

ASIAN VACCINATION INITIATIVE

Uzbekistan National Immunization Program

FINANCING ASSESSMENT

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Abbreviations

BCG	anti-TB vaccine
CDC	Centers for Disease Control in Atlanta (United States)
DPT or DTP	diphtheria and tetanus toxoids and pertussis vaccine
DT	diphtheria and tetanus vaccine
EBRD	European Bank for Reconstruction and Development
EPI	Expanded Program on Immunization
FAP	feldsher-midwifery post
GAVI	Global Alliance on Vaccines and Immunization
GDP	gross domestic product
GNP	gross national product
HIB	Haemophilus influenzae type B
MME&S	Ministry of Macroeconomics and Statistics
MOF	Ministry of Finance
MOH	Ministry of Health
OPV	oral polio vaccine
RCES	Republican Sanitary and Epidemiological Center
CES	public health headquarters at oblast and rayon levels
SUB	rural hospital at subdistrict level
SVA	ambulatory care clinic
SVP	primary health care center (slated to replace the FAPs)
TB	tuberculosis
Td	diphtheria (reduced component) and tetanus vaccine
TT	tetanus toxoid
UNICEF	United Nations Children's Fund
VII	Vaccine Independence Initiative
WHO	World Health Organization

Executive Summary

This financing assessment of the Uzbekistan national immunization program was made as part of the Asian Vaccination Initiative and in collaboration with the Government of Uzbekistan, the United Nations Children's Fund (UNICEF), the World Health Organization (WHO), and the World Bank.

Rather than being a comprehensive review of the program, the assessment was made primarily to:

- Estimate the current and future costs of the program, including additional costs associated with strengthening and expanding it
- Identify future sources of funding and determine any funding gaps
- Provide recommendations related to finance and finance policy to strengthen the program and improve overall financial sustainability

Furthermore, the assessment aimed to provide information that the Government could use in immunization financial planning, policy dialogues, and funding negotiations with donors and international agencies.

The health system in Uzbekistan, inherited from the Soviet period, is extensive but costly and unsustainable. With most of the population living in the rural areas, the equitable provision of quality care at an affordable cost is an immense challenge. Reform planned over the next five years will dramatically reduce the number of primary care facilities serving the population. As a result, the way in which immunization services are delivered, and therefore vaccines distributed, will also undergo fundamental change. Any investment in the immunization program will have to be made in this context of medium-term change.

The public-sector finance system of Uzbekistan is decentralized, but budget decisions are still made within a strict vertical structure of tight national guidelines and norms. Regional administrations are expected to mobilize up to 80 percent of all their funding requirements. As economic wealth varies significantly between regions, equitable access to public health care is compromised.

It is difficult to produce a coherent national picture of the total cost of delivering routine immunization services. The (semi) decentralized budget system creates a complicated system of money flows, accountability, and reporting. Also, there are no comprehensive aggregated national data because of inadequate financial information systems at all levels.

Despite setbacks in the transition period after independence, the Uzbekistan national immunization program provides high coverage (over 95 percent) for all vaccines for the Expanded Program on Immunization (EPI). Nonetheless, infectious diseases remain a problem, with some incidence rates increasing over the last two years, most notably for measles and Hepatitis B.

The immunization program has not been assessed in depth in the last three years, but the cold chain and the vaccine management system have been reviewed three times during

Despite setbacks in the transition period after independence, the Uzbekistan national immunization program provides high coverage (over 95 percent) for all vaccines for the Expanded Program on Immunization (EPI)

Since independence, Uzbekistan has relied largely on donor support for the procurement of routine EPI vaccines

that period. Important weaknesses uncovered in the program (such as the quality of the cold chain) persist to this day. In addition, both political commitment and financial resources, currently lacking, are required to strengthen safe injecting practices and surveillance capacity.

Since independence, Uzbekistan has relied largely on donor support for the procurement of routine EPI vaccines. This support is continuing in 2001, despite the Government's demonstrated capacity in 2000 to provide sufficient funds for national vaccine procurement.

