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ACRONYMS AND ABBREVIATIONS

AIDS	Acquired Immune Deficiency Syndrome
ALOS	Average Length of Stay
CAR	Central Asia Republics
CDC	Center for Disease Control
CSW	Commercial Sex Worker
DALY	Indicator which allows researchers to estimate the years that a sick person could lose if he/she dies prematurely or lives with a disability
DOTS	Directly Observed Treatment, short-course
ECA	Europe and Central Asia
FGD	Focus Group Discussion
FSU	Former Soviet Union
GFTAM	Global Fund for TB, AIDS and Malaria
GoK	Government of the Republic of Kazakhstan
IDI	In Depth Interview
IDU	Injection Drug User
IEC	Information, Education and Communication
HIV	Human Immunodeficiency Virus
HR	Human Resources
MDGs	Millennium Development Goals
MDR TB	Multi-drug Resistant Tuberculosis
MoH	Ministry of Health
MOU	Memorandum of Understanding
MsM	Men Having Sex with Men
NGO	Non-Governmental Organization
PLWHA	People Living with HIV/AIDS
SES	Sanitary Epidemiology Station
STI	Sexually Transmitted Infection
TB	Tuberculosis
TP	Trust Point
UNAIDS	Joint United Nations Program on HIV/AIDS
UNICEF	United Nations International Children's Emergency Fund
USAID	United States Agency for International Development
WB	World Bank
WHO	World Health Organization

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EXECUTIVE SUMMARY

TB and HIV/AIDS have a significant impact on the economy and society of Kazakhstan and a growing challenge to the country's health system. Each year TB is estimated to cost the economy of Kazakhstan over US$43 million and estimates of the potential future impact of AIDS on the economy approach 1 percent of GDP. Together, these two diseases could severely constrain the future economic growth and the human capital development of the country. To face the challenge of the dual threat of HIV/AIDS and TB focused, highly cost-effective programs will be required to ensure that limited resources produce the highest impact.

To this end, this study addresses the overall performance of the tuberculosis (TB), human immunodeficiency virus (HIV) and acquired immune deficiency syndrome (AIDS) programs in the Republic of Kazakhstan. It is the result of the ongoing policy dialogue and collaboration in the health sector between the World Bank and the Government of Kazakhstan to develop policy strategies that focus on improving the quality of public services and obtaining value-for-money in the public sector. The research was carried out by Sanigest International and local consultants Sange Research Institute and Konstantin Osipov.

Over the past few years, the Ministry of Health (MoH) and the Government of Kazakhstan (GoK) have made important progress in meeting the challenge of TB and HIV/AIDS. DOTS (Directly Observed Treatment, short course), a strategy developed by the World Health Organization (WHO), has been formally adopted as the policy for the entire country and efforts are being made to implement it nationwide. These efforts had a significant impact. Over the past few years, the mortality rate from TB has declined and there is some evidence of improvements in case detection. With respect to HIV/AIDS, early action by the government will potentially ward off any problems in the future. Having obtained support from the Global Fund, it is increasingly important that these resources are well spent.

Combined financing of TB and HIV/AIDS was close to $45 million in 2002 and was likely to surpass $60 million in 2004. At over ten percent of the annual MoH healthcare spending budget, it is imperative that these funds are invested carefully and that impact on the target population is maximized. To this extent, investing in prevention and population awareness is important but more important is the issue of ensuring cost-effectiveness in the existing programs and guaranteeing adequate access to all services. While increased funds may be required in the future, the inefficiencies and ineffective aspects of the current programs should be fixed now so that these resources will not be wasted.

Along these lines, the paper provides a detailed analysis of the efficiency, quality and effectiveness of each of the programs and identifies the structure of financing and cost-effectiveness of each program. The paper does not attempt to provide an in depth review of the epidemiological situation of the two diseases in the country or to review the performance of the DOTS program. Rather it focuses on the availability of resources to combat the diseases and the distribution of these resources within the country. The report is a complement to the more detailed information available on these areas in the World Bank Technical Paper "Stopping TB in Central Asia: Priorities for Action" (in press). In addition, the paper identifies opportunities to improve performance, specifically analyzing the relationship between inputs and outcomes and

highlighting, in the case of the TB Program, opportunities to produce significant savings or improved value-for-money in the program.

This executive summary presents an overview of the study, summarizing the key findings and recommendations. The executive summary first outlines the overall situation in each program. The second section under each program then outlines the key issues and actions associated with the performance of the national programs, TB and HIV/AIDS. The key actions summarize recommendations on future areas of interest that would complement the findings of this report and deepen policymakers' understanding of how to improve the system.

TB IN THE REPUBLIC OF KAZAKHSTAN

Over the past few years, the economic situation in Kazakhstan has improved notably and the social sectors are also experiencing important increases in the availability of resources. It is particularly important in the face of economic growth to ensure that programs are actually delivering results and that the government does not try to address the problem only with more resources when the existing resources could be better spent to obtain more value-for-money. It is also important that the Government of the Republic of Kazakhstan (GoK) understands that being more open and transparent will lead to improvements in the TB Program and the reduction of costs. Access to data for this paper was restricted, meaning that there are gaps in the results.

Kazakhstan bears one of the greatest burdens of TB in the Central Asian Region (CAR): at the end of 2001 there were 48,701 registered cases of active TB. Kazakhstan has the highest notification rate of all Central Asian Republics. Since independence in 1991, the tuberculosis notification rate has more than doubled, from 65 per 100,000 population in 1991 to 160 in 2003. The increase of annual case notification rates in 1991-2002 likely reflects increased case detection and improved reporting. In 2003, for the first time, notifications decreased by 2.2 percent to 23,943, which may indicate that Kazakhstan has reached the plateau of its epidemic. Following the successful implementation of the DOTS strategy on a nationwide scale since 1998, the treatment success rate increased to 83 percent in 1999 and 2000, and the TB death rate declined 36 percent by 2001.

The growth rate of new TB cases slowed significantly during the last two years, although the rate reported in 2001 remained the highest in the CAR region. The United States Agency for International Development (USAID)/CDC estimates that the implementation of the DOTS strategy in Kazakhstan saved approximately 13,000 lives during the period 1998-2001. However, results in terms of cure and detection rates vary greatly across oblasts. Outcomes do not appear to be related to inputs or resources but rather to management and program implementation. Given the almost 100 percent DOTS coverage, the regional differences highlight one of the key study issues: why do some TB Programs appear to work well and others have a lower performance and what government interventions and investments can best address these shortfalls in performance?

KEY ISSUES AND ACTIONS FOR STRENGTHENING THE TB PROGRAM

The Kazak TB Program has made important progress over the past years in terms of the establishment of a comprehensive policy framework. This framework is oriented towards the implementation of DOTS, improvements in the care of prisoners with TB, providing training for medical professionals and ensuring free drugs for the population. Surprisingly, these investments have not produced the desired results in terms of improved cure rates. It appears that the main reason outcomes are lagging behind improvements in the availability of inputs is related to the way that the programs are executed at the local level and the need to adapt the standard DOTS protocol to the reality of Kazakhstan's geographic and socioeconomic conditions.

The main issues and actions include:

Government commitment to DOTS remains high but policies and weaknesses in the provider network contribute to problems in meeting challenges of improving the performance of the TB Program.

- While the GoK has taken important steps towards formalizing DOTS as government policy, at the facility level there are a number of factors impeding implementation: staff attitudes and knowledge; availability of drugs; the cost to patients (excluding free drugs) and infrastructure conditions.
- Cure rates are below the acceptable level. Considered nationally, cure rates for TB patients are 75 per cent. Such cure rates would not be satisfactory even if achieved at very low cost.
- The DOTS strategy is difficult to implement given the lack of patient compliance. Particularly notable, for example is that knowledge of DOTS among patients is low: only ten percent of patients interviewed were prescribed DOTS treatment or were aware that they were following DOTS.
- With similar success rates in Kazakhstan and the Kyrgyz Republic, average length of in-hospital stay per patient treated is noticeably higher in Kazakhstan than in the Kyrgyz Republic: 92 and 74 days respectively.
- Local governments procure a significant quantity of drugs to address gaps in the distribution of drugs by the national program but the quality of these drugs is not adequately controlled.
- The multi drug resistance situation is of great public health concern given the high cost of treatment and the potential risk of the spread of drug resistance. MDRTB patients account for an estimated ten percent of total TB patients and represent between 13 and 20 percent of total TB Program control costs.
- Financial barriers to access are also likely to reduce the effectiveness of treatment. The cost of obtaining access to treatment, in terms of transport costs combined with under-the-table payments to providers for tests, drugs or food inhibit patients from seeking access.

Key actions include:

- To improve cure rates, it is important to improve current understanding about why these rates are low. Investigation of the role of drug resistance is needed and understanding of the reasons why TB treatment is not completed in some cases.
- Introducing a drug planning and management system that allocates drugs based on the actual number of patients treated is critical to ensuring adequate drug supply. The drug supply system should also focus on ensuring adequate quality of drugs procured locally.
- Specific policies should be introduced to identify what types of patient incentives and enablers (strategies to facilitate patient compliance) should be introduced to improve cure rates.
- Mass media and other means of communication should be used to address patient behavior and manage the change process.
- There is a need to coordinate provision of TB control services between TB services and prisons, Primary Health Care and AIDS Centers.
- A comprehensive monitoring and evaluation system should be established to provide real time and end of period assessment on the evolution of the epidemics and the impact of interventions.
- In terms of MDRTB, efforts should focus on: improving testing and verification of MDRTB; implementing quality-assured DOTS Plus TB Programs; seeking Green Light Committee clearance for use of second-line drugs at discounted prices.

The system's resources are not allocated based on population demand (TB patients treated) but rather based on supply indicators such as the number of beds or physicians thus leading to important differences in outcomes.

- The importance of management and organization at the local level is shown by the achievement of successful outcomes in oblasts that have fewer resources per capita or fewer supply based indicators such as beds or staff.
- In terms of outcomes, Pavlodar, Karaganda and Western Kazakhstan were the lowest performers, while the three best were Almaty City, Kzyl-Orda and Southern Kazakhstan. The best performing oblast does 4.7 times better than the worst performing oblast. This highlights the wide differences in outcomes achieved amongst the oblasts.
- Resources remain scarce in some high burden oblasts. Historical budgeting and the lack of performance monitoring has led to divergence between the inputs provided, in terms of staff, drugs and infrastructure and the number of cases treated.

Key actions include:

- Serious efforts should be made to link a variable part of staff payment to outcomes and satisfaction indicators, introducing a performance-based payment initiative. At a minimum, resources should be allocated based on the number of TB patients treated and some combination of outcome indicators as a performance-based payment.
- Future improvements in the program should focus on identifying those Oblasts that obtain the best results with the least resources.
- There is important scope to target inputs for TB control, detection and treatment to areas demonstrating greater socioeconomic needs.

Despite the overall importance of management, deficiencies in inputs, skills, processes, equipment, drugs and infrastructure contribute to problems with performance.

- The facility survey indicates that in many cases the inputs, processes, staff skills and equipment and infrastructure conditions do not meet the minimum standards required for a TB facility. As an example, only 82 percent of facilities visited had a microscope (and only 56 percent had a functioning microscope), 35 percent a refrigerator, the average age of x-ray machines was ten years and disinfection areas were inadequate.
- Failure to guarantee drugs to TB patients is one of the main weaknesses in the system, undermining the effectiveness of DOTS or any other TB therapy. While most of the facilities (78 percent) had the appropriate first line drugs for TB therapy, only 62 percent had second line drugs. When patients were interviewed, 21 percent indicated that the drugs they were prescribed were not available at the time of their visit.
- Many key inputs to ensure a high quality TB Program are not consistently available. As an example, the findings indicate that syringes, gloves and masks are often not available. As shown, only 44 percent of the facilities had masks at the time of the interview. Fewer than 20 percent of the facilities had disposable syringes and gloves during the facility survey.

Key actions include:

- Investments should focus on ensuring that all facilities have a minimum set of equipment and infrastructure conditions that are necessary to treat TB. In this regard, a master plan should be formulated to address shortcomings in the TB Program and to develop a cost-effective investment strategy that will maximize improvements in outcomes.
- Efforts should be made to test the quality of drugs provided at the local level.
- An adequate monitoring system should be in place to check for the availability of key inputs, including materials and drugs.

Costs are high by international standards and efforts need to be made to contain costs. The average cost per case is estimated to be among the highest for middle income countries.

- Comparisons with other countries with similar income levels suggest that there is much scope for improving resource allocation and use. Other middle-income countries are achieving similar or better cure rates at lower costs, even though staff salaries are higher (e.g. US$300 per month for a doctor in Peru to over US$1,000 per month in South Africa).
- On a per capita basis, considering the total population in the oblast, total spending varied from US$0.4 per person in Almaty to US$4.9 per person in Kzyl-Ordaorda, with a national average for the 16 oblasts of US$2.4 (Table 25). These figures are considerably higher than the US$1.6 per person in Russia according to a recent study carried out by the WHO (2002).
- The cost per TB TB patient cured in Kazakhstan is US$1,639 and is much higher than the cost per patient cured in other middle-income countries. The cost per TBTB patient cured is around US$525 for South Africa and US$1,500 in Russia, countries where cure rates range between 52 and 63 percent.

- The cost of case detection using fluorography is considerable and has very low cost-effectiveness. This suggests that there is considerable room for improvements in efficiency in Kazakhstan.

Key actions include:

- Use benchmarking across oblasts to highlight high cost oblasts and to seek savings in the system. If costs were lowered to international standards per case cured or treated, they would amount to US$20 million per year, reducing the total cost of the program by one-third.
- Adjust staffing levels as a ratio of the number of patients treated rather than historical distributions based on the number of beds.
- Increase the use of ambulatory treatment as a substitute for the long hospital stays that are currently practiced.
- Strengthen the capacity of the primary care system to detect and provide follow-up treatment of TB at the local level. Improving outcomes through enhancing the PHC system and shifting resources from expensive TB hospitals to PHC would contribute to a reduction in overall costs.

HIV/AIDS IN KAZAKHSTAN

Kazakhstan has observed a rapid spread in HIV prevalence over the past three years. Distinguished by its large territory and relatively high level of annual per capita income (US $1,200), Kazakhstan has had an HIV/AIDS prevalence higher than its four neighboring countries combined. Since the first case was registered in 1987, the number of officially reported cases had grown to almost 5,000 by December 2004. However, UNAIDS estimates that the real number is at least twice as high, and the Government estimates that about 20,000 people were already infected by the end of 2001.

In summary, the HIV/AIDS epidemic in Kazakhstan is now characterized by:

- Number of registered cases from 2000 to 2003 increased in 1.9;
- Concentration among highly vulnerable populations (IDUs, CSWs), but the growth is observed in sexual transmission: from 5.4 percent in 2001 up to 21.5 percent in 2003;
- The most common mode of transmission is through the use of infected syringes and needles when injecting drugs. The government estimated there are 250,000 IDUs in the country. Official data report that 86 percent of HIV infection cases are due to drug injections, while sexual transmission accounts for nine percent of cases. The potential for continued rapid spread among IDUs is acute, as the country may have nearly half a million injecting drug users[1];

[1] At the end of 2001, the number of IDUs registered by the Narcology Dispensary was over 45,000 people. However, a rapid assessment carried out by the UN in 1998-2000 showed that the number of IDUs may exceed 250,000. According to official estimates, 3 percent of the Kazak population inject drugs, which would bring the number of IDUs to about 450,000 (Godinho et al 2004).

- Geographic concentration. Worst affected are the oblasts of Karaganda, Pavlodar, Kostanay and Almaty City. Although initially confined to the Karaganda region, all oblasts now have confirmed HIV positive cases;
- Disproportionate impact on youth, and especially among young men. Over half of HIV-infected persons are aged 20-29 years. Almost 90 percent are within the age category 15-39 years, and about 80 percent are men;
- Concentration within vulnerable groups. Almost 75 percent of affected persons were unemployed at the time of infection. Infection rates for newly admitted prisoners have been increasing rapidly, as shown through sentinel surveillance upon admission.
- The epidemic is compounded by the spread and poor treatment of sexually transmitted infections (STIs). In 2000, syphilis was diagnosed in 1 percent of blood donors, 1 percent of pregnant women, and 2 percent of hospital patients. In 2001, 5 percent of prisoners in temporary detention had syphilis. Data from the STIs dispensaries show that 75 percent of CSWs have at least one sexually transmitted infection.

The GoK is committed to the fight against HIV/AIDS, and has recently accelerated its action in this area. The National HIV/AIDS Strategy, which was developed with assistance from UNAIDS, and a five year program (2001-2005) were approved. The government's National Strategy is a very thorough document, and identifies the need to raise public awareness and involve the general population, since many people, including local government officials, do not realize the extent of the problem. Since 1995, the Republican Coordination Council on prevention and fight against AIDS has been working on the development and implementation of strategies to combat HIV/AIDS. In 2003, the government established the Commission for coordination of work with the Global Fund to Fight AIDS, TB and Malaria (GFATM) which includes representatives of ministries, non-government and international organizations. The Commission prepared and submitted a proposal to the Global Fund, which was ultimately accepted and is currently under implementation.

The government has estimated the cost of the HIV/AIDS Program at about $150 million for the period 2001-2005. In 2001, the government allocated $2.5 million to the implementation of the Program, and in 2002 $6.35 million. Part of these resources comes from the donors, including those since 2003 from the GFATM. However, additional resources will be required, and it is critical that these resources are targeted to the most cost-effective interventions.

KEY ISSUES AND ACTIONS TO IMPROVE THE PERFORMANCE OF THE HIV/AIDS PROGRAM

The HIV/AIDS Program faces a number of problems related to the overall context in which the program is implemented: political will, policies and patient and provider behaviors and the limitations of the health care provider system. Together these factors constitute the principal challenges to reducing the incidence of disease.

The main issues and actions include:

There are critical institutional issues including a lack of available human resources and key inputs for prevention and treatment and organizational weaknesses in the provider network.

- Preventing and controlling the related epidemics requires significant institutional changes, such as functional integration of prevention and treatment activities presently undertaken separately by four independent, vertical structures: the Narcology Services; AIDS Centers; Dermatological and Venereal Diseases Dispensaries; and the TB Institutes. These structures continue to act independently, with a few examples of good practice.
- While the AIDS Center has assumed a leadership role, with support from MoH, the Center has only limited multi-agency and multi-sector cooperation.
- The policies in place do not support adequate training for HIV/AIDS. Without responding to this need it will be impossible to make adequate use of investments and manage the epidemic.
- Problems with inputs also limit the effectiveness of the programs. One-third (33 percent) of facilities surveyed had suffered a shortage of condoms in the last 12 months, and staff at one institution mentioned that this problem happens 14 times per year.
- There are significant differences in the distribution of expenditure by oblast. The total annual cost of HIV/AIDS Program in the Republic of Kazakhstan varied from US$0.06 million in Atyrau to nearly US$0.34 million in Karaganda. Costs per HIV/AIDS patient are nearly US$675.
- Over half of the CSW do not use condoms, and are not aware of prevention of sexual HIV transmission, and key harm reduction programs have only limited coverage of risk groups. A survey carried out in Almaty City, has shown that 80 percent of MSM do not use condoms, 25 percent have STIs, 10 percent inject drugs and only 30 percent have adequate knowledge about HIV transmission.
- Drugs prescribed were not available in 45 percent of the cases analyzed. However, patients indicate that there were good instructions from the doctor on how to use those medicines.

Key actions include:

- Extend the availability of harm reduction programs to cover a higher percentage of all vulnerable groups.
- Improve availability of condoms among risk groups.
- Improve coordination in the provider network. In terms of treatment, there is a lack of integration/cooperation between primary health care and specialized hospital services, and between AIDS Centers, the TB Institute and Dispensaries and the Dermato-Venerealogical Dispensaries.
- Investments should be targeted to key areas which aim to: (a) develop the professionals qualified to work in the field; (b) fill the gaps in staffing (e.g. psychologists; social workers; counsellors; IT; etc); (c) equally deploy staff throughout oblasts; and (d) upgrade the quality of facilities and medical equipment and providing sufficient, good quality supplies and drugs.
- Introduce a resource allocation strategy that targets resources to high risk populations and ensures a capitated approach to distribute adequate resources for prevention to all oblasts.

Additional research is required to better understand the means of transmission among risk groups and to better estimate the burden of disease. The CDC has been making important progress in this regard and continued government support will be a critical success factor.

Key actions include:

- Expanding the scope and quality of the surveillance system will be critical to stemming the epidemic. Improvements should be made in the quality and quantity of data available regarding the HIV/AIDS epidemic in Kazakhstan. In comparison with the TB Program, the AIDS program has relatively limited information on those at risk, infected or receiving care and support.
- Behavioral surveillance surveys related to UNGASS and other international indicators must be developed in the short-term.
- At the same time, a monitoring and evaluation framework should be established to guide program implementation and provide feedback on the results and impact of the program.

Issues related to stigma affect the population's and provider's behavior regarding access and treatment for HIV/AIDS.

- Policies protecting human rights, confidentiality, and anonymous voluntary counseling and testing (VCT) need to be specifically addressed.
- Many of the interviews indicate that women are unable to declare their health status to the physician for fear of being excluded from prenatal and other obstetric services.
- There is evidence that physicians are unwilling to deliver the babies of women with HIV. In order to reduce mother-to-child transmission targeted interventions are required to improve education of both doctors and women.
- Policy approaches to commercial sex work (CSW) suggest a need for decriminalization, both in terms of the definition of laws dealing with prostitution, and enforcement practices. Gender issues are not addressed by the Strategic Plans, and this should be an area of concentration for policy work. Users of commercial sexual services are not prosecuted in general, while CSWs (most at risk for STI and HIV) are marginalized and isolated by police practices.

Key actions include:

- Improving the legal framework related to the HIV/AIDS issue. This will include strengthening the policy and legislative framework to ensure the constitutionally-guaranteed rights and freedoms of citizens, including those who engage in risky behaviors and HIV-infected persons;
- However, even written policies will not change the underlying professional, governmental, and individual set of prejudices that seem to be widespread in the region. It will likely take a very concerted, professional public information campaign to change social norms, against which all programs will be implemented.
- Changing the population's attitudes and behavior through increased investments in information, education and communication activities.

Local NGOs have only a limited role in the delivery of services to prevent infection and to address palliative care issues for those infected.

- The relationship between the government and NGOs has been limited and there is great potential to use NGOs to deliver preventive services to vulnerable groups.

- The use of NGOs should be expanded to more rapidly approach the needs of at-risk populations. This would include establishing a clear policy on the role of NGOs. This would outline the role NGOs play, define mechanisms to hold NGOs accountable for their programs, minimize duplication of resources and promote the development of a sustainable framework for the role of NGOs in the fight against HIV/AIDS.
- Without a clear state policy to deliver financing to such NGOs and support their capacity development, it will become unfeasible to carry out effective work among high-risk groups.

Key actions include:

- Improving national policy and practices to support relations between the Government, civil society, and groups which engage in risky behavior. Although NGO capacity is still nascent, there is considerable opportunity to deliver services to vulnerable populations through the use of NGOs.

There is a need for improved syndromic management of STIs. In general the protocols for STI treatment are outdated.

- Surveys show that nearly 70 percent of facilities do not make a physical examination of male patients relying exclusively on questioning. In the case of females this percentage increases to 75 percent.
- More than 80 percent of facilities offer education to patients and staff but only 50 percent offer treatment for drug users.

Key actions include:

- Increase integration of dermato-venerological services and the primary and specialist provider networks.
- Ensure adequate availability of free drugs for syndromic management
- Update the protocols for STI treatment.

In conclusion, the TB and HIV/AIDS Programs have improved dramatically over the past five years. Both programs have the highest levels of political support and there is widespread awareness and, in general, willingness to address the dual threat. Furthermore, the programs are led by motivated and informed professionals. Behind many of the weaknesses identified are cultural and clinical practices that will require a gradual period of change and assimilation by the political and technical levels within the sector. These factors should be explicitly taken into account in the formulation of all internal and external assistance provided.

The information contained in the report reflects the inputs and outcomes of these programs, establishes a baseline for evaluating performance and highlights key areas that might eventually improve performance. In the end, the challenge lies with aligning incentives for local physicians and nurses who are the front line for fighting these diseases. The staff needs to be provided with inputs of sufficient quantity and quality, improved information for the population and a safety net for patients which would limit welfare reduction and quality of life and restore their health.

1. TB, HIV/AIDS AND STIs IN KAZAKHSTAN

Each year TB is estimated to cost the economy of Kazakhstan over US$43 million and estimates of the potential future impact of AIDS on the economy approach 1 percent of GDP. Together, these two diseases could severely constrain the future economic growth of the country and certainly the human capital development. To face the challenge of the dual threat of HIV/AIDS and TB focused, highly cost-effective programs will be required to ensure that limited resources product the highest impact.

Sound strategies exist for curing, preventing and controlling TB. In response to the global tuberculosis emergency, WHO has adopted an effective tuberculosis control strategy known as DOTS.[2] DOTS is the most effective way of controlling tuberculosis.

The DOTS strategy was successfully expanded to cover the entire country by 2000. The GoK has allocated funds for regular monitoring of DOTS implementation. However, an issue of concern is the efficient use of available resources and donor funding. This is generally due to a break from the DOTS strategy at the point of applying the clinical protocol component of DOTS: detection under sputum smear microscopy, regular access to drugs and directly observed treatment. For the remainder of the paper these aspects will be referred to as the "DOTS protocol."

Over the past several years, the economic situation in Kazakhstan has improved notably and the social sectors are also experiencing important increases in the availability of resources. It is particularly important in the face of economic growth to ensure that programs are actually delivering results and that the government does not try to address the problems exclusively with more resources when the existing resources could be better spent to obtain more value-for-money. This study will specifically address the performance of the TB and HIV/AIDS Programs by establishing a constructive framework, providing better data for decision makers seeking to obtain the highest level of value for money.

This report is based on a thorough review of data from the MoH, the Ministry of Justice, and local governments, primary data collected through specially developed survey instruments and qualitative analysis of focus groups and direct interviews. The report was prepared in the context of the ongoing policy dialogue and collaboration between the World Bank and the Government of Kazakhstan in the health sector. The objective of this analysis is to assess the relevance of these national programs to contribute to contain the TB and HIV/AIDS epidemics, and to provide policy makers with analysis for informed decision making on the allocation of scarce public sector resources.

To address these issues, the report looks at four dimensions of the national programs:

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[2] DOTS is composed of five key elements. (1) Government commitment to a National Tuberculosis Program as a public health priority. (2) Detection of infectious cases by sputum smear microscopy examination in general health services. (3) Standardized short-course anti-tuberculosis treatment to, at least, all smear-positive tuberculosis cases, with direct observation of treatment. (4) Regular, uninterrupted supply of anti-tuberculosis drugs. (5) A monitoring system for program supervision and evaluation of treatment outcome.

(i) **Potential resource shortages in provision of services.** Actual, planned and necessary human, technical and financial resources invested on services required by TB and HIV/AIDS patients are reviewed and evaluated.

(ii) **Appropriateness of assessment and treatment practices followed by services.** The review looks at the reality of clinical practice and compares it with evidence-based practices recommended by international organizations such as the World Health Organization (WHO), and followed up in countries that have been able to contain the spread of TB, such as China and Peru.

(iii) **Efficiency and quality of TB and HIV/AIDS Programs**. The review analyzes coverage, financial and geographic access, notification and cure rates, and compares these with outputs of similar services in countries that have been able to contain the spread of TB.

(iv) **Potential epidemiological impact, economic benefits and financial sustainability of investment in TB and HIV/AIDS Programs.**

In general, the assessment looks at issues related to strategy/policy, skills, resources, program management and information or surveillance. The paper does not attempt to provide an in depth review of the epidemiological situation of the two diseases in the country or to review the performance of the DOTS program. Rather it focuses on the availability of resources to combat the diseases and the distribution of these resources within the country. In this way, the report is a complement to the more detailed information available on these areas in the World Bank report "Stopping TB in Central Asia: Priorities for Action."

The report follows a conventional approach to evaluation and combines a process evaluation with an impact or effectiveness evaluation. In this context, the study looks at the overall performance of the national programs in terms of inputs, outputs and outcomes, or impact. These are assessed throughout the report by comparing the levels found in Kazakhstan with other countries and, more importantly, by comparing oblasts within Kazakhstan. Finally, the paper outlines recommendations that could improve the programs' performance.

TUBERCULOSIS IN KAZAKHSTAN

TB Epidemiology

This section provides a broad overview of the epidemiological situation of TB in Kazakhstan based on the World Bank Study "Stopping TB in Central Asia: Priorities for Action." Specific details regarding the functioning of the TB Program and a review of DOTS implementation are available in that Study.

Kazakhstan has the highest TB rates of all Central Asian Republics. About half (51 percent) of the patients are between 15 and 35 years old. The male to female ratio is 1.3. The majority of TB patients are socially and economically deprived people, mainly from rural areas. The most affected region is Kzyl-Orda near the Aral Sea with 291 patients per 100,000. The city of Almaty with 69 patients per 100,000 has the lowest case notification rate. Between 1990 and

2001, notification rates of new TB cases and deaths in Kazakhstan increased 2.4 times. However, following the successful implementation of the DOTS strategy on a nationwide scale since 1998, the treatment success rate increased to 83 percent in 1999 and 2000, and the TB death rate declined 36 percent by 2001.

Due to overcrowding and poor ventilation and nutrition in prisons, TB notification and death rates were noticeably higher in the prison sector: 30 and 9 times, respectively, than among the civilian population. However, these figures represent a significant improvement since 1997. Notification and death rates in the prisons declined 61 percent and 85 percent respectively. The Ministry of Justice, which administers the prisons, interprets such a positive change as a result of the implementation of the DOTS approach in the prison system.

USAID/CDC estimates that the implementation of the DOTS strategy in Kazakhstan saved approximately 13,000 lives during the period 1998-2001. Table 1 provides an overview of the notification and mortality per 100,000 inhabitants. It also shows the wide variation among oblasts. Given the nearly 100 percent coverage of DOTS the regional differences highlight one of the key study issue: why do some TB Programs appear to work well and others have a lower performance and what government interventions and investment can best address these shortfalls in performance?

Table 1: TB Indicators by Oblast 2002

	Notification per 100,000	+/- Nat'l Avg.	Mortality per 100,000	+/- Nat'l Avg.
Total Kazakhstan	**165**	**0%**	**24**	**0%**
Akmola oblast	302	79%	28	14%
Aktubinskaia oblast	372	120%	33	38%
Almaty oblast	123	-27%	11	-53%
Atyrau oblast	241	43%	32	30%
East-Kazakhstan oblast	150	-11%	28	14%
Zhambyl oblast	151	-11%	22	-10%
West-Kazakhstan oblast	222	31%	22	-7%
Karaganda oblast	173	2%	30	22%
Kostanai oblast	291	72%	26	7%
Kyzyl-Orda oblast	180	7%	29	19%
Mangistau oblast	234	38%	44	81%
Pavlodar oblast	196	16%	39	60%
North-Kazakhstan oblast	142	-16%	31	28%
South-Kazakhstan oblast	119	-30%	15	-38%
City of Almaty	69	-59%	14	-41%
City of Astana	161	-5%	29	20%

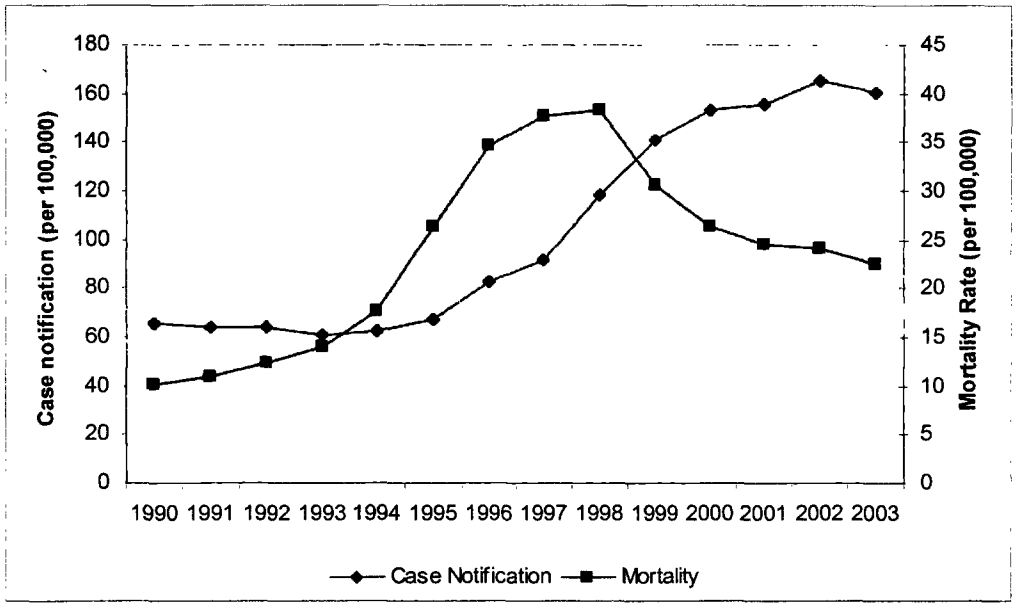
Source: Ministry of Health, Kazakhstan 2002.

Notification

Since independence in 1991 the tuberculosis notification rate has more than doubled, from 65 in 1991 to 165 per 100,000 population in 2002. In 2000, 2001, and 2002, TB case notification in

Kazakhstan was 22,629, 23,090 and 24,483 new TB cases, respectively. In 2003 notifications decreased by 2.2 percent to 23,943. In 2002, Kazakhstan reported 61,606 patients with active TB. However, according to the classic FSU definition this includes patients in the two years after completion of treatment, which explains why this figure is about 3 times the annual notification of new cases. It is wrong to take this figure as TB prevalence as sometimes is done, as by modern definitions patients after completion of treatment are not counted as patients anymore. The increase of annual case notification rates likely reflected, at least in part, increased case detection and improved reporting. In 2003, for the first time notifications dropped, which may indicate that Kazakhstan has reached the plateau of its epidemic.

Figure 1: Notification and Mortality Rates 1990–2003



Source: Ministry of Health, Kazakhstan 2002.

Mortality

Since the introduction of the DOTS strategy, mortality has declined. The Kazakhstan TB mortality rate increased more than three times from 1990 to 1998 and was one of the highest in the Eurasian region with 38 per 100,000 in 1998. In 1999, for the first time since 1990, the mortality rate started to decrease, from 38 in 1998 to 31 per 100,000 in 1999, a relative decrease of 20%. The rate in 2000 was 26 per 100,000, a decrease of 13% between 1999 and 2000. During the period of 1998-2001, death rates have been declining by 36%. This significant decrease of mortality is an early sign that the TB control program is successful.

Table 2: TB Notification and Mortality Rates per 100,000 (does not include prisoners)

Rate /Year	1990	1995	1996	1997	1998	1999	2000	2001	2002	2003
Notification Rate	65.8	67.1	82.5	91.3	118.4	141.0	153.2	155.7	165.1	160.4
Mortality Rate	10.1	26.4	34.6	37.7	38.4	30.7	26. 4	24.5	24.2	22.4

Source: Ministry of Health, Kazakhstan 2004. Ministry of Health data are based on TB ESCM

Treatment Outcome

Following the implementation of the DOTS strategy (since 1998), the treatment success rate according to the MoH increased to 82 percent in 2002. The case fatality rate is around 5 percent and the failure rate 10-12 percent. When the data as provided by the MoH are recalculated according to WHO methods the success rate is around 78 percent.

Table 3: Treatment Outcome for New Smear-positive Cases Treated under DOTS 2000-2002 (%)

Year	Cured	Completed	Died	Failed	Default	Transfer	Evaluated
2000	75.6	3.0	4.7	10.1	3.3	3.3	8,781
2001	76.2	1.7	4.7	11.6	3.7	2.2	8,894
2002	76.4	1.3	4.8	11.2	4.2	2.1	9,191

Source: Ministry of Health, Kazakhstan 2004. Data for 2002 estimated according to WHO methods.

Cavity closure is still seen by many FSU doctors as the proper indicator for cure. Closure of cavity has to be proven by roentgen tomography. Cavity closure is reported for 70% of pulmonary cases, while bacteriological conversion is seen in 82%. The MoH reports cure rates, but no completion rates. Apparently all patients have their sputum examined at the end of treatment. Cure rates for smear positive patients are based on negative smears at the end of treatment but deaths are excluded from the denominator (in some facilities also MDRTB) increasing the cure rates in such a way, that it makes them incomparable to other countries using WHO definitions. Also the proportions do add up to over 100%, indicating that not only do the cohorts differ from international standards, but also cohort analysis is not well understood.

MDRTB

According to a national DST survey, primary MDR is estimated at 9.7 percent while the acquired MDR is estimated at 18.3 percent. The NTP has been treating patients with MDRTB since 2000. The government purchased second line drugs for 300 patients. In 2001 the number of patients on treatment was 400. In 2002 the government provided second line drugs to cover treatment of 1,300 patients with MDRTB. In 2003 it planned to expand MDRTB treatment to the entire republic. Based on new NTP regulations all re-treatment patients should have a culture and DST and Oblast centers would provide second line treatment if available.

TB/HIV

TB is the main opportunistic infection of AIDS. Early case detection of persons with TB, combined with early and effective treatment, means the prevalence of infectious cases of TB should eventually reduce, becoming less of a problem for those with HIV. Similarly, MDRTB, which is likely to be increasing in Kazakhstan, is known to spread more easily in areas where there is high prevalence of HIV. A new pilot project will address the problem of TB/HIV in Almaty city. 17 TB/HIV patients are currently under treatment.

TB in Prisons

Currently there are around 79,000 prisoners held in pre-trial detention centers (SIZO), prisons and settlement colonies. Kazakhstan has the third highest rate of prisoners after the USA and Russia: 590 prisoners per 100,000 population. The TB notification rates are as high as 3,500 per 100,000 and mortality rates are as high as 300 per 100,000. MoH, MoJ and MoI collaborate in tuberculosis diagnosis, treatment and surveillance.

Table 4: TB Notification and Mortality in the Prison Population in Kazakhstan 1997-2001

Years	1997	1998	1999	2000	2001
Total Number TB Cases Registered	11,903	12,970	13,697	10,061	8,060
Number of new cases (#)	5,555	5,061	5,591.2	3,434	3,038
Case Notification Rate/100,000	4721	4301	4752	4346	3845
Cases of Death (#)	1,302	1,218	345	175	174
Mortality Rate/100,000	880	820	300	140	130

Source: Ministry of Justice, Kazakhstan 2002.

The Ministry of Justice interprets the significant decrease in case notification rate (41 percent between 1999 and 2001) and mortality rate (85 percent) as the result of DOTS implementation in the prison system in Kazakhstan. It emphasized the importance of uninterrupted TB drug supply by the Government of Kazakhstan. There are no reliable data on MDRTB in prisons, but the proportion is likely to be high. From other countries in the region, it is known that over 50 percent of the patients in prisons suffer from a TB drugs resistant strain, often MDRTB.

There are no data available on the prevalence of the dual infection with TB and HIV. But in a population where 10-20 percent of the prisoners suffer from TB, the prevalence of TB infection among inmates may well be over 50 percent. This raises the possibility that at least 50 percent of HIV positive people have also been infected by TB. A rough estimate gives a possible 400 HIV infections, and therefore about 200 TB/HIV cases.

