clinical trainers. • High-level managers and key MOH officials from Tajikistan attended the Bishkek (Kyrgyzstan) conference. • Tajikistan counterparts attended the Tashkent conference hosted by CDC and AED. • Minutes of the conferences and three regional staff meetings, prepared by Project HOPE staff, describe the impact of these exposures during the whole period of program implementation. 	<p><i>Learning centers:</i></p> <ul style="list-style-type: none"> • Project HOPE established a learning center in Dushanbe, equipped with computers, printers and Internet access. In 2003 the team of clinical trainers was selected during two stages of TOT. 	<p><i>Publication:</i></p> <ul style="list-style-type: none"> • Project HOPE results from the entire period of program implementation were presented at the world TB conference in Paris, 2003. 	<p><i>Advocacy:</i></p> <ul style="list-style-type: none"> • Project HOPE experts helped to prepare the draft of the national TB program, accepted by Tajikistan's MOH and implemented at the end of 2003. • A team from the national program, MOH and Project HOPE specialists prepared a GDF application. The first TB drugs from GDF were delivered in 2003. Project HOPE staff coordinated closely with GDF on the control, delivery and monitoring of TB drug use and acted as liaison between GDF and MOH.
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Appendix C:

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