The routine immunization program is projected to cost about \$10 million to implement over five years, or about \$2 million per year, if the health (and vaccine distribution) system remains unchanged. Introducing auto-disable syringes, improving the cold chain and laboratory infrastructure, introducing Hepatitis B vaccine, implementing a measles eradication campaign, and achieving polio eradication certification will cost another \$9.3 million in the first year. This includes \$2.3 million for capital investment and \$2 million for a measles campaign. In later years, \$3 million more will be required. Over the five-year period, assuming the Government funds all core EPI activity and identified donors commit as planned, there will be a funding gap of about \$8.5 million, 37 percent of this for the measles eradication campaign.

Recommendations are directed at both the policy environment and financing requirements. They take into consideration the changing structure of the health system and the need to maintain high coverage of quality, safe vaccinations. It is therefore recommended that the Government:

- Improve financial sustainability and accountability by creating and maintaining immunization budget lines at both national and regional levels, funding all core EPI activities, and improving financial information systems
- Improve equitable access to quality vaccines and ensure the safe administration of injectable vaccines by centralizing the procurement and distribution of all essential immunization supplies, and continuing to procure through UNICEF or through open bidding with WHO-prequalified manufacturers
- Implement cost reduction strategies by (again) centralizing the procurement of all vaccines, syringes, and cold-chain and laboratory equipment; seeking technical assistance for vaccine management; and undertaking a comprehensive cost-effectiveness study of the vaccine distribution system
- Mobilize resources to strengthen the cold chain and the surveillance system, improve safe injection practices, and eradicate measles

Finally, to facilitate program sustainability, it is recommended that donors contribute only if the Government shows its long-term commitment to fund all core operational EPI costs, including and especially vaccines and disposable syringe needs.

Introduction

Purpose of the Assessment

This assessment of financing issues in the Uzbekistan national immunization program was made for the Asian Vaccination Initiative (AVI) of the Asian Development Bank. The assessment was part of a joint mission of the World Health Organization (WHO), the Centers for Disease Control (CDC) in the United States, and the World Bank, which conducted a Global Alliance on Vaccines and Immunization (GAVI) assessment for the introduction of Hepatitis B vaccine.

The assessment sought to determine:

- The financial status of the program, including financing gaps
- Future funding requirements for a routine (or expanded) national immunization program
- Sustainable financial options for strengthening the program, including the introduction of new vaccines and the implementation of disease control initiatives
- Anticipated and potential funding sources

A coherent analysis of financial requirements, available resources, and funding gaps is an important aspect of medium-term planning.

Methodology

The data used in this report were gathered during a field visit to Uzbekistan. Most are national-level data, obtained from documents and interviews with key informants.

The cost and funding analyses used data from reports prepared on request by the Ministry of Health (MOH) and the Ministry of Finance (MOF) of Uzbekistan; management reports on the immunization program, including the national five-year strategic plan; the findings of previous consultants; private-sector pricing information; and current contract prices of the United Nations Children's Fund (UNICEF).

Estimates of immunization coverage rates and target populations were based on World Bank reports, joint reports of WHO and UNICEF, and demographic information provided by the Government of Uzbekistan.

A coherent analysis of financial requirements, available resources, and funding gaps is an important aspect of medium-term planning

Background

Socioeconomic Situation in Uzbekistan

After gaining independence in 1991, Uzbekistan sought to sustain its Soviet-style command economy and only gradually instituted reforms toward a market economy. This cautious approach shielded the economy from the large-scale disruption that others in the region underwent in 1991–1995, and can account for the strict restrictions on foreign currency exchange that exist today. During the transition period, however, per capita income fell by about 30 percent from pre-independence levels. At the start of 1997, 22 percent of the population had a per capita income equal to or below the poverty line, down from as high as 62 percent in 1994. Uzbekistan now ranks 103rd for human development indicators, down from 31st in 1991.

Since 1997, the economy has progressively improved (see Table 1). Inflation has dropped, from a high of 1554 percent in 1995, to 26 percent in 1999 and 19.1 percent in 2000. Real GDP has grown since 1996; it grew by 4.4 percent in 1998 and is expected to grow by 4.8 percent in 2001. Growth has not been uniform across the country, however, and eastern regions, particularly Tashkent, are economically better off than the rest. In a decentralized public-sector finance system, this imbalance significantly affects the quality of social services, including health care, in the various regions.