HIV/AIDS AND STIs IN KAZAKHSTAN

HIV prevalence in Kazakhstan has increased rapidly over the past 5 years. Kazakhstan has an HIV/AIDS prevalence higher than its four neighboring countries combined. Since the first case was registered in 1987, the number of officially reported HIV/AIDS cases has grown to almost 5,000 cases by December 2004. UNAIDS estimates that the real number is 6,000, and the Government estimates that about 20,000 people were already infected by the end of 2001. However, the Government has reported in November 2002 that the notification of HIV/AIDS in the period January-October fell by 37 percent as compared with the same period of 2001, which is attributed to the success of the national program against the HIV/AIDS epidemic.

As in most places of Central Asia, the vulnerable groups are mainly intravenous drug users, commercial sex workers, prisoners and youth in general. About 80 percent of the affected are young people aged between 15-29 years; and 80 percent are males, although notification is growing among women. Official data report that 86 percent of HIV infection cases are due to drug injections, while sexual transmission accounts for 9 percent of the cases. One hundred fifty three people currently have AIDS and 123 have already died (UNAIDS estimates that 300 have

died from AIDS); 89 HIV positive women have given birth to 91 children, of which 7 have been found to be HIV positive. Although all oblasts have HIV cases, the two main oblasts affected are Karaganda and Pavlodar oblasts, which account for about 50 percent of the cases.

At the end of 2001, the number of IDUs registered by the Narcology Dispensaries was over 45,000 people. However, a rapid assessment carried out by the UN in 1998-2000 showed that the number of IDUs may exceed 250,000. According to official estimates, 3 percent of the Kazakh population injects drugs, which would bring the number of IDUs to about 450,000. The majority of drug users are young people aged 20-25 years, and 85 percent are male. Between 20,000–50,000 women engage in commercial sex work, and about 30 percent use drugs, which they exchange for sex. An estimated 20,000 men have sex with men. Hazardous practices such as the use of common syringes for injections, including injecting in turns when in the company of many people (this is at least occasionally practiced by 60 percent of IDUs); and the use of human blood in the preparation of narcotics put IDUs at an especially increased risk.

Table 5: HIV/AIDS in Kazakhstan

HIV/AIDS	1990	1995	2000	2001
	-	3	6	15
AIDS Cases	-	2	8	20
HIV Cases	4	5	347	1,175
HIV Cases among IDUs	-	3	302	1,050
Syphilis Cases	242	20,235	23,996	20,577
Drug Users (registered)	10,300	10,900	37,812	42,680
IDUS	3,000	4,583	26,087	31,390
Drug Users (estimated)	-	-	183,125	180,410
IDUS (estimated)	-	-	130,800	128,900
CSWs (estimated)	-	-	-	13,000
No. Trust Points	-	-	30	78
No: Harm Reduction Programs	-	-	3	3
No. CSW/MSM Programs	-	-	-	2
AIDS Centers	19	19	21	21
AIDS Centers staff	213	407	458	485

Source: AIDS Center. Kazakhstan 2002.

Kazakhstan is at the center of intensive drug trafficking routes, and the number of drug users continues to increase annually. The age of drug users is decreasing, and women and children are becoming active in the trafficking and consumption of drugs. The main drug used by IDUs is heroin. Sentinel surveillance data shows a low level of awareness among IDUs on how to prevent HIV when injecting drugs. Furthermore, the majority of IDUs belong to the poorest groups, limiting their access to services including information and medical services.

The spread of HIV/AIDS is exacerbated by the poor treatment of STIs. Syphilis increased from less than ten cases per 100,000 people in 1986-93 to 269 in 1997, then gradually decreased to 161.38 in 2000 (UNAIDS 2002). UNICEF (2002) reports rates of STIs (new cases of syphilis and gonorrhoea/100,000 population) of 323 in 2000, which is the highest rate in Europe and Central Asia (ECA) and represents an increase of over 200 percent in syphilis since 1990 (Carinfonet 2000).

According to official data in 2000, syphilis was diagnosed in one percent of blood donors, one percent of pregnant women, and two percent of hospital patients; in 2001, five percent of

prisoners in temporary detention had syphilis. Data from the STI dispensaries show that 75 percent of CSWs have at least one sexually transmitted disease. In 1999, more than 19,000 patients with early syphilis were placed in hospitals, accounting for over 400,000 inpatient days, leading to millions of dollars inefficiently spent. However, the proportion of people who visited these medical providers because of syphilis was less than 30 percent, as most people can get anonymous and satisfactory care without being hospitalized, albeit at great cost.

Table 6: HIV/AIDS in Prisons

	1990	1995	2000	2001
Prison inmates	64,490	65,359	58,424	67,937
HIV positive	0	0	218	446
HIV prevalence	0	0	171.6	340.4
People entering prisons	51,018	51,613	54,211	56,785
People released from prisons	23,895	19,354	33,222	24,544
Correctional institutions	54	60	74	75
Prisons w/ AIDS facilities				4
Prisons w/ hospitals beds				1

Source: Ministry of Justice, Kazakhstan 2002.

Kazakhstan has 21 AIDS centers operating in all oblasts and major cities (no beds). The AIDS Centers have established 87 Trust Points, which provide highly vulnerable groups with syringes, condoms, brochures, and pre and post testing counseling. Trust Points use volunteer reformed drug users to provide better education and information. The performance of these points varies throughout the oblasts. For example, health professionals consider that Trust Points work well in Pavlodar, but are not very efficient in Almaty. The main issue is the lack of trust by IDUs and other highly vulnerable populations. When the centers first opened it was very difficult to work. Even now, many people still hide instead of contacting the AIDS Centers or NGOs for assistance. AIDS Centers publicize that syringes can be exchanged anonymously, but IDUs do not believe this information.

Trust Points are usually located in out-patient clinics, but the AIDS Centers are planning to use other venues, such as pharmacies, to establish needle exchange programs. Furthermore, Trust Points need to be evaluated and scaled-up. The National AIDS Center only recently established contact with Dermatological and Venereal Diseases Dispensaries and the horizontal integration remains limited. A network of Narcology Dispensaries deals with treatment and rehabilitation of drug users. Reproductive health services and family practice centers are also expected to have a role in HIV/AIDS Prevention. A network of Narcology Dispensaries deals with treatment and rehabilitation of drug users.

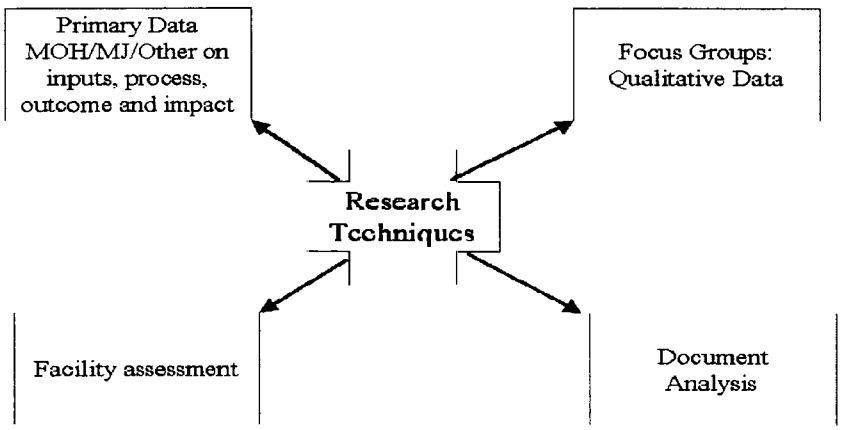
The network of Dermatological and Venereal Diseases Dispensaries provides assessment and treatment of STIs, but these centers do not target highly vulnerable and vulnerable populations, and do not yet coordinate activities with the AIDS Centers and other organizations working on HIV/AIDS prevention. According to international protocols of early syphilis treatment, patients only need a single injection of benzatinpeniciline G provided by an outpatient service. Due to the unpopular methods of clinical assistance provided in the Dermatological and Venereal Diseases Dispensaries, there is a low rate of visits.

2. METHODS

TOOLS

The research team used a combination of qualitative and quantitative tools, to collect critical data on HIV/AIDS and TB services provided in Kazakhstan. This includes an analysis of interventions funded by both state and regional governments. The overall scheme is reflected in the following Figure.

Figure 2: Study Design



Qualitative methods included Focus Groups Discussions (FGDs) with the providers and NGOs and In-Depth Interviews (IDI) were carried-out with individuals suffering from HIV/AIDS and TB and with experts and workers at different institutions. Interviews with key informants helped consultants to construct the guides and identify the critical groups and institutions to be targeted. Analysis of various research papers describing the magnitude of the HIV/AIDS and TB problem in the country significantly contributed to the process of fccus groups and interviews guide development. Qualitative tools were employed to better understand the service provision process and care-seeking behavior of the population. This also helped identify the strengths and weaknesses of the care provision for HIV/AIDS and provided insight into social and personal factors affecting the use of services by patients.

Quantitative tools were used for TB and HIV/AIDS service assessment and the objectives were to:

- Examine the quality or effectiveness of case management in the facilities;
- Measure the compliance of provider units with legal Decrees and Guidelines;
- Assess existing approaches to diagnostic and treatment regimes;
- Detect barriers and gaps in HIV/AIDS and TB control at facility level;
- Assess overall quality of services offered by the facilities;
- Obtain data on financing of TB Programs including central TB spending and additional spending by oblast governments.

Quantitative tools (structured questionnaires) included nine modules and one additional module for facilities in prison. The modules covered diverse areas of service provision including, but not

limited to general facility information; infrastructure condition; availability of drugs, equipment and supplies; diagnostic procedures and medical information systems (Annex 2). In addition, to evaluate the quality of services a Patient Satisfaction Module was developed and administered at each facility. Quantitative tools were administered in regional, rayonal and city level facilities and in one prison.

Study Samples

The study targeted three geographical regions of Kazakhstan: (a) Almaty City; (b) Atyrau Oblast; and (c) Karaganda Oblast. In the oblasts the study included urban and rural areas to detect differences, if any. In total, 17 focus group discussions (FGDs) were conducted with providers and NGOs/journalists. FGD allocation per region and per type of participants is detailed in the table below. In depth interviews were also conducted in the same regions. A total of 92 individuals representing diverse groups were questioned. Their distribution by type of area and respondent is detailed in Table 8. Quantitative tools were administered in 38 facilities. Facility distribution by type and locality is shown in table 9.

Table 7: Focus Groups

Focus Group	Almaty City	Karaganda Oblast		Atyrau Oblast		Total
		urban	rural	urban	rural	
TB Physicians	1	1	1	1	1	**5**
TB Nurses	1	1	1	1	1	**5**
HIV/AIDS Physicians	1	1	0	0	0	**2**
HIV/AIDS Nurses	1	1	0	0	0	**2**
NGOs/ Journalists working on HIV/AIDS	2	1	0	0	0	**3**
Total	**6**	**5**	**2**	**2**	**2**	**17**

Collection of TB Financing Data

The analysis of costs and cost-effectiveness are based on the collection of statistics from the MOH and the application of a special template for determining the level of TB spending by local governments (Annex 4). The template was sent to each Oblast health authority to provide the requested data. A local consultant visited each of the oblasts to ensure consistency in the type of data provided and in the overall allocation of expenditures across categories. In some cases, in order to represent the total level of financing for a given oblast, the federal spending was allocated to each oblast based on the total number of TB patients treated. For example, centralized drug spending was prorated for each oblast based on the number of TB patients treated.

Focus Groups and Interviews

A private Kazak company, SANGE Research Agency, was contracted to adapt the tools for Kazakhstan and administer them in the national language. SANGE staff received training during March-April 2003. The fieldwork took place during April-June 2003. For the recruitment of TB and HIV/AIDS patients, ethical issues were considered. In all cases, written informed consent was secured prior to inclusion of the respondent in the study. SANGE transcribed FGD and IDI.

Videotapes were made when possible. Data from quantitative tools were computerized and provided to the research team for further analysis.

Table 8: In Depth Interviews

In Depth Interviews	Almaty City	Karaganda Oblast		Atyrau Oblast		Total
		urban	rural	urban	rural	
TB Patients						
New cases	4	3	0	4	0	**11**
Relapse	1	1	2	2	2	**8**
Failed	1	2	2	2	2	**9**
Chronic	1	1	1	1	1	**5**
TB patients- prisoners	0	3	0	0	0	**3**
Total TB Patients	**7**	**10**	**5**	**9**	**5**	**36**
HIV/AIDS Patients						
HIV/AIDS patients	7	9	1	3	0	**20**
HIV/AIDS patients-prisoners	0	2	0	0	0	**2**
Total HIV/AIDS Patients	**7**	**11**	**1**	**3**	**0**	**22**
Others						
TB Physicians	2	3	0	3	0	**8**
HIV/AIDS Experts	2	2	0	1	0	**5**
HIV/AIDS Physicians & Nurses				4	*	**4**
Prison Physicians	0	2	0	0	0	**2**
NGO/journalists working on HIV/AIDS	2	2	0	11	0	**15**
Total Other	**6**	**9**	**0**	**19**	**0**	**34**
TOTAL IDI	**20**	**30**	**6**	**31**	**5**	**92**

Table 9: Facilities Surveyed by Region

Region	TB Hospitals				Number of HIV centers		The out-patient Facilities		Prisons	FAPs	Total
	Oblast	Rayon	City	Dist.	Oblast	City	Rayon	City /Dist			
Atyrau Oblast	1	1	1	0	1	0	2	2	0	2	**10**
Karaganda Oblast	1	1	1	1	1	1	1	2	1	2	**12**
Almaty City	1	0	1	1	2	1		2	0	0	**8**
Total	**3**	**2**	**3**	**2**	**4**	**2**	**3**	**6**	**1**	**4**	**30**

DATA LIMITATIONS

Our findings highlight a number of important issues regarding the availability of data. We drew data from the National TB and AIDS Centers, oblast governments, Ministries of Health and Finance and the Accounting Chamber. Although the MoH and National TB Institute have

provided significant data on TB HIV/AIDS, administrative and financial data important for evaluation purposes are often incomplete and inconsistent. In most cases, the authorities were unable or unwilling to clarify the differences or gaps in information. The main problems encountered can be summarized as follows:

a. There is little consolidation of information on TB in the country. While the TB Institute makes an effort to maintain clinical information, it does not keep information on expenditures and has only a limited analysis of outcomes across oblasts.
b. We were not able to access the TB database. While the MOH provided the data requested, the lack of access to the TB database did not allow the analysis of the specific relationship between treatment outcomes, at the patient level, and confounding variables. As a result, our analysis of performance is based on benchmarking across oblasts.
c. There is wide inconsistency of data from different sources. There were irreconcilable differences in data received from different sources. This was particularly relevant with regard to local expenditure information. For example, data on TB drug expenditures obtained from the National TB Institute do not correspond to summary sheets obtained from the Ministry of Health (Table 10).

Table 10: Conflicts Between Data Sources

Data	Data Source for the FY02 Budget ('000 tenge)		Ratio of MoH Figures to National TB Institute Figures
	MoH (revised 2002 budget)	National TB Institute	
Drug Expenditures	1,217,000	989,189.4	1.23
Total Expenditures	6,284,421	5,638,057.4	1.11

Sources: Ministry of Health and TB Institute, Kazakhstan 2003.

Figures on total expenditures for the TB Program are also inconsistent. A reason for this could be that the data provided by the National TB Institute reflects cash execution as opposed to MoH figures showing total budget allocations. These National TB Institute statistics are not always internally consistent. This could be due to the fact that the data were gathered at different times of the year.

Reports often conflict on how the processes are executed and the level of responsibility held by national and local authorities. In addition to financial data (Table 10), some administrative links remain unclear. A purchasing authority within the MoH is ultimately responsible for the availability of TB drugs. Purchasing requires competitive tender procedures. Once the tender is finished and the supplier is selected, the national TB Institute collects drug requirement applications from oblasts. The Institute processes the applications, makes adjustments based on the projected number of patients and applies to the MoH, which allocates funding. The National TB Institute is also in charge of distribution of centrally purchased drugs. What remains unclear is whether local budgets are used to purchase TB drugs and at what price. Once purchased, it is also uncertain whether they are distributed among oblasts according to estimated needs. Unfortunately, the National TB Institute has not been cooperative in clarifying these questions forcing a number of assumptions to avoid data inconsistencies and information gaps.

Limitations in the availability of comparative information and the failure to adopt international definitions and standards regarding the registration of TB cases, limits the possibility of measuring performance. For example, the TB Program does not register patients that have been previously treated and failed to continue treatment, including them in the category "new" when they re-enter rather than "other previously treated cases", as recommended by the WHO and CDC.

In the case of HIV/AIDS, the extremely limited information made it difficult to determine the full scope of problems in the sector. The program is at a very incipient stage and will require improved data collection and monitoring. In recent years, in both TB and HIV/AIDS Programs, efforts have been made by international organizations to standardize monitoring and evaluation indicators.

3. PERFORMANCE OF THE TB AND HIV/AIDS PROGRAMS

THE TB CONTROL PROGRAM[3]

Government Commitment

In May 1998, the President of Kazakhstan issued a Decree on "Priorities for Improvement of the Health Status of Kazakhstan's People." This Decree called for nationwide implementation of the WHO-recommended directly observed therapy, short-course strategy (DOTS) and allocated special state funds for regular TB drug procurement. Kazakhstan is the only country in Central Asia that finances anti-TB drugs from the state budget. In the Presidential program "Health of the Nation", efficient TB control is seen as a priority health problem and the importance of the DOTS strategy is stated. In response to the Presidential decree, the Government of Kazakhstan issued an Order on "Urgent Actions to Protect the Population from Tuberculosis." This order states that the TB control program should be a priority for financing and social protection of medical staff, and should provide free treatment with anti-TB drugs to all TB patients.

A high-level working group for DOTS implementation, the Coordinating Council on TB Control, was established at the national level. This Council consists of Ministries of Health, Justice, Internal Affairs, Finance and Defense, and this interdepartmental structure has also been established at the oblast level. In November 1998, the Ministry of Health issued the first order (Prekaz) on DOTS implementation in Kazakhstan. The Ministry of Health prepared this order with technical assistance from Project HOPE and CDC, financed by USAID, and WHO. The content complies with the WHO-recommended DOTS strategy. In 2001, the Ministries of Health and Justice issued an order "On the improvement of TB medical services for the population of the Republic of Kazakhstan"; and in May 2001, an order "On the status and measures to strengthen the TB control in the Republic of Kazakhstan." In 2001, the National TB Institute (NTBI), submitted a 5-year plan to the MoH, 'A Complex of Urgent Actions for TB Control in the Republic Kazakhstan for 2002–2006.' Each region (Oblast) has to have a TB Program signed by the Governor (Akim); districts (Raions) also develop an annual TB Program.

Health Care Services

There are huge distances between villages and primary health care points, but also significant variation between the quality of health services in urban and rural areas. The number of primary health care (PHC) workers is being reduced. Efforts are underway to decentralize the administration and introduce new payment systems that encourage professionals to provide efficient and effective health care. A reform program aiming to reduce the number of hospitals and hospital beds by shifting the priority to the PHC system is being established in pilot areas. Reforms in medical education have introduced the concept of family practice and training of general practitioners. More than 1,000 family doctors have been already trained. In addition, the

[3] This section is based on a background report by Jaap Veen, of KNCV, prepared for the regional study "Stopping TB in Central Asia: Priorities for Action." Annex 1 outlines an analysis of the strengths, weaknesses, opportunities and threats that have been identified by KNCV for the TB control program in Kazakhstan.

Kazakhstan School of Public Health has been established, and has started providing training in health policy, management, economics and other related areas for health administrators and managers. A priority is the strengthening of the private health sector.

The downturn of the economy has led to a general deterioration of public services. Before 1995, the Kazakhstan health-care system was based on the "Semashko" model, with medical services free-of-charge. But in the 90s, health-budget deficits (only 2.5% of the gross national product went to health care in 1997, while 3.3% had been allocated in 1998) and lack of incentives for providers have led to an inefficient system.

Hospitals spend 75%-85% of the available funds for health, while primary health care services receive only about 10-15 % of the overall budget. Health care development has involved uncontrolled increases in the numbers of medical staff and hospital facilities. An average physician's salary amounts to only about half the average salary in the country and is insufficient to meet even the most basic needs, such as housing and food. For this reason, many qualified health staff leave the profession and those who remain lack motivation.

The management structure is very centralized with little community involvement and participation. Efforts are underway to decentralize the administration and introduce new payment systems that encourage professionals to provide efficient and effective health care. A reform program aiming to reduce the number of hospitals and hospital beds by shifting the priority to the PHC system is being piloted. The budget allocation for PHC increased from 1997 to 1998 from 15% to 30%.

TB Services

TB control is still provided through a vertical system. The National Tuberculosis Institute is the main policy body for TB control in Kazakhstan. Its Director is the NTP manager, and deputies supervise aspects of the TB control program: epidemiology, treatment, MDRTB, laboratory management, and drug procurement. The NTBI houses the country's MDRTB treatment unit, and the National Reference Laboratory. The system is replicated at oblast and raion level. The NTBI supervises activities at the Oblast TB Hospital level, while the Oblast TB Coordinator, often the Director of the Oblast TB Hospital supervises the raion level. Patients self refer either to PHC polyclinics or directly to the TB Dispensary. Initiation of treatment takes place in TB hospitals or TB dispensaries with inpatient facilities. Chronic cases can be admitted in sanatoria, although the number of sanatorium beds has decreased in recent years.

Case Finding and Diagnosis

The NTBI reports for 2001 that 35 percent of the population was screened and that 99 percent of the target groups have been reached. This contributed to 43 percent of the total cases of tuberculosis notified. The notification rate among the screened population was 193 new TB patients per 100,000. The latter would indicate that risk groups have been properly targeted, as the notification rate is higher than in the general population. It is however difficult to understand that one-third of the population would belong to a risk group.

Smear microscopy is the basic bacteriological method for detection of infectious TB cases. The proportion of sputum smear positives TB cases among all cases notified has increased slightly between 1998 and 2000 and was stable since. This indicates a reliable case detection system. X-ray, fluorography and digital fluorography are largely reserved for high risk population and the penitentiary sector.

The National Reference Laboratory has taken on its role as Reference Laboratory, and the quality of its work has improved greatly with support from CDC. The main TB laboratories in the country have been equipped with binocular microscopes. TB laboratories are organized in a network that consists of three diagnostic levels. At the first level there are smear microscopy centers in raion TB dispensaries and in PHC facilities. The number of these laboratories has been reduced in the last few years from 700 to 510. There is no clearly defined second, intermediate level for culture examination. The 20 oblast TB laboratories that perform culture also do drug susceptibility testing (DST). There are a certain number of bacteriological laboratories in general policlinics that do cultures, but they are not included in the network. The third level laboratory is the National Reference Laboratory (NRL), which performs smear, culture and DST. Prison TB laboratories are only partly incorporated in the network on oblast level.

Table 11: Percentage of Sputum Smear Positives of All Cases Notified

Year	1998	1999	2000	2001	2002
Rate	35.7	37.1	39.3	39.4	38.6

Source: Ministry of Health, Kazakhstan 2003.

Direct Observation of Treatment and Patient Follow-up

A default tracing procedure has been introduced; however default prevention mechanisms are lacking. In Kazakhstan access of patients to health care facilities for direct observation of treatment during the continuation phase of treatment is limited due to long distances.

The DOTS strategy for treatment has been adapted to Kazak guidelines, thus allowing doctors to choose from a variety of standard regimens, for which the selection criteria are unclear, and to prolong the intensive phase according to clinical and radiological criteria. This leads to over-treatment. A training module for clinical case management is needed. So far the DOTS training has emphasized the public health approach of case management, but it should be made clear that this approach is also based on a sound clinical basis.

TB Drug Management

From the point of view of TB drug availability and access, Kazakhstan has achieved sustainability in procurement and distribution. But the registration and quality assurance system does not capture unbiased drug quality issues. Kazakhstan has been committed to centralized procurement of TB drugs for its national TB Program, but recently decided to decentralize procurement to the oblast level. TB drug procurement and distribution are the Government responsibility. Since 1998, there has been a steady increase in Government funds allocated for competitive procurement ensuring the availability of all first-line TB drugs to all patients at all levels of health care free of charge.

In general, first line drugs are available across the country; however, in many cases the oblasts have to procure first line drugs to compensate for gaps in the distribution from the centralized procurement. These gaps are due to problems in the planning model and a tendency to base procurement on historical figures rather than a projection of future demand. Second line drugs are also purchased and distributed. However, prices paid for second line drugs can be greatly reduced if procured through the Green Light Committee (GLC) mechanism. TB drugs, including second line drugs can be found in private pharmacies.

Recording and Reporting

New forms have been introduced in Kazakhstan. Since the year 2000 individual patient data are transferred from the TB 01 patient card to an electronic data base developed and introduced by USAID/CDC, called Electronic Surveillance and Case based Monitoring system (ESCM). Quarterly reporting as well as annual soviet reporting is followed. The system has been gradually established in all oblasts till 2002. In 2003, MoH stopped applying ESCM until further notice. Since then, access to TB statistic data has become limited to written permission to MoH. WHO laboratory registries have been established across the country.

Supervision and Monitoring

Project HOPE developed a Monitoring Checklist for laboratories. New checklists have been in use since May 2002. There is a checklist for bacteriology and culture, which consists of 33 questions and a workbook with instructions and explanations of 13 pages.

Training and monitoring are not sufficiently funded. The state budget allocates funds for regular monitoring visits of the NTBI coordinators and a recently appointed prison coordinator for monitoring visits to the oblasts. However, there is no fund allocation for monitoring visits of the oblast coordinator to the raions. The new KfW project includes also the procurement of cars for supervision activities.

TB Control in Prisons

The Ministry of Justice is responsible for TB Control in prisons, while the MoI is in charge of TB Control in SIZOs (pre-detention centers). In 2002, a Prekaz was signed between the MoI, MoJ and MoH, regulating the co-operation between the medical departments of SIZOs and prison colonies, and the civil health services. This enables a better follow up of released prisoners with TB and allows supervision by the staff of the NTBI and the oblast TB dispensaries in prisons.

Since 1998, KNCV Tuberculosis Foundation and Penal Reform International support the sector with TB control, training, and proposals for alternatives to imprisonment. In 1998-2001 a pilot took place in Pavlodar oblast, and since 2002 the project has been extended to East Kazakhstan, Akmola and Karaganda.

Since October 2001, USAID/Project HOPE, at the request of the Ministry of Justice, supports the penitentiary system in Karaganda oblast by providing training to prison medical staff and equipment to the prison laboratory at Dolinka. The laboratory serves the TB hospital and a

colony for TB and HIV. In the Karaganda prison hospital diagnosis still relies on radiological rather than bacteriological criteria, although in all cases sputum smear microscopy was performed. Treatment regimens followed the DOTS strategy. Results can not be good given the fact that many prisoners have been treated before (probably more than 50%) and the proportion of prisoners being released while still on treatment is rather high (30%).

Early release through amnesties and regular release of prisoners with TB still under treatment is of major concern. Many prisoners do not report to health facilities after release. The link between the oblast TB dispensaries and other health services and the prison health services is still weak because of lack of funds, even if a Prekaz has been issued on monitoring TB control in prisons by the NTBC.

Other aspects of the TB Control Program

Social support to marginalized and vulnerable patients is being carried out in five oblasts by the National Red Crescent Society. This program covers only patients who have interrupted treatment more than two weeks. Socially vulnerable patients are supported with food and hygienic parcels and home visits of Red Crescent nurses.

There is concern that stigmatization, poverty, unemployment of more than 80% of the population, homelessness, a history of imprisonment, alcoholism and drug abuse lead to late detection, late diagnosis, advanced disease with low cure rates, increased death, default and treatment failures. Particular risk groups may not be reached by health education messages targeted at the general population. Project HOPE conducted a Knowledge, Attitude and Practice (KAP) survey. One of its major preliminary findings was that the population does not trust health services and staff. Health education – targeting risk groups, patients, their families and the general public – needs to be strengthened.

In the laboratories in general safety instructions are followed, although proper safety cabinets have not been installed, nor does staff use the proper masks. It is imperative to introduce guidelines to improve infection control and waste management.

Project HOPE has trained several thousands of health staff. Meanwhile a pool of trainers at central level has been established consisting of health professionals from the NTBI, the Kazak State Medical University and the nursing school in Almaty. Project HOPE involves these trainers, together with their own staff, on training in the regions, including in prisons.

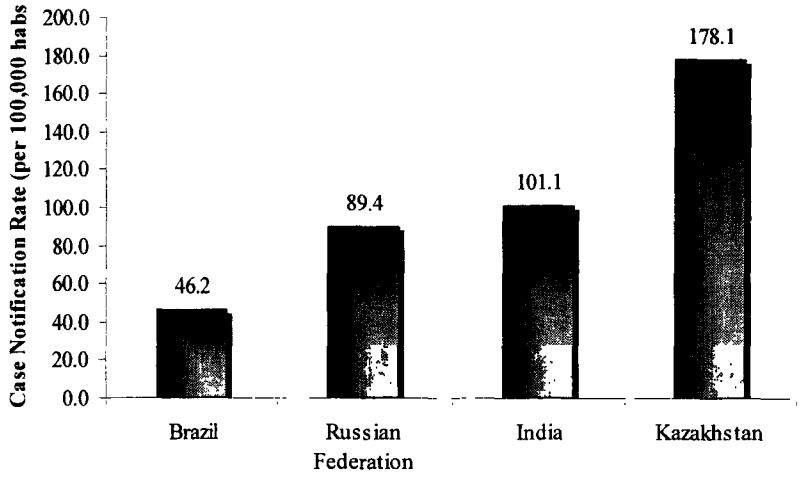
PERFORMANCE OF THE TB PROGRAM

Figure 3 reflects the serious situation of Kazakhstan in 2002 in terms of burden of TB in various countries. The data shows that, in comparison with other high burden, middle-income countries, Kazakhstan has the highest number of cases per 100,000 (178.1 cases per 100,000 persons), based on case notifications in 2002.

Despite the high notification rate, the general performance of the TB Program has better results than many European countries with lower notification rates. In the same year, the average cure rate was 66 percent for all cases treated, while at the European level it was 59 percent. Reported MOH cure rates indicate a level of 75 percent, thereby placing Kazakhstan considerably above

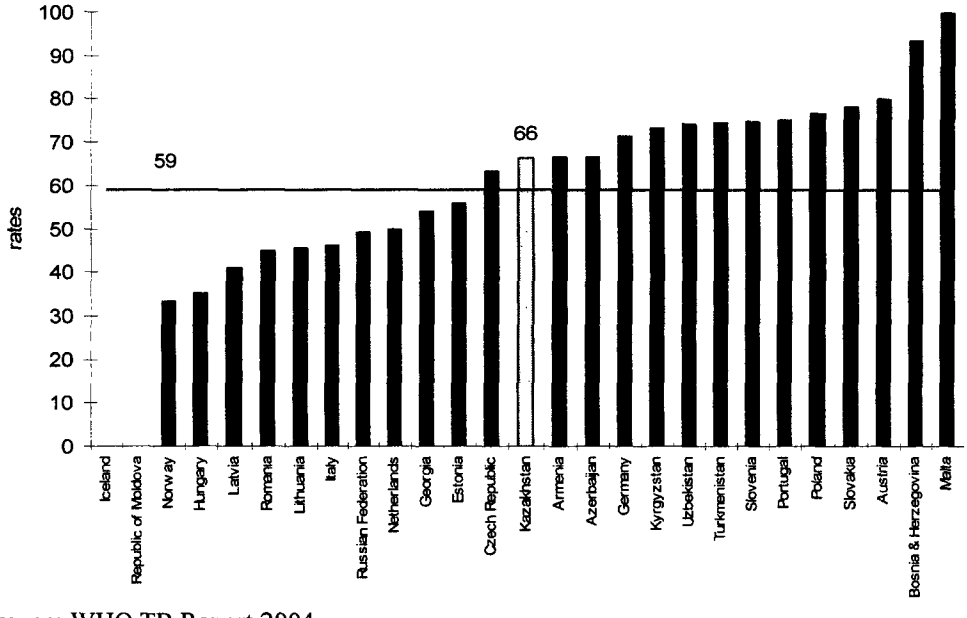
comparable countries. In order to ensure comparability, however, figures used are official WHO statistics for all countries. Among 25 countries considered in the sample, Kazakhstan ranked 14th in cure rate.

Figure 3: TB Benchmarking



Source: WHO TB Report 2004

Figure 4: Comparing Cure Rates Across Countries

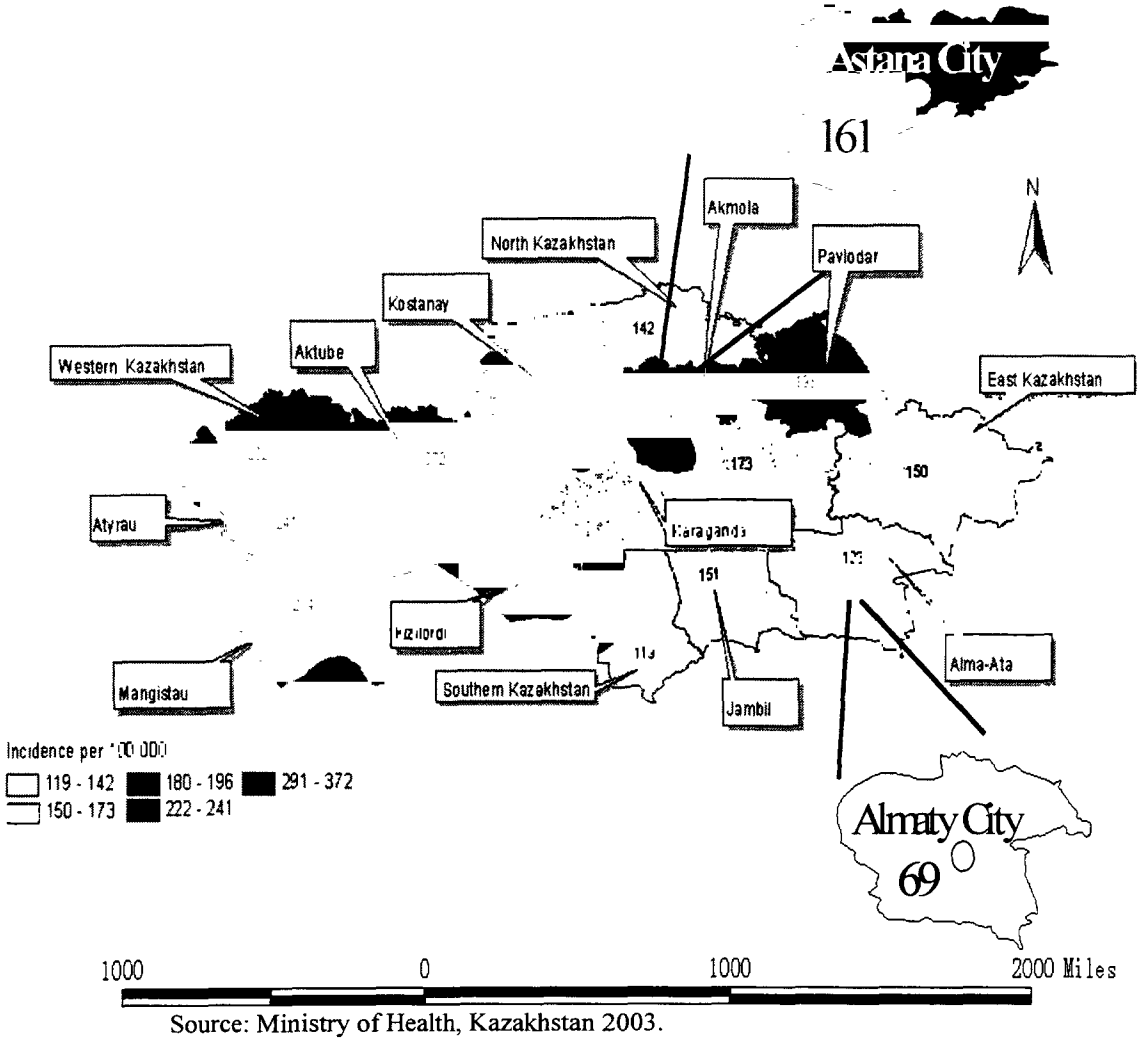


Source: WHO TB Report 2004

Internal Performance

In this section performance among the oblasts is analyzed. Akmola, Kzyl-Orda and Aktube comprise the three oblasts with rates above 291 cases per 100,000 habitants. On the other hand, Almaty, Northern Kazakhstan, Southern Kazakhstan and Alma-Ata have the lowest notifications, ranging from 69 to 142 cases. The rest of the oblasts experience TB notification rates between 143 and 290 cases. Geographically, low-notification oblasts tend to be located in the northern and southern extremes of the country, while the high-notification regions are mainly in the western part of the country. In fact, the five oblasts located on this side of Kazakhstan have rates of over 222 cases.

Figure 5: TB Notification Rates by Region 2002



Source: Ministry of Health, Kazakhstan 2003.

Three oblasts had almost one-third of new cases in 2002: South Kazakhstan, with 2,505 cases, Karaganda (2,308) and East Kazakhstan (2,205). For instance, the share of the oblast with the

lowest number of cases (Almaty City, with 790 cases) is four percent of new cases, while the largest number of cases per oblast (Southern Kazakhstan) accounts for 10 percent of new cases.

Table 12: TB Notification 2001–2002

Region	New TB Cases Adults and Adolescents 2002	New TB Cases Children 2002	New Cases 2002	Patients with active TB 2001	Patients with active TB 2002
Republic Kazakhstan	22576	1848	24478	52467	61606
Akmola	1598	60	1658	3211	4011
Aktube	1558	175	1733	3353	4118
Almata	1677	239	1917	4120	4682
Atirau	994	97	1091	2476	2931
Eastern-Kazakhstan	2079	119	2205	4802	5623
Jambil	1352	120	1479	3690	4149
Western-Kazakhstan	1273	65	1338	2668	3484
Karaganda	2141	142	2308	4077	5453
Kzyl-Orda	1625	135	1760	4209	4043
Kostanay	1563	95	1658	3398	4026
Mangistau	687	102	793	1859	2036
Pavlodar	1295	162	1467	4048	4770
Northern- Kazakhstan	917	49	966	1965	2368
Southern- Kazakhstan	2275	230	2505	5210	5732
Almaty City	774	16	790	1923	2157
Astana-City	768	42	810	1458	2023
Prisons				8060	8242
Penitentiaries				729	484

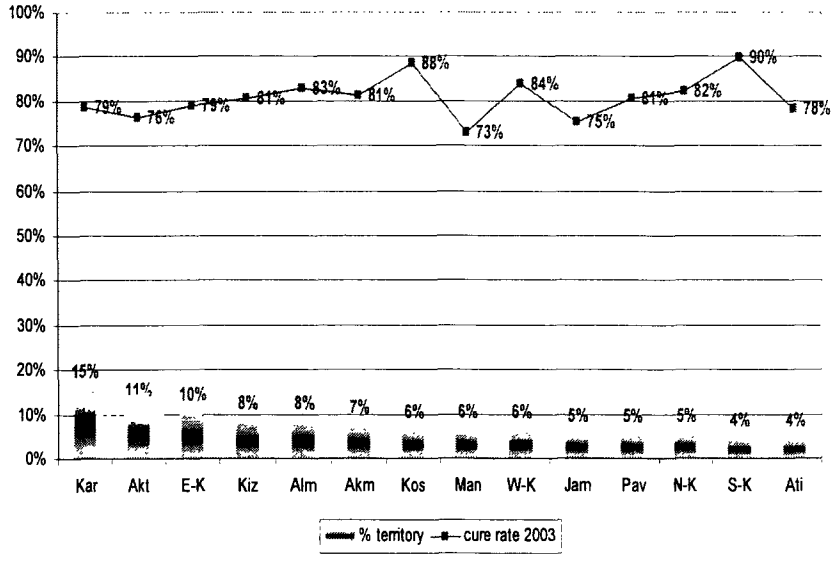
Source: Ministry of Health, Kazakhstan 2003,

Finally, by size of the oblast and cure rates, Figure 6 shows that the largest regions (10 percent or more of the country) have relatively low cure rates compared to medium (5 percent to 9 percent) and small (< 1 percent – 4 percent) oblasts. In the first case, the average cure rate is 78 percent, while the other two groups experience 81 percent in the medium-size case and 84 percent in the small size. This suggests that geographical distance has an impact on cure rates.

There are two main reasons for the ratio of smear positive to smear negative to be below the optimum. The first is related to the misclassification of cases that were previously treated as new when in reality they are other previously treated cases. Since the national TB Program does not use the classification of "other", it is likely to misclassify the results. This may lead to increases

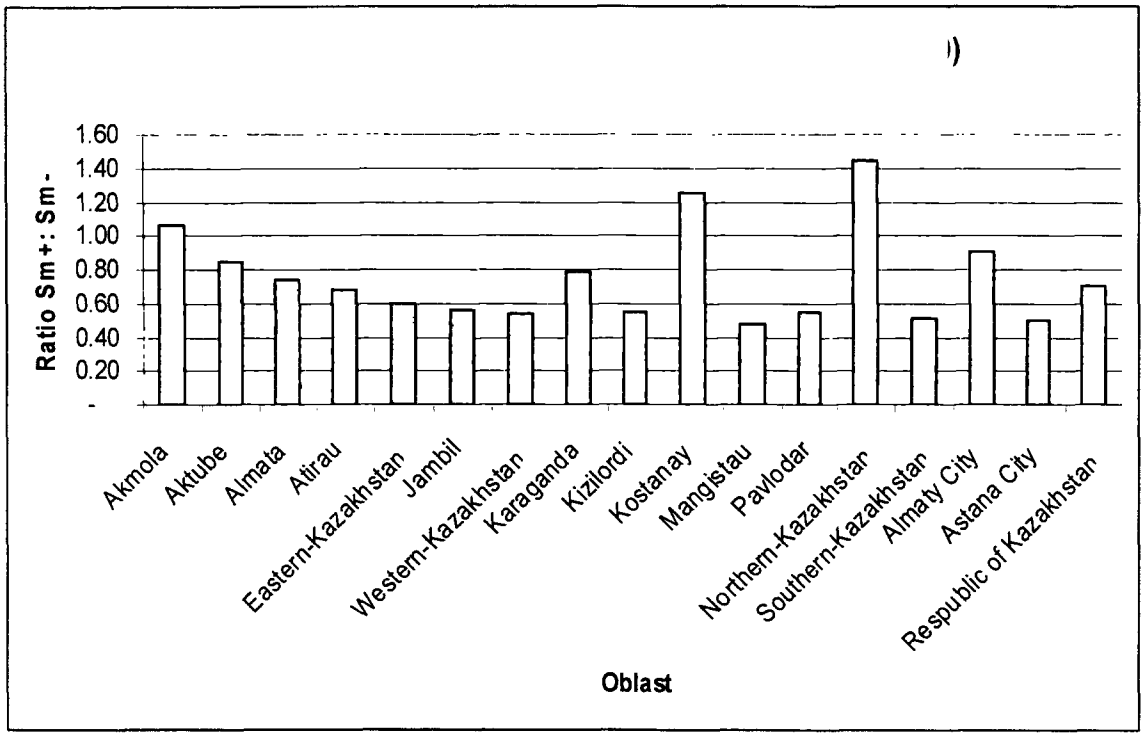
in acquired drug resistance as the treatment regime applied to previously treated cases should be Category 2 treatment rather than the Category 1 for treatment of new cases.

Figure 6: Percentage Territory vs. TB Cure Rate



Source: Study Estimates based on data from Ministry of Health, Kazakhstan 2003.

Figure 7: Ratio of New Smear Positive: Smear Negative TB Notified Cases (desired level < 1.0)



Source: Study Estimates based on data from Ministry of Health, Kazakhstan 2003.

The second reason for low performance in this area is the high dependence on x-ray as a diagnostic tool. While it is not possible to confirm that physicians are neglecting sputum smear as a diagnostic tool, it is clear that there is no trend toward increasing smear positive cases. This has been confirmed by other analysis of time series results that show that there is little improvement amongst oblasts.

Treatment Outcomes

One of the key elements regarding the evaluation of the TB Program performance is related to the percentage of new smear positive patients that enter treatment and are cured. Table 13 shows that the percentage of cured cases reaches 80 percent. The default rates remain high (compared to the desired outcome of zero default) but despite the wide differences in outcomes by oblast, the low death rate of 5 percent is an encouraging outcome in a country with a high prevalence of MDRTB. For example, Malawi, which is considered to have a good TB Program, has a TB death rate of 22 percent.

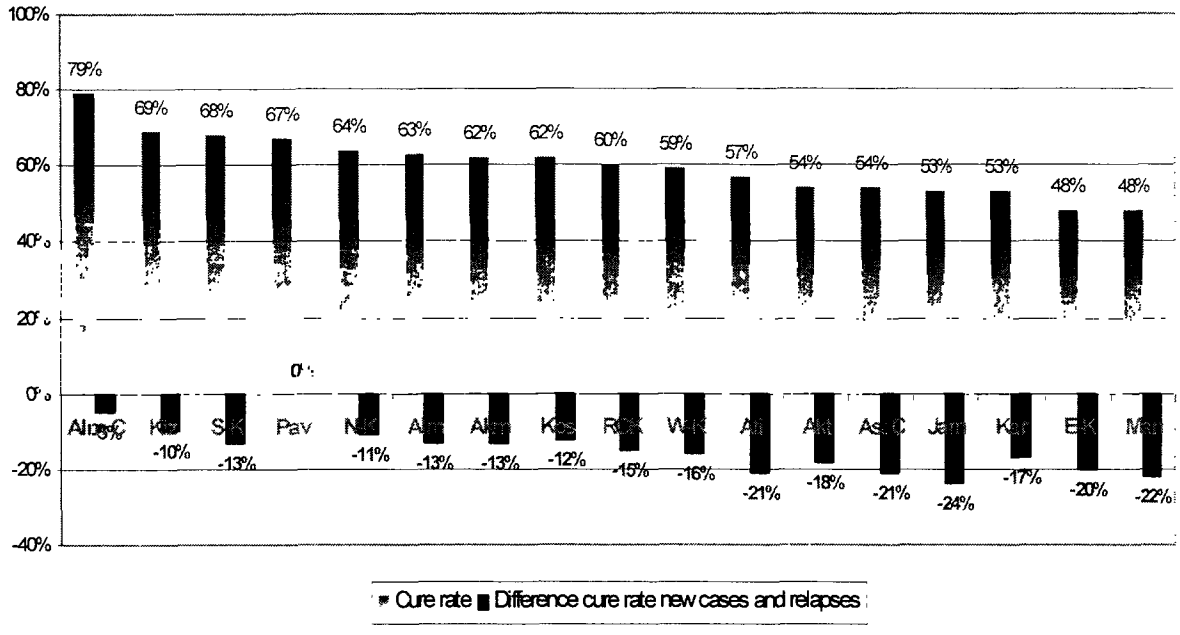
Table 13: TB Indicators by Oblast

Oblast	Ratio Sm+ : Sm-	Cure rate 2003 (%)	Default rate 2003 (%)	Failure rate 2003 (%)	Death rate 2003 (%)	New Sm+ (2002)
Akmola	1.07	81%	4%	11%	6%	703
Aktube	0.84	76%	6%	15%	5%	633
Almata	0.74	83%	2%	10%	5%	729
Atirau	0.68	78%	6%	13%	3%	473
Eastern-Kazakhstan	0.60	79%	4%	15%	6%	738
Jambil	0.56	75%	7%	14%	5%	532
Western-kazakhstan	0.53	84%	5%	9%	5%	429
Karaganda	0.79	79%	5%	13%	7%	824
Kizilordi	0.55	81%	4%	13%	5%	595
Kostany	1.26	88%	2%	8%	4%	862
Mangistau	0.48	73%	8%	16%	4%	262
Pavlodar	0.55	81%	7%	10%	3%	503
Northern-Kazakhstan	1.44	82%	2%	10%	6%	541
Southern-Kazakhstan	0.51	90%	3%	6%	2%	720
Almaty City	0.91	91%	0%	5%	2%	341
Astana City	0.50	87%	3%	9%	7%	193
Republic of Kazakhstan	**0.70**	**82%**	**4%**	**11%**	**5%**	**9078**

Source: Ministry of Health, Kazakhstan 2003.

The final analysis of treatment outcome compares the cure rates with the number of cases in relapse. This shows that those oblasts that have very low cure rates also have a much higher rate of relapse, indicating either weakness in the program or much higher rates of drug resistance. Although relapses may have been caused by treatment episodes before the introduction of DOTS, the fact that most relapses occur within two years and DOTS was introduced in 1999 allows us to make this comparison.

Figure 8: TB Cure Rate vs. New Cases and Relapses 2002



Source: Study Estimates based on data from Ministry of Health, Kazakhstan 2003.

TB Program Inputs

This section reviews the overall level of staffing, beds and facilities per 1,000 cases at both the national and oblast level to identify differences in the allocation of resources.

Staffing

As indicated in the overview of the TB Program, the TB Program remains a highly vertical structure under the Republican TB Center. Monoprofile hospitals remain at the core of the program and all staff are dedicated exclusively to treating TB. There is very little integration of TB with the PHC services. On average, Kazakhstan has 22.4 physicians per 1,000 TB cases, a mean relatively homogeneous among oblasts. With the exception of Almaty City (73 doctors per 1,000 cases), and Western Kazakhstan and Pavlodar (less than 13), oblasts have between 17 and 23 doctors.

Staffing distribution can be analyzed by considering the number of doctors and the corresponding share of total TB cases/new cases for each oblast:

a. An oblast has a *surplus* if its share of doctors exceeds the relative percentage of TB cases compared to the national burden of disease.
b. Similarly, it has a *deficit* if the opposite occurs.

Four oblasts have an apparent surplus: Southern Kazakhstan, Almaty City, Karaganda and Eastern Kazakhstan. Ten regions experience a deficit and only two (Almaty and Kzyl-Orda) have the same share for both cases and doctors.

Table 14: TB Doctors 2002

Physicians							
Region		Doctors	TB Cases	New Cases	Percentage of Total Doctors	Percentage of Total Cases	Input Indicator (Per 1,000 Cases)
1	Akmola	84	4011	1658	6%	7%	20.9
2	Aktube	83	4118	1733	6%	7%	20.2
3	Almata	108	4682	1917	8%	8%	23.1
4	Atirau	60	2931	1091	4%	5%	20.5
5	Eastern-Kazakhstan	127	5623	2205	9%	9%	22.6
6	Jambil	72	4149	1479	5%	7%	17.4
7	Western-Kazakhstan	48	3484	1338	3%	6%	13.8
8	Karaganda	151	5453	2308	11%	9%	27.7
9	Kzyl-Orda	90	4043	1760	7%	7%	22.3
10	Kostanay	67	4026	1658	5%	7%	16.6
11	Mangistau	35	2036	793	3%	3%	17.2
12	Pavlodar	59	4770	1467	4%	8%	12.4
13	Northern-Kazakhstan	40	2368	966	3%	4%	16.9
14	Southern-Kazakhstan	168	5732	2505	12%	9%	29.3
15	Almaty City	156	2157	790	11%	4%	72.3
16	Astana-City	31	2023	810	2%	3%	15.3
	Republic of Kazakhstan	**1379**	**61606**	**24478**	**100%**	**100%**	**22.4**

Source: Ministry of Health, Kazakhstan 2003.

The second staff indicator is nurses per 1,000 cases. The national average is 70 nurses per 1,000 cases. The overall distribution is even more inequitable than the distribution of physicians per 1,000 cases. Southern Kazakhstan and Kzyl-Orda have the highest coefficients, exceeding 100 nurses per 1,000 patients in both cases. Kostanau and Mongastau have less than 40. In comparison with national averages, four oblasts have a surplus (South Kazakhstan, Kzyl-Orda, Karaganda and Northern Kazakhstan), 11 experience a deficit and just one (Eastern Kazakhstan) has an identical share of cases and nurses; only two oblasts have surpluses in the case of both doctors and nurses.

Table 15: Nurses

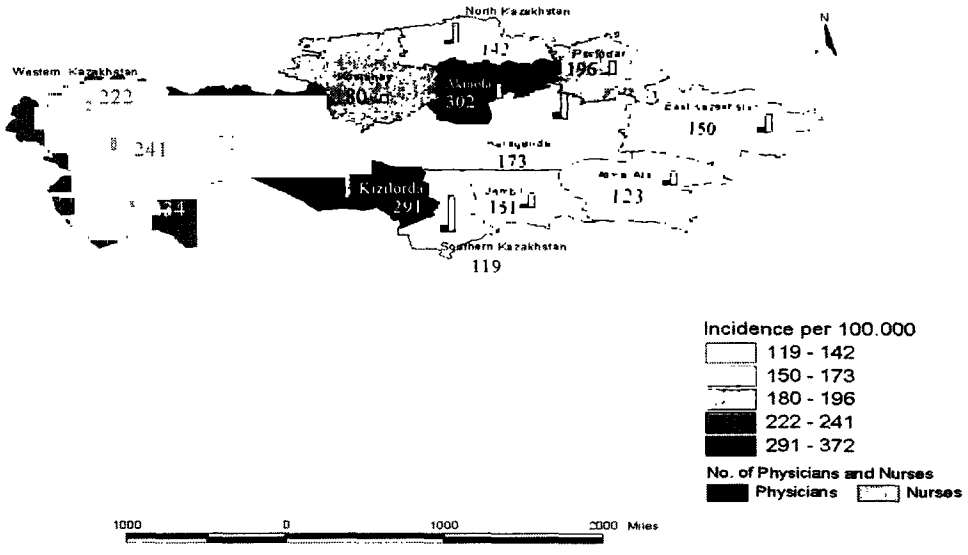
Nurses							
	Region	Nurses	TB Cases	New Cases	Percentage of Total Nurses	Percentage of Total Cases	Input Indicator (Per 1,000 Cases)
For the year 2002							
1	Akmola	250	1011	1658	6%	7%	62.3
2	Aktube	212	4118	1733	5%	7%	51.5
3	Almata	257	4682	1917	6%	8%	54.9
4	Atirau	163	2931	1091	4%	5%	55.6
5	Eastern-Kazakhstan	395	5623	2205	9%	9%	70.2
6	Jambil	241	4149	1479	6%	7%	58.1
7	Western-Kazakhstan	189	3484	1338	4%	6%	54.2
8	Karaganda	529	5453	2308	12%	9%	97.0
9	Kzyl-Ordaordi	444	4043	1760	10%	7%	109.8
10	Kostanay	139.5	4026	1658	3%	7%	34.6
11	Mangistau	74	2036	793	2%	3%	36.3
12	Pavlodar	249	4770	1467	6%	8%	52.2
13	Northern-Kazakhstan	187	2368	966	4%	4%	79.0
14	Southern-Kazakhstan	755	5732	2505	17%	9%	131.7
15	Almaty City	130	2157	790	3%	4%	60.3
16	Astana-City	103	2023	810	2%	3%	50.9
	Republic of Kazakhstan	**4317.5**	**61606**	**24478**	**100%**	**100%**	**70.1**

Source: Ministry of Health, Kazakhstan 2003.

The variance between the availability of health care professionals and the prevailing notification rate is shown in Figure 9. As shown, the three oblasts with highest notification rates - Aktube, Kzyl-Ordaorda and Akmola - have staffing rates in line with national averages but well below the level required to cover the number of new cases per year.

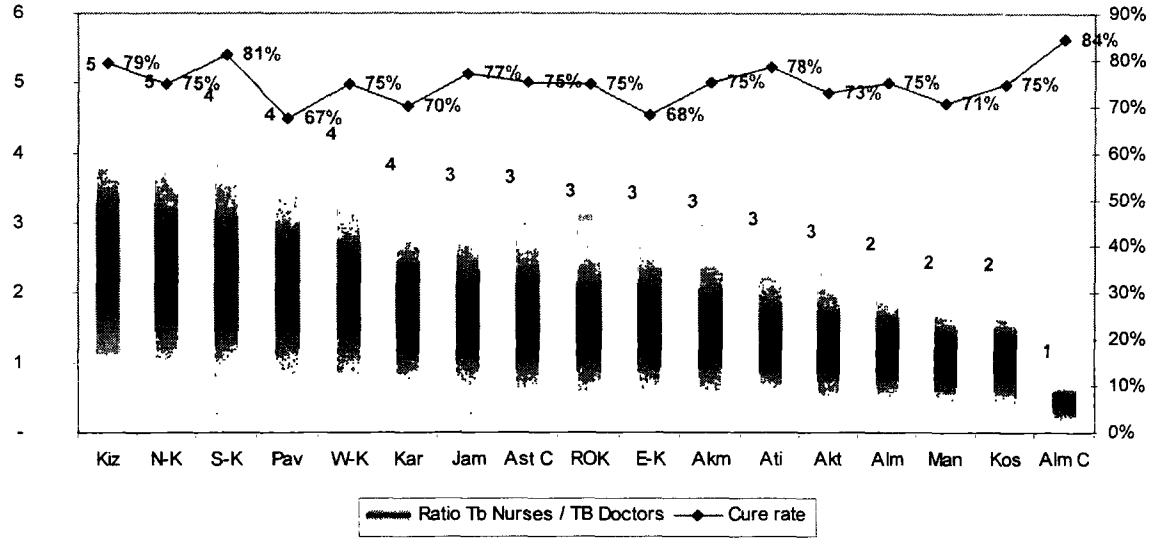
Another way to evaluate staff distribution and outcomes is by assessing the relationship between the nurse/doctor ratio and cure rates. Figure 10 shows no clear correlation between a high or low nurse/doctor coefficient and cure rates. For instance, Northern Kazakhstan, with five nurses per doctor, and Atyrau with three, have exactly the same cure rate, 75 percent.

Figure 9: TB Notification Rates vs. Health Staff 2002



Source: Study Estimates based on data from Ministry of Health, Kazakhstan 2003.

Figure 10: Ratio TB Nurses / TB Doctors vs. Cure Rate by Region 2002



Source: Study Estimates based on data from Ministry of Health, Kazakhstan 2003.

Hospital Beds and Infrastructure

The continuing reliance on hospital treatment under the TB Program underscores the importance of analyzing the relationship between hospital beds, TB facilities and outcomes. This section looks at the distribution of beds as a function of the number of TB cases.

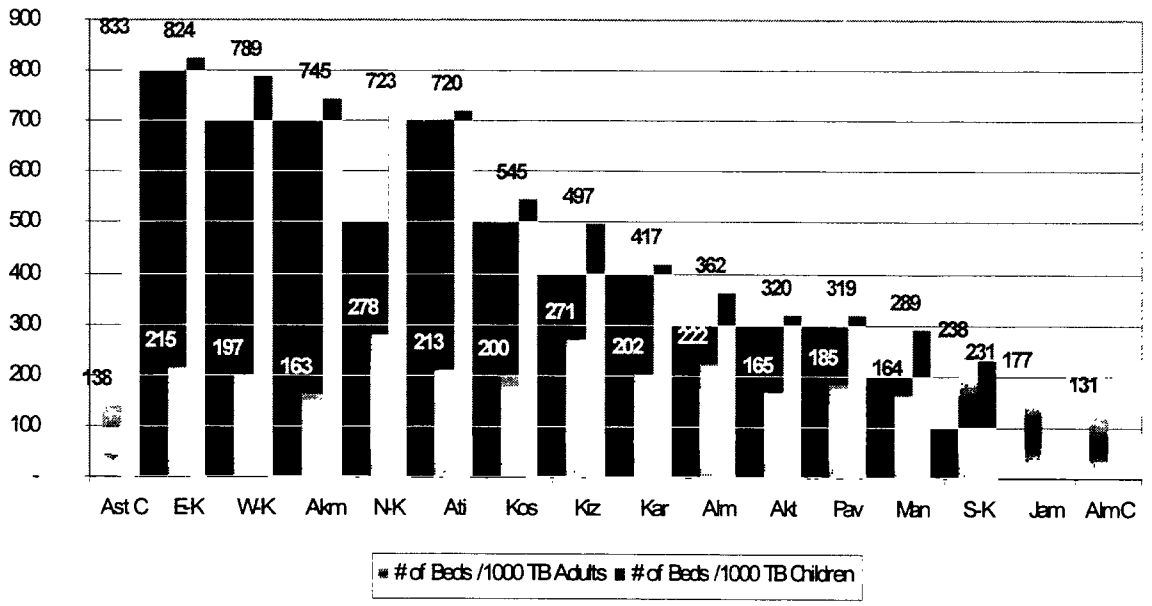
Hospital beds are mainly concentrated in four oblasts: Southern Kazakhstan, Eastern Kazakhstan, Karaganda and Kzyl-Orda, which comprise one third of adult beds supply. Almaty,

Astana and Mangistau have the lowest share of total beds, accounting for just seven percent of total beds. The case of Almaty, a top performer, does not suggest a deficit in hospital beds. On the contrary, its small participation is due to low notification and prevalence rates in Almaty, so bed supply is correspondingly low compared to other oblasts.

Almaty, Eastern Kazakhstan and Pavlodar have the highest number of childrens' beds, with 31 percent of total supply. Almaty City, Jambil, Mangistau and Astana City account for seven percent. Again, these figures are not due to either an outstanding or a poor performance.

Figure 11 shows that the ratio of beds per 1,000 cases varies from a high of 278 in Northern Kazakhstan to a low of 131 in Almaty City. While this may reflect the distance to services and the possibility of substituting outpatient for inpatient treatment, it is clear that further efforts need to be made to rationalize the number of beds per 1,000 cases. This is particularly true with regard to pediatric TB beds. In this case, there is almost a 4 fold difference between the oblast with the highest number of beds per 1,000 patients (Astana City) and the lowest (Southern Kazakhstan).

Figure 11: Beds per 1,000 TB Cases

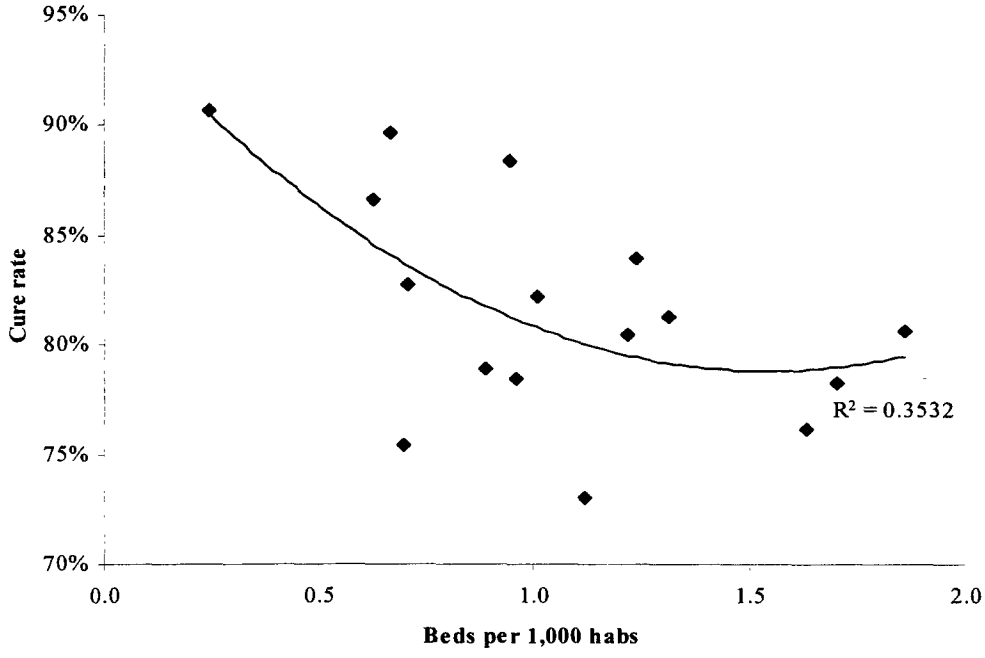


Source: Study Estimates based on data from Ministry of Health, Kazakhstan 2003.

The relationship between beds per 1,000 and cure rates is depicted in Figure 12. The shape of the curve may be taken as an indication of the existence of two groups of oblasts. On one hand, the first segment presents a negative correlation between both variables, so the higher the number of beds, the lower the cure rate. This part may be interpreted in an allocative perspective: those oblasts with low cure rates tend to invest more in infrastructure and equipment, reflecting a higher bed coefficient. On the other hand, the positive segment of the curve shows an outcome perspective, so a higher level of investment (i.e. bed per 1,000 persons) corresponds to a higher cure rate. Additionally, the figure also supports the idea that, in order to improve cure rates, bed supply must be above a certain level, in this case, close to 1.6 beds per 1,000 persons.

Another way to approach the former is through the division of oblasts into two groups. The first one corresponds to those oblasts where, despite the existence a low bed coefficient, the cure rate is high due to other relevant factors such as treatment efficiency, physicians and drugs availability. The other group consists of those oblasts that are more dependent on infrastructure to improve their outcomes, so bed availability plays a critical role in the hospitalization process.

Figure 12: TB Beds and Cure Rate



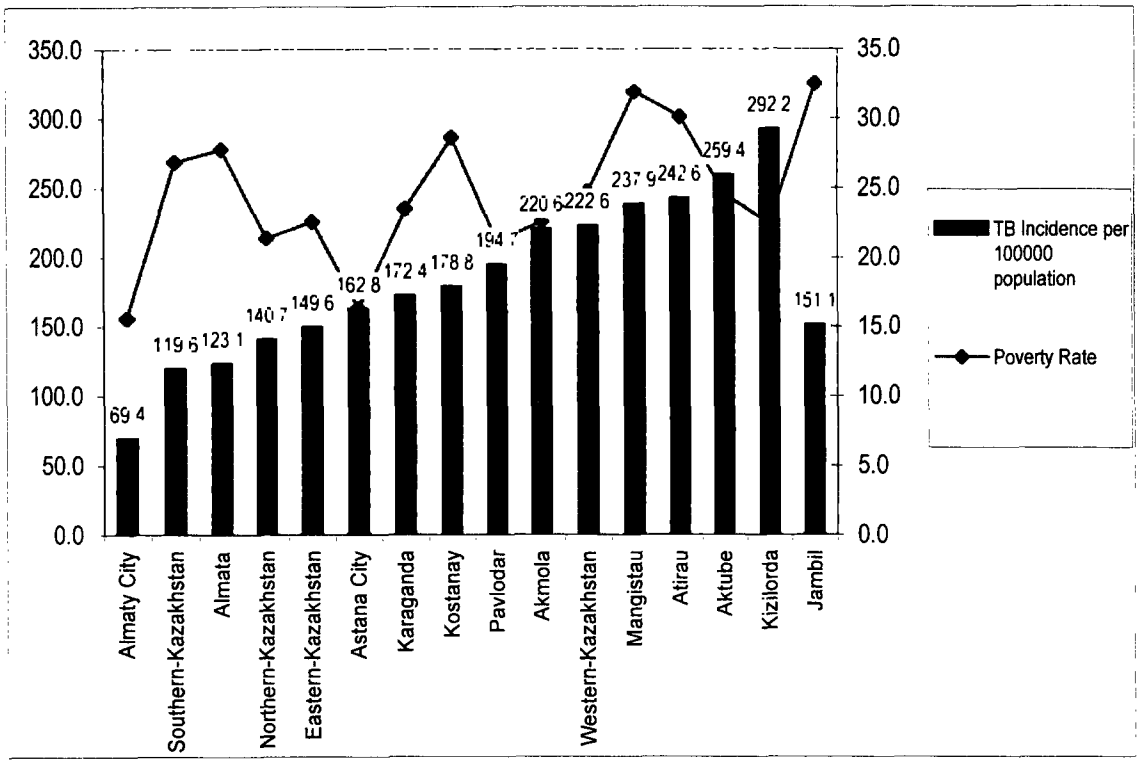
Source: Study Estimates based on data from Ministry of Health, Kazakhstan 2003.

TB and Social Conditions

The last section evaluates the relationship between TB outcomes and a set of economic and social variables such as poverty levels, unemployment rate and others.

Poverty levels and TB notification rates display a slightly positive relationship. As an example, Almaty City, with the lowest TB notification rate (69.4) has a poverty rate near 15 percent, while Atyrau, with 242 TB cases per 100,000 people, has a poverty rate of 30 percent. Some cases, however, do not reveal a systematic pattern. For instance, Almaty ranks among the top three oblasts in terms of lower notification rates (123.1) although its poverty level reaches 28 percent. In contrast, Kzyl-Orda, with almost 300 cases per 100,000 inhabitants, experiences a poverty rate of 23 percent.

Figure 13: TB Notification Rate vs. Poverty Rate



Source: Study Estimates based on data from Ministry of Health, Kazakhstan 2003.

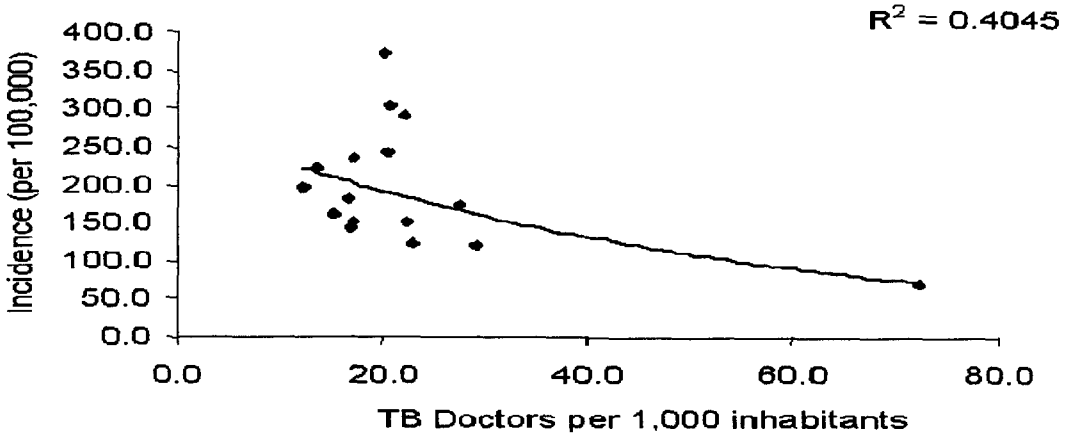
Relationship between Outcomes and Inputs

This section analyzes the correlation between input variables (i.e. doctors, nurses and beds per 1,000 inhabitants) and two outcome indicators, prevalence and notification per 100,000 people and cure rates.

The next three figures show the relationship between notification rates and inputs. For the first two indicators (human resources), the relation is as expected - those oblasts with higher doctor or nurse coefficients tend to experience a lower notification rate.

A special caveat is important here. Although the coefficient of determination (R^2) is significantly different between doctors (0.4) and nurses (0.02), suggesting that the former provides a better explanation of notification dynamics than the later, the reality is somewhat different. As shown in Figure 14, the R^2 for doctors per 1,000 people and notification rate is highly biased towards Almaty (the outlier in terms of lower notification and higher physicians per 1,000), whose physician indicator is 3.2 times greater than the national average. If we exclude this value, the coefficient of determination falls to 0.01. As shown, most oblasts are concentrated around the national average of 22 physicians per 1,000 inhabitants indicating that little variation is present even though there are large differences in the rates of notification. This reflects the underlying historical allocation of staff, based on the number of beds rather than patients.

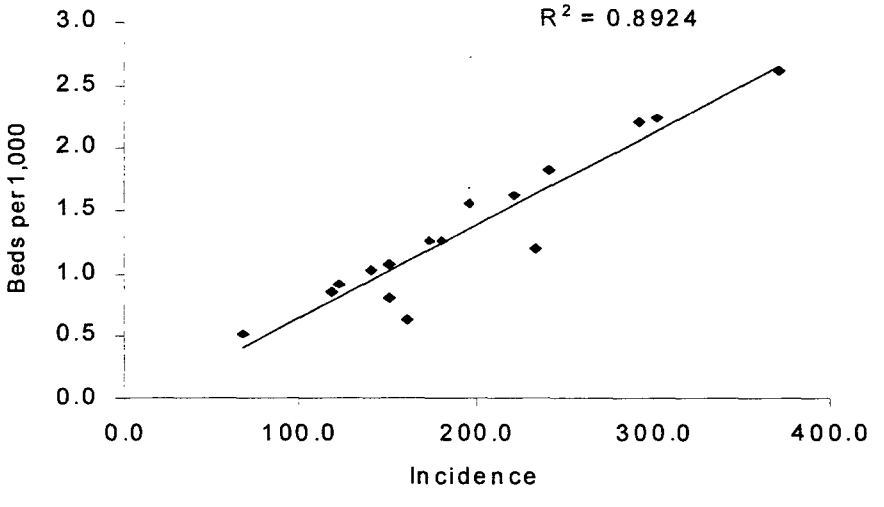
Figure 14: TB Notification Rates and TB Doctors



Source: Ministry of Health, Kazakhstan

The analysis of notification rates and beds per 1,000 people differs from the previous two indicators. In this case, there is a strong correlation between inputs and outcomes. Beds are a special case, particularly because they are the dependent variable, not the independent. The former means that those oblasts with higher notification rates require more beds for treatment. Similar results are obtained when we use prevalence rates, instead of notification rates.

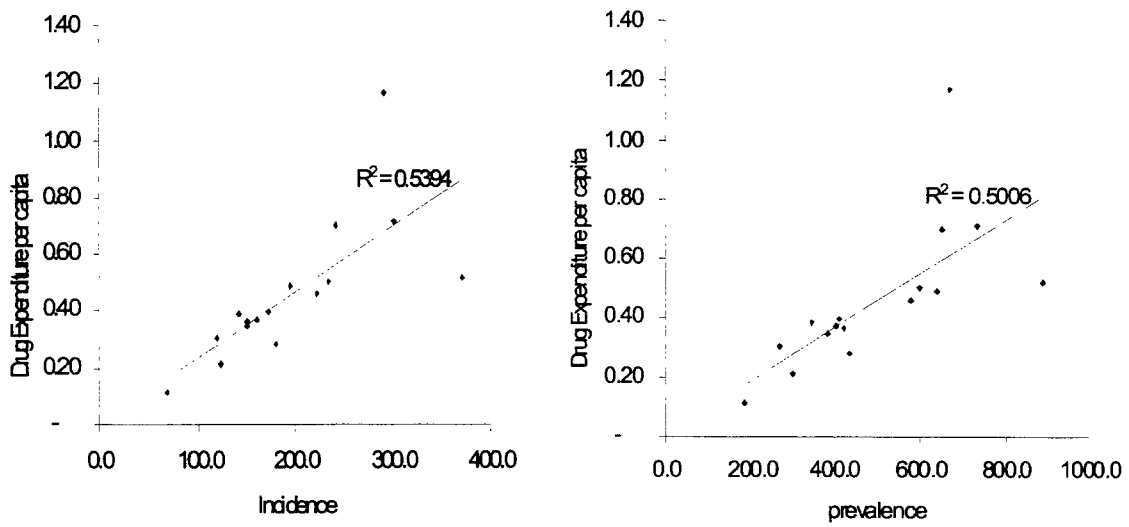
Figure 15: TB Beds and Notification Rates



Source: Ministry of Health, Kazakhstan

Similar conclusions arise from financial inputs and outcomes analysis. The correlation between notification and prevalence rates and drug expenditure per patient is similar to that for beds in two aspects. First, the coefficient of determination is relatively high, at 0.54 for notification rates and 0.50 for prevalence rates. At the same time drug expenditure is taken as the dependent variable, and similar results are found as with beds per 1,000 people: oblasts with higher rates tend to allocate more resources to drug purchasing.

Figure 16: Notification/Prevalence Rates and Drug Expenditures



Source: Ministry of Health, Kazakhstan

Based on the previous input-outcome analysis, oblasts can be classified into two broad groups.

1) The first group, based on human resource indicators, is characterized by low and negative correlation between inputs and outcomes suggesting two issues: (i) there is a heterogeneous, inefficient allocation of human resources among oblasts. The wide diffusion of observations points toward the existence of a range of cases with similar input coefficients and very different needs; and (ii) the existence of more doctors and nurses means only a small reduction in notification and prevalence rates.

2) A second group is based on beds and drug expenditures and points to a strong correlation between variables. In such cases, the analysis shows that those oblasts with a higher burden of disease allocate more resources according to demand. The question is whether the higher allocation of resources based on the burden of disease influences the outcomes. This issue is explored in the next section.

Do More Inputs Lead to Better Cure Rates?

The evaluation of input-outcome correlations yields some interesting differences vis-à-vis the previous findings. For instance, the relationship between beds per 1,000 people and cure rates is

low and negative, diverging from what was observed in prevalence and notification rates. In reality, Figure 17 shows what appears to be a U-shaped correlation: a group of oblasts has very high cure rates with low ratios of beds per 1,000 and a second group achieves higher cure rates with a higher ratio of beds per 1,000.

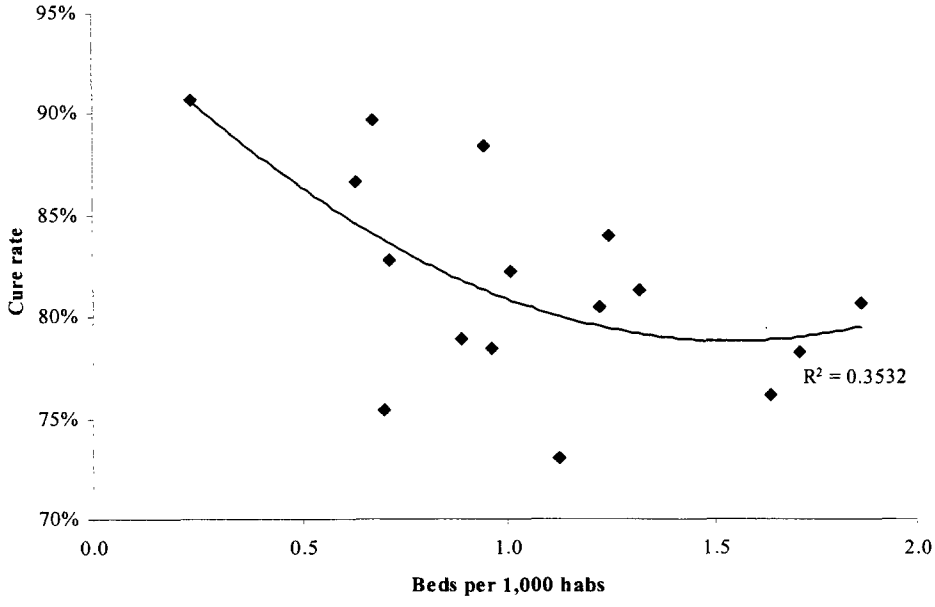
This result, while at first confusing, would appear to be consistent with factors observed elsewhere in the study and confirmed through focus groups and patient interviews. There is clearly a group of patients that can be adequately treated with DOTS on an out-patient basis – implying that there is no need for increasing beds. At the same time, there is a second group of patients, in rural areas, in greater conditions of poverty and/or with other social diseases such as drug addiction and alcoholism, for whom out-patient therapy does not work. These patients require hospitalization and will require increasing guarantees of all requirements in order to ensure treatment compliance. This conclusion, which would lead to changes in protocol, has been confirmed by programs in the USA (Box 1).