Table 1: Macroeconomic Indicators, 1992–2000

Indicator	1992	1993	1994	1995	1996	1997	1998	1999	2000
GDP per capita ^a	—	232.0	251.0	442.0	590.0	611.0			
GDP PPP \$ per capita ^b	2,650.0	2,510.0	2,438.0	2,376.0	—	—			
GDP growth rate (% change) ^c	-11.1	-2.3	-4.2	-0.9 ^d	1.7	1.0/2.5	4.4	4.0	4.5
GNP per capita				970.0	1,010.0	1,020.0			
Annual inflation rate (%) ^c	645.0	534.0	1,554.0	305.0	54.0	65.0		26.0	19.0
Government expenditure, as % of GDP ^c	43.4	38.8	33.3	37.6	36.2	30.0			
Total government health expenditure, as % of GDP ^b		4.8	4.6	3.4	3.1	3.04			
Total government health expenditure, as % of public expenditure	9.4	11.1	9.1		9.3	9.5	9.6		

Sources: ^a EBRD (1998); ^b WHO Regional Office for Europe Health for All database, 2000; ^c UNICEF TransMONEE database, 2000

Note: Inconsistencies in government financing indices are due to variations in methodology used by the various sources of economic data.

With decentralization, revenue collection and spending authority has been delegated to the 14 administrative regions. However, budget decisions remain within a strict vertical structure of tight national guidelines and norms. The system, in practice, is only semidecentralized.

Allocation of health resources

The health care system is still primarily owned and subsidized by the Government. In 1998, it accounted for about 3.3 percent of gross domestic product (GDP) and 9.6 percent of public expenditure. Government expenditure as a percentage of GDP has contracted since 1995, but health expenditure as a percentage of public expenditure has remained stable.

Convertibility of hard currency

The Government tightly controls access to hard currency, making the importation of supplies both time-consuming and expensive. Companies, including those that are state-owned, must apply for the right¹ to convert a “quota” of local Uzbek som into foreign currency. Quotas are granted irregularly, sometimes after long delays. The commercial bank exchange rate at the time of this study (September 2000) was 675 som to \$1, about 18 percent below the (black) market rate, and almost 60 percent above the official Government rate of 290 som to \$1. However, before 2000 the bank exchange rate was kept artificially high: 140 som to \$1. A change to a more realistic rate may raise the local prices paid for imports such as vaccines.

Demographic and Health Indicators for Uzbekistan

Uzbekistan has a population of 24.6 million, 62.2 percent of whom live in the rural areas. The population has grown steadily over the last 20 years (Table 2). Although a declining fertility rate and a rise in the death rate have slowed the growth, population growth in absolute terms remains high, especially among the rural population. This presents a major challenge to providing cost-effective health services.

Table 2: Demographic Indicators, 1992–1999

Indicator	1992	1993	1994	1995	1996	1997	1998	1999
Population (millions) ^a	21.7	21.9	22.5	22.9	23.3	23.8	24.0	24.6
Live births ^a								
Per 1,000 population	32.7	31.1	28.7	29.0	27.5	25.6	23.1	
Absolute number	710,500	681,500	643,863	664,729	634,842	602,694	553,145	509,419 ^b
Fertility rate ^c				3.6	3.3	3.4	2.8 ^d	
Population growth (annual %) ^b				1.8	1.9	1.9	1.6	1.8

Sources: ^aWHO Regional Office for Europe Health for All database, 2000; ^bWHO/UNICEF (1999); ^cDepartment of Health Statistics (1997); ^dWorld Bank World Development Indicators database, 2000 (from a 1997 rate of 3.08)

Infectious diseases as well as chronic noncommunicable diseases cause high mortality among infants and children below 5 years, high maternal mortality, and reduced life expectancy (Table 3). Circulatory, respiratory, and infectious or parasitic diseases are the main causes of death.