In terms of financial resources (payroll per capita and drug expenses per patient), the situation does not differ considerably, although both cases have different features. Regarding payroll and cure rates, the figures show a slightly negative correlation between wages and outcomes. These results seem to confirm findings presented in other recent studies that outcomes are correlated with the availability of free drugs for TB patients. Limited spending per capita on drugs undermines the efficiency of the TB Program.

In summary, the results presented in this section seem to point to several important results that underline program performance. These findings are also supported by further analysis of composite input-outcome indicators which are presented in Annex 4. The main results are:

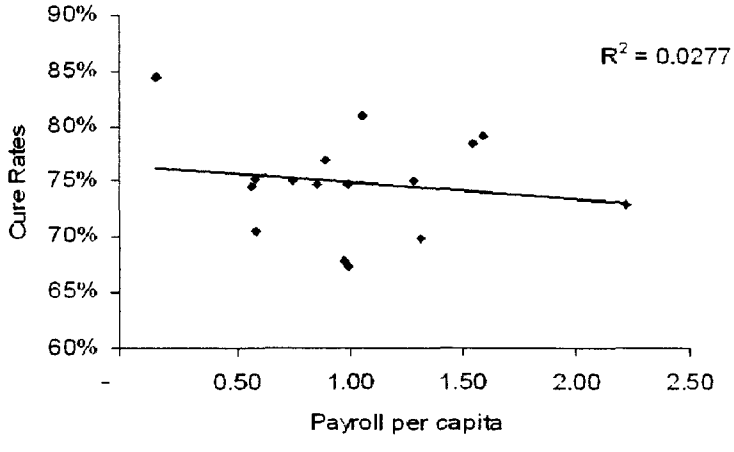
- In many cases, there is a need to reallocate staff to those oblasts that have a higher burden of disease. Although staff reallocations are difficult, allocating future new staff positions to those areas currently under-staffed will gradually overcome differences.
- Many of the differences in program outcomes do not appear to be related to the availability of inputs but rather to intangible issues such as the quality of local management. While further analysis of the best performing oblasts will be critical to understand how they achieve better results with fewer inputs, the results point to the fact that good results can be achieved without additional investments in beds and staff.
- The analysis points to an underlying relationship between payroll spending, drug expenditure per patient and cure rates. Higher levels of spending on staff salaries crowds out spending on drugs and therefore limits the efficiency of the program.

Figure 17: Cure Rates and Beds



Source: Study Estimates based on data from Ministry of Health, Kazakhstan 2003.

Figure 18: Cure Rates and Average Salary per Capita



Source: Study Estimates based on data from Ministry of Health, Kazakhstan 2003.

Box 1: Approaches for Improving Adherence to Anti-TB Treatment in New York and South Carolina, USA

Patients with TB who fail to complete a standard course of anti-TB therapy are at increased risk of treatment failure and may be in danger of developing drug-resistance. During 1986-1991, the South Carolina Department of Health and Environmental Control and the NYC Department of Health introduced changes in their TB programs to improve adherence, employing a combination of DOTS and commitment for inpatient management.

Since 1985, most county health departments have routinely used incentives (food, clothing and books) and enablers (e.g. free transportation to clinics) to ensure completion with anti-TB therapy. Since 1985 the South Carolina program administered DOTS as a first line defense and then employs hospitalization as a measure to address patients that do not keep appointments for DOTS. These patients are notified by the local health official and informed that they are required to take the treatment under observation of the public health nurse. If they continue to be incompliant, they are committed to a long-term facility for care. The average length of stay for these patients is 68 days.

During the five year period, the use of incentives, enablers and increased hospitalization for incompliant patients, allowed the SC program to increase completion from 93 to 96 percent and decrease the number of new cases from 593 to 410. The costs were: $0.95 to $20 per treatment for patient incentives and enablers; $653 per patient for DOTS; $450 for committed patients in half-way houses; and $10,700 per hospitalized patient.

New York City had similar results. In the case of NYC, 30 percent of people with TB are injecting drug users, and approximately 25 percent are homeless. Patients who do not adhere to treatment are offered residential treatment; however, some patients with histories of repeated non-adherence may be committed for inpatient management. To assess the effectiveness of inpatient treatment, New York City Department of Health (NYCDH) evaluated all patients admitted from January 1988 to April 1991.

The results indicate that patients were more likely to have a successful outcome if the length of commitment for inpatient management was more than 62 days. Neither abuse of substances or having isolated resistance to anti-TB medications were associated with a lower likelihood of successful outcome.

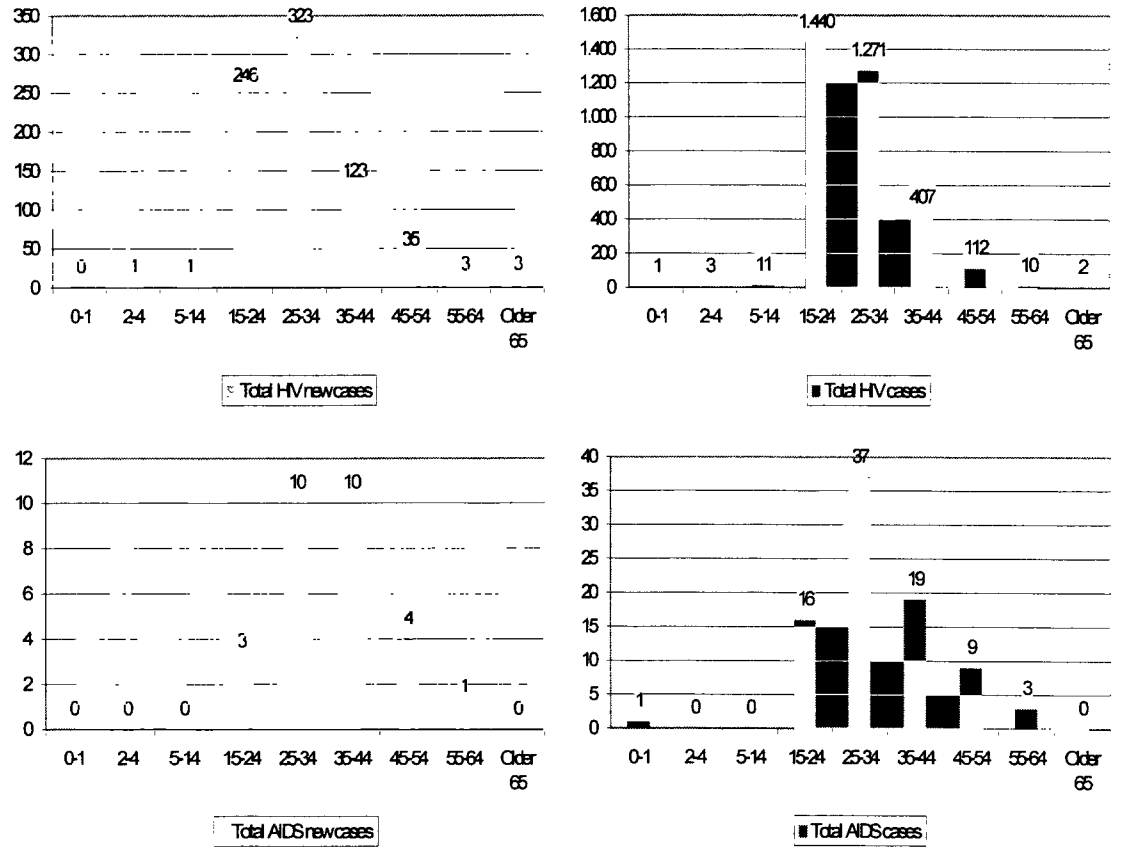
Source: www.cdc.gov/mmwr/preview/mmwrhtml/00019521.htm

PERFORMANCE OF THE HIV/AIDS AND STIS PROGRAM

HIV/AIDS and STIs data trends in Kazakhstan in the 1990s and in 2000-2002 are summarized in Tables 16-18. Both AIDS cases and deaths, and HIV cases, have grown significantly, especially during the last six years. AIDS cases increased tenfold and total deaths increased by five times between 1995 and 2001; syphilis cases grew almost a hundred times between 1990 and 2000.

HIV cases increased from five to 1,175 cases in the same period, meaning that total number of cases increased 235 times. HIV prevalence was 17 cases per 100,000 in 2002. The most vulnerable groups were IDUs. By 2001, for example, 89 percent of the cases were among IDUs, with a prevalence rate of 3.3 percent. Prisoners, another vulnerable group, experienced important increments: HIV cases increased from 218 to 446 cases and HIV incidence rate increased from 171 to 340 cases.

Figure 19: HIV/AIDS Cases 2002



Sanigest Internacional S.A.

Source: AIDS Center, Kazakhstan 2003

Despite these problems during the 1990s, resources for AIDS, HIV and STI surveillance and control did not always grow at the same pace. By 2002, the total budget allocated to HIV/AIDS was US$2.68 million.

By population group, most of the HIV cases appeared in the 15–34 age group in 2002. For instance, most new cases are concentrated in the 25–34 age group, but 15–24 year olds had the highest share of total HIV (more than 40 percent). A different situation occurs with AIDS, where the 25–34 age group dominates both new and total cases and the 35–44 age group ranks second. In total, both groups comprise 60 percent of total cases. Mother to child vertical transmission is limited, with only 11 children born with HIV, but this may be due to the fact that testing for pregnant women was only recently initiated. The following table shows that the MTCT rate is roughly 24 percent of HIV infected infants born to HIV infected mothers.

By oblast, AIDS cases tend to be uniformly distributed among regions. However, this is not the situation with HIV. Regions with the highest shares of existing HIV cases are Atirau, and Karaganda with more than 80 percent of new cases. Those oblasts with the lowest share are

Jambali, Almaty City and Northern Kazakhstan, with less than 45 percent of cases. However, oblasts with a low share of existing cases are those with the largest number of new cases.

Table 16: HIV/AIDS 1990–2001

	1990	1995	2000	2001
AIDS Deaths	-	3	6	15
AIDS Cases	-	2	8	20
HIV Cases	4	5	347	1,175
HIV Cases among IDUs	-	3	302	1,050
Syphilis Cases	242	20,235	23,996	20,577
Drugs Users (registered)	10,300	10,900	37,812	42,680
IDUS	3,000	4,583	26,087	31,390
Drug Users (estimated)	-	-	183,125	180,410
IDUS (estimated)	-	-	130,800	128,900
CSW (estimated)	-	-	-	13,000
Trust Points	-	-	30	78
Harm reduction Programs	-	-	3	3
CSW/MSM Programs	-	-	-	2
AIDS Centers	19	19	21	21
AIDS Centers staff	213	407	458	485

Source: AIDS Center, Kazakhstan 2003.

Table 17: HIV/AIDS in Prisons 1990–2001

	1990	1995	2000	2001
Prisoners	64,490	65,359	58,424	67,937
HIV Cases	0	0	218	446
HIV Prevalence Rate	0	0	171.6	340.4
People entering prisons	51,018	51,613	54,211	56,785
People released from prisons	23,895	19,354	33,222	24,544
Correctional institutions	54	60	74	75
Prisons w/ AIDS facilities				4
Prisons w/ hospitals beds				1

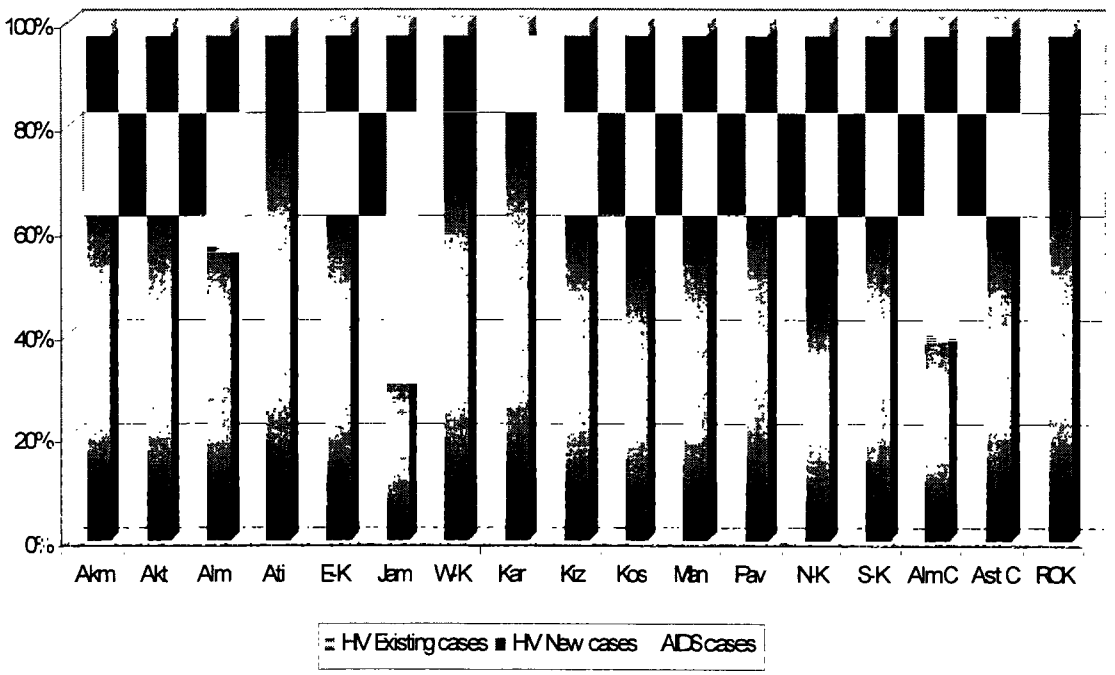
Source: AIDS Center, Kazakhstan 2003.

Table 18: HIV/AIDS 2002

Indicator	2001	2002
Government funding		USD $2,7
HIV/AIDS Doctors	260	292
HIV/AIDS Nurses	260	257
HIV/AIDS Facilities	20	21
HIV Prevalence per 100,000		106,5
HIV Prevalence among urban population		
% of HIV- infected sex workers		1%
% of HIV- infected IDU		3,3%
% of HIV- infected prisoners		0,3%
% of HIV- infected infants born to HIV- infected mothers		24%
IDUS		71%

Source: AIDS Center, Kazakhstan 2003.

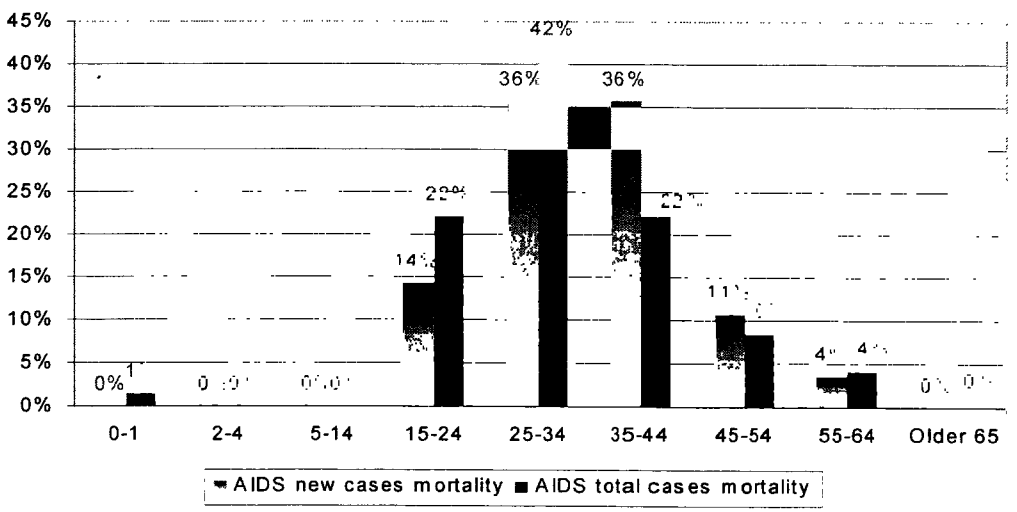
Figure 20: HIV/AIDS Cases by Region 2002



Source: Ministry of Health, Kazakhstan 2003.

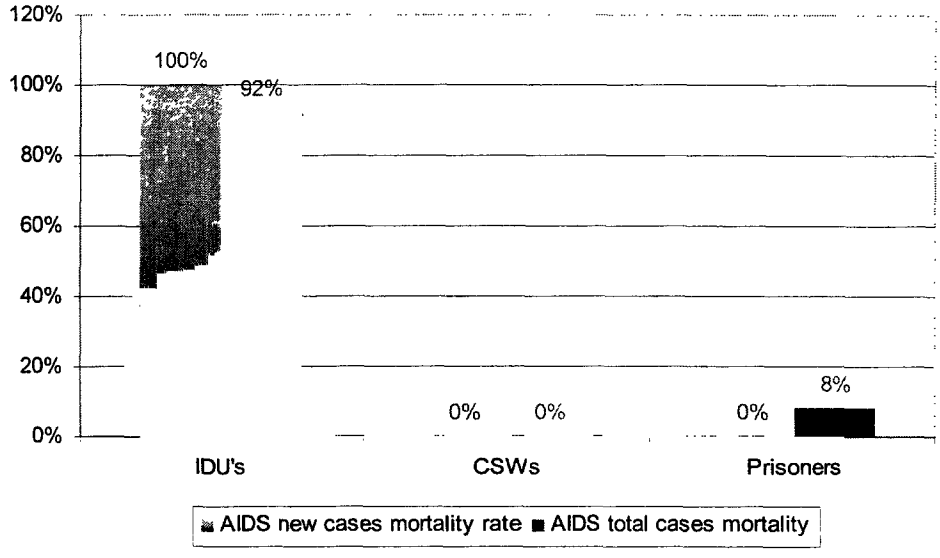
AIDS mortality by age is shown in Figure 21: 72 percent of mortality among new cases occurs in the 25–34 and 35–44 age groups, while the 15–24 group accounts for 14 percent. AIDS mortality by vulnerable group confirms that all deaths among new cases were IDUs, while 92 percent of the total were IDUs and 8 percent prisoners (possibly, IDUs as well).

Figure 21: AIDS Mortality by Age Group 2002



Source: Ministry of Health, Kazakhstan 2003.

Figure 22: AIDS Mortality among Risk Groups



Source: Ministry of Health, Kazakhstan 2003.

HIV/AIDS Program Inputs

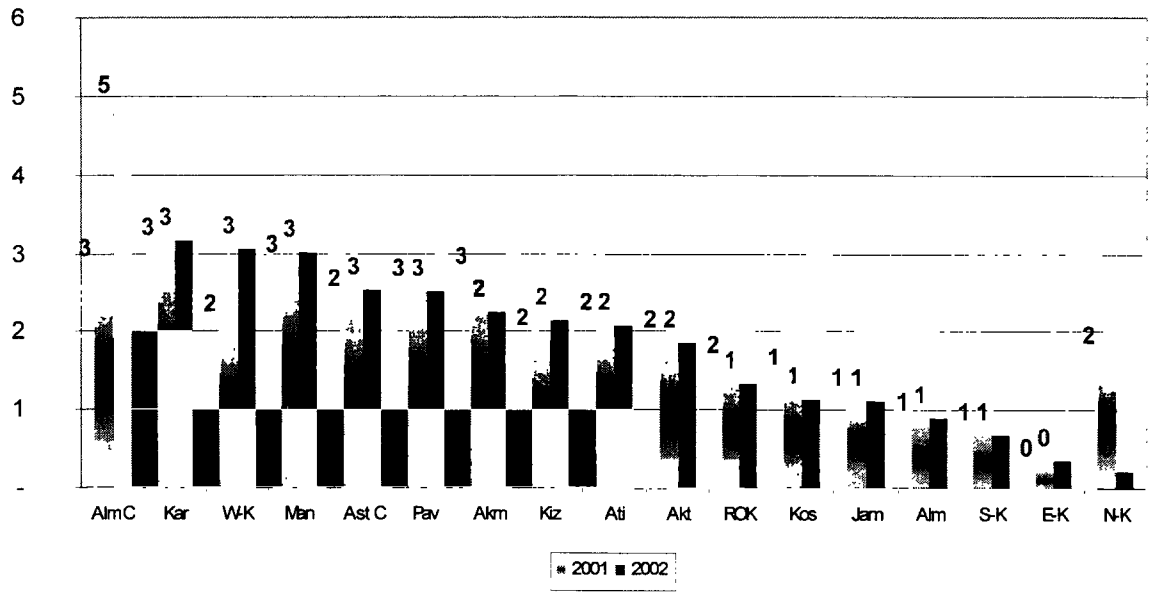
Regarding inputs, results show contradictory trends. AIDS Centers increased from 19 to 21 between 1990 and 2001. However, total staff in those centers more than doubled and continued increasing between 2001 and 2002, but only in certain areas. For instance, total HIV/AIDS doctors increased from 260 to 292 physicians in one year, but nurses decreased from 292 to 260.

Figures 23 and 24 show the distribution of doctors and nurses by oblast. In general terms, for 2002, the highest ratios were found in Almaty City, with five doctors per 100,000 people, followed by Karaganda and Western Kazakhstan (three doctors). On the lower extreme of the spectrum are Northern Kazakhstan, Eastern Kazakhstan and Southern Kazakhstan, all three with one or less than one doctor per 100,000 habitants. From 2001 to 2002, eight oblasts increase their coefficients, six kept them practically intact and two reduced the number of doctors.

Nurses per 100,000 inhabitants follow the same pattern at the bottom of the scale, but not at the top. Here, the top three oblasts are Karaganda, Astana City and Mangistau, with Almaty City ninth among all oblasts. The four regions at the bottom of the list are Kostanay, Northern Kazakhstan, Eastern Kazakhstan and Southern Kazakhstan, virtually the same as the lowest regions among doctors. From 2001 to 2002, five oblasts increased their nurse indicator, seven regions maintained the same level and four reduced the number of nurses.

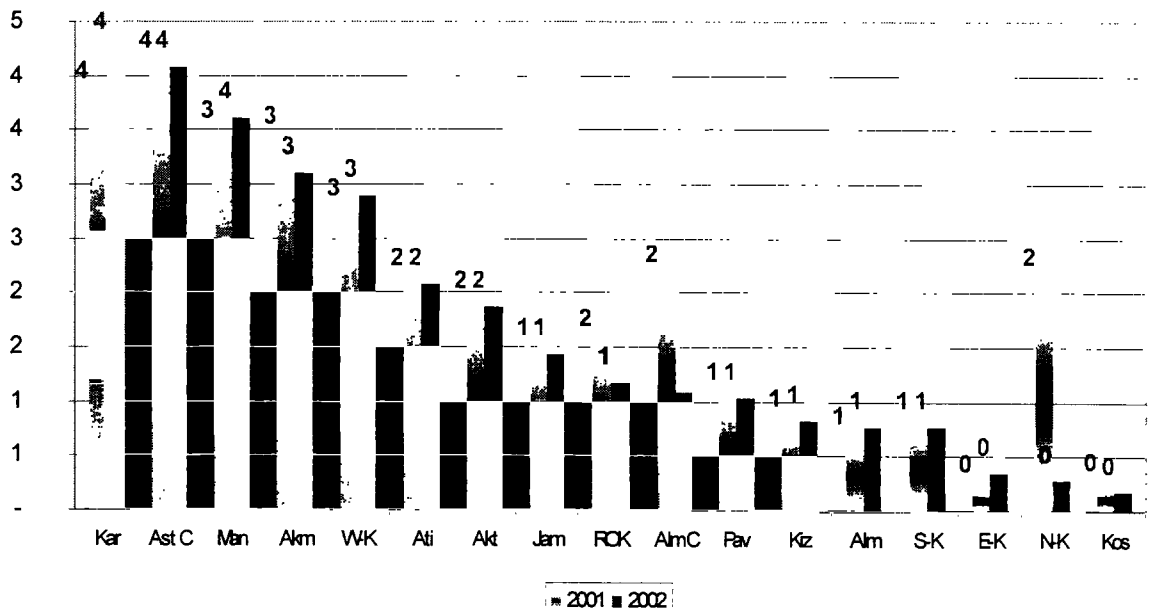
Southern Kazakhstan is an interesting case. As observed above, this oblast has the largest payroll expenditures share. However, in the case of both doctors and nurses per 100,000 people, it appears in the bottom of the list. This may imply one of two things: Southern Kazakhstan pays excessively high medical salaries or has a predominantly administrative staff.

Figure 23: HIV/AIDS Doctors per 100,000 People



Source: Ministry of Health, Kazakhstan 2003.

Figure 24: HIV/AIDS Nurses per 100,000 People



Source: Ministry of Health, Kazakhstan 2003.

Main Outcomes

A survey of some of the main policies followed until 2002 yields the following results:

- 98.3 percent of patients with STIs were appropriately diagnosed, treated and counseled.
- 76.2 percent of people aged 15-24 are capable of both correctly identifying ways of preventing sexual transmission of HIV and rejecting misconceptions about HIV transmission.
- 276,000 condoms were distributed among CSWs and 502,000 among IDUs.
- There are currently 25 client-friendly clinics, 78 trust points and 6164 volunteer educators including prisoners and staff that work with prisoners.

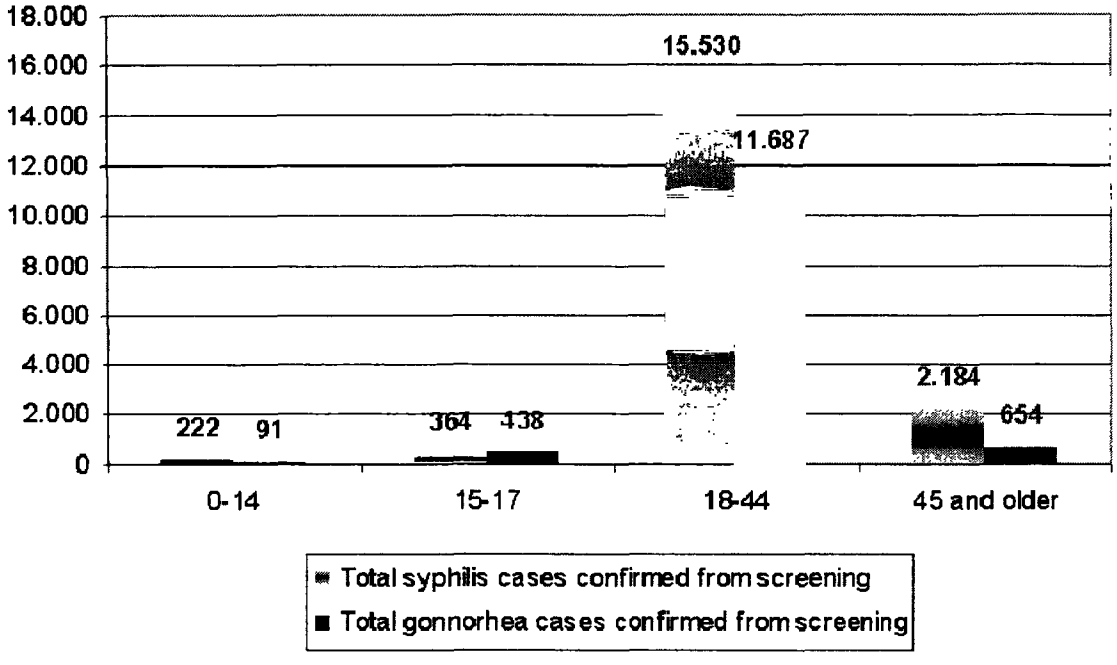
There are still some areas that require additional support. For instance, only one percent of people with advanced HIV infection receive antiretroviral therapy. While this is likely to increase in the coming years as Kazakhstan implements the Global Fund grant, it is important to understand the magnitude of change that will be required. Also, 4.5 percent of HIV-infected pregnant women receive a complete course of antiretroviral prophylaxis to reduce mother-to-child transmission. Finally, only 14 percent of injecting drug users practice adequate behavior to reduce transmission.

A last section refers to STIs, although problems with data availability severely affect the analysis. First, by age group, the highest incidence of new cases occurs in the 18–44 age group, where more than 27,000 new cases appeared in 2002. Interestingly, the 45 and above age group contributed almost 3,000 cases, being the second most important group.

In terms of inputs, the country has, on average, six STIs doctors per 100,000 inhabitants. Astana City is the leading oblast with 25 STIs physicians per 100,000 people. The rest of the regions have between three and nine doctors per 100,000 people.

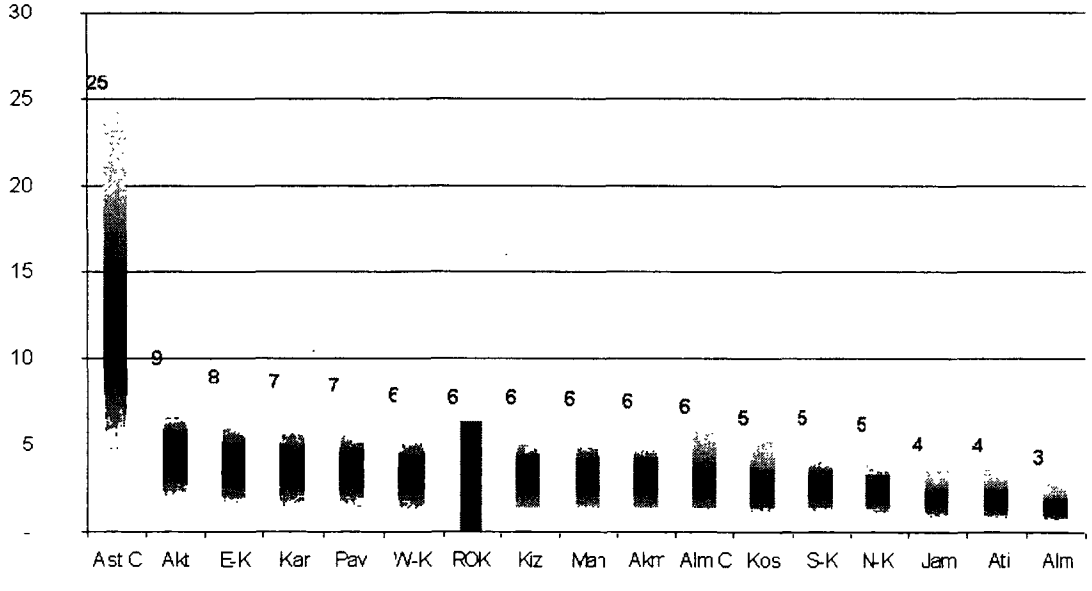
The number of STIs beds are shown in Figure 27. Southern Kazakhstan and Almaty City have the highest proportion of beds for adults, and Southern Kazakhstan and Eastern Kazakhstan for children. On the other hand, Western Kazakhstan, Atyrau and Mangistau have the lowest shares of STIs beds.

Figure 25: New STIs Cases by Age Group 2002



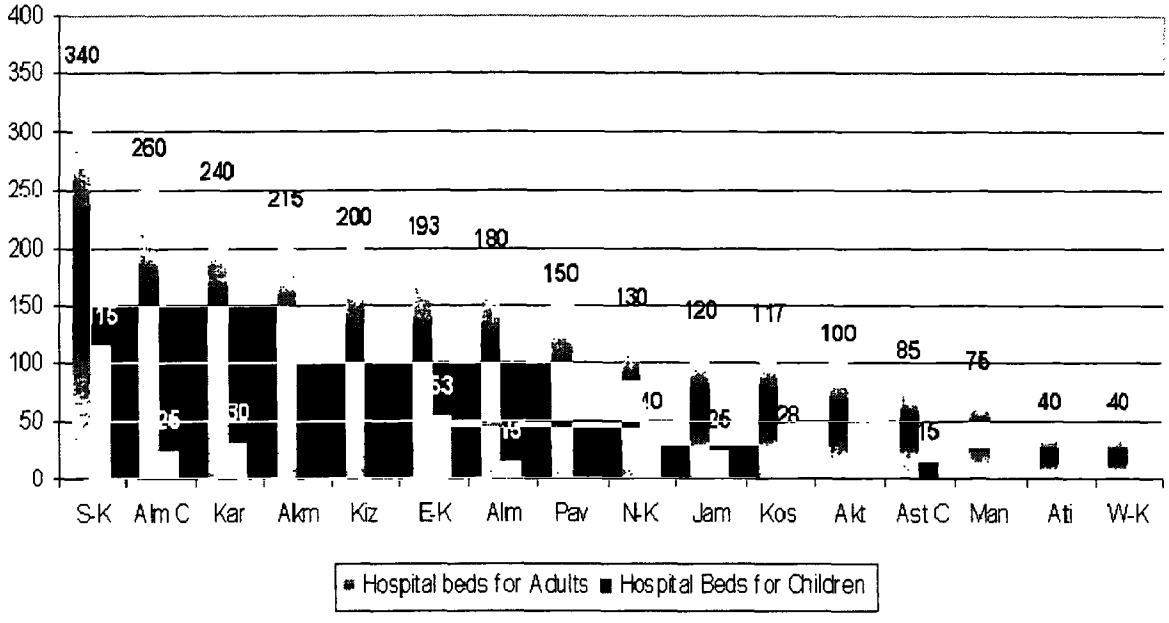
Source: Ministry of Health, Kazakhstan 2003

Figure 26: STIs Doctors per 100,000 by region 2002



Source: Ministry of Health, Kazakhstan 2003

Figure 27: STIs Beds by Region 2002



Source: Ministry of Health, Kazakhstan 2003

4. PATIENT AND PROVIDER PERCEPTIONS AND FACILITY SURVEY

This section is based on the analysis of results from focus groups and direct interviews carried out over a period of three months. Quotes of those interviewed are shown in italics. Collected information allowed researchers to group the findings around key issues related to:

a. Care seeking behavior of patients, which details various factors influencing population attitudes and practices with regards to disease;
b. Inputs for adequate service provision; and
c. Process of care provision emphasizing weaknesses and strengths where possible.

PERCEPTIONS ABOUT THE TUBERCULOSIS PROGRAM

Due to increasing rates of TB in Kazakhstan, which reports the highest prevalence among former Soviet Union countries, the National TB Program has increased annual spending and receives significant financial resources from regional/local budgets. However, progress in terms of improving cure and mortality rates could be even better given the high level of investment. The results of the qualitative analysis highlight some of the underlying factors, which may be limiting the effectiveness of these investments.

Focus Groups: TB Program

Discrimination

Various factors were found to have a significant influence on the way TB patients behave and seek care. These factors limit the level of patient compliance and thereby pose a significant threat to the program's success. Social perception and fear of TB forces those that have the disease to hide and avoid revealing themselves even to close friends.

> *"If you say that you were treated for TB people avoid contacting you and even run away when they see you. Occasionally they may say hello quickly but then they leave."*
>
> *"I was friends with a girl for 18 years, but when she found that I had TB she started to ignore me."*
>
> *"I have heard people say that it is better not to catch the number 33 bus which is used by TB patients commuting to the hospital."*
>
> *"...when I leave hospital where should I go? If I go to my friends and tell them that I have TB they will run away."*
>
> *"Many of my relatives try to avoid me because they are afraid they will be infected. People tell their children not to play with mine."*

Such attitudes exist not only towards patients but also towards medical personnel at TB facilities.

"Patients and parents hide from us, they shut doors and do not allow us to enter."

"People are afraid of the patients and of us (the doctors). If a doctor works in a TB facility his reputation is endangered. Colleagues working in other fields fear us as well."

Being ill with TB, which requires lengthy hospital treatment, leaves people unemployed with no income to support their families. They are unwilling to stay in TB hospitals because they are afraid they will lose their job. Due to high unemployment rates and competition in the labor market people try to avoid visiting doctors when they develop the disease. For the same reasons many patients, having completed the intensive treatment at the hospital immediately return to work when they are not fully recovered. The current social security and labor system in Kazakhstan does not work effectively and does not have a positive influence on the behavior of TB patients.

"Foreign companies lay-off sick people, and sufferers have to hide their disease."

"I have been ill for a long time. I am afraid for my children if something happens to me. I need to work to feed my children. If we are to be treated I think it is necessary to provide welfare payments for TB patients."

Social attitudes towards TB patients include low public awareness of the disease. Some participants in the focus groups even mentioned that people believe that TB is a congenital disease that transfers from generation to generation as well as infecting others. The weak Information, Education and Communication (IEC) campaign implemented by the local and central government has not changed the way the population misperceives this disease and treats patients:

"As a state TV and radio broadcasting company we do not address the TB problems adequately."

"Area doctors visit schools to educate students but they have little or no information, literature and brochures on TB."

"The Healthy Lifestyle Promotion Center informs people about TB. Doctors give lectures at enterprises and at educational institutions quite formally. Journalists receive prepared notes or statistics from them and include the information in the coming issue of newspaper. The articles are cold and overloaded with technical terms and do not communicate anything to the public. The quality of such articles is very poor."

"We do not have local radio discussions about TB issues. If we had one with a lot of information about TB and its follow-ups, people would listen and change."

Willingness on the part of journalists and the mass media to play a role in raising public awareness is inhibited by unwillingness among public health officials to provide the necessary

information or adequate statistics for public education. Necessary data on the magnitude of the TB problem in the oblasts or at the national level is hidden from public.

Additionally, even doctors working at medical facilities at the primary care level, who should inform the public about TB and increase awareness, fear TB patients. Thus the frontline of rural medical health workers, who should play a major role in fighting TB, is not contributing much.

Economic factors also significantly influence patient behavior. According to those interviewed most TB patients are refugees from neighboring countries, alcoholics, former convicts and the unemployed poor.

> *"90 percent of patients are from socially troubled families."*

> *"The number of chronic patients is growing in our region. They are mainly alcoholics, drug-addicts, former convicts, the unemployed or the poor."*

> *"The poor and displaced who arrive from Tajikistan and the Kyrgyz Republic, and those who live in villages close to petty-traders markets are at most risk."*

A number of policies from the Soviet era are still in effect and contribute to adverse behavior in TB patients. Poor enforcement of labor laws allows employers to suspend TB patients and some regulations even prohibit TB patients from working for a lengthy period of time. For example, people who worked as teachers or doctors prior to the onset of disease cannot work for two years after the treatment. Such policies force individuals to hide in order not to lose their job.

The functioning of public health services further aggravates patient fear. Patient confidentiality is not respected due to state policies.

Every TB case detected by the medical provider is subject to notification to Sanitary Epidemiology Station (SES), which has to trace the contacts and conduct case finding. Such action violates patient confidentiality and puts sufferers at risk of losing their jobs.

> *"This disease is infectious. Information about us is sent to the SES. They inform our employer and there is no confidentiality in the system."*

Availability of Key Supplies

While according to state policies, TB drugs and services are offered at no cost, other diseases relating to TB are subject to charges. Lack of medical supplies at TB facilities forces doctors to ask patients to purchase medicines from pharmacies. Shortages of financial resources at TB institutions result in poor nutrition at TB hospitals, making relatives bear the cost of food. The cost of transportation to/from TB facilities along with medical and food costs described above becomes so burdensome that most patients avoid treatment or stop taking the medication.

> *"They say that treatment is free of charge, but when my nephew was ill medical staff required syringes and IV fluid transfusion systems from us. The food was not good and we had to feed him ourselves."*

"TB patients also have other diseases of the kidneys, liver or stomach, but treatments are subject to direct charges."

"TB services are not accessible in our village. I needed to drive my husband and son to the rayonal center but we had no money. That is why we didn't come for 15 days."

"Patients from rural areas have to drive to the city to get treatment, but transportation becomes expensive."

"There are drug supplies from the state but we can not reach them. We drive to another village where a doctor lives and has medicines. In our family I am the only one working. I have three small children. The money that I earn is not enough even for food, let alone transportation costs."

TB Treatment

Social fear, financial access barriers, low awareness and sometimes geographical access, force patients to seek alternatives or delay treatment. Some patients refer to traditional methods of cure and some purchase drugs on their own (sometimes with a doctor's or friend's advice). Traditional methods are used even when patients have no confidence in their effectiveness but when such remedies are recommended by a doctor or a friend, patients try them as they are the only cure they can afford.

"I know one recipe: egg shells plus two bottles of wine and a pigs head. This recipe gives 100 percent guarantee of recovery. I believe in it."

"Patients eat seal, fish, badger grease and gryllotalpa. Whether it is effective or not, we do not know."

"I tried a folk remedy: 35 gram of vodka plus oil but I do not believe in it. I eat aloe and plantain, which may heel the lungs but bacteria are left."

"Some patients treat themselves. They visit doctors and then purchase the drugs. I know that in some policlinics they sell TB medicines."

Self-treatment significantly delays recovery and outcomes are generally poor. Fear of job loss and exclusion from society significantly impedes public health institutions responsible for TB surveillance and new case detection. Public unwillingness to reveal oneself makes contact tracing impossible. Physicians interviewed said that there were cases when people did not open the door or behaved aggressively towards visiting medical personnel.

"Individuals in contact with TB patients (relatives, co-workers etc) avoid physicians."

High prevalence of the disease among economically deprived and anti-social elements further impede adequate implementation of TB control programs.

TB Services

Focus groups and interviews conducted among service providers and patients helped to identify several weaknesses related to adequate service provision. In general, all surveyed TB facilities were found to be deficient in: infrastructure, equipment and supplies, drugs, and human resources (HR).

According to policies adopted for the National TB Program, patients undergo an intensive phase of hospital treatment and a follow-up phase as an outpatient. Increased morbidity observed in the country created an imbalance between demand and supply of hospital beds and outpatient facilities. Additionally, infrastructure is old and does not meet structural standards for adequate epidemic/infection control. Overcrowding, poor sewage and ventilation systems, shared feeding space for patients and medical staff all contribute to the spread of infection within a medical facility and increased risk for those treating and caring for patients.

> *"There is a lack of beds which results in hospital waiting-lists."*

> *"Our facility is overloaded. There are five or six patients in one room and 90 in the department, which is much more then our bed capacity."*

> *"We place chronic patients with those newly admitted. We cannot keep patients with the multi-resistant form isolated. They move around and infect others. Something needs to be done. For instance, complete isolation. A community could be established where such patients are treated, live and work."*

> *"The water supply and sewage system of our institution are not disinfected. Sewage infects the surroundings. Due to this we also have a high sickness rate among employees. There should be a large number of bactericidal lamps in our institution and an adequate air ventilation system. We have only 40 percent of the bactericidal lamps we need. In addition, we use gauze masks, which are not effective. We need disposable polypropylene masks to protect staff."*

> *"There is one shower for three rooms. Water is provided only once a day for a couple of hours. The reserve water is kept in tanks and bottles, there is no hot water."*

The study shows that there are geographic areas (rural) where providers and infrastructure do not exist. This creates significant barriers to those in need of TB services. Poor transportation and weak purchasing capacity of the rural population in deficient areas prevent the public seeking care.

Outdated and poorly functioning equipment and lack of supplies (sterilization fluids, masks, clothing, etc.) on one hand affect the quality of services and on the other increase the risk of infection among the TB facility staff.

> *"Old equipment, lack of bactericidal lamps and poorly functioning sterilization machines all contribute to the spread of infection."*

"The X-ray unit works but it is very old and picture quality is quite bad."

"Japanese microscopes have a better enlargement capacity. The microscopes we receive have poor enlargement and it is hard to detect TB in sputum."

"We continuously lack masks and gloves. We buy uniforms ourselves. Detergents and soaps are also bought by the staff on their wages."

Drug supplies are interrupted and quality is poor. Providers were concerned with the quality of state-purchased pharmaceuticals, which may cause significant side effects and force patients to stop treatment due to complications of kidney and liver.

"The quality of state supplied medicines is poor. European ones are much better. Side effects of the available drugs are frequent."

"Most of our medicines are made in India. America and England would not use them. First these medicines were donated by foreigners and came from Western Europe. Fever was one of the side effects. The new wave of medicines from Pakistan and India are cheaper but have worse side effects. Greedy man pays twice."

"I had to interrupt the treatment. The drugs that I took had a toxic effect. I felt very bad because of them."

Delays in drug provision due to the state tender process commonly affect continuous drug provision to the patients. Providers believe that poor quality drugs along with interrupted supply have a negative influence on treatment and could also be the reason for the increased number of MDRTB cases.

Human resources problems were detected in terms of quantity and quality. Increased morbidity and understaffing of TB facilities (which is quite common) creates an imbalance between demand and supply. The imbalance becomes even more pronounced with low willingness among medical and support staff to work in a high-risk environment. Being employed at the TB facility became unattractive, due to low pay and lack of additional benefits common in Soviet times.

"*Even in the city clinics and hospitals there is a lack of TB specialists.*"

"We have poor holiday allowance. Employees of mental facilities have two months. Don't we deserve the same?"

"We have three doctors instead of six working in the surgery department. Recently, a young specialist came to work but soon left. Why? Low wages and twice as much work-load as in other medical facilities."

"Not a single young specialist works in the TB facility because they are afraid."

"We have very low wages. We are in contact with patients and are not protected well. We are professionally trained. Why should one want to work under such conditions?"

Lack of continuous training and lack of state subsidies to finance the professional development of medical staff seems to have affected quality of services. As mentioned above, TB facility staff have to pay for their professional development from the low wages they receive.

"A radiologist in a policlinic does not know how to read X-ray films."

"The quick detection of TB depends on the primary care doctor. Sometimes a patient is treated for a cold and TB is never suspected. Doctors in primary care do not pay sufficient attention to TB. When a patient does not recover for a long time they are finally directed to us. We have a lot of complaints about primary care doctors."

TB Care

The deficiencies described in the previous section significantly affect the process and quality of adequate care provision for TB. The combination produces poor outcome and impedes adequate control of the epidemic. The study also helps to identify other causes that contribute to and further aggravate the problem. These findings could be grouped into the following four categories:

- Inadequate organization of service provision
- Broken links between various levels of health care
- Weak state policies and poor enforcement
- Provider attitudes towards the DOTS treatment

The way service provision is organized for TB in Kazakhstan requires intensive medical treatment provided on an in-patient basis and a follow-up phase at the patient's home. Quality of hospital care is quite poor due to the deficiencies discussed earlier. Service provision during the follow-up phase is also impeded. Kazakhstan's sparsely populated regions are not specifically provided for and flexibility in drug provision is not exercised:

"The nurse sends patients to the regional Center to take medicines. Patients have to find money to reach the Center and every infected patient has to attend – medication cannot be claimed on behalf of another."

Links between TB facilities and the general primary care network are broken. After discharge from hospital information about the patient is not adequately communicated to the relevant local primary care facility. Follow-up work to in-patient treatment sometimes fails because of this.

"Lack of control in the network creates problems. After discharge patients are not monitored to check that they are continuing to receive treatment."

Furthermore, high migration within the country prevents nurses dispensing drugs when a patient's address is not known. As mentioned by one nurse:

> *"It is difficult to detect patients among bazaar workers because they have no permanent residence and there are always newcomers."*

This problem gets even worse when patients are former prisoners or migrants from neighboring countries who do not register with state agencies. In some rural areas during winter it becomes impossible to supply drugs on time, due to poor road conditions and treatment interruptions for rural residents. These issues have enormous importance for DOTS treatment. Moreover, representatives of those facilities that have to conduct outreach work face vehicle shortages.

Large parts of Kazakhstan call for non-conventional approaches to delivering care. The impracticality of villagers traveling long distances calls for a change in approach, so that drugs are dispensed to patients once a week in their village and patients are not required to travel far to reach the rayon Center.

> *"The nurse supervises the patients living on farms. She issues the medicines for one week and we do not know if she supervises them or not."*

> *"We had five or six cars in a group, which we used to reach remote areas. Now we have only one car, which I believe is almost dead. Adequate DOTS implementation is impossible."*

Logistical problems facing DOTS triggered controversy among providers. While some fully support DOTS (mainly in big cities where distance is not a major problem) others complain that DOTS only detect the disease at an advanced the stage. Initial treatment then consumes significant resources and outcomes are not favorable.

> *"DOTS is not good because it involves large costs. DOTS cause the disease to be neglected. Patients come to providers at their destruction stage, 70 percent of which have obvious infiltration."*

> *"Doctors say that the DOTS program is not justifiable. Patients suffer regressions and return to hospital in three or four months. It proves the inefficiency of such treatment but the state doesn't want to understand this."*

Screening services with the help of the fluorography are given priority by the doctors to detect TB at an early stage, allowing a better chance of recovery.

> *"We got used to working with fluorography. Using DOTS therapy we detect infection, but this is only found in patients who have advanced TB. Fluorography detects infection at the primary stage."*

> *"Money saved on fluorography will increase funds for treatment."*

There are high-risk groups identified by the state who are screened with fluoroscopy at no cost. However, providers think that some representatives of high-risk groups have been neglected - mainly workers and those with no permanent residence or work place. Such patients form a significant proportion of those with TB. Patients who do not have a permanent work place or residence are being excluded.

In addition to poor organization of service provision there is a problem with weak or un-enforced state policies, preventing adequate epidemic control. As mentioned above, confidentiality issues force a significant number of employed patients to avoid the official health sector when they develop TB. Such behavior limits active contact tracing and early case-detection by public health agencies.

According to the Kazakhstan regulations there are groups of professions (public kitchen-restaurant workers, teachers, doctors, agricultural market workers, etc.) who have to undergo medical examination several times a year in order to make sure that they are not infectious disease carriers. Each worker has a sanitary card, detailing the records and results of the last examination. Without such cards people are not permitted to work in certain areas. However, widespread corruption, combined with the low incomes of staff at the SES (the agency responsible for issuing such cards) means that sanitary cards can be purchased without passing the test, allowing people to work and spread the disease.

> *"Sanitary cards are purchased from the SES. People with such cards are allowed to work while they are sick with TB. This helps to spread the disease even faster."*

Official policy ensures that medical staff dispense drugs and see that the correct dosage is taken at the correct time as prescribed. This is known as the directly observed component of the DOTS strategy and is designed to ensure that patients complete the full treatment necessary to cure them.

It is obvious that Kazakhstan faces human resources deficiencies in TB facilities. Some policies further exacerbate this deficiency by making huge demands on people working in the sector. Lack of time to devote to work has an impact on the quality of information that the public receives. Poor quality health information prevents policy makers from carrying out adequate response, planning or policy development.

> *"We write reports at home after work because we are unable to do it at the hospital. We are overloaded with work. It takes two hours to write a report. Sometimes we do not manage at all."*

The problems observed among former prisoners and anti-social elements with MDRTB contribute to the spread of disease among the general public. Thus laws on compulsory treatment were passed forcing such individuals to seek treatment. However, the laws are not adequately enforced.

> *"There is a law on compulsory treatment filed through a court. From the time of detection treatment should begin within days, but in reality it takes nearly a month. Police are unwilling to help because they do not get paid for this. Nurses*

buy sputum tests at their own expense. All of this prevents adequate implementation of state policies."

Main Findings

The findings of the qualitative research partially explain the problems faced by the National TB Program: increasing morbidity and a growing problem with MDRTB; slow pace of decline in TB mortality; and the National TB Program fails to deliver the expected results.

The study has shown that there are inadequate investment decisions for:

- Development and upgrade of infrastructure that is in a desperate condition, contributing to the spread of disease among staff in TB facilities as well as among the general public. This also increases MDRTB spread among facility residents.

- Human resources development for the TB Program and the primary care network, which has a significant role to play in epidemic control, especially in rural areas. If investments are not made in adequate human resources, it is doubtful that services will be of a sufficiently high quality to improve the outcome of the treatment.

- The system needs to be developed to ensure that drugs are monitored for quality. Investment in adequate drug distribution systems is also required to maintain continuous supply throughout the country and ensure uninterrupted treatment.

- There is currently poor organization of service provision, failing to adapt to the specific conditions of Kazakhstan with its huge distances and sparsely populated rural areas. Weak integration of different layers of service provision also prevents continued care for TB patients. If service provision is not streamlined and adequate integration is not achieved, it is doubtful that the problem of TB will be resolved in Kazakhstan.

- Cultural and social aspects are not given due attention on a policy level and mechanisms to cope with them are under-developed. Public attitude towards TB needs to be changed. Mass media and other means of communication are of prime importance to address these issues and manage the change. A well-designed strategy tailored to national and regional conditions needs to be developed by policy makers with resources from national and local budgets. It is essential to break those barriers currently preventing the public seeking early care.

- TB control policies and the social protection of those suffering from the disease is another problem. Lack of social protection keeps significant numbers of patients away from the health care network. Policies prohibiting TB patient employment in certain sectors contribute to this. Kazakhstan needs to amend such policies to provide effective support for TB patients undergoing treatment and also protect their jobs. State policies in the health sector need to be changed in a number of critical areas:

- Active contact tracing and case detection need to be organized to protect patient confidentiality. Large numbers of countries have successfully implemented effective policies and Kazakhstan could draw on their experience.

- Current financing mechanisms of the TB Programs (low income, under funded facilities, low motivation for medical staff to work at TB facilities) need to be revisited and adjusted.

TB FACILITY SURVEY

The TB facility survey analyzed general working conditions, equipment and clinical conditions for implementation of the DOTS strategy, including diagnostic capacity and drug dispensing. The results from the survey of 23 TB facilities present important results regarding the profile of services provided in TB dispensaries in the selected regions. Many of these results confirm the observations from the focus groups. This section summarizes the conclusions from the facility survey along three main lines: inputs (including people, drugs and supplies, equipment and technology), processes and access. The main issues identified are highlighted at the end of the chapter.

TB Facilities

A total of 23 TB facilities were surveyed with 15 hospitals and TB dispensaries and eight primary care centers. The following table summarizes the distribution of the facilities surveyed.

Table 19: Facilities Surveyed

	Number	Percent	Cumulative Percent
TB Dispensary	10	43,5	43,5
General Hospital	5	21,7	65,2
Primary Care Facility	8	34,8	100
Total	23	100	100

Of the 23 facilities surveyed, 20 were equipped with a laboratory but only 47 percent had a functioning pharmacy on the premises. The overall condition of the buildings is highly degraded with most of the buildings well over ten years old and with a notable lack of maintenance over the previous five years. In total, only 87 percent of the facilities had potable drinking water and over 90 percent functioning latrine/toilet. Nearly all facilities were able to identify high-risk groups and provide basic statistics on notification, prevalence, mortality and general socio-economic conditions.

Capacity to deliver basic services varied. Ninety-six percent of the centers had Mantoux testing capacity and 87 percent sputum smear assessment. Only 35 percent of the TB dispensaries and hospitals had meals supervised by a nutritionist. Surveyors reported un-sanitary conditions in 30 percent of the centers visited; and just above 50 percent of the centers had clean bed linens at the time of the visit and roughly the same percentage (50 percent) had hot water. Only 34 percent of the facilities had a working generator to restore electricity. The poor working conditions are

underlined by the fact that nearly ten percent of the centers were without a functioning heating system the previous winter.

Access to internet and communications remains low. Only 34 percent of the centers had access to internet and 40 percent access to televisions and VHS. However, 75 percent had access to emergency communications.

Inputs of TB Facilities

Staff

The results underline findings from focus groups and the analysis of oblast level data, which indicate that staffing levels vary much across facilities. Many facilities are understaffed relative to the workload and security conditions are poor. The survey results show that over 95 percent of staff has been trained in the DOTS strategy, although many of them express aversion to the use and effectiveness of the approach. The results underscore a need to improve training in secondary areas, which are critical to the program's success. In the past 12 months, only 35 percent of all staff interviewed had received continuing education on TB or a related topic, such as HIV/AIDS. Only 52 percent had received training in stigma reduction for dealing with social issues related to TB. In nearly 50 percent of cases, no staff had received any training on HIV/AIDS in the past 12 months. Roughly the same results are shown for more technical training in laboratory work (65 percent). High levels of training for cleaning staff are reported, over 85 percent.

Equipment

The facility survey indicates that the infrastructure conditions in many of the facilities visited do not meet the minimum standards required for a TB facility. Only 82 of the facilities had a microscope (only 56 percent had a functioning microscope), 35 percent a refrigerator, the average age of x-ray machines was over 10 years and there were inadequate areas for disinfection. While over 95 percent of the facilities had adequate decontamination facilities, the centers did not score nearly as well on disposal of hazardous waste (62 percent did not have a disposal mechanism). Likewise, only 48 percent of the centers had adequate ventilation, 73 percent did not have any mechanism to control air quality and 22 percent had no bactericidal lamps.

Drugs and Supplies

The facility survey shows that there are important deficiencies in the availability of drugs and supplies. Many facilities have problems in infrastructure as outlined in the previous section. The difficulty of providing adequate care is exacerbated by the limitations in key inputs. Table 20 shows the availability of key inputs at the time of the survey. As shown, only 44 percent of facilities had masks at the time of the interview. Fewer than 20 percent had disposable syringes and gloves.

Table 20: Availability of Medical Supplies

	Availability (percent)		
Resource	**Yes**	**No**	**Don't Know**
Drugs (1st line TB)	96	4	0
Tests	70	17	13
Syringes	16	74	10
Gloves	16	65	19
Masks	44	44	16

Table 21: Availability of Other Inputs

	Availability (percent)		
Resource	**Yes**	**No**	**Don't Know**
Food	35	53	14
Bed linens	48	40	12
Clothes	17	70	13

Barriers to Access

In general, patients interviewed had little problem with physical access to the facilities. Thirty percent of people interviewed indicate that they traveled more than 30 minutes to arrive at the facility. The most common means of transportation were walking (40 percent) and bus (42 percent).

The facility survey shows that more than 90 percent of facilities indicate that drugs and care are provided free of charge to TB patients. Upon closer examination, however, over 40 percent of the facilities indicate that they charge for other services such as clothes, bed linen, tests and food, which are all required for care. In other words, patients may be guaranteed access to the drugs but the cost of food and bed linen is high enough that many people do not seek treatment or are unable to continue the treatment over six months.

Financial barriers to access are likely to reduce the effectiveness of treatment. In addition to the results shown above and the indication that over 20 percent of the people had to buy drugs at a private pharmacy, or postpone treatment, only six percent of the interviewed patients had not paid for a consultation. This confirms previous finding that while most people receive free drugs, all other services required are subject to charges.

Main Findings

The following problems were cited regarding the process and facilities available for providing care to TB patients:

- The DOTS strategy is difficult to implement given the lack of compliance by patients.
- Only 10 percent of patients interviewed were treated according to DOTS standard treatment protocols or were aware that they were following the DOTS strategy.
- Out-patient visits to the institution are irregular.
- Patients do not comply with treatment.

- Lack of nutrition by patients impedes treatment.
- Patients are absent from work.
- Only 39 percent of facilities were appropriately registering cases.
- Most facilities indicate that they were not sharing information between TB facilities and PHC.
- Time consuming documentation and reports required from doctors. A simpler procedure is required.
- Only 70 percent of facilities have the capacity to take a sputum sample.
- Only 50 percent of staff had training or review of protocols more than once a year.
- Facilities are small and far from rayon center, limiting access and increasing travel costs for patients.
- There are not enough vehicles.
- The number of doctors is low.
- The number of doctors with higher education is limited.
- And Wages are low.

PERCEPTIONS ABOUT THE HIV/AIDS PROGRAM

Population Awareness and Attitudes towards HIV/AIDS

The majority of people interviewed emphasize that despite the prevention work underway, people are still ignorant about HIV/AIDS, especially the older generation. This may be due do most older people believing that the problem will never affect them or their families. Rural residents totally ignore the issue. Some of the key responses are highlighted below:

> *"Population awareness of HIV/AIDS is around 40 percent. Young people know that AIDS is transmitted through sexual contact and that they have to use condoms to protect themselves. That's all they know."*

Those doctors, who work with HIV/AIDS patients, noted that not only people but also medical providers from other specialties are not sufficiently aware of this problem.

> *"Poorly informed medical personnel do not know how to behave in emergency cases or how to work with blood. This puts them at risk of contracting HIV/AIDS themselves."*

> *"Once when I was on duty in the hospital an HIV-infected patient came in. I saw how nurses and doctors responded - they panicked, thinking that they had been infected when they realized that the patient was HIV-positive."*

> *"...even among medical personnel there are people who want to isolate HIV/AIDS patients like lepers, as if they are hopeless cases and there is nothing society can do to help."*

Among medical practitioners it is commonly believed that personnel working in the AIDS field are the only ones equipped to deal with the problem. At FGDs there were cases where doctors specializing in other areas refused to treat HIV-infected patients and referred them to an AIDS Center.

"If the AIDS Center is operational they should take care of HIV/AIDS patients. It is not our business."

Low awareness among medical staff and poor working conditions at medical facilities influence attitudes towards HIV/AIDS patients and raise issues of anonymity. The opinions of medical personnel with regard to confidentiality were split:

- Some believed that anonymity is the individual right of people living with HIV/AIDS. Local people do not understand the disease and are likely to treat HIV/AIDS patients as social outcasts.
- Other people think that anonymity poses a threat to society because patients do not always practice preventive measures to protect others.

"Upholding the rights of HIV-infected patients, we jeopardize other lives. Our safety is not guaranteed and our views must be taken into account. Medical personnel must be aware of the disease."

Kazakhstan abolished mandatory testing of high-risk groups and prisoners. This was controversial among providers and the general public. While some on human rights principles support voluntary testing others argue against such proposals.

"I would not abolish compulsory examination for HIV. All those in high risk groups should be tested."

"...pregnant women should be examined for HIV/AIDS. We do mandatory tests for syphilis, gonorrhea and other diseases, because they affect the baby. In infected regions we must also test for HIV."

Due to low public awareness, HIV/AIDS patients are socially excluded.

"People treat HIV patients negatively. I talked to a doctor who was ready to leave the room if a person infected with HIV came into his office. A banking officer was forced to leave his job because of being HIV-positive. It's a small town. Information leaks out."

"A child (HIV-infected) came to the institute and everyone began pointing at him. The teacher of the course phoned the mother asking her to remove her son from the institute."

Low public awareness has largely been attributed to poor IEC activities among those interviewed. Doctors emphasized that the mass media addresses this problem but in most cases journalists lack competence in this field. Therefore, locally available information has not made its way to the public. Airtime and column inches need to be allocated for expert educational work.

"...many people do not reveal that they are HIV-infected. Some doctors would not operate on patients who are HIV-infected. Such patients are treated badly. It is

hard to change such attitudes in society. We need preventive measures, lectures and broader, high quality coverage from the mass media."

"Not everyone is ready to face the facts of HIV in their environment. ...The problem is that people are unaware of HIV/AIDS and its transmission routes in society. This sets a trap."

Inputs of HIV/AIDS Facilities

Two types of institutions have been providing care to PLWHA: HIV Centers and preventive-curative organizations. In addition, Trust Points (TPs) are also involved in the provision of services and operate as part of preventive-curative organizations.

Kazakhstan, with the help of various donor agencies, opened a significant number of TPs to provide needle exchange, counseling and other preventive and curative services. TPs are currently supported by local budgets and Kazakhstan has specific regulations to determine required funding for such centers and to identify the type of services necessary. TPs are opened and operated by local AIDS Centers or primary care facilities – SVAs (rural surgery). Consultations, condoms and syringes are free. HIV sufferers are more willing to visit TPs in AIDS centers, because TPs in SVAs are known for a lack of anonymity and inconvenient locations.

"A large portion of medical personnel from primary care facilities have a negative attitude towards high risk groups. HIV patients do not want to be revealed to the public. There is no confidentiality even for risk groups. Nobody wants to go there again, they do not trust them."

During the interviews, it was noted that AIDS Centers work closely with NGOs and quite often AIDS Center employees run these NGOs. Most institutions are poorly equipped. Equipment is old and outdated and limits the capacity of AIDS Centers to deliver a fast, high-quality service. Shortages in the test-systems and lab equipment significantly inhibit assessment.

"The AIDS Center is poorly equipped. The laboratory occupies two rooms. There are no efforts to comply with sanitary standards. Washers and sterilization units are combined, violating anti-epidemic standards. Work with materials is often delayed. The laboratory is inadequately equipped. The lab dishes and furniture are insufficient."

"Distillers, thermostats, drying machines and sterilization equipment are out of date. They do not meet our requirements. We have only one vehicle, which is broken-down."

"We need an automatic analyzer; a computer to register all tests and make comparative analysis for epidemiological purposes. There are no trained personnel. One computer is used by 15 people, we need two more."

Many AIDS Centers were lacking vehicles, which prevented delivery of services to rural areas.

"The AIDS Center has no vehicle to respond to cases of HIV/AIDS in villages. This limits surveillance work."

Basically, all AIDS centers are supplied with antiretroviral drugs but in inadequate quantities. Treatment with antiretroviral drugs is free of charge. However, the patient must pay for other drugs needed for opportunistic infections, though whenever such medicines are available from the AIDS Center they are free.

"Treatment is free for AIDS patients; for HIV sufferers only some of the drugs are provided at no cost. Antiretroviral drugs are free, but many others are too costly to keep in regular storage. We have only a certain list of medications, but we cannot provide everything free (for gonorrhea or syphilis patients). Medicines are free for women."

"Anti-retroviral preparations are not enough. Sometimes HIV patients cannot get such treatment. The treatment of one patient costs US$12,000-15,000. It is easier to take preventive measures now, than cure the disease later."

Supplies and drugs are usually provided by the state and purchased through tender process. Quite often the goods do not meet standards and are inadequate for AIDS or TB sufferers.

"... Cheap condoms are purchased; the funding department searches for the cheapest source to satisfy demand."

"We cannot provide IDUs with the right syringes. We only have syringes that are the wrong size."

"IDUs need foreign-made syringes with sharp needles of various sizes. The 5ml syringe that we get from state is not good. IDUs need insulin syringes with thick needles."

Most AIDS Centers and TPs are deficient in printed materials and IEC activities aimed at risk groups are not carried out effectively. This deficiency is largely explained by state authority attitudes:

"State authorities believe that funds allocated for brochure production are a waste of money. They do not understand the essence of preventive work in this area."

Inadequate investment is made in human resources, resulting in shortages and under-qualification of staff. Frequently staff must pay for their continuing education no matter how low wages their wages are.

"I completed an additional course. The Republican AIDS Center offers courses at 6,000 Tenge (US $90) but I had to cover the cost on my own."

Lack of staff in AIDS Centers seems to be due to little or no investment in human resources development. Institutions do not train specialists in HIV/AIDS. AIDS Center administrative personnel also earn low wages, making the work unattractive to most from non-medical fields.

> *"There are five doctors in our center, while we should have ten. There are no AIDS trained specialists. Educational institutions do not provide training for such narrow specialization."*

> *"The average wage at the center is 7,000 tenge per month. Therefore psychologists and computer specialists will not work for us. Only medical admin personnel may accept the work."*

HIV/AIDS Care

Service provision by the AIDS Centers and TPs is affected by the deficiencies outlined in previous sections. However, other factors also have a significant influence. TPs quite often attract the attention of the police. Doctors mention that drug users visit TPs and police trace and arrest them. Very often, doctors from AIDS Centers have to negotiate the release of drug users from the police. A number of AIDS Centers have agreed with local police not to interfere preventing IDUs from seeking help from TPs. However, often drug-addicts are afraid to go to TPs. Services are delivered more easily when volunteers (often recovered users) provide needles and syringes and refer IDUs for counseling. Such volunteers enjoy more trust among IDUs. However, there are not enough funds to pay for their recruitment. The Karaganda AIDS Center seemed to be the only one that received money from the local budget, which it spent on engaging volunteers.

Doctors from AIDS Centers have to visit rural settlements in order to deliver guidance and assistance to the local TPs and carry out surveillance work when necessary. Lack of transportation and shortage of financial resources hamper such work, meaning that the rural population is not well covered.

Removal of mandatory testing for certain groups and low public awareness of HIV/AIDS seems to have also hindered epidemic control. The perception of the focus group was that while HIV tests are free, those who apply are mainly men applying for licenses or residence permits. Demand for tests among other groups is relatively low, indicating lower rates of detection.

Shortage of adequate human resources also limits delivery of such services as counseling, legal advice and social support, making TP and AIDS Center work even less attractive to the public.

Social security for HIV and AIDS patients is only available for single mothers. International organizations offer food and drugs, but it is limited to a very small number of individuals or communities.

Significant services should be provided by the NGO sector though the sector is weak and cannot provide the coverage needed for epidemic control.

Main Findings

The HIV/AIDS Program faces a number of problems related to the social environment and health care system. The effectiveness of the system in dealing with HIV/AIDS is impaired by low levels of awareness about disease, social attitudes towards those who are HIV positive or have AIDS and fear among doctors. These factors significantly influence the ability of the GOK to implement adequate measures and prevent the growth of the epidemic.

While Kazakhstan has taken important steps towards public recognition of the HIV/AIDS problem and has developed a National Strategy, it has not secured public support to fight the disease. This is particularly evident with regard to preventive measures. Sufficient investments in information, education and communication are required, along with funding of human resources to fulfill this task.

In addition, adequate resources should be mobilized and invested in the network for service provision. Without an upgrade in the quality of facilities, medical equipment, supplies and drugs, the health system responsible for HIV/AIDS is unlikely to improve. Current levels of national and local budget allocations are deemed to be insufficient and should be increased in order to finance services.

Our findings indicate that the lack of available human resources requires government attention. The policies in place do not support adequate human resources development for HIV/AIDS cases. Investments in human resources should have several targets: (a) to develop professionals able to work in the HIV/AIDS field; (b) to fill the gaps where professionals are not available (e.g. psychologists, social workers, counselors, IT, etc); and (c) spread staff throughout the country.

According to those interviewed, local NGOs have a significant role to play in HIV/AIDS epidemic control. However, their capacity is still low and they are not able to provide adequate coverage to the high-risk population. Without clear state policy to finance NGOs and support their development, it will become unfeasible to carry out effective work among high-risk groups. TPs established under primary care facilities and operated by the government under-perform compared to those run by NGOs. In Karaganda, local authorities contracted NGOs to deliver services to HIV/AIDS patients. This should be replicated where possible and fully supported by state policies.

NGOs need support so they can select volunteers for work with HIV patients and drug Users. It was noted that HIV sufferers trust others who have the infection.

> *"I think that we need non-governmental organizations where HIV patients would be involved. Then we can talk on a peer-to-peer basis. A person could come to the NGO with a problem and would see another HIV sufferer who knows all the related problems and could give advice."*

Finally various governmental sectors (for example, police) have to be adequately informed about the problems, cooperative intersectoral work needs to be initiated on a local level to attack the problem from different angles.

"...careful consideration leads us to recognize that this problem is a social issue and should be the concern of everyone in the community..."

HIV/AIDS FACILITY SURVEY

HIV/AIDS Facilities

A total of six HIV/AIDS facilities were surveyed, including one state establishment, one state center, one oblast, one health Center, one dispensary and one state association.

All facilities surveyed were equipped with an HIV laboratory but none had a functioning pharmacy on the premises. All buildings had been in operation for more than five years and 33 percent did not have maintenance programs for major equipments. All six facilities had potable drinking water for patients and personnel. Only 50 percent of the facilities were able to identify at least one high-risk group; moreover, only 50 percent of the facilities surveyed had printed materials, condoms and syringes available for harm reduction programs.

Capacity to deliver basic services was varied. With the exception of one facility, HIV and STIs treatment are provided by outpatient services. Only one facility had emergency services and only one had beds to treat patients. All facilities surveyed provided HIV tests.. Protocols for the management of hazardous materials (like syringes, sharp objects, etc.) are followed by every facility. Hot water for patients and personnel is available in 83 percent of the Centers but only one-third had a functioning generator with fuel.

Access to internet and communications is reasonable: 50 percent of the Centers had access to internet, 33 percent had access to radio communications and 83 percent had access to televisions.

Inputs of HIV/AIDS Program

Staff

Table 22 shows key staffing ratios across the facilities surveyed. Ratios range from 0.07 to 1.21 general practitioners treating HIV/AIDS per 100,000 inhabitants. The number of licensed nurses treating patients with HIV/AIDS is below the national average of 1.73 per 100,000 inhabitants, but if auxiliary nurses are included, the ratios are considerably higher than the national average.

Survey results show that only 50 percent of all staff have been trained on HIV/AIDS related issues and more than 80 percent of facilities use protocols for the treatment of HIV patients. Fifty percent of facilities conduct seminars with doctors and paramedics to prevent blood transmission. Seminars are held annually. Eighty percent of centers provide monthly training for cleaning personnel.

Table 22: Staff per 100,000 population

Name of the facility	Admin Staff	Clinical staff	Total GPs		Pediatri-cians	OB/ GYN	Nurses	Auxiliary Nurses	Techs	Other
Republican AIDS Center	0.87	2.27	3.14		NA		NA	NA	0.87	0.87
State AIDS Center	1.22	8.45	9.67	0.17	NA	0.09	0.09	0.61	1.48	1.22
Regional AIDS Center	NA	NA	2.79		NA				0.09	2.79
Aktau AIDS Center	NA	NA		0.44	NA		0.22	1.55	0.22	2.43
Karaganda AIDS Center	1.95	3.45	5.40	0.07	0.07		0.07	0.75	0.67	0.07
Jeskazgan AIDS Center	NA	NA	10.91	1.21	NA	NA	0.61	3.64	1.21	4.24

Source: Ministry of Health, Kazakhstan 2003

Equipment

In general, most of the facilities had the key equipment but the results show that most equipment is outdated. All equipment used in the HIV facilities had been in use for more than five years. More than two thirds of facilities surveyed reported a program of routine maintenance of major equipment and 60 percent of those have a functioning program of routine maintenance or replacement of small equipment. The following table lists available equipment in laboratories and their respective frequencies in all facilities.

Table 23: Available Equipment in Laboratories

Type of equipment	% of facilities available
Spectrophotometer	100.0
Washer for plane	83.3
Thermostat	83.3
Automatic medicine droppers	100.0
Automatic medicine droppers points	33.3
Centrifuge	83.3
Refrigerator	83.3
Test-systems	100.0

Source: Study Estimates based on data from Ministry of Health, Kazakhstan 2003.

All facilities surveyed had a set of equipment for immune-enzyme and automatic dosers. Sixty seven percent of the AIDS Centers were using uni-scans, multi-scans and spectrophotometers manufactured at Yoshkar-Ola Plant. Half the facilities use the Organon-Technics test system and only one used the test proposed by WHO. One third of centers use Russian Technology for the test system (Combi-test).

Provision of Care

Trust Points operate in two-thirds of the AIDS Centers but only 17 percent tested blood residues in returned syringes. Fifty percent of the facilities notify cases of HIV/AIDS/ and STIs, and drug use.

More than 80 percent of the facilities offer education to prisoners and staff but only 50 percent offer treatment for drug users. Related to the treatment of STI patients, nearly 70 percent of facilities do not make a physical examination of their male patients. In the case of females this percentage rose to 75 percent.

The six facilities surveyed monitor the quality of care routinely in a structured manner using analytical methods, sampling inspections and test systems. Either management or a quality committee reviews the findings of the monitoring.

Eighty percent of the Centers surveyed had an epidemic surveillance team constituted by physicians, epidemiologists, infection diseases specialists and others. Two-thirds of the facilities reported that they ask basic questions of people who complain of an STI. Questions are focused on present symptoms, duration of symptoms, recent sexual contacts and so on. Physical examinations are not routine in those centers and only one institution reported the availability of gloves to make those examinations.

Sixty-seven percent of the facilities used disposable syringes and needles but only one-third advise STI patients on the need to take medications prescribed adequately or to tell their sexual partners to have treatment. Condom availability was limited. One-third of facilities surveyed had run out of condoms in the previous year, and at one institution this happened 14 times during the year.

Only two centers answered a question about following protocols for treatment of STIs, which suggests that centers surveyed have problems following protocols for treatment of STI patients. Only 17 percent of HIV/AIDS centers reported that they had adequate security to avoid theft of drugs.

Barriers to Access

In general, there are fewer problems associated with barriers to access. All facilities surveyed had labs (Table 22). Outpatient services provided by AIDS Centers include blood tests and treatment with anti-retroviral drugs. About 33 percent of facilities reported between 1,000 and 3,000 consultations per year. Sixty-seven percent of facilities said that the drugs prescribed for treatment of HIV/AIDS patients are available for free. In all cases tests were free. Only half of the facilities provided their patients with condoms and instructions on how to use them. Sixteen percent of facilities reported a regular, uninterrupted supply of essential HIV drugs. When asked about shortages of HIV and palliative drugs in the last 12 months, nearly 85 percent of all facilities had a shortage in the past 12 months.

Perception on Quality of Care

More than 70 percent of patients at AIDS Centers had a satisfactory opinion regarding the quality of the examination and correctness of assessment. One-third had a low opinion of the knowledge, experience and level of education of the doctor. Nearly 40 percent of patients said that the treatment received was satisfactory and they saw a positive change in their health. However, with regard to attention to their privacy and personal needs, more than two-thirds expressed an unsatisfactory or very unsatisfactory opinion. About 62 percent of individuals are dissatisfied with the level of interest displayed by the doctor but nearly two-thirds are satisfied with the attitude and politeness of hospital personnel. About 50 percent of people said that the doctor spends between five and 15 minutes with them. Drugs prescribed were not available in 45 percent of cases but instructions on how to use them were considered good. Eighty-six percent of patients reported that they were not encouraged to refer their partner for testing and treatment. Seventy-six percent did not receive adequate instructions about the importance of completing the full course of treatment and 95 percent did not receive any advice about using condoms for preventing transmission of STIs.

Prisons

Six male prisoners were interviewed. Half the group had some high school education. All have a basic knowledge about transmission of HIV/AIDS, but were unsure how to prevent HIV infection. They reported that facilities included toilets but less than 70 percent had bathrooms and 17 percent did not have showers. The majority of the bathrooms were clean. The quality of medical examination and correctness of diagnosis was considered satisfactory, but only half were satisfied with the treatment.

5. FINANCING AND COST-EFFECTIVENESS OF THE TB AND HIV/AIDS PROGRAMS

This section describes the financing, costs and cost-effectiveness of the TB and HIV/AIDS programs in Kazakhstan. The review focuses on the executed budget (not programmed) at the republican and local level, for each of the respective programs. To assess the total cost of TB and AIDS Programs, salaries, drugs, materials, utilities, maintenance and other expenditures required for the operation of the these Programs were considered.

In the case of TB drug expenditures, predominantly procured centrally, total national expenditures on drugs were reallocated to each oblast based on the respective number of new TB cases. This methodology differs from traditional efforts to evaluate the cost and cost-effectiveness of TB Programs, by considering actual expenditures for the total group of TB patients, rather than constructing a theoretical cost for each type of patient. Data were collected from executed MOH Republican budget figures and efforts were made to collect oblast level data on TB spending through visits to all oblasts and the preparation of a standardized data collection form (Annex 4).