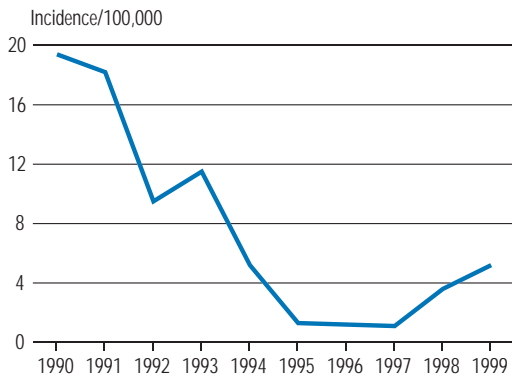
Table 3: Health Indicators, 1990–1998

Indicator	1990	1991	1992	1993	1994	1995	1996	1997	1998
Infant mortality rate (per 1,000 live births) ^a	34.3	35.1	37.6	32.8	29.2	26.3	24.7	23.1	22.3
Mortality rate of children below 5 years (per 1,000 live births) ^a	47.8	48.0	51.5	48.9	47.4	42.8	39.1	36.4	35.7
Maternal mortality (per 100,000 live births) ^b	34.1	33.3	30.1	24.5	17.4	19.3	12.0	10.3	8.7

Sources: ^aWHO Regional Office for Europe Health for All database, 2000; ^bUNICEF Trans MONEE database, 2000

¹ Some companies are allocated a quota automatically at the start of the financial year. Companies importing vaccines must apply for one.

Figure 1: Incidence of Measles, 1990–1999



Source: RCES

Vaccine-preventable diseases

The level of vaccine-preventable disease in a country is the ultimate measure of the effectiveness of its immunization system. The incidence of diseases that could have been prevented with routine Expanded Program on Immunization (EPI) vaccines peaked in 1993–1994, during the transition to independence, when the health system (and immunization coverage) suffered. However, despite good reported coverage (better than 95 percent) for all routine EPI vaccines since 1998, infections remain a major problem. There were serious outbreaks of diphtheria in 1995–1996 and an increasing number of measles cases have been detected in the last two years (three deaths in 1998, five in 1999) (Figure 1). Rapid growth in new Hepatitis B infections since 1998 has been reported and the incidence of tuberculosis (TB) has increased over 50 percent in the 1990s, with a rate of 50 in 100,000 in the last two years. On the upside, no cases of disease due to wild polio virus have been detected in the last five years, and cases of pertussis have declined over the last three years.

Health System of Uzbekistan

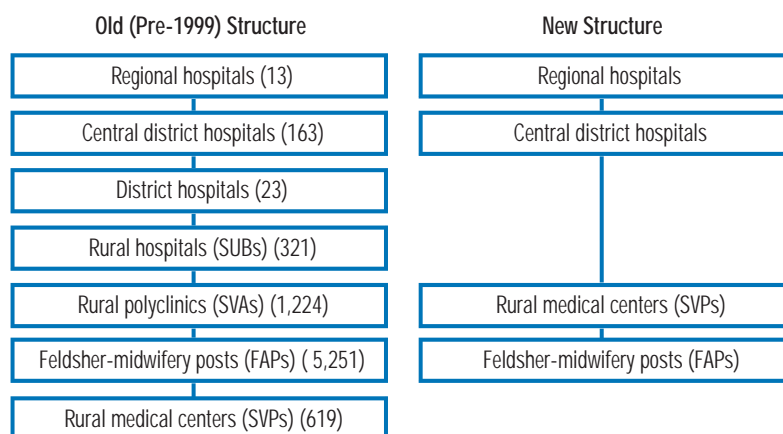
The Cabinet of Ministers, under the President, develops national health policies and approves the health care budget. The Law on the Protection of the Health of the Citizens of the Republic of Uzbekistan (1996) holds that medical services funded by the Government must be provided for free. This law sets forth six priorities including the protection of women and children's health ("to combat relatively high levels of infant mortality and poor nutritional status"), the provision of "infectious disease prophylactics," and "improved availability of drugs." Presidential Decree No. 2107 on the State Health Care Reform Program of the Republic of Uzbekistan for 1998–2005 (issued in November 1998) states the objective of achieving self-reliance in immunization services.