TB PROGRAM COSTS

Costs are high by international standards. The average cost per case is among the highest estimated for middle-income countries. Kazakhstan spends US$35.4 million to treat about 60,000 cases while around US$500 million is spent globally in the 22 high-burden countries that collectively accounted for 6.9 million cases treated in 2002. This implies that Kazakhstan spends an estimated seven percent of the budget of the highest burden countries but treats less than one percent of cases. The main differences are a lower than average cure rate in Kazakhstan, the high cost of treatment and higher than average treatment failures.

Comparisons with other countries with similar income levels suggest that there is much scope for improving the efficiency with which resources are used. Other middle-income countries are achieving similar or much better cure rates at much lower cost, even though staff salaries are much higher (e.g. from around US$300 per month for a doctor in Peru to over US$1,000 per month in South Africa). This reflects the fact that in other middle-income countries, the breakdown of costs is quite different to that in Kazakhstan. Three middle-income countries are compared to Kazakhstan. These are South Africa, Peru and Botswana. In these countries there is either no use of in-patient care, or much lower use of in-patient care (an average stay of 17.5 days in one example) than in Kazakhstan.

MDRTB patients account for an estimated ten percent of total TB patients and represent between 13 and 20 percent of total TB Program control costs. Cost for treating MDRTB patients is relatively high at US$5,000 on average and the duration of treatment places additional pressure on the national TB budget.

The cost per TB patient cured in Kazakhstan is US$1,639 and is much higher than the cost per patient cured in other middle-income countries. The cost per TB patient cured is about US$525 for South Africa and US$1,500 in Russia, countries where cure rates range between 52

and 63 percent. This suggests that there is considerable room for improvements in efficiency in Kazakhstan.

Cost-effectiveness is highly variable across the oblasts, including differences in costs, cure rates, financing mechanisms as well as geography and income levels. For example, when only costs from the perspective of the health system are considered, the cost per death avoided varies from US$7,632 in Southern Kazakhstan to US$1,300 in Almaty City. The cost per year of life gained varies from US$61 in Almaty City to US$358 in Southern Kazakhstan.

The cost of case detection using fluorography is considerable and has very low cost-effectiveness. The case detection rate is 0.28 on average, ranging from a high of 0.68 in Jambul to a low of 0.03 in Almaty. The total estimated cost of this diagnostic procedure is just under US$2 million per year, with an average cost per case detected of US$143. This contributes significantly to the higher cost in Kazakhstan compared to other countries.

Treatment appears not to be provided uniformly across oblasts. This is illustrated by an unequal distribution of the total costs of TB control, whether broken down by category or on a per capita and per patient basis.

Cure rates are below the acceptable level. Reported nationally cure rates for TB patients are 75 percent. Such cure rates would not be satisfactory even if achieved at a very low cost.

To improve cure rates, it is important to improve current understanding of why these rates are low. It is necessary to analyze factors that are associated with low cure rates. For example, the role of drug resistance needs to be further investigated, understanding of the reasons why TB treatment is not completed in some cases, etc. Failure to obtain access to the database limited the scope of analysis in this area.

Large savings are available in the system. A scenario was constructed allowing an estimation of savings that the system could achieve by improving cure rates or lowering costs. The best cure rate from all the oblasts was used to estimate the effect of improving cure rates. Using data from 2002, the savings related to direct costs were estimated at US$2.6 million. Adding direct and indirect costs, total savings account for nearly US$13 million. If costs were lowered to international standards per case cured or treated, savings would amount to US$20 million per year, reducing the total cost of the program by one-third.

There are several indicators besides cure rates that can be used to describe the effectiveness of TB control at the local level. These include the number of deaths averted per patient treated; the average years of life gained per patient treated; the average number of DALYs (disability-adjusted life years) gained per patient treated; and the average number of QALYs (quality-adjusted life years) gained per patient treated.

The following table provides some of the key conclusions regarding the analysis of costs and cost-effectiveness of the TB Program in Kazakhstan.

Table 24: Reported Results

Category	Reported result
Cost per patient treated (BK+ and BK-) ***including*** MDRTB patients	US$1,422
Cost per patient treated (BK+ and BK-) ***excluding*** MDRTB patients	US$1,334
Cost per patient cured (BK+ and BK-) ***including*** MDRTB patients	US$1,751
Cost per patient cured (BK+ and BK-) ***excluding*** MDRTB patients	US$1,639
Cost per case detection Fluorography	US$143.4
Cost per death averted	US$195
Cost per DALY	US$4,157

Source: Study Estimates based on data from Ministry of Health, Kazakhstan 2003.

Data Issues

The analysis of costs and cost-effectiveness of TB in Kazakhstan is based on reported statistics from the Ministry of Health and oblast level data collected. The main issues and assumptions made are described next:

- Costs do not include investments, only recurrent costs associated with TB at the Republican and local budgets. Expenditure estimates are based on the total executed expenditures of the republican and local budgets based on data provided by the MoH and local governments. Allocation of drug expenditure, executed at the national level, was prorated to each of the oblasts based on the total number of new TB cases.
- Estimates of TB Program expenditures include all staff, supplies, drugs, maintenance and other recurrent costs associated with management.
- A detailed description of other recurrent costs was not available. For other expenses not included in previous categories roughly 70 percent is allocated to utilities, building maintenance and other related costs. Following expert consultations with the TB Institute, this category includes: staff travel costs, transfers (these are designed for TB staff who developed the disease from working at the facility), disposables such as bedding and cleaning materials.
- In determining the cost per patient, the treated population is divided into several sub-categories. The first is the total number of TB patients treated in 2002. To determine the cost per patient treated, the total executed expenditures is divided by oblast and by the total number of treated patients. The second category is the total population of new patients (BK positive and BK negative) cured. In this case we continue to use total expenses by oblast, minus expenses for the MDRTB patients, and the total population of new patients cured. This may reflect costs that are higher than actual costs of treatment, but it shows the additional inefficiencies in the program as low cure rates tend to increase the cost per patient cured. Specific, direct and indirect costs associated with curing one patient were not available so the above methods are proposed as a substitute.

- The number of MDRTB patients was estimated using 10 percent of patients, according to the *Central Asia HIV/AIDS and TB Country Profiles (2004)*. The quality of data regarding MDRTB is limited and the actual number may be closer to 17 percent.
- To estimate the relative cost of treating MDRTB, two scenarios regarding treatment and cure were constructed: the first assumed that 50 percent of all MDRTB patients receive treatment, while the second assumed that 70 percent receive treatment.
- Costs of MDRTB patients were estimated using the average cost of US$5,000 reported in the World Bank study.
- Cure rates were estimated as the number of BK positive patients cured over the total number of BK positive patients treated, according to the definition established by the WHO.
- Statistics were compiled from primary sources provided by the Ministry of Health and the National TB Institute and were translated from Russian to English.
- In calculating the number of disability days lost, average earnings were used. Data on prisoners and low-income individuals was unavailable but this was compensated by taking into account the unemployed population.
- Comparisons (benchmarks) were drawn with Russia, a very similar country in aspects such as: framework of the health sector, burden of disease, geographic and climate similarity, etc. Other countries used for comparisons represent some of the best TB practices globally.

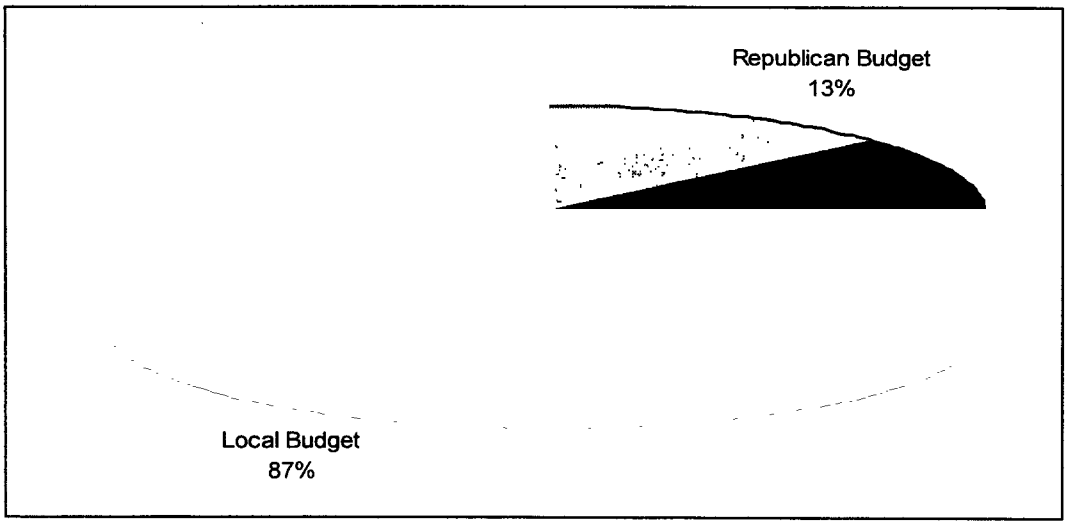
Financing the TB Program

Total spending on the TB Program for 2002 was US$37.6 million. An estimated 13 percent of total TB spending, or nearly US$5 million, is from the Republican Budget, financing the National TB Institute, two sanatoriums and centralized drug procurement. As in most neighboring countries, Kazakhstan also benefits from external aid flows for TB control, although these are relatively small in comparison to the overall budget. The total expected contributions between 2002 and 2007 are US$ 9.3 million, out of which 75 percent will be distributed between 2004 and 2006. The analysis in this section focuses on the public expenditure, central and local, since donor financing for 2002 was estimated at less than $800,000.

Figure 28 shows that local government financing contributes an estimated 87 percent of total resources for TB in Kazakhstan. These resources finance salaries, additional drug expenditures and other recurrent costs. Spending distribution in 2002 was heavily weighted to recurrent costs, with US$35.4 million in recurrent costs and US$2.2 million in investments. Preliminary estimates for 2003 indicate that investment costs increased from US$2 million in 2002 to over $14 million in 2003.

Estimates for 2003 place total spending on the Republican Budget considerably higher than in 2002, increasing from just under US$5 million to US$11.6 million. This increase is mainly due to the fact that spending on drugs doubled.

Figure 28: Republican and Local Budget 2002



Source: Study Estimates based on data from Ministry of Health, Kazakhstan 2003.

Donor Financing

In addition to the funds outlined in the previous section, the international community has played an active role in implementing DOTS and the TB Program. USAID has been a major financial contributor through several agencies. Training and refurbishment was undertaken through Project HOPE. HOPE has been in Kazakhstan since 1994 and introduced the first DOTS program in Central Asia. Since October 2001 HOPE also supports TB control in the prison in the Karaganda Oblast.

CDC started its activities by establishing an Infectious Diseases network in 1995. Since 2000 it works on strengthening laboratory diagnosis and electronic surveillance. Rational Pharmaceutical Management (RPM), present in Kazakhstan since 1998, started a TB drug quality assurance program with USAID support in 2002.

Primary Health Care has been strengthened by Zdrav Plus since 1994. WHO Euro with USAID funds created a post for a Regional TB officer, who is based in Almaty. USAID has issued an RFA for US$ 15 million for 2004-2008 for the 5 CA countries.

KfW supports with its first TB Program of € 2,56 million in 2004-2006 and a second for also € 2,56 million in 2004-2007 the upgrading of laboratories, training, supervision and uninterrupted supplies of consumables in 5 oblasts both for the civilian an penitentiary sector.

The World Bank provided US$ 9.5 million to equip the PHC laboratories, which has also impact on the diagnostic services for TB control.

Cordaid and ICCO, two Dutch co-financing organizations, with support of the Dutch government financed a TB control and human rights prison project since 1998 through Penal Reform International (PRI) based in London and KNCV Tuberculosis Foundation based in The Hague.

A combined PRI/KNCV program started in Pavlodar and has since been extended to 3 more oblasts, among which Karaganda, where KNCV co-operates with Project HOPE.

Distribution of Spending by Oblast

Data on local TB spending was collected from each oblast health authority through the submission of a standardized form and follow-up with local authorities. Analyzing the distribution of spending by oblast we see that there are significant differences. The total annual cost of the TB Program varied from US$0.5 million in Almaty City to nearly US$6.3 million in Southern Kazakhstan. For the purposes of cost and cost-effectiveness analysis in these sections, we consider only the recurrent costs. We have also reallocated spending for the three Republican Centers proportionally among the oblasts, according to the volume of TB patients in each oblast.. These centers have budgets of US$1.4 and US$4.4 million, respectively, and attend a large proportion of patients from the surrounding city. This allows proper comparisons to be drawn between per capita and per patient allocations per oblast.

On a per capita basis, considering the total population in the oblast, total spending varied from US$0.4 per person in Almaty to US$4.9 per person in Kzyl-Orda, with a national average for the 16 oblasts of US$2.4 (Table 25). These figures are considerably higher than the US$1.6 per person in Russia according to a recent study carried out by the WHO (2002). The cost per registered patient with TB disease varied from US$574 in Almaty City to US$2,536 in Southern-Kazakhstan. These figures are also higher than those calculated for Russia, which reported a range from US$848 to US$1,403.

Distribution of TB Costs by Input

The distribution of total costs was broadly similar in all oblasts (Table 26). When broken down into different inputs, spending on payroll for the staff in TB facilities accounted for the largest share of costs (39 percent for the Republic of Kazakhstan). Staff costs in the Russia study were slightly lower (30-35 percent). Other recurrent expenses accounted for 26 percent of total TB costs, but this category is not clearly defined, so these figures should be treated with caution. Other expenses accounted for 17 percent of total costs and drugs expenses represented 16 percent.

Drug expenditure by the National TB Institute and the two "Borovoe" sanatoriums was reallocated in each oblast according to the proportion of total TB patients in each oblast. This reallocation was added to the current amount of drugs spending for each oblast.

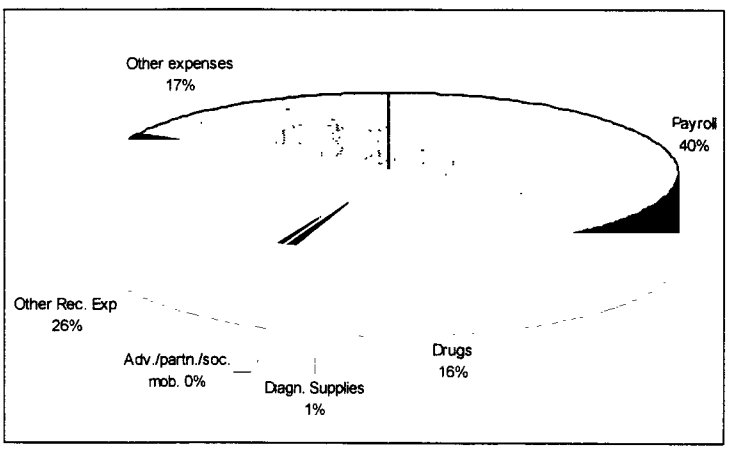
Distribution of costs by categories and oblasts is shown in Figure 30. As indicated earlier, the principal categories of spending are payroll, recurrent expenses and other expenses.

Table 25: Total and Per Capita Costs 2002

Oblast	Total Recurrent	Total Investments	Per capita All population	Per capita BK+ BK-patients
Akmola	1,850,287	147,278	3.4	1,214
Aktube	2,266,591	5,938	4.9	1,418
Almaty	2,213,057	41,263	1.4	1,154
Atyrau	2,117,928	4,886	4.7	1,611
Eastern-Kazakhstan	3,082,314	100,858	2.1	1,367
Jambil	1,955,227	42,216	2.0	1,205
Western-Kazakhstan	1,889,003	11,225	3.1	1,310
Karaganda	3,422,296	55,414	2.6	1,632
Kzyl-Orda	2,968,950	89,236	4.9	1,565
Kostanay	1,786,541	26,616	1.9	1,016
Mangistau	937,567	3,441	2.8	1,012
Pavlodar	1,989,467	184,187	2.7	1,258
Northern-Kazakhstan	1,529,708	281,773	2.2	1,530
Southern-Kazakhstan	6,341,777	1,185,567	3.0	2,536
Almaty City	458,378	2,965	0.4	574
Astana City	604,809	25,604	1.2	911
Republic of Kazakhstan	**35,413,901**	**2,208,466**	**2.4**	**1,422**

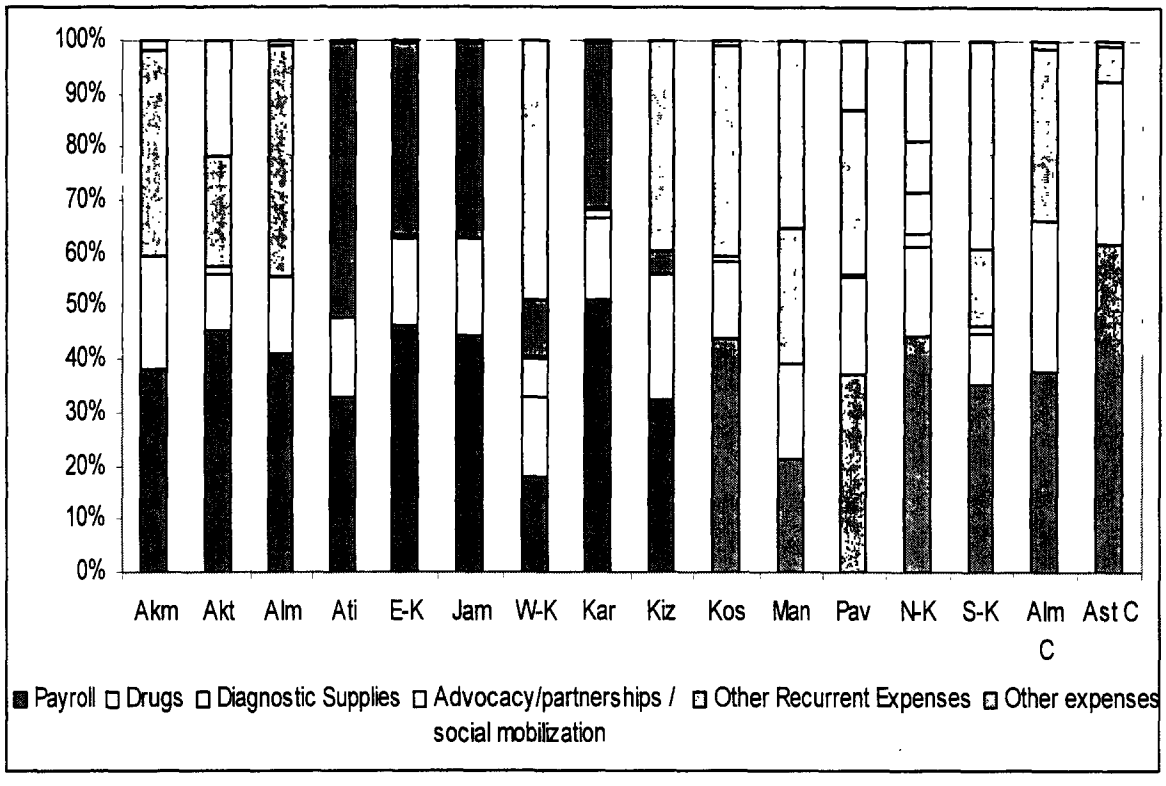
Source: Ministry of Health, Kazakhstan 2003.

Figure 29: Total Cost Distribution by Inputs 2002



Source: Study Estimates based on data from Ministry of Health, Kazakhstan 2003.

Figure 30: Distribution of Costs by Oblast



Source: Ministry of Health, Kazakhstan 2003.

As above, on a per capita basis (considering total population for each oblast) the principal expenditures are in the categories of payroll expenses, recurrent expenses and other expenses, representing over US$2 of the average of US$2.45 per capita.

If distribution by budget categories is calculated on a capitated basis, where the target population is not the entire population but the total number of TB patients, the results highlight significant differences among the oblasts in all categories. Total expenditure per TB patient ranges from a low of US$574 in Mangistau to Astana City, which spends US$2,536. In contrast, the national average is US$1,422. The order of these differences ranges from four to one in the case of payroll to three to one in the case of pharmaceuticals. In other words, the difference between the oblast with the highest expenditure in personnel per TB patient is four times higher than the lowest and three times higher in the case of pharmaceuticals. In absolute terms, the highest financed oblast (Southern Kazakhstan) received US$890 per TB patient in personnel costs and US$254 in drugs, while the oblast with the least financing (Mangistau) received US$215 for staff and US$183 for drugs. It is important to note that some of the spending in Astana and Almaty is for Republican facilities that serve the entire population. These estimates use population of the cities only when in fact they treat a larger population. It was not possible to estimate the percentage of patients treated from outside the city.

The final analysis of cost by category estimates the share of spending on fluorgraphy in each oblast and compares this with spending in other major categories. Figure 31 shows the distribution of spending across all oblasts. The figure ranges from a low of 3.2 percent in Kzyl-

Orda to a high of 33.5 percent in Almaty. If we consider that TB expenses for Almaty including total expenses from the National TB Institute, the participation of fluoroscopy in total expenditure is 3.3 percent.

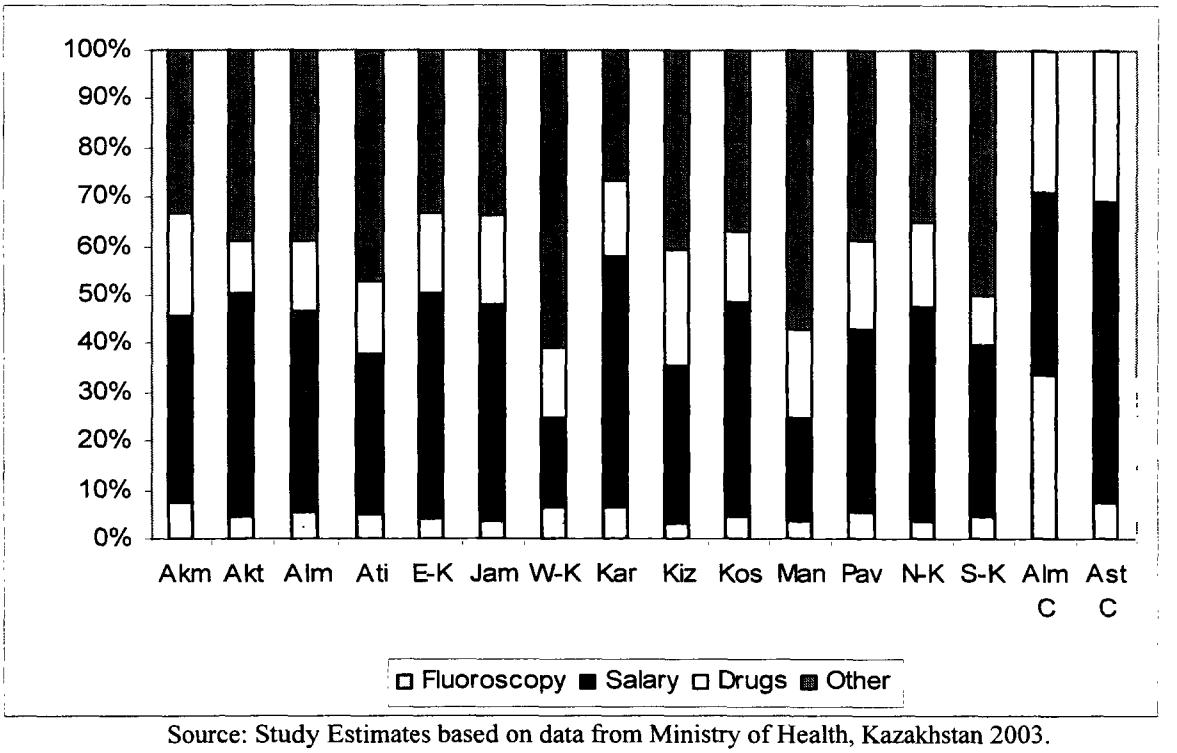
Table 26: Cost by Budget Category (US$)

Oblast	Payroll	Drugs	Diagnostic Supplies	Advocacy Partnerships Social mobilization	Other Recurrent Expenses	Other expenses	Total
Akmola	463.4	256.5	2.9	0.0	466.3	24.9	1,214.1
Aktube	647.0	150.8	19.7	0.0	290.7	310.1	1,418.4
Almaty	473.1	169.9	0.2	0.0	502.6	8.7	1,154.4
Atyrau	529.0	240.6	0.2	0.0	832.1	8.7	1,610.6
Eastern-Kazakhstan	632.9	226.8	7.6	0.0	491.0	8.7	1,366.9
Jambil	537.6	219.3	0.2	0.0	439.0	8.7	1,204.7
Western-Kazakhstan	237.2	191.3	98.5	7.1	135.0	640.8	1,310.0
Karaganda	836.4	250.3	23.6	11.8	501.3	8.7	1,632.0
Kzyl-Orda	505.7	371.9	1.7	0.0	67.8	618.0	1,565.1
Kostanay	446.3	146.6	10.1	0.0	404.6	8.7	1,016.2
Mangistau	214.8	183.3	0.2	0.0	259.5	354.6	1,012.5
Pavlodar	468.9	230.9	7.9	0.0	385.9	163.9	1,257.6
Northern-Kazakhstan	676.4	263.1	38.9	114.6	148.7	288.0	1,529.7
Southern-Kazakhstan	890.9	254.3	28.5	0.0	370.2	991.8	2,535.7
Almaty City	216.8	164.4	0.2	0.0	184.4	8.7	574.4
Astana City	562.2	279.7	0.2	0.0	60.1	8.7	910.9
Republic of Kazakhstan	**557.2**	**227.2**	**15.6**	**6.0**	**371.6**	**244.8**	**1,422.4**

Source: Ministry of Health, Kazakhstan 2003.

This analysis is particularly interesting given the low detection rates for fluorgraphy in all oblasts. The detection rate ranges from 0.03 in Almaty City to 0.68 in Jambil, as shown in Table 27. More importantly, the cost per case detected ranges from just under US$60 per case detected to US$1,248 in Almaty City. Overall, the cost per case detected for fluorography is nearly $150.

Figure 31: Budget by Category 2002



Source: Study Estimates based on data from Ministry of Health, Kazakhstan 2003.

Table 27: Fluoroscopy Costs and Other Categories 2002 (US$)

Oblast	Fluoro-graphy	Cases Detected	% patients screened detected	Estimated costs US$	Cost per case detected (US$)	% of Total TB spending
Akmola	350,643	1,502	0.43%	140,257	93.4	7.6%
Aktube	273,356	1,044	0.38%	109,342	104.7	4.8%
Almaty	307,240	968	0.32%	122,896	127.0	5.6%
Atyrau	264,717	959	0.36%	105,887	110.4	5.0%
Eastern-Kazakhstan	314,729	660	0.21%	125,892	190.7	4.1%
Jambil	174,662	1,192	0.68%	69,865	58.6	3.6%
Western-Kazakhstan	304,700	755	0.25%	121,880	161.4	6.5%
Karaganda	562,449	844	0.15%	224,980	266.6	6.6%
Kzyl-Orda	239,842	524	0.22%	95,937	183.1	3.2%
Kostanay	217,623	1,431	0.66%	87,049	60.8	4.9%
Mangistau	84,642	459	0.54%	33,857	73.8	3.6%
Pavlodar	278,771	508	0.18%	111,508	219.5	5.6%
Northern-Kazakhstan	138,887	211	0.15%	55,555	263.3	3.6%
Southern-Kazakhstan	740,154	1,541	0.21%	296,062	192.1	4.7%
Almaty City	383,913	123	0.03%	153,565	1,248.5	33.5%
Astana City	116,191	538	0.46%	46,476	86.4	7.7%
Republic of Kazakhstan	**4,752,519**	**13,259**	**0.28%**	**1,901,008**	**143.4**	**5.4%**

Source: Study Estimates based on data from Ministry of Health, Kazakhstan 2003.

The Cost of MDRTB

In this section, rough estimations on the costs of TB and MDRTB patients are made. Since official figures on the number of MDRTB patients were unavailable, the number is estimated using figures established by experts and clinical tests made on some groups of the population. According to this data, MDRTB represents nearly ten percent of total TB patients in the Republic of Kazakhstan.

The cost of treating MDRTB patients is considerably higher than the cost of treatment for regular TB patients. A study by the Johns Hopkins School of Public Health from 1998 estimated that the costs of treatment of MDRTB patients could be in the range of US$1,000 to US$8,000 according to the combination of drugs used in the treatment. A UK based Charity (MERLIN) identified the costs for treatment as US$5,000 for Russia. Another study (WHO 2002) estimated that the cost of treating MDRTB patients in Peru is nearly US$2,400. The figures for Russia based on consultations with local experts are used in this study. The estimated costs for this group of TB patients are later subtracted from the total costs for the TB control program. Subsequently, the calculations of costs of treatment and cost of curing those patients are separated.

TB Control Costs by Type of Patient

Due to the lack of data regarding MDRTB patients cured, we assume that the number is the same as for BK positive patients. Once these estimates were made, the cost to cure a MDRTB patient was estimated (using the costs of treatment for scenarios one and two). Highest variability on the cost effectiveness for oblasts is reflected in a higher variation coefficient of nearly 50 percent (this coefficient expresses percentage variation in relation to average).Estimates involve the two different scenarios mentioned before, where the first assumes that only 50 percent of total MDRTB patients receive treatment, while the second assumes that 70 percent receive treatment.

Table 28 shows the total costs of TB and MDRTB patients. Figures on the costs for MDRTB represent 8 and 12 percent of the total costs of the TB Program respectively in each scenario. If we assume that all MDRTB patients receive treatment, the costs for the health system would represent US$6 million.

How Much Does TB Cost the Kazak Economy?

The true cost of TB to the Kazak economy includes both the direct costs of providing health care to the population and the indirect costs of lost wages and productivity. In order to calculate the cost of illness from the perspective of the patient and productivity lost, we include an analysis of indirect costs. To this end, we estimate two kinds of costs related to TB in Kazakhstan. **Direct costs**, which are related to local health budgets assigned to TB and reflect the cost of treating TB patients, from the perspective of the health care system. **Indirect costs** are estimated using two different sources: visits by patients and disability days resulting in loss of work. The indirect costs reflect the cost of care from the perspective of the patient, although we do not include travel and other indirect costs that the patients face when seeking services. This study used the average number of visits made by a TB patient that was used in the Russia Study (2002). The study established a benchmark according to GDP per capita. The Kazak study used the benchmark closest to the economic conditions of this country. Costs do not include patient transportation.

Table 28: Costs of TB and MDRTB Patients under Different Scenarios

Oblast	Total	Reg Pat1	Reg Pat2	MDRTB-Sce1	MDRTB-Sce2
Akmola	1,850,287	1,633,787	1,547,187	216,500	303,100
Aktube	2,266,591	2,054,591	1,969,791	212,000	296,800
Almaty	2,213,057	1,979,807	1,886,507	233,250	326,550
Atyrau	2,117,928	1,963,678	1,901,978	154,250	215,950
Eastern-Kazakhstan	3,082,314	2,824,564	2,721,464	257,750	360,850
Jambil	1,955,227	1,786,227	1,718,627	169,000	236,600
Western-Kazakhstan	1,889,003	1,729,253	1,665,353	159,750	223,650
Karaganda	3,422,296	3,159,796	3,054,796	262,500	367,500
Kzyl-Orda	2,968,950	2,766,950	2,686,150	202,000	282,800
Kostanay	1,786,541	1,518,541	1,411,341	268,000	375,200
Mangistau	937,567	841,567	803,167	96,000	134,400
Pavlodar	1,989,467	1,822,717	1,756,017	166,750	233,450
Northern-Kazakhstan	1,529,708	1,373,708	1,311,308	156,000	218,400
Southern-Kazakhstan	6,341,777	6,070,277	5,961,677	271,500	380,100
Almaty City	458,378	352,628	310,328	105,750	148,050
Astana City	604,809	535,809	508,209	69,000	96,600
Republic of Kazakhstan	35,413,901	32,413,901	31,213,901	3,000,000	4,200,000

Source: Study Estimates based on data from Ministry of Health, Kazakhstan 2003.

Table 29 shows that the direct costs range from around US$458,000 in Almaty to a high of nearly US$6.3 million in Southern Kazakhstan. Costs of visits and disability days are borne by the patient. In the first case this is an out of pocket payment and in the second it is a measure of time lost translated into monetary terms (Table 29). To estimate the costs associated with visits, it is assumed that a total of 80 visits or consultations per year (and per patient) is carried out and costs of US$0.62 are assigned to each. This shows that visits represent a cost of nearly US$3.1 million.

Table 29: Direct and Indirect Costs by Oblast

Oblast	Direct Costs	Indirect Costs			% Direct Costs	Total Costs	ALOS
		Visits	Disability	Total			
Akmola	1,850,287	198,946	232,130	431,076	81%	2,281,363	59.8
Aktube	2,266,591	204,253	253,067	457,320	83%	2,723,911	60.8
Almaty	2,213,057	232,227	357,812	590,039	79%	2,803,096	81.1
Atyrau	2,117,928	145,378	274,647	420,024	83%	2,537,952	77.7
Eastern-Kazakhstan	3,082,314	278,901	414,933	693,834	82%	3,776,148	77.7
Jambil	1,955,227	205,790	221,208	426,999	82%	2,382,226	65.2
Western-Kazakhstan	1,889,003	172,806	247,899	420,705	82%	2,309,708	71.6
Karaganda	3,422,296	270,469	404,649	675,118	84%	4,097,414	74.5
Kzyl-Orda	2,968,950	200,533	364,856	565,388	84%	3,534,338	98.6
Kostanay	1,786,541	199,690	250,636	450,326	80%	2,236,867	73.0
Mangistau	937,567	100,986	161,639	262,625	78%	1,200,192	59.8
Pavlodar	1,989,467	236,592	317,194	553,786	78%	2,543,252	67.6
Northern-Kazakhstan	1,529,708	117,453	221,410	338,863	82%	1,868,571	101.4
Southern-Kazakhstan	6,341,777	284,307	374,500	658,807	91%	7,000,584	86.9
Almaty City	458,378	106,987	108,917	215,905	68%	674,283	48.0
Astana City	604,809	100,341	98,338	198,679	75%	803,487	50.0
Republic of Kazakhstan	**35,413,901**	**3,055,658**	**4,303,836**	**7,359,493**	**83%**	**42,773,394**	**76.0**

Source: Study Estimates based on data from Ministry of Health, Kazakhstan 2003.

The cost of disability days was estimated using the Average Length of Stay (ALOS) as the measure of the inactive days of work for a TB patient. This unit was converted to US dollars through the estimation of money lost in a day of work (the average for Kazakhstan was US$1.6). In the estimations 40 percent of TB patients are considered unemployed, since poverty is one of the main causes for the development of the disease. For Kazakhstan the figures estimated showed that nearly US$43 million per year is lost by workers due to the disease. We made the assumption that even in the case of children with the disease their parents need to take some days off to care for them. It could also be possible that parents with a sick child pay for care. The latter was not taken into account in the calculations.

Costs of TB Treatment

This section analyzes the cost of treating and curing TB patients by oblast. This includes several dimensions, including: (a) the cost of new and relapsed smear positive and smear negative patients detected and treated (this does not include the issue of cure rates); (b) adjustment for cure rates, the cost of treatment and cure rates for smear positive and smear negative patients; (c) the cost of curing an average TB patient; and (d) corrections and estimates for the cost of treating MDRTB patients. The latter cost is subtracted from the expenditures estimated for smear positive and smear negative patients.

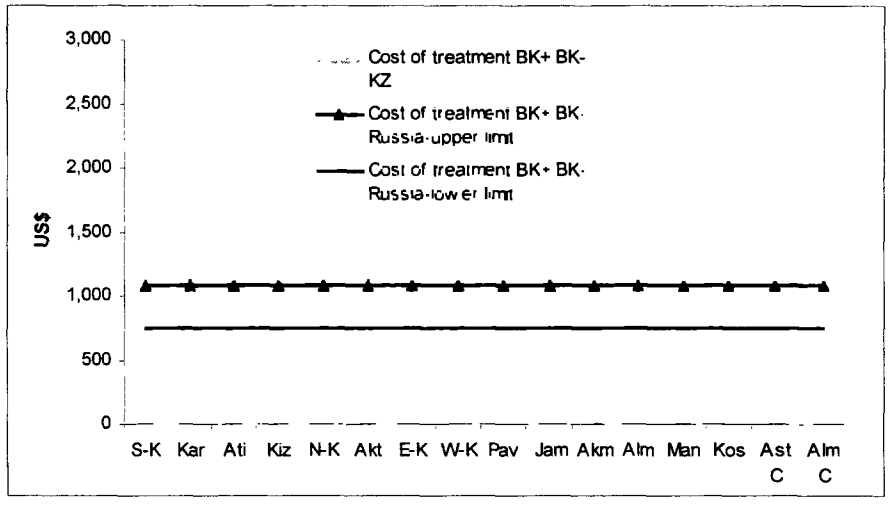
The first step towards estimating the cost-effectiveness of TB treatment in Kazakhstan is to adjust the previous results regarding cost per smear positive patient by the respective cure rate. It is important to remember that the objective of a cost-effectiveness analysis is to relate the cost of curing or preventing illness with the effectiveness of the intervention. As such, we first analyze the cure rate for smear positive patients to determine the total number of patients cured.

If both groups of patients (BK positive and BK negative) are considered, the cost per TB patient treated ranges from US$454 in Almaty City to US$2,481 in Southern Kazakhstan in scenario one (Figure 32). The national average ranges from US$1,334 to US$1,297, under scenario one and two respectively. The figures show considerable variation across the oblasts highlighting issues related to the efficiency of the TB Program in each oblast.

These figures compare negatively with similar estimates from Russia where the estimated cost per patient treated, including BK positive and BK negative, ranged from US$752 to US$1,076. This last cost is lower than the average cost per patient treated in Kazakhstan (US$1,334). One of the factors driving the increased cost per patient is the higher than average failure rates in Kazakhstan and the process related problems that were highlighted elsewhere in this report.

Comparisons made with the cost per patient treated in the 20 high burden countries in 2002 are shown in Figure 33. Kazakhstan has the highest cost per patient treated. All calculations show the budget cost implied for treatment of TB patients in general.