Structure and reform

Uzbekistan inherited an extensive but costly and unsustainable Soviet-style health care system, which is gradually undergoing necessary reform. More than 9,000 institutions deliver health care services at the national, regional, district, and local levels. The 1998 Presidential decree on reform prescribes a reduction in the number of service delivery points, particularly in the rural areas (Figure 2), and the further decentralization of resource allocation. Primary health care services will be provided at polyclinics and medical posts by general practitioners. Rural and outpatient polyclinics and rural hospitals will be combined into new rural medical centers. These consolidation activities will significantly affect immunization services, which are now delivered at more than 8,000 facilities (all FAPs, SUBs, and SVAs) throughout the country.

In 1999, under a World Bank loan for the health sector, this revised organizational structure was introduced in three pilot regions alongside other reforms (in financial management and other areas).

Figure 2: Health Care Delivery and Reform in Rural Areas



Source: European Observatory on Health Care Systems (2001)

Note: Most of the rural hospitals (SUBs) will be closed or reorganized; however, some in remote areas such as mountainous and semidesert regions will most likely remain. Most of the feldsher-midwifery posts (FAPs) will be closed or reorganized; however, some FAPs in remote areas will remain.

Finance

Health programs are funded from a combination of republican (national), oblast (regional), and rayon (district) revenues. The national health budget is set by the MOF on the basis of the budget proposals submitted each year by the oblasts and cleared by the MOH. Following budget approval by the Parliament, national resources are allocated to each region according to its population. In this way the MOF provides for 12 percent to 20 percent of the health needs of oblasts and rayons. Oblasts and rayons must raise local taxes to meet the remaining 80 percent to 88 percent. In 1999, oblasts generated \$255 million (85 percent) of their health budget (Table 4). Capital investment budgets must also be cleared by the Ministry of Macroeconomics and Statistics (MME&S).

Table 4: Health Budget, 1995–1999 (amounts in million som)

Government Level	1995		1996		1997		1998		1999	
	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%
Republican	903.9	14	1,637.2	13	6,071.7	19	6,730.6	16	8,607.5	15
Oblast	5,680.5	86	11,340.7	87	25,874.9	81	36,009.2	84	48,531.5	85

Source: MOF (2000)

Donor support

Outside sources account for about 2 percent to 2.5 percent of health sector revenues.² The European Union had a \$32 million technical assistance program for 1998–1999 and the World Bank recently approved a \$30 million loan for a Primary Health Care Reform Project. The Japanese Government plans to provide \$18 million for the health programs of Uzbekistan in 2000/2001, including up to \$2 million for immunization services. WHO and UNICEF provide technical and limited financial support.

² European Observatory on Health Care Systems (2000), p. 29.

National Immunization Program

No comprehensive assessment of the national immunization program has been made in the last three years, but the cold chain, vaccine management, and vaccine financing were studied in 1998 and 1999. The recommendations of these studies are summarized in Appendix A.

Strategic Plan

The National Immunization Plan (1998–2002), with a number of additional orders, guides the immunization program. A new five-year plan for 2001–2005 (Appendix B) was finalized in September 2000 with the assistance of the Centers for Disease Control (CDC) of the United States and WHO. This new plan has six objectives:

- Maintain an immunization coverage of greater than 95 percent at the national and district levels for all diseases routinely targeted by the EPI
- Achieve certification of polio eradication by 2001
- Reduce the incidence of measles to less than 1 in 100,000
- Increase the safety of injections used for all routine EPI vaccines
- Introduce the Hepatitis B vaccine into the routine immunization schedule for infants by mid-2001 and achieve greater than 80 percent coverage by 2003
- Measure the burden of Hib disease with a view to obtaining funding for the introduction of Hib vaccine

At the time of writing, this new plan had not been approved by the Cabinet of Ministers, and therefore was yet to take effect. The cost projections in this report are nonetheless based on the above objectives.

The national immunization schedule is represented in Table 5. The national and local governments are required to provide all scheduled vaccinations free of charge. All other vaccinations demand a fee, which is not centrally regulated and therefore varies from oblast to oblast. There are about 20 licensed providers in the private sector.

Table 5: Immunization Schedule

BCG	Hepatitis B	OPV	DPT	DT	Td	Measles	Mumps
2–4 days	1 day	2–4 days					
	2 months	2 months	2 months				
		3 months	3 months				
		4 months	4 months				
	9 months					9 months	
		16 months	16 months			16 months	16 months
7 years		7 years			7 years		
16–17 years					16–17 years		
					26 years		
					46 years		

Note: Shaded boxes represent vaccines procured through the Vaccination Independence Initiative (VII) agreement. Hepatitis B vaccine will be provided by GAVI. All other vaccines are purchased at the oblast level. There is some confusion about the supply of the second dose of measles vaccine. The VII agreement provides for the procurement of only the first dose, but the volumes purchased via UNICEF indicate sufficient supplies for the second dose.

A 1997 survey reported by UNICEF showed that actual vaccinations were 20 percent below the level claimed in administrative records, and a recent household survey in Fergana by Abt Associates noted that official records had overestimated the population by about 14 percent

The oblast and rayon CESs are responsible for ensuring that enough vaccines and syringes are provided to service delivery points. In a parallel organization structure, the Department of Maternal and Child Health, through its pediatricians, nurses, and routine EPI vaccinators, actually delivers the services. Therefore, immunization services are partially incorporated into the primary care health system.

Each CES has bacteriology, virology, immunology, and parasitology laboratories, and special laboratories for the prevention and early detection of “especially dangerous infectious diseases.”

Coverage

Administrative reports attest to more than 95 percent coverage for all routine EPI vaccines. Although the reports are based on clinic records of the number of children immunized, they may not be reliable. They use 1988 census data for their denominator, and possibly different methods of calculating coverage rates.³ Nor are the data likely to be consistent across oblasts, as immunization services are uneven in quality (because of differing economic circumstances and levels of political commitment). A 1997 survey reported by UNICEF showed that actual vaccinations were 20 percent below the level claimed in administrative records, and a recent household survey in Fergana by Abt Associates noted that official records had overestimated the population by about 14 percent. A UNICEF-funded multi-indicator cluster survey, whose results are expected to be available in October 2000, should provide more accurate levels of coverage.

Financing Structure

A coherent national picture of the total cost of delivering routine immunization services is difficult to produce for the following reasons:

- The (semi) decentralized budget system of Uzbekistan complicates money flows, accountability, and reporting.
- Financial information systems at all levels do not report immunization costs along specific budget lines, and regional financial data are not easily aggregated at the national level. Limited national information was made available to the consultants, only after days of dedicated (new) work by MOH officials.⁴

Funds for immunization services come principally from MOF and the regional mayor’s office (oblast budget). Routine EPI vaccines and some vaccines used in outbreaks are purchased at the national level, through MOH and RCES. All other operational costs, including supplies and salaries, are charged to oblast and rayon budgets.

³ Steinglass (2000): “Some NIS (newly independent states) countries calculate coverage by birth cohort irrespective of age. So when they report 90% of children were immunized, what they mean is that 90% of children who were born in 1997 were eventually immunized, irrespective of age.”

⁴ The MOH itself asked the consultants for information regarding 1999 immunization expenditure (to fill out the GAVI application).

Because of economic disparities among the regions, oblast CESs differ significantly in the amount of funds they have available for cold-chain equipment and syringe supplies

National sources of funds

At the start of each financial year (January), the MOF allocates funds to the MOH to cover:

- The cost of all routine EPI vaccines for children under 2 years old, except BCG vaccine, which is purchased at the oblast level. Funds come either from the national budget or from donor contributions. The MOH, using procurement support from UNICEF, buys the vaccines and distributes them nationally through the CES system.
- The cost of operating the national CES. No funds pass from the RCES to the regional or district level. The RCES should have a small supply of vaccines for use in case of outbreaks.⁵

Oblast sources of funds

The oblast CES has three separate sources of funds for immunization activities:

- Mayor's office. Immunization activities are primarily funded directly from the oblast budget. In October