Figure 32: Average Cost per TB Patient Treated 2002



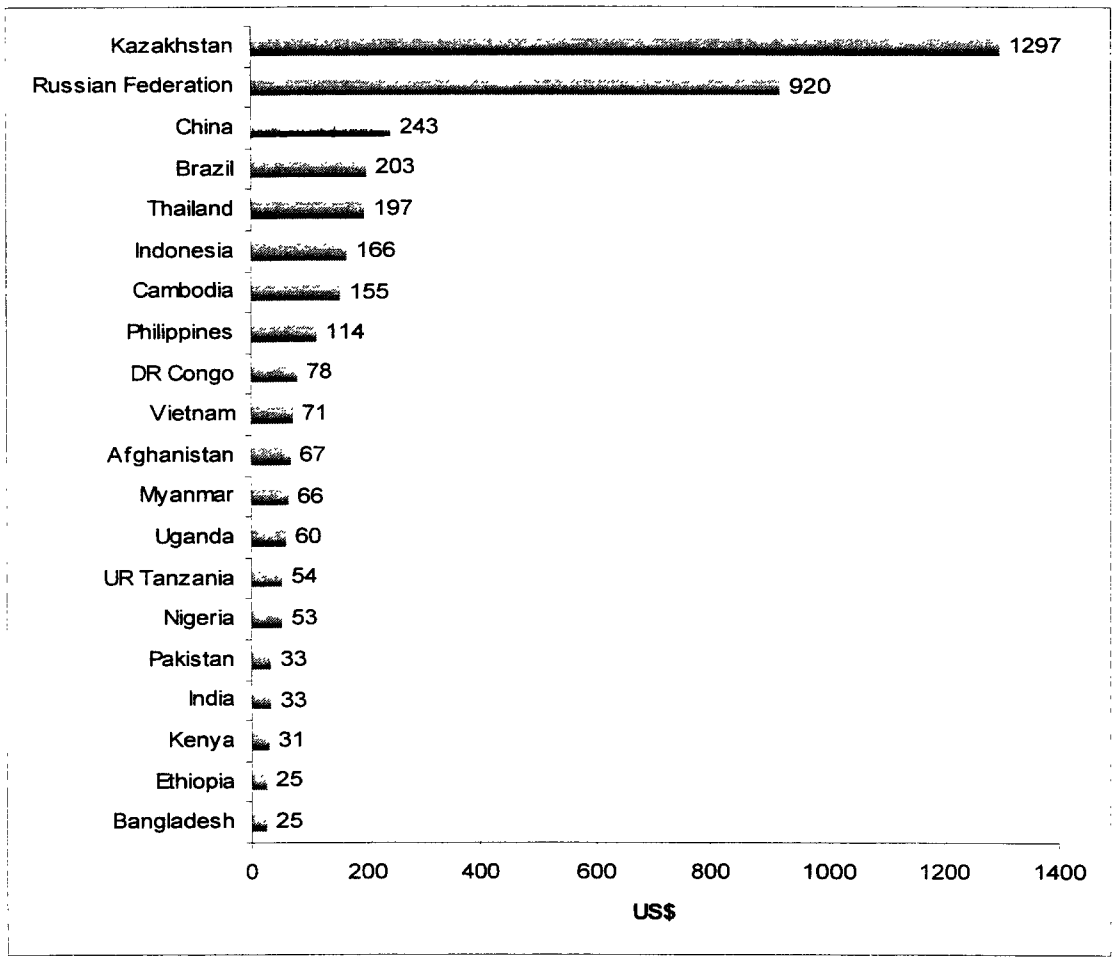
Source: Study Estimates based on data from Ministry of Health, Kazakhstan 2003.

While the varied staffing costs and the higher costs in Kazakhstan due to the size of the country and access causes some of these differences, the comparative figures indicate considerable opportunities to deliver better value-for-money in the national TB Program. Improvements can be achieved in three ways, which are not mutually exclusive.

- First, there appears to be a sizeable opportunity to reduce costs on drugs and other recurrent spending in many oblasts. More attention should be paid to the use of local financing to pay for TB drugs.
- Second, improvements in the cure rate would reduce expenditure per patient and offer the government the possibility of lowering the cost per BK positive cured to internationally acceptable ranges.

Finally, a change in the care paradigm, shifting to a more intensive out-patient services regime, would free up many of the resources required to strengthen the program. Investment costs will be a continued burden on the MoH budget if the full hospitalization protocol continues to be followed in all areas. This does not advocate for a full conversion to out-patient TB treatment, as the distances and social problems in Kazakhstan merit increased hospitalization. However, in many areas there is an opportunity to shift some of the hospital care to out-patient clinics.

Figure 33 : Comparative Cost of Treatment of TB Patients



Source: WHO Report 2002. Global Tuberculosis Control. Surveillance, Planning, Financing.

TB PROGRAM COST-EFFECTIVENESS

The final stage of the economic analysis attempts to relate the outcomes of a program with the cost of achieving those outcomes. This allows the cost per death averted or the cost per DALY to be compared among alternative investments in the health sector. In the first case, effectiveness is estimated by the number of deaths avoided from TB treatment and cure. Deaths avoided were calculated as the total number of patients who received TB treatment and were cured. The DALY is one of the most frequent indicators used in cost-effectiveness. This measure, first proposed in 1993 by the WHO, allows researchers to estimate the years that a sick person could lose if he/she dies prematurely or lives with a disability. Principal determinants of the years lost are the life expectancy of the country and the average age of death due to the disease.

Estimation of direct costs per death avoided is shown in Table 30. The average cost per death avoided is US$4,157 with minimum and maximum costs for Almaty City (nearly US$1,300) and Southern Kazakhstan (US$7,632), respectively, in accordance with the levels of spending.

Table 30: Cost per Death Avoided (US$)

Oblast	Cost per death avoided
Akmola	2,942
Aktube	3,921
Almaty	3,269
Atyrau	4,675
Eastern-Kazakhstan	4,809
Jambil	4,031
Western-Kazakhstan	4,255
Karaganda	4,917
Kzyl-Orda	4,804
Kostanay	2,305
Mangistau	3,842
Pavlodar	4,431
Northern-Kazakhstan	3,347
Southern-Kazakhstan	7,632
Almaty City	1,299
Astana City	3,183
Republic of Kazakhstan	**4,157**

Source: Study Estimates based on data from Ministry of Health, Kazakhstan 2003.

To calculate DALYs for TB, it was assumed that the average age at death for a TB patient is 47 years. Other parameters used in the calculation include the life expectancy in Kazakhstan of 63.38 years according to official figures and some other parameters established for the DALYs formula (Murray et al 1994). To calculate DALYs the number of deaths avoided is calculated (considered as those who were cured when receiving treatment). On average, each death from TB represents an average loss of 21.29 years of production. The product of each death averted by the number of DALYs avoided per death allows calculation of the total number of DALYs saved in Kazakhstan.

The total amount of direct costs over the number of DALYs saved represents the costs for Kazakhstan TB control program of saving one year of disability. Cost per DALY saved is determined in Table 31. Cost-effectiveness ratios varied from US$61 in Almaty City to US$358 in Southern Kazakhstan.

To compare cost-effectiveness of the program it is necessary to look at it in comparison with other projects related with TB control. In Table 32 we present a comparison with some other FSU countries.

As shown, the higher than average costs found in the Kazak TB Program are reflected in the lower cost-effectiveness of the program. In comparison, the cost per DALY saved in Kazakhstan is 3.4 times and 3.7 times higher than the costs in Russia and China, respectively. The cost per death averted is nearly 5 times higher than in Russia.

Table 31: Cost per DALY Avoided (US$)

Oblast	Cost per DALY saved
Akmola	138
Aktube	184
Almaty	154
Atyrau	220
Eastern-Kazakhstan	226
Jambil	189
Western-Kazakhstan	200
Karaganda	231
Kzyl-Ordaordi	226
Kostanay	108
Mangistau	180
Pavlodar	208
Northern-Kazakhstan	157
Southern-Kazakhstan	358
Almaty City	61
Astana City	150
Republic of Kazakhstan	**195**

Source: Study Estimates based on data from Ministry of Health, Kazakhstan 2003.

Table 32: Comparative Cost-Effectiveness

	Cost per Death Averted	Cost per DALY Saved
TB		
Russia	815	58
China	NA	53
Kazakhstan	4,157	195

Source: Study Estimates based on data from Ministry of Health, Kazakhstan 2003.

How Could Savings Be Made?

The fact that many previous estimates of the cost per TB patient appear to be higher than Russia and other comparable cases indicates that potentially savings could be made. In this section two alternative scenarios are analyzed. In the first, we assume that the average costs per BK positive patient could be reduced. This would include savings in drug costs, lower costs of case detection and more consistent staffing patterns. The second scenario assumes that cure rates would increase in all oblasts to the rate achieved in the best oblast: 84 percent for Almaty City. Under both scenarios, the considerable opportunities to save resources within the system would allow the MoH to reallocate funds to those oblasts that require strengthening and a redoubling of efforts to address the TB problem.

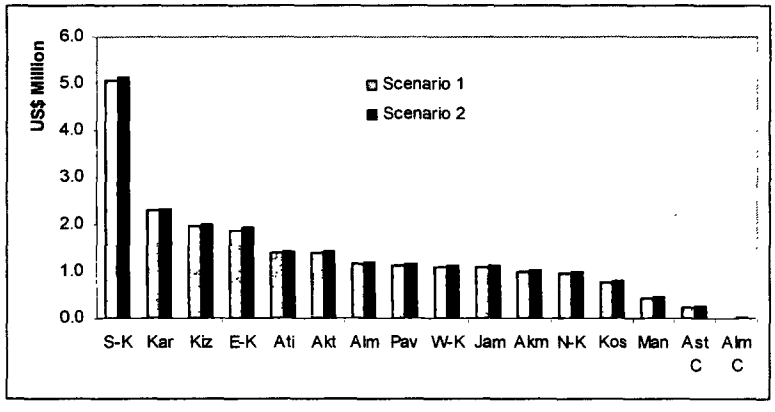
Scenario 1: Savings if Costs per TB Patient Were Reduced

In order to estimate the potential saving to the system under the assumption that spending can be reduced per patient, two alternative scenarios are provided. In the first, the highest spending oblast is benchmarked to the oblast with the lowest costs per TB patient. Under this scenario, an average cost per TB patient of US$ 454 is taken, corresponding to the cost of treatment in Almaty City. In the second scenario, existing spending is benchmarked against the average cost per new smear-positive patient treated in a middle income country with an average income of US$ 2,390 in 1999 (US$ 4,390 at PPP), using the DOTS regime. While the second scenario

probably underestimates the full cost of a TB Program, the real number is likely to lie somewhere in between. Under this scenario, the average cost was estimated at US$ 430 and it takes into account the case detection costs.

Under both scenarios, the potential savings are considerable. The total potential savings under scenario 1 sum to more than US$ 21 million per year. Under scenario 2, the total potential savings would be nearly US$ 23 million. The following figure displays the comparative results by oblast.

Figure 34: Savings in Treatment Costs of TB Patients 2002



Source: Study Estimates based on data from Ministry of Health, Kazakhstan 2003.

Scenario 2: Improving Cure Rates Saves Money

This section estimates the impact on savings to the health system from an increase in the cure rates for all oblasts. The benchmark rate is that of the oblast with the best cure rate in 2002, corresponding to Almaty City, with a cure rate of 84 percent (very close to the target rate of 85% recommended by WHO to qualify as an effective TB control program). Benefits from this simulation include the avoided direct costs per patient and the indirect costs savings due to the reduction of disability days, number of visits avoided and total economic value of deaths avoided. The main results of the simulation process are shown in Table 33.

Scenario 3: Savings if TB Control Performance Improves 1 Percent

Calculations for this section are based on a scenario whereby the detection rate improves one percent, raising the number of treated patients. Cure rates likewise improve one percent for all oblasts and mortality rates fall one percent for each oblast. The treatment rate was calculated as the current number of people treated over the total number of TB patients, so improvements of one percent could increase the total number of new patients receiving treatment. This new set of patients would experience an improvement in cure rates of one percent and a reduction by one percent in mortality rates. The new number of patients treated and cured, and deaths avoided will represent significant direct and indirect benefits to the Republic of Kazakhstan. These benefits, expressed in monetary terms are shown in Table 34.

Table 33: Benefits from Improving Cure Rates to 84 Percent in All Oblasts (US$)

Oblast	Direct Benefits (US$)	Indirect Benefits (US$)				Total Benefits (US$)
		Visits	Disability	Cost of Deaths	Total	
Akmola	140,451	3,261	6,341	734,657	744,258	884,709
Aktube	196,765	3,651	7,540	822,720	833,911	1,030,676
Almaty	158,199	3,308	8,495	745,374	757,177	915,376
Atyrau	97,774	1,413	4,448	318,332	324,193	421,967
Eastern-Kazakhstan	365,621	6,066	15,041	1,366,764	1,387,871	1,753,492
Jambil	116,601	2,000	3,582	450,541	456,123	572,724
Western-Kazakhstan	125,113	2,099	5,019	472,991	480,109	605,223
Karaganda	390,890	5,949	14,833	1,340,316	1,361,097	1,751,987
Kzyl-Orda	115,826	1,563	4,741	352,285	358,590	474,416
Kostanay	140,029	4,168	8,718	939,034	951,920	1,091,949
Mangistau	88,577	1,799	4,800	405,444	412,044	500,621
Pavlodar	255,979	4,257	9,511	959,124	972,892	1,228,872
Northern-Kazakhstan	129,719	2,625	8,246	591,370	602,240	731,959
Southern-Kazakhstan	146,537	1,245	2,733	280,445	284,422	430,960
Almaty City	0	0	0	0	0	0
Astana City	39,450	893	1,459	201,198	203,550	243,000
Republic of Kazakhstan	**2,635,532**	**44,295**	**109,130**	**9,980,595**	**10,134,020**	**12,769,551**

Source: Study Estimates based on data from Ministry of Health, Kazakhstan 2003.

Aggregated benefits from the two scenarios are shown in Table 35. The majority of savings are due to indirect costs, including reduced travel costs, disability costs and improved labor productivity. In total, direct savings would be over US$1 million per year for each one percent improvement. This implies that a five percent improvement in the detection, cure and mortality rates would result in direct savings over US$5 million per year. The indirect costs reach nearly US$ 3 million per year for every one percent improvement.

Table 34: Benefits Due to Improvement of Health System Performance (US$)

Oblast	Direct Benefits (US$)	Indirect Benefits (US$)				Total Benefits (US$)
		Visits	Invalidity	Deaths	Total	
Akmola	58,581	3,078	5,985	154,213	163,276	221,856
Aktube	68,903	3,139	6,483	164,472	174,095	242,998
Almaty	67,023	3,746	9,619	195,181	208,546	275,568
Atyrau	60,888	2,508	7,896	142,516	152,919	213,808
Eastern-Kazakhstan	91,273	4,357	10,803	235,448	250,609	341,882
Jambil	61,412	3,273	5,864	167,736	176,873	238,285
Western-Kazakhstan	57,264	2,852	6,818	153,979	163,648	220,912
Karaganda	102,377	4,046	10,088	210,519	224,652	327,030
Kzyl-Orda	84,192	3,596	10,906	209,141	223,643	307,835
Kostanay	50,996	3,296	6,894	181,776	191,966	242,962
Mangistau	25,811	1,712	4,567	100,849	107,128	132,939
Pavlodar	67,778	3,438	7,683	172,361	183,481	251,259
Northern-Kazakhstan	45,037	1,902	5,977	99,585	107,464	152,500
Southern-Kazakhstan	189,528	4,880	10,713	264,142	279,735	469,263
Almaty City	15,685	1,743	2,958	87,667	92,368	108,053
Astana City	20,996	1,459	2,382	71,021	74,862	95,857
Republic of Kazakhstan	**1,074,686**	**49,061**	**120,872**	**2,610,713**	**2,780,646**	**3,855,332**

Source: Study Estimates based on data from Ministry of Health, Kazakhstan 2003.

Table 35: Savings for Each Scenario

	All Oblasts Reach Cure Rate of 84 %	Improvement of 1 percent in Treatment Rate, Cure Rate and Mortality rate
Direct costs	2,635,532	1,074,686
Indirect costs	10,134,020	2,780,646
Total	12,769,551	3,855,332

Source: Study Estimates based on data from Ministry of Health, Kazakhstan 2003.

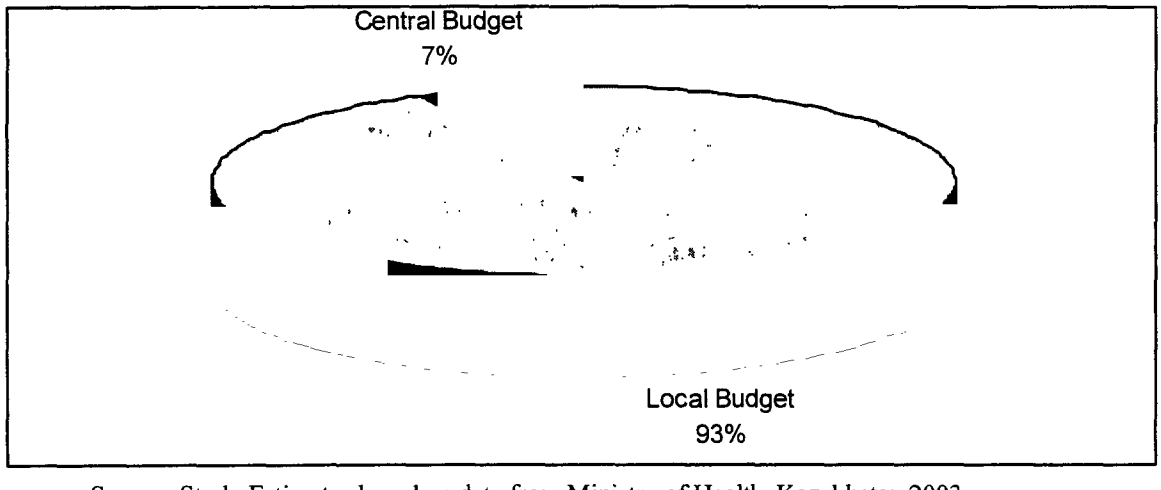
COSTS OF THE HIV/AIDS PROGRAM

Total spending on the HIV/AIDS Program for 2002 was nearly US$3 million. Less than 10 percent of these expenditures come from the central budget. Distribution of expenditures is heavily weighted to recurrent costs with higher participations for payroll and diagnostic supplies expenditures.

There are significant differences in the distribution of expenditures by oblast. The total annual cost of the HIV/AIDS Program in the Republic of Kazakhstan varied from US$0.06 million in Atyrau to nearly US$0.34 million in Karaganda.

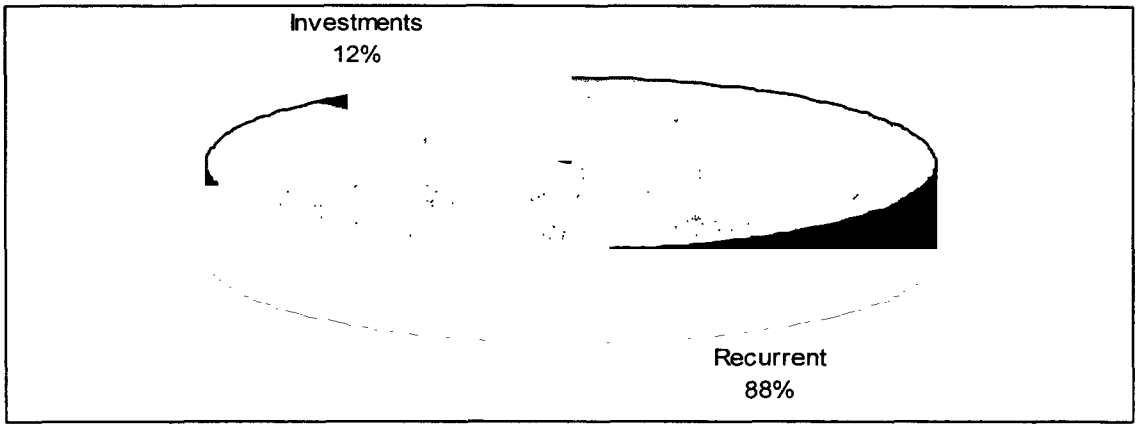
Costs per HIV/AIDS patient are nearly US$675. Considering that not all HIV patients receive treatment and that all AIDS patients do, the costs are much higher, representing more than US$26,000 per patient. There are also significant differences in costs per patient by oblast.

Figure 35: Central and Local Budget 2002



Source: Study Estimates based on data from Ministry of Health, Kazakhstan 2003.

Figure 36: Recurrent and Investment Expenditures 2002



Source: Study Estimates based on data from Ministry of Health, Kazakhstan 2003.

The total spending on HIV/AIDS Program for 2002 was US$2.8 million. An estimated seven percent of total HIV/AIDS spending (nearly US$0.2 million), is from the central budget. The Government has estimated the costs of the HIV/AIDS Program at about $150 million for the period 2001-2005. Given the distribution of spending between central and local governments it is difficult to envisage how increased funding will be mobilized unless central government contributions increase significantly. This would include the execution of the recently approved Global Fund grant, which will contribute to increased national funding.

Figure 35 shows that local government financing contributes an estimated 93 percent of total resources for HIV/AIDS in Kazakhstan. These resources finance salaries, drug expenditures and other recurrent costs. The distribution of spending in 2002 was heavily weighted to recurrent costs, with US$2.3 million in the latter and US$0.3 million in investments (this does not include the central budget as the distribution by expenditure categories was not available).

The distribution of spending by oblast shows significant differences. The total annual cost of the HIV/AIDS Program in the Republic of Kazakhstan varied from US$0.06 million in Atyrau to nearly US$0.34 million in Karaganda. For the purposes of cost analysis in these sections, only the recurrent costs are considered.

On a per capita basis, considering the total population in the oblast, total spending varied from US$0.04 per person in Southern Kazakhstan to US$0.46 per person in Mangistau, with a national average for the 16 oblasts of US$0.16 (Table 36). On a per capita basis (considering the total population for each oblast) the principal expenditure drivers are payroll expenses, diagnostic supplies, other recurrent expenses and other expenses, representing over US$0.14 of the average of US$0.16 per capita.

Table 36: Total and Per Capita Costs 2002

Oblast	Total Recurrent	Total Investments	Per capita All population	Per capita HIV/AIDS patients	Per capita AIDS patients
Akmola	180,267	0	0.33	3,137	123,346
Aktube	66,915	0	0.14	1,035	40,699
Almaty	67,357	0	0.04	1,727	67,920
Atyrau	62,727	24,739	0.14	5,094	200,295
Eastern-Kazakhstan	127,587	0	0.09	1,130	44,444
Jambil	138,353	0	0.14	2,175	85,506
Western-Kazakhstan	209,833	125,640	0.35	1,493	58,688
Karaganda	344,820	12,633	0.26	278	10,920
Kzyl-Orda	74,600	21,393	0.12	10,386	408,357
Kostanay	95,880	0	0.10	477	18,744
Mangistau	155,367	41,333	0.46	7,969	313,331
Pavlodar	138,647	0	0.19	192	7,536
Northern-Kazakhstan	93,815	10,131	0.14	1,550	60,929
Southern-Kazakhstan	76,187	1,518	0.04	202	7,933
Almaty City	191,487	77,040	0.17	1,009	39,661
Astana City	226,313	0	0.45	7,352	289,060
Republic of Kazakhstan	**2,250,154**	**314,427**	**0.16**	**673**	**26,472**

Source: Study Estimates based on data from Ministry of Health, Kazakhstan 2003.

HIV/AIDS Prevention and Control Costs by Input

The distribution of total costs was different across oblasts (Table 37). When broken down into different inputs, spending on payroll for staff in HIV/AIDS facilities accounted for the largest share of costs (38 percent for Republic of Kazakhstan, Figure 37). Drugs accounted for less than 10 percent of total costs and the two kinds of investments reported (investment in equipment and building, construction or renovation of facilities) accounted for 12 percent of the total local budget allocated to programs to fight HIV/AIDS epidemic. Diagnostic supplies is an expense category representing more than one fourth of the total local budget. This is likely to reflect the high cost of diagnosing HIV/AIDS and warrants important attention with regard to strategies to centralize procurement of tests and to introduce new, lower cost testing techniques.

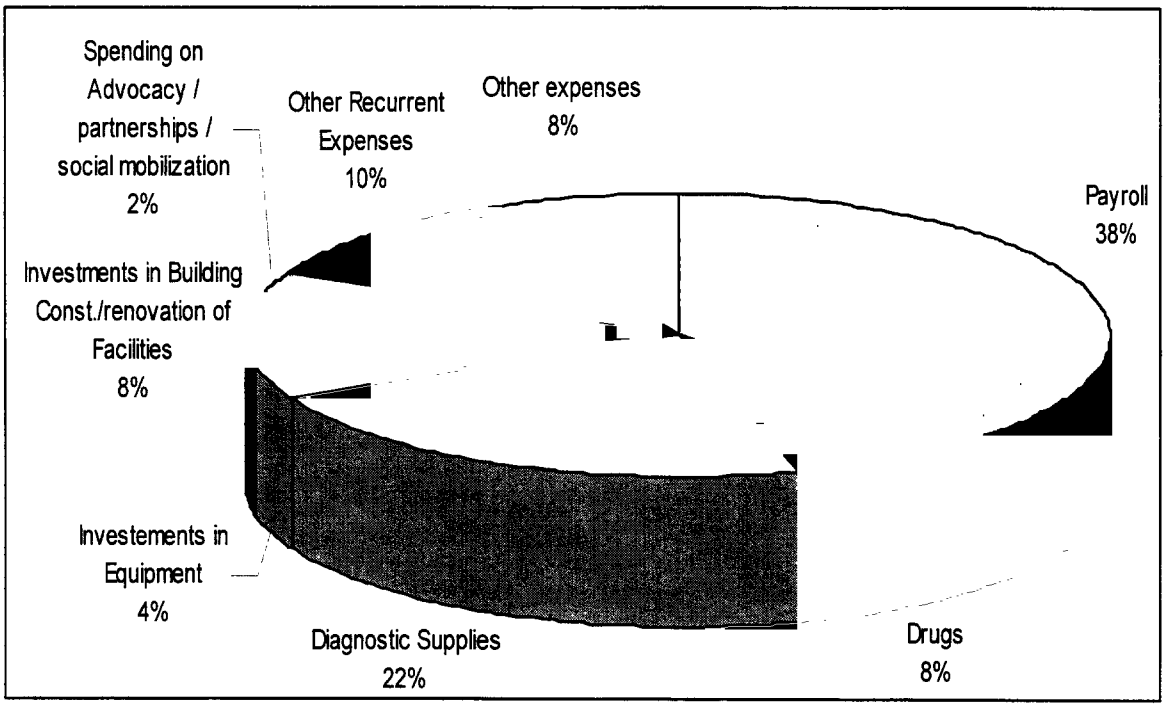
Distribution of costs by category and oblast is shown in Figure 37. As indicated above, the principal categories of spending are payroll, diagnostic supplies, recurrent expenses, and other expenses. Figure 37 shows the considerable variation in the distribution between spending categories. In Southern Kazakhstan, personnel costs account for nearly 80 percent of total spending and drug costs are negligible, while in Western Kazakhstan staff costs are lower than 25 percent and drug costs are around 10 percent.

There are important differences in the allocation of resources among oblasts that do not appear to be explained by either the total number of HIV/AIDS patients or the total number of reported AIDS patients. The following examples highlight the lack of resource allocation logic.

If distribution by budget categories is calculated on a capitated basis, where the target population is not the entire population but rather the total number of HIV/AIDS patients, the results highlight significant differences among the oblasts in all categories. Total expenditure per HIV/AIDS patient ranges from a low of US$192 per patient in Pavlodar while Kzyl-Orda

receives more than US$10,300 per HIV/AIDS patient. These stand in sharp contrast to the national average of US$673 per HIV/AIDS patient. These differences range from 42 to one in the case of payroll to 56 to one in the case of drug expenditures. In other words, the difference between the oblast with the highest expenditure in personnel per HIV/AIDS patient is 42 times higher than the lowest and 56 times higher in the case of pharmaceuticals. In absolute terms, the highest financed oblast (Kzyl-Orda) received US$4,374 per HIV/AIDS patient in personnel costs and US$139 in drugs, while the oblast with the least financing (Pavlodar) received US$104 per HIV/AIDS patient for staff and just US$1 for drugs 90 and 1 values were excluded to have adequate estimates of differences aamong oblasts).

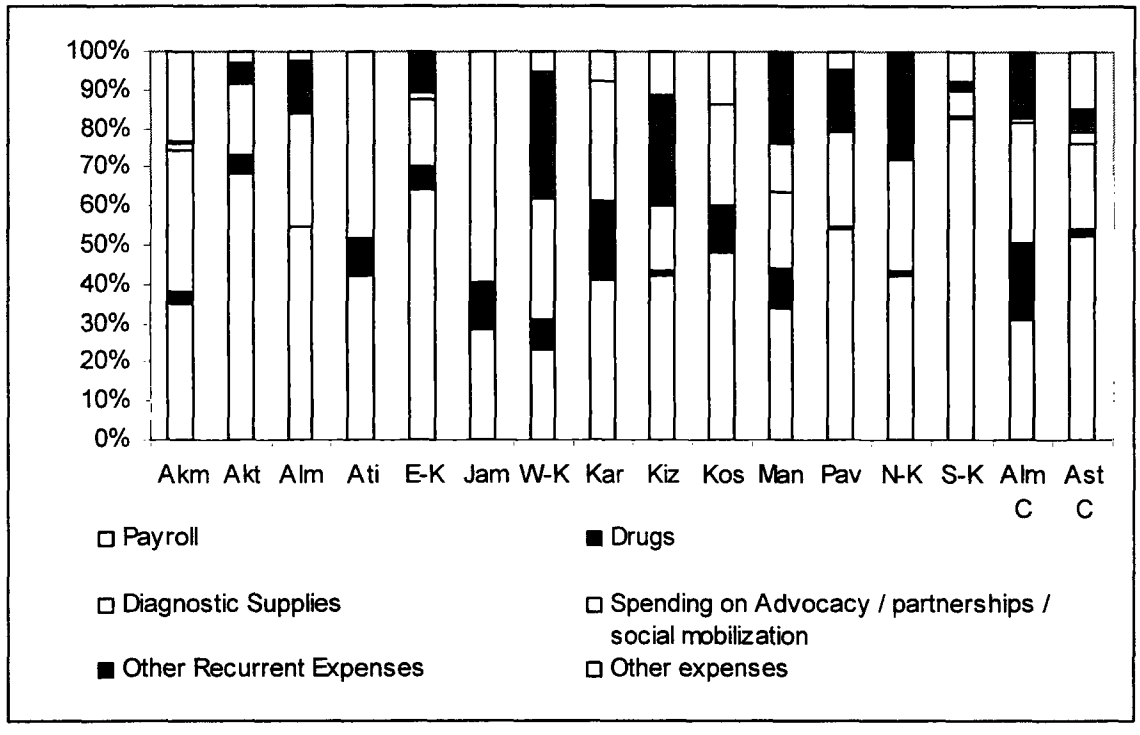
Figure 37: Cost by Inputs 2002



Source: Study Estimates based on data from Ministry of Health, Kazakhstan 2003.

If we only consider the number of AIDS patients, 85 in total for the Republic of Kazakhstan, those costs are higher. Average costs for AIDS patients in Kazakhstan represent nearly US$26,500. It is important to note that Karaganda, believed to have around half of all cases, has a per capita spending of only 30 percent of the national average and less than three percent of Kzyl-Orda, the oblast with the highest expenditure per patient. Pavlodar and Kzyl-Orda have the lowest and highest costs for AIDS patients (US$7,536 and US$408,357 respectively).

Figure 38: Costs by Oblast 2002



Source: Study Estimates based on data from Ministry of Health, Kazakhstan 2003.

Table 37: Cost by Budget Category per HIV/AIDS Patient 2002 (US$)

Oblast	Payroll	Drugs	Diagnostic Supplies	Advocacy Partnerships Social Mobilization	Other Recurrent Expenses	Other Expenses	Total
Akmola	1,096	104	1,137	58	6	735	3,137
Aktube	711	49	191	0	55	28	1,035
Almaty	944	0	501	0	239	43	1,727
Atyrau	2,160	492	2,442	0	0	0	5,094
Eastern-Kazakhstan	727	69	193	23	119	0	1,130
Jambil	622	258	0	0	0	1,295	2,175
Western-Kazakhstan	350	111	463	0	489	79	1,493
Karaganda	114	56	86	21	0	0	278
Kzyl-Orda	4,374	139	1,717	0	3,011	1,144	10,386
Kostanay	230	57	123	0	0	66	477
Mangistau	2,687	831	1,573	986	1,892	0	7,969
Pavlodar	104	1	46	0	31	9	192
Northern-Kazakhstan	654	15	446	0	434	0	1,550
Southern-Kazakhstan	167	1	13	0	5	16	202
Almaty City	314	196	314	9	175	0	1,009
Astana City	3,858	124	1,608	225	463	1,073	7,352
Republic of Kazakhstan	**291**	**59**	**169**	**18**	**76**	**62**	**673**

Source: Study Estimates based on data from Ministry of Health, Kazakhstan 2003.

It is likely that the treatment costs for HIV/AIDS patients are considerably lower per unit since the total number of AIDS patients is estimated to be between five to ten times higher than the official figures used for study estimates, thereby increasing the denominator while the numerator (spending) is fixed.

How Much Does It Cost to Prevent and Treat HIV/AIDS in Kazakhstan?

Direct costs are related with the local health budgets assigned to HIV/AIDS and reflect the cost of preventing and treating HIV/AIDS, from the perspective of the health care system. **Indirect costs** are estimated from the approximate number of days of disability resulting in loss of work productivity. The indirect costs reflect the cost of care from the perspective of the patient, although travel costs and other indirect costs that the patients face when seeking services are not included.

Table 38 shows that the direct costs range from around US$75,000 in Kzyl-Orda to a high of nearly US$345,000 in Karaganda.Disability can be calculated as a measure of time lost translated in monetary terms (Table 38). The costs of disability days were estimated using ALOS as the measure of the inactive days of work for an HIV/AIDS patient. Since the study did not have specific ALOS per oblast, we used the national figure. This unit was converted to US$ through an estimate of money lost for one day of work (the average for Kazakhstan was US$1.6). Nearly US$139,000 per year are lost by workers due to HIV/AIDS in Kazakhstan.

A preliminary estimation of the costs of treatment for HIV/AIDS patients can be reached by assuming an average cost of treatment of US$2,500. The results are shown in Table 39. This Table includes three scenarios: (i) only HIV patients receive treatment; (ii) only AIDS patients receive treatment; and (iii) both kinds of patients receive treatment.

Table 38: Direct and Indirect Costs by Oblast

Oblast	Direct Costs	Indirect Costs	Total Costs
Akmola	180,267	2,408	182,675
Aktube	66,915	2,830	69,744
Almaty	67,357	1,592	68,949
Atyrau	62,727	644	63,370
Eastern-Kazakhstan	127,587	4,647	132,234
Jambil	138,353	2,255	140,608
Western-Kazakhstan	209,833	6,056	215,890
Karaganda	344,820	53,597	398,417
Kzyl-Orda	74,600	285	74,885
Kostanay	95,880	7,432	103,312
Mangistau	155,367	1,121	156,488
Pavlodar	138,647	30,839	169,486
Northern-Kazakhstan	93,815	2,419	96,235
Southern-Kazakhstan	76,187	12,302	88,488
Almaty City	191,487	8,649	200,135
Astana City	226,313	1,297	227,610
Republic of Kazakhstan	**2,250,154**	**138,374**	**2,388,528**

Source: Study Estimates based on data from Ministry of Health, Kazakhstan 2003.

Table 39: Average Costs of Treatment of HIV/AIDS Patients

Oblast	Average Cost of Treatment of HIV Patients	Average Cost of Treatment of AIDS Patients	Average Cost of Treatment of HIV /AIDS Patients
Akmola	140,000	3,654	143,654
Aktube	157,500	4,110	161,610
Almaty	95,000	2,479	97,479
Atyrau	30,000	783	30,783
Eastern-Kazakhstan	275,000	7,177	282,177
Jambil	155,000	4,045	159,045
Western-Kazakhstan	342,500	8,938	351,438
Karaganda	3,025,000	78,945	3,103,945
Kzyl-Orda	17,500	457	17,957
Kostanay	490,000	12,788	502,788
Mangistau	47,500	1,240	48,740
Pavlodar	1,762,500	45,997	1,808,497
Northern-Kazakhstan	147,500	3,849	151,349
Southern-Kazakhstan	920,000	24,010	944,010
Almaty City	462,500	12,070	474,570
Astana City	75,000	1,957	76,957
Republic of Kazakhstan	**8,142,500**	**212,500**	**8,355,000**

Source: Study Estimates based on data from Ministry of Health, Kazakhstan 2003.

6. KEY ISSUES AND ACTIONS

This study has addressed the overall performance of the TB and HIV/AIDS Programs in the Republic of Kazakhstan. It provides an analysis of both qualitative and quantitative aspects that influence efficiency, quality and effectiveness of each of the programs and identifies the structure of financing and cost-effectiveness of each program. In addition, the paper identifies opportunities to improve performance, specifically analyzing the relationship between inputs and outcomes and highlighting, in the case of the TB Program, opportunities to produce significant savings or improved value-for-money. In the face of rapidly increasing expenditures in both programs, the importance of understanding how to get better results for each dollar invested is of particular interest to policy makers. While further research will be required into why there are such significant differences among oblasts, the study highlights these differences and provides an analytical framework for future analysis.

This section presents an overview of the key issues and actions recommended by the study. The section is divided between the conclusions regarding the TB Program and those that are directly related to HIV/AIDS.

KEY ISSUES AND ACTIONS FOR STRENGTHENING THE TB PROGRAM

The Kazak TB Program has made important progress over the past years in terms of the establishment of a comprehensive policy framework. This framework is oriented towards the implementation of DOTS, improvements in the care of prisoners with TB, providing training for medical professionals and ensuring free drugs for patients. Surprisingly, these investments have not produced the desired results in terms of improved cure rates. It appears that the main reason outcomes are lagging behind improvements in the availability of inputs is related to the way that the programs are executed at the local level and the need to adapt the standard DOTS protocol to the reality of Kazakhstan's geographic and socioeconomic conditions.

The main issues and actions include:

Government commitment to DOTS remains high but policies and weaknesses in the provider network contribute to problems in meeting challenges of improving the performance of the TB Program.

- While the GoK has taken important steps towards formalizing DOTS as government policy, at the facility level there are a number of factors impeding implementation: staff attitudes and knowledge; availability of drugs; the cost to patients (excluding free drugs) and infrastructure conditions.
- Cure rates are below the acceptable level. Considered nationally, cure rates for TB patients are 75 percent. Such cure rates would not be satisfactory even if achieved at very low cost.
- The DOTS strategy is difficult to implement given the lack of patient compliance. Particularly notable, for example is that knowledge of DOTS among patients is low: only 10 percent of patients interviewed were prescribed DOTS standard treatment or were aware that they were following DOTS.

- With similar success rates in Kazakhstan and the Kyrgyz Republic, average length of in-hospital stay per patient treated is noticeably higher in Kazakhstan than in the Kyrgyz Republic: 92 and 74 days respectively.
- Local governments procure a significant quantity of drugs to address gaps in the distribution of drugs by the national program but the quality of these drugs is not adequately controlled.
- The multi drug resistance situation is of great public health concern given the high cost of treatment and the potential risk of the spread of drug resistance. MDRTB patients account for an estimated 10 percent of total TB patients and represent between 13 and 20 percent of total TB Program control costs.
- Financial barriers to access are also likely to reduce the effectiveness of treatment. The cost of obtaining access to treatment, in terms of transport costs combined with under-the-table payments to providers for tests, drugs or food inhibit patients from seeking access.

Key actions include:

- To improve cure rates, it is important to improve current understanding about why these rates are low. Investigation of the role of drug resistance is needed and understanding of the reasons why TB treatment is not completed in some cases.
- Introducing a drug planning and management system that allocates drugs based on the actual number of patients treated is critical to ensuring adequate drug supply. The drug supply system should also focus on ensuring adequate quality of drugs procured locally.
- Specific policies should be introduced to identify what types of patient incentives and enablers (strategies to facilitate patient compliance) should be introduced to improve cure rates.
- Mass media and other means of communication should be used to address patient behavior and manage the change process.
- There is a need to coordinate provision of TB control services between TB services and prisons, Primary Health Care and AIDS Centers.
- A comprehensive monitoring and evaluation system should be established to provide real time and end of period assessment on the evolution of the epidemics and the impact of interventions.
- In terms of MDRTB, efforts should focus on: improving testing and verification of MDRTB; implementing quality-assured DOTS Plus TB Programs; and seeking Green Light Committee clearance for use of second-line drugs at discounted prices

The system's resources are not allocated based on population demand (TB patients treated) but rather based on supply indicators such as the number of beds or physicians thus leading to important differences in outcomes.

- The importance of management and organization at the local level is shown by the achievement of successful outcomes in oblasts that have fewer resources per capita or fewer supply based indicators such as beds or staff.
- In terms of outcomes, Pavlodar, Karaganda and Western Kazakhstan were the lowest performers, while the three best were Almaty City, Kzyl-Orda and Southern Kazakhstan.

The best performing oblast does 4.7 times better than the worst performing oblast. This highlights the wide differences in outcomes achieved amongst the oblasts.

- Resources remain scarce in some high burden oblasts. Historical budgeting and the lack of performance monitoring has led to divergence between the inputs provided, in terms of staff, drugs and infrastructure and the number of cases treated.

Key actions include:

- Serious efforts should be made to link a variable part of staff payment to outcomes and satisfaction indicators, introducing a performance-based payment initiative. At a minimum, resources should be allocated based on the number of TB patients treated and some combination of outcome indicators as a performance-based payment.
- Future improvements in the program should focus on identifying those Oblasts that obtain the best results with the least resources.
- There is important scope to target inputs for TB control, detection and treatment to areas demonstrating greater socioeconomic needs.

Despite the overall importance of management, deficiencies in inputs, skills, processes, equipment, drugs and infrastructure contribute to problems with performance.

- The facility survey indicates that in many cases the inputs, processes, staff skills and equipment and infrastructure conditions do not meet the minimum standards required for a TB facility. As an example, only 82 percent of facilities visited had a microscope (and only 56 percent had a functioning microscope), 35 percent a refrigerator, the average age of x-ray machines was ten years and disinfection areas were inadequate.
- Failure to guarantee drugs to TB patients is one of the main weaknesses in the system, undermining the effectiveness of DOTS or any other TB therapy. While most of the facilities (78 percent) had the appropriate first line drugs for TB therapy, only 62 percent had second line drugs. When patients were interviewed, 21 percent indicated that the drugs they were prescribed were not available at the time of their visit.
- Many key inputs to ensure a high quality TB Program are not consistently available. As an example, the findings indicate that syringes, gloves and masks are often not available. As shown, only 44 percent of the facilities had masks at the time of the interview. Fewer than 20 percent of the facilities had disposable syringes and gloves during the facility survey.

Key actions include:

- Investments should focus on ensuring that all facilities have a minimum set of equipment and infrastructure conditions that are necessary to treat TB. In this regard, a master plan should be formulated to address shortcomings in the TB Program and to develop a cost-effective investment strategy that will maximize improvements in outcomes.
- Efforts should be made to test the quality of drugs provided at the local level.
- An adequate monitoring system should be in place to check for the availability of key inputs, including materials and drugs.

Costs are high by international standards and efforts need to be made to contain costs. The average cost per case is estimated to be among the highest for middle income countries.

- Comparisons with other countries with similar income levels suggest that there is much scope for improving resource. Other middle-income countries are achieving similar or better cure rates at lower costs, even though staff salaries are higher (e.g. US$300 per month for a doctor in Peru to over US$1,000 per month in South Africa).
- On a per capita basis, considering the total population in the oblast, total spending varied from US$0.4 per person in Almaty to US$4.9 per person in Kzyl-Orda, with a national average for the 16 oblasts of US$2.4 (Table 25). These figures are considerably higher than the US$1.6 per person in Russia according to a recent study carried out by the WHO (2002).
- The cost per TB patient cured in Kazakhstan is US$1,639 and is much higher than the cost per patient cured in other middle-income countries. The cost per patient cured is around US$525 for South Africa and US$1,500 in Russia, middle-income countries where cure rates range between 52 and 63 percent.
- The cost of case detection using fluorography is considerable and has very low cost-effectiveness. This suggests that there is considerable room for improvements in efficiency in Kazakhstan.

Key actions include:

- Use benchmarking across oblasts to highlight high cost oblasts and to seek savings in the system. If costs were lowered to international standards per case cured or treated, they would amount to US$20 million per year, reducing the total cost of the program by one-third.
- Adjust staffing levels as a ratio of the number of patients treated rather than historical distributions based on the number of beds.
- Increase the use of ambulatory treatment as a substitute for the long hospital stays that are currently found in the treatment protocol.
- Strengthen the capacity of the primary care system to detect and provide follow-up treatment of TB at the local level. Improving outcomes through enhancing the PHC system and shifting resources from expensive TB hospitals to PHC would contribute to a reduction in overall costs.

KEY ISSUES AND ACTIONS FOR STRENGTHENING THE HIV/AIDS AND STIS PROGRAM

The HIV/AIDS Program faces a number of problems related to the overall context in which the program is implemented: political will, policies and patient and provider behaviors and the limitations of the health care provider system. Together these factors constitute the principal challenges to reducing the incidence of disease.

The main issues and actions include:

There are critical institutional issues including a lack of available human resources and key inputs for prevention and treatment and organizational weaknesses in the provider network.

- Preventing and controlling the related epidemics requires significant institutional changes, such as functional integration of prevention and treatment activities presently undertaken separately by four independent, vertical structures: the Narcology Services; AIDS Centers; Dermatological and Venereal Diseases Dispensaries; and the TB Institutes. These structures continue to act independently, with a few examples of good practice.
- The policies in place do not support adequate training for HIV/AIDS. Without responding to this need it will be difficult to develop the human capital which is required to deal with the epidemic at point of service delivery.
- Problems with investments and other inputs also limit the effectiveness of the programs. One-third (33 percent) of facilities surveyed had suffered a shortage of condoms in the last 12 months, and staff at one institution mentioned that this problem happens 14 times per year.
- There are significant differences in the distribution of expenditure by oblast. The total annual cost of HIV/AIDS Program in the Republic of Kazakhstan varied from US$0.06 million in Atyrau to nearly US$0.34 million in Karaganda. Costs per HIV/AIDS patient are nearly US$675.
- Over half of the CSW do not use condoms, and are not aware of prevention of sexual HIV transmission and other key harm reduction programs have only limited coverage of risk groups. A survey carried out in Almaty City, has shown that 80% of MSM do not use condoms, 25% have STIs, 10% inject drugs and only 30% have adequate knowledge about HIV transmission.
- Drugs prescribed were not available in 45 percent of the cases analyzed. However, patients indicate that there were good instructions from the doctor on how to use those medicines.

Key actions include:

- Extend the availability of harm reduction programs to cover a higher percentage of all vulnerable groups.
- Improve availability of condoms among risk groups.
- Improve coordination in the provider network. In terms of treatment, there is a lack of integration/cooperation between primary health care and specialized hospital services, and between AIDS Centers, the TB Institute and Dispensaries and the Dermato-Venerealogical Dispensaries.
- Investments should be targeted to key areas which aim to: (a) develop the professionals qualified to work in the field; (b) fill the gaps in staffing (e.g. psychologists; social workers; counselors; IT; etc); (c) equally deploy staff throughout oblasts; and (d) upgrade the quality of facilities and medical equipment and providing sufficient, good quality supplies and drugs.
- Introduce a resource allocation strategy that targets resources to high risk populations and ensures a capitated approach to distribute adequate resources for prevention to all oblasts.

Additional research is required to better understand the means of transmission among risk groups and to better estimate the burden of disease. CDC has been making important progress in this regard and continued government will be a critical success factor.

Key actions include:

- Expanding the scope and quality of the surveillance system will be critical to stemming the epidemic. Improvements should be made in the quality and quantity of data available regarding the HIV/AIDS epidemic in Kazakhstan. In comparison with the TB Program, the AIDS Program has relatively limited information on those at risk, infected or receiving care and support.
- Behavioral surveillance surveys related to UNGASS and other international indicators must be developed in the short-term.
- At the same time, a monitoring and evaluation framework should be established to guide program implementation and provide feedback on the results and impact of the program.

Issues related to stigma affect the population's and provider's behavior regarding access and treatment for HIV/AIDS.

- Policies protecting human rights, confidentiality, and anonymous voluntary counseling and testing (VCT) need to be specifically addressed.
- Many of the interviews indicate that women are unable to declare their health status to the physician for fear of being excluded from prenatal and other obstetric services.
- There is evidence that physicians are unwilling to deliver the babies of women with HIV. In order to reduce mother-to-child transmission targeted interventions are required to improve education of both doctors and women.
- Policy approaches to commercial sex work (CSW) suggest a need for decriminalization, both in terms of the definition of laws dealing with prostitution, and enforcement practices. Gender issues are not addressed by the Strategic Plans, and this should be an area of concentration for policy work. Users of commercial sexual services are not prosecuted in general, while CSWs (most at risk for STI and HIV) are marginalized and isolated by police practices.

Key actions include:

- Improving the legal framework related to the HIV/AIDS issue. This will include strengthening the policy and legislative framework to ensure the constitutionally-guaranteed rights and freedoms of citizens, including those who engage in risky behaviors and HIV-infected persons;
- However, even written policies will not change the underlying professional, governmental, and individual set of prejudices that seem to be widespread in the region. It will likely take a very concerted, professional public information campaign to change social norms, against which all programs will be implemented.
- Changing the population's attitudes and behavior through increased investments in information, education and communication activities.

Local NGOs have only a limited role in the delivery of services to prevent infection and to address palliative care issues for those infected.

- The relationship between the government and NGOs has been limited and there is great potential to use NGOs to deliver preventive services to vulnerable groups.

- The use of NGOs should be expanded to more rapidly approach the needs of at-risk populations. This would include establishing a clear policy on the role of NGOs. This would outline the role NGOs play, define mechanisms to hold NGOs accountable for their programs, minimize duplication of resources and promote the development of a sustainable framework for the role of NGOs in the fight against HIV/AIDS.
- Without a clear state policy to deliver financing to such NGOs and support their capacity development, it will become unfeasible to carry out effective work among high-risk groups.

Key actions include:

- Improving national policy and practices to support relations between the Government, civil society, and groups which engage in risky behavior. Although NGO capacity is still nascent, there is considerable opportunity to deliver services to vulnerable populations through the use of NGOs.

There is a need for improved syndromic management of STIs. In general the protocols for STI treatment are outdated.

- Surveys show that nearly 70 percent of facilities do not make a physical examination of male patients relying exclusively on questioning. In the case of females this percentage increases to 75 percent.
- More than 80 percent of facilities offer education to prisoners and staff but only 50 percent offer treatment for drug users.

Key actions include:

- Increase integration of dermatological and venereal diseases services and the primary and specialist provider networks.
- Ensure adequate availability of free drugs for syndromic management
- Update the protocols for STI treatment.

In conclusion, both programs analyzed face important challenges. In order to optimize the use of resources in the future, action needs to be orientated towards improving outcomes in both programs and rationalizing the use of resources. This study establishes a framework for future analysis. A comprehensive monitoring and evaluation system is required to ensure that future investments deliver the required returns.

ANNEX 1. SWOT ANALYSIS FOR DOTS IMPLEMENTATION

SWOT Analysis	Strengths	Weaknesses	Opportunities	Threats
Political Commitment	TB control is a priority issue for the government. TB control in prisons has become an integral part of government control efforts. Good co-operation at operational level between the 2 departments.	Overnight implementation in the whole country. Insufficient Technical Assistance to prison sector. Funding of the program at oblast level through bed-days. Prisoners on treatment that are released are lost for follow up by lack of adequate supportive mechanisms.	Comprehensive 5 year NTP plan under preparation.	Opposition to DOTS strategy has political influence.
Diagnosis	Smear microscopy has been adopted as the basic tool for diagnosis. Well organized laboratory network NRL has a very good technical standard.	Screening with fluorography is still seen as a major tool in case finding. Too many laboratories perform culture and DST. Not all laboratories are included in QA network.	NRL has the technical capacity to become the SNRL for the CAR.	Suspects have to pay for a chest x-ray, which could be an obstacle for early diagnosis. QA system may breakdown because of overloading in higher level services.
Treatment	Standardized regimens have been introduced. Creation of the position of Chemizator for case management.	Too many standardized regimens without criteria when to use what. Too long in-patient treatment. High failure rates. Rapid expansion of MDRTB treatment without training and quality assurance.	Co-operation between Chemizators and PHC structures to ensure adequate treatment delivery and patient adherence. NTBC can become the Center of Excellence for the CAR .	Erratic treatment of MDRTB cases.
Drug Management	Consistent availability of all 1st line drugs because of central procurement. Availability of 2nd line TB drugs. Anti-TB drugs can not be sold in private pharmacies.	Lack of feed back mechanism. No quality requirements in tender documents. Procurement process is not transparent. 2nd line drugs are not bought through GLC mechanism. No adequate storage facilities at oblast level. Lack of skills in drug management.	Establishment of a National Drug Information Center.	Poor quality drugs may increase MDRTB problem.

SWOT Analysis	Strengths	Weaknesses	Opportunities	Threats
Recording and Reporting	ESCM has facilitated data collection.	Definitions still differ from DOTS definitions . Checklists of Project HOPE are too complicated. No standardized treatment. Outcome monitoring of MDRTB absent.	Inclusion of prison sector in electronic data collection.	Improper outcomes due to misunderstanding may lead to wrong management decisions.
Training	Extensive training of health staff and ToT. Adult Learning Methods.	Not all levels of health staff (PHC, prisons) have been adequately trained. No drug management module in training.	NTBC could nominate a Training Coordinator to draw up a comprehensive long-term training plan.	
Supervision	NTBC supervises oblast level.	Insufficient funds for supervision at raion level.		
Health Education	KAP survey was conducted.	No adequate IEC materials have been developed yet.	Findings of KAP survey could be used to better target risk groups.	Groups at risk are not reached by general health education.
Infection Control	Guidelines exist.	Guidelines are not followed everywhere.	New position of Infectious Control Nurse to be established. Training by the SPH with help of CDC.	Insufficient funding.
Health Sector Reform	Decentralization is piloted. PHC budget increased. The private sector becomes strengthened.	PHC system is weak. Mandatory health insurance was discontinued.	School of Public Health has been created.	Geographical situation with vast distances between small settlements and poor infrastructure is an obstacle to a well organized PHC .
TB/HIV		No programmatic links between AIDS and TB Programs.	A working group on TB/HIV at the government level has been established.	No strategy for dually infected patients.

Source: KNCV TB Foundation 2002

ANNEX 2. CRITERIA FOR PARTICIPANT SELECTION FOR FOCUS GROUPS AND INTERVIEWS

	Urban	Rural
HIV/AIDS Patients	• Individuals who have been tested positive for HIV or have been diagnosed with AIDS. • Patients should be identified in the AIDS Center in order to decide who should be invited. • Adequate male-female representation, assuming that this is culturally acceptable. If not the genders could be separated. • Doctors contact the patients and obtain *Statement for Participation*.	• Individuals who have tested positive for HIV or been diagnosed with AIDS. • Patients should be identified in the AIDS Center in order to decide which should be invited. • Adequate male-female representation, assuming that this is culturally acceptable. If not the genders could be separated. • Doctors contact the patients and obtain *Statement for Participation*.
HIV/AIDS Doctors	• Doctors working at AIDS Center should be at a similar professional level so as not to influence the discussion by facility heads or professors (if applicable to Kazakhstan). • Doctors from the laboratory could be included but not nurses. • Doctors from hospitals that treat AIDS patients could also join the discussion.	• **No centers were available in rural areas.**
HIV/AIDS Nurses	• Nurses working at AIDS Centers. • Lab nurses could be included, but not doctors.	• **No centers were available in rural areas.**
HIV/AIDS NGOs	• NGOs working with drug users. • NGOs working with CSWs and those with a focus on HIV/AIDS.	• **No NGOs were available in rural areas.**
TB Patients	• Individuals diagnosed with TB. • Patients should be identified in the TB Dispensary or hospital in order to decide who will be invited. • One group should be patients diagnosed with TB during past three to four months but have not started treatment. • Another group should be patients diagnosed with TB during the past five to six months and are under out-patient treatment. • Adequate male-female representation, assuming that this is culturally acceptable. If not the genders could be separated. • Doctors contact the patients and obtain *Statement for Participation*.	• Individuals diagnosed with TB. • Patients should be identified in the TB Dispensary or hospital in order to decide who will be invited. • One group should be patients diagnosed with TB during past three to four months but have not started treatment. • Another group should be patients diagnosed with TB during the past five to six months and are under out-patient treatment. • Adequate male-female representation, assuming that this is culturally acceptable. If not the genders could be separated. • Doctors contact the patients and obtain *Statement for Participation*.
TB Doctors	• Doctors working at TB Hospitals. • Doctors working at TB Dispensaries. • Equal male-female representation.	• Doctors working at the TB Hospitals if available. • Doctors working at the TB Dispensaries. • Equal male-female representations.
TB Nurses	• Nurses working at TB Hospitals. • Nurses working at TB Dispensaries. • Nurses working in labs. • Equal male-female representation.	• Nurses working at TB Hospitals, if such hospitals exist. • Nurses working at TB Dispensaries. • Nurses working in labs. • Equal male-female representation.

ANNEX 3. FOCUS GROUP GUIDELINES: PROVIDERS – DOCTORS AND NURSES

Moderator: Good evening and thank you for coming. We invited you to participate in a group discussion about TB in our country. The project aims to improve the quality and efficiency of the government strategies regarding TB in our country. With your assistance the study will obtain information critical to the formation of adequate policy recommendations.

Over the past few years, Kazakhstan has improved its efforts to achieve the targets set for 2005 by the World Health Assembly: to detect 70 percent of sputum smear-positive infectious cases and to cure at least 85 percent of such cases. To date, the TB Program has yet to achieve these targets. One key element of the DOTS strategy is the use of short-course chemotherapy regimens, proven by clinical trials to be highly effective under proper case management conditions. This includes direct observation of patients taking drugs at the correct dosage and for the proper period of time.

Ensuring that people with TB complete a full course of treatment is one of the major challenges for TB control. Direct observation of treatment is essential to help patients stay on treatment, even after symptoms have subsided following the first few weeks of chemotherapy. The risk is that uninformed patients (as well as uninformed and careless doctors) may change the regime, avoiding one or more of the drugs they believe are no longer necessary, leading to treatment failure or relapse. In doing so, some of these patients will develop antimicrobial resistance to one or more drugs. As a consequence, the spread of strains of mycobacteria resistant to drugs may occur in a community. This is how the notorious multidrug-resistant tuberculosis (MDR-TB) outbreaks have developed and spread in many parts of the world.

We are interested in provider attitudes toward the following issues:

a. **Sustained political commitment** to increase human and financial resources and make TB control a nation-wide activity integral to the national health system;
b. **Access to quality-assured TB sputum microscopy** for case detection among people presenting with, or found through screening to have, symptoms of TB (most importantly prolonged cough). Special attention needs to be paid to case detection among HIV-infected people and other high-risk groups, e.g. those in institutions;
c. **Standardized short-course chemotherapy to all cases of TB under proper case-management conditions including direct observation of treatment** – proper case management conditions imply technically sound and socially supportive treatment services;
d. **Uninterrupted supply of quality-assured drugs** with reliable procurement and distribution systems;
e. **Recording and reporting system enabling outcome assessment** of each patient and assessment of overall program performance.

In this regard, we are interested in provider perception with the ultimate goal of identifying the major obstacles to reaching the targets of 70 percent case detection rate and 85 percent cure rate. In addition, we are interested in determining factors contributing to the growth of MDRTB. This meeting is being held to discuss these issues. Our discussion will take an hour and a half; it will be recorded and analyzed by our experts. In the final report your ideas will be discussed

generally, without mentioning particular names. We guarantee confidentiality. In addition I would like to brief you about a couple of discussion rules:

1. Issues raised will be discussed by one person at a time.
2. I would like to stress that there are no right and wrong statements. Please do not argue if you do not agree with other statements. We only want to hear your ideas about the issues.
3. All participation will be anonymous.

Now please briefly introduce yourselves: name, age, profession and occupation.

TB in Our Country

- How would you describe the problems related to TB in our country? [*Probe knowledge about the ways of transmission, rates in the country or oblasts, number of patients, availability of information sources for patients and providers: e.g. TV, newspapers, friends, etc., government attitude/policies, etc*]

- How do you feel about this problem, what can be done to resolve it? *[This is a general warm-up question do not spend much time on it, just try to capture the list of the things that providers feel are necessary].*

Availability of Services

- Can anyone describe what services are available for the population and where? Allow as many participants as possible to speak [*Probe: diagnostic screening services, curative services, availability - to whom, where]*

- Can you briefly describe how these services are delivered to the population? *[Probe: What specifically do people have to do to get these services? Do they have to pay? Do they have to travel long distances? Do they have to use connecting buses and trains? Are services confidential?].*

Attitudes Towards TB Patients

- How would you characterize the attitude of the general population to TB sufferers? [*Probe for stigma, why it may exists, how it could be changed, what could be the major determinant etc. If public attitude is positive what may explain it? Also try to capture differences between the attitudes of the public and doctors and nurses].*

- Would you say that there are specific cultural issues about the way the public treats TB patients? Could you describe these?

- Would you say that there are specific cultural issues that affect the way people seek care? Could you describe what these? [*Probe: public knowledge of these diseases, other cultural beliefs, fear of being revealed to the public; trust between patients and providers].*

- Are there other issues that may have a significant impact on TB patients? Could you describe these issues in more detail? Try to get a list of issues and how they could be dealt with: policy level; through communications; or by any other means.

Available Resources

- How would you describe the situation at your respective institutions, would you say that supplies and equipment available are sufficient to offer adequate services? *[Probe: equipment quality and quantity; buildings/space; drug and lab tests supplies]*

- How would you describe financial resources at your facility?

- How would you describe human resources? *[Probe: quantity of staff relative to workload; adequacy of professional skills/training; any future staff development needs].*

Provider Knowledge and Perception of DOTS

- Now we would like to discuss issues related to the DOTS strategy approved by the country. Mainly we would like to hear your personal views on the approach. What could you say about its effectiveness and adequacy based on your personal experience? *[Probe: Do the participants have good knowledge of the approach? Do they see it as useful or have any major problems? If problems are mentioned they could be explored in depth].*

Provider Perception of Main Issues

- How would you describe in a few words the strengths, weaknesses, opportunities and threats in providing services to the population. What would you say are the most critical areas? **Instructions:** *Respondents may repeat what the first participant said, but ask if they could identify their own. However, repetition is not a problem. We do not need a list of priorities, just a list of the most critical issues. These include:*

  a. Is there sustained political commitment to increase human and financial resources and make TB control a nation-wide activity integral to the national health system?

  b. How would you qualify access to quality-assured TB sputum microscopy for case detection among people with symptoms of TB (most importantly prolonged cough). Are all patients with suspected TB referred for smears? If not, what are the main obstacles to obtaining access to sputum microscopy, including: distance to facility, problems in assessment by physicians, lack of diagnostic equipment and supplies.

  c. What are the main obstacles to the implementation of standardized short-course chemotherapy in all cases of TB under proper case-management conditions including direct observation of treatment?

  d. In your facilities do you have an uninterrupted supply of quality-assured drugs with reliable procurement and distribution systems? If not, please probe to determine the main problems, what percentage of time the facility is without drugs, and how this could be improved.

e. Are there any problems with the recording and reporting system enabling outcome assessment of each and every patient and assessment of the overall program performance? How are new, chronic and relapsed cases registered?

- What are the main obstacles with regard to detecting 70 percent of TB cases? *[Probe: try to identify issues related to policy, operational strategies, patient behavior, and physician practice?]*

- What are the main obstacles with regard to obtaining an 85 percent cure rate? *[Probe: At present, most oblasts are below 80 percent, try to identify issues related to policy, operational strategies, patient behavior, and physician practice?]*

- Patients sometimes cease treatment early. What are the main reasons for this? [*Probe: we are interested in problems with geographic access, lack of drugs or other supplies, long waiting lists, side effects from medication, lack of understanding regarding the immediate need for treatment, provider attitude to patients and treatment, or issues related to employment.]*

- HIV infection remains the single most important factor in the development of TB. For this purpose, TB control programs should be linked closely with HIV/AIDS prevention and control programs. Please describe how the programs are linked. *[Probe: try to press participants to identify specific measures that are taken to link the two programs. If a lack of coordination is identified, please identify what could be done to improve this.]*

TB Policies

- Can anyone describe state policies with regards to the TB epidemic in the country and how would you characterize existing policies? *[Probe: knowledge of policies, what do they include and how appropriate are they in a given context. If deficiencies are mentioned what are they?]*

- Are there any government regulations (enabling and/or impeding) functioning of your organizations and could you provide details of such regulations? *[Probe: if regulations are mentioned let them explain why they are perceived to be enabling or impeding.]* **Instructions:** *try to lead the discussion in a direction that will avoid repetition of the subjects discussed in the other sections.*

- Please describe the supervision available for PHC and other health facilities that are responsible for overseeing the implementation of DOTS.

ANNEX 4. DEFINING A METRIC TO COMPARE PERFORMANCE

In order to evaluate the relationship between inputs and outcomes, a consolidated index was created. This index considers four input variables": total expenditure per patient, drug expenditure per patient, TB beds per 1,000 and TB doctors per 1,000 population. At the same time, three outcome variables were considered: cure rates, failure percentages and mortality rates. The 16 oblasts were considered individually to benchmark performance.

The construction of the index followed several steps. First, each of the oblasts received a number, from one to 16, according to its performance in the corresponding coefficient. For instance, for total expenditure per patient, a number 1 goes to the oblast with the lowest expenditure, while that with the highest value gets a 16. The same applies to all input variables and to cure rates, but not to mortality rates and failure percentages; in those cases, the higher the value of the coefficient, the lower the number assigned.

Next, the four input variables are aggregated and a global result is calculated, for each region considered. Higher values for this sum index mean that the region allocates more resources in an overall perspective. A similar process is repeated for outcomes, where a high sum implies a better performance. For both groups we get two consolidated rankings, one for inputs and the other for outcomes.

For analytical purposes, if an oblast has a better outcome-ranking position than its input-ranking position, then such a region is considered efficient. Similarly, if the result is the opposite, we have an inefficient region.

Finally, the Spearman Correlation Coefficient -SCC- is calculated[4]. The SCC is a non-parametric indicator that measures correlation between two ranked variables. Based on the ranking from step two, it is possible to calculate the coefficient and value the association between inputs and outcomes.

Table 40 summarizes the results from the approach described above. Three key results appear from the calculations. In terms of inputs, Almaty City, Astana City and Kostanay are located in the top of the ranking, being the three oblasts with the least expenditure per patient. The bottom three oblasts were Kzyl-Orda, Southern Kazakhstan and Atyrau. By considering the two extremes of the ranking, Kzyl-Orda (55 points) had 2.3 times more points than Kostanay (17 points).

The second result deals with outcomes. In this case, Pavlodar, Karaganda and Western Kazakhstan got the lowest values, indicating poor performance, while the three best performers correspond to Almaty City, Kzyl-Orda and Southern Kazakhstan. In this case, the gap between the two extreme values is 4.7 times. That is, gap in terms of inputs is smaller than the outcomes

[4] The coefficient is defined as $SCC = 1 - \frac{6 * \sum d_i^2}{n(n^2 - 1)}$ where d is the difference between the values of the first and second rankings for each region and n is the number of observations.

gap, indicating that there is less variance in inputs than in outcomes. This highlights the wide differences in outcomes achieved amongst the oblasts.

Examining the combined indexes, 56 percent of the oblasts performed poorly that is, their ranking in the Input Index is much better than the one in the Outcome Index. However, this is not a strong result, as suggested by the low SCC (0.08), so more resources do not always mean better regional performance.

Table 40: Kazakhstan: Consolidated Rankings Input-Outcome per Oblast 2002

	Input Consolidated Rank	Outcome Consolidated Rank
Akmola	12	8
Aktube	9	4
Almaty	7	13
Almaty City	3	16
Astana City	2	10
Atyrau	14	9
Eastern-Kazakhstan	10	2
Jambil	6	11
Karaganda	13	3
Kzyl-Orda	16	14
Kostanay	1	6
Mangistau	4	5
Northern-Kazakhstan	11	7
Pavlodar	5	1
Southern-Kazakhstan	15	15
Western-Kazakhstan	8	2
Spearman Correlation	0.085	

Source: Study estimates based on data from the Ministry of Health, Kazakhstan, 2003.

The rankings above demonstrate the following:

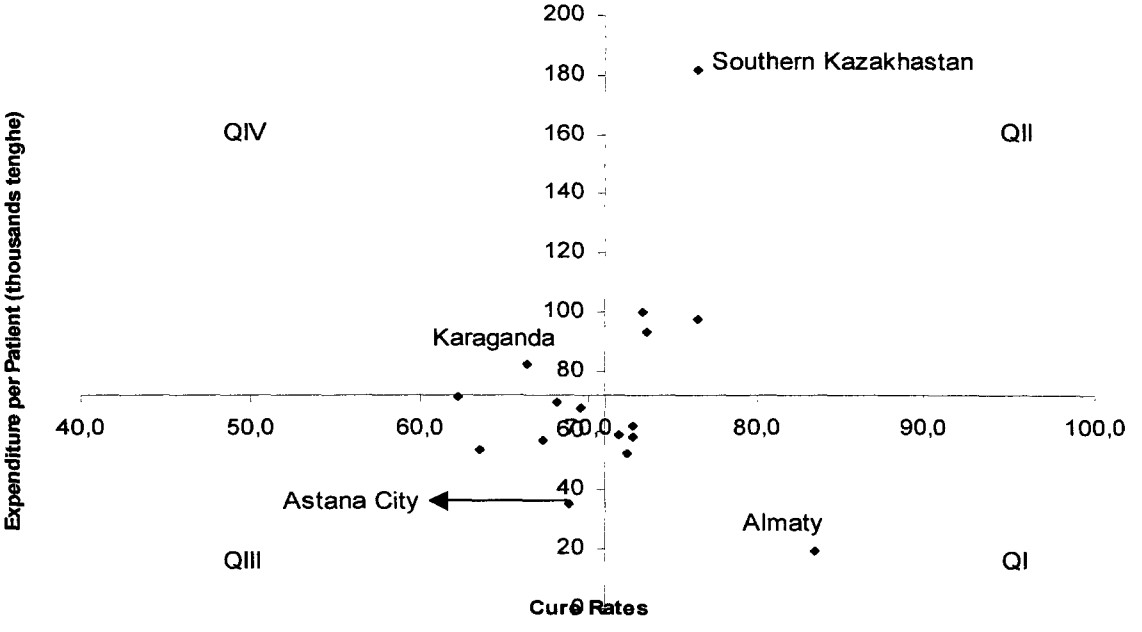
i. Almaty City is the best performer according to the existing statistics because it ranks in the lower part of the Input Index, indicating lower expenditure and use of resources, but is first in terms of Outcomes.
ii. Other regions, like Almaty and Astana City, obtain higher marks on Outcomes than on Inputs, signaling relative efficiency.
iii. At the same time, oblasts like Karaganda, Atyrau and Eastern Kazakhstan are at the other end of the spectrum, with high level of resources but low results.
iv. Finally, Kzyl-Orda and Southern Kazakhstan share the special feature of being high-input, high-outcome oblasts.

Graphic Analysis

Figures 39 to 40 complement the previous information. Each one is divided into quadrants. The first (Q1), comprises all cases that combine a below-average cost per patient with an above-average outcome. The second (Q2), represents high costs with good results. The third and fourth cases (Q3 and Q4), represent areas with low outcomes and low/high costs, respectively. The vertical and horizontal axes represent the average rate for Kazakhstan.

Figure 39 correlates Cure Rates and Expenditures per Patient. Five oblasts (31 percent of the country) are located in the optimal quadrant, that is, they have costs below 72,400 tenges and cure rates over 71 percent. The most interesting case is Almaty City, which combines the lowest number of patients with the highest outcome. It is clear that its performance is superior to any other region of the country, even those ones in Q1.

Figure 39: Kazakhstan: Cure Rates and Cost per Patient



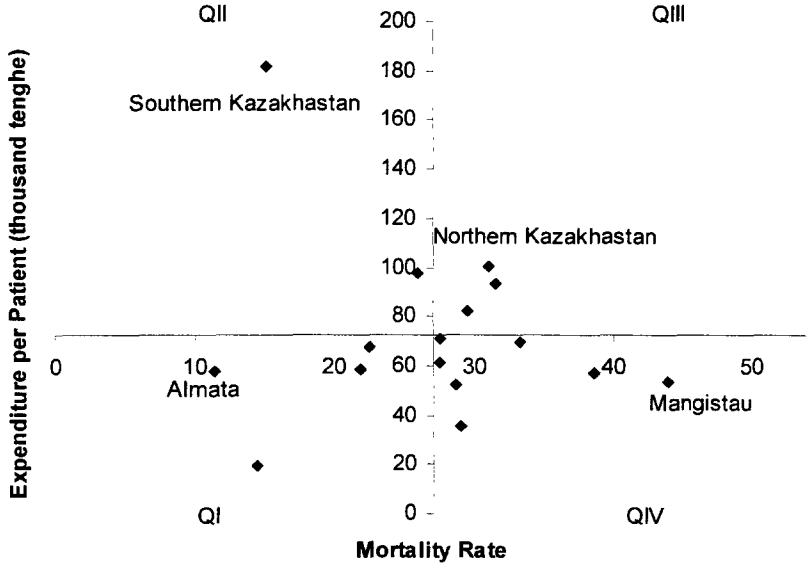
Source: Study Estimates based on data from Ministry of Health, Kazakhstan 2003.

The second quadrant comprises four oblasts (25 percent of all oblasts), with Southern Kazakhstan (SK) as a special case. SK's expenditure per patient is 80 percent higher than the rest of the Q2 oblasts, but its outcome is similar: 76.5 percent versus 74.4 percent.

Six of the 16 oblasts are located in Q3, indicating low expenditures and cure rate and one oblast is in Q4, with high expenditure per patient and low outcomes. In total, 44 percent of the oblasts are in the low performance range. In the first case, Astana City is the most representative because of its low per patient cost (the second in Kazakhstan) and its close-to-average cure rate (68.8 percent).

Figure 40 analyzes the situation in terms of Mortality Rates and Expenditures per Patient. In this case, the order of the quadrants changes to reflect the optimal outcome of low mortality rates, rather than high cure rates. The distribution of the oblasts per quadrant differs significantly from Figure 39. Four oblasts are located in Q1, two in Q2, three in Q3 and seven in Q4. Contrary to our finding regarding cure rates, the majority of the oblasts are in the worst quadrant (QIV), undermining the relatively good performance observed in Q1 and Q2.
There are also some changes within the quadrants. With the exception of Southern Kazakhstan, no region repeats its position in terms of Mortality Rates. Almaty (11 percent), instead of Almaty City dominates Q1, although the latter still belongs to QI. In Q4, Mangistau (44 percent) and not Karaganda is the worst performer.

Figure 40: Kazakhstan: Mortality Rates and Cost per Patient

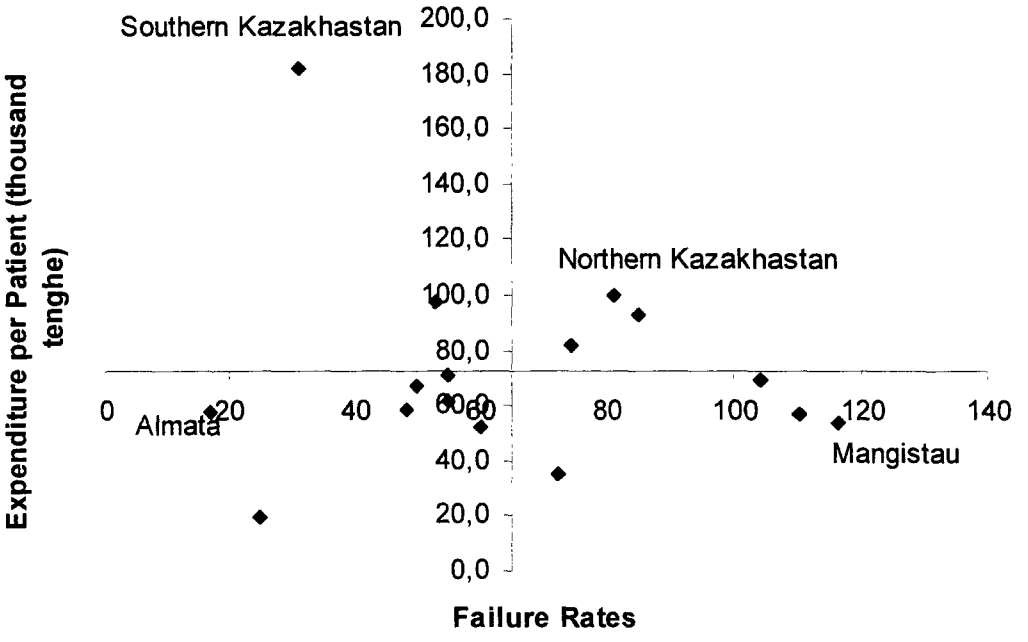


Source: Study estimates based on data from the Ministry of Health, Kazakhstan, 2003.

Finally, performance is analyzed in terms of failure rates. Here we find no significant changes compared to mortality rates. As shown in Figure 41, the four key oblasts in the Mortality Rates section are now the same in Failure Rates, confirming the conclusions made about good and bad performers.

In general, both the ranking and the graphic analysis point toward Almaty and Almaty City as the best performers, among the 16 oblasts evaluated. Both areas are consistently located in Q1, irrespective of the indicator considered. In other words, conclusions are robust to changes in outcome coefficients. Similarly, Southern Kazakhstan is the typical high-cost, good-outcome region, being the most important in Q2.

Figure 41: Kazakhstan: Failure Rates and Cost per Patient



Source: Study Estimates based on data from Ministry of Health, Kazakhstan 2003.

In terms of low-outcome oblasts, Northern Kazakhstan is the worst performer. For instance, when Cure Rates are the considered variable, NK belongs to QII. Finally, Mangistau and Karaganda have the poorest performances, given that both appear in either Q3 or Q4 in all three outcomes variables analyzed.

ANNEX 5. TEMPLATES FOR FINANCIAL DATA COLLECTION

Information was provided by the Oblast health authorities, with support from local consultants, using the template below.

Table 41. Local Budget Execution by Oblast for TB Prevention and Treatment

Subdivision	Specification	Expenditure Category	Plan for 2002 Total	Execution	Cash Expenditures 2002
1	2	3	4	5	6
110		Salary			
	111	Basic salary			
	112	Auxiliary financial payments			
	113	Compensation payments			
120		Employers payment			
	121	Social taxes			
	125	Vehicles			
130		Goods			
	131	Supplies			
	132	Pharmaceuticals			
	136	Travel within the country			
	138	Rent			
	139	Other expenditures			
140		Services			
	141	Public utilities			
	142	Communication			
	143	Transportation			
	144	Electricity			
	145	Heating			
	146	Maintenance			
	149	Other services			
150		Other current services			
	155	Execution of the plan			
	159	Other current expenditures			
410		Acquisition of fixed capital			
	411	Acquisition of basic equipment			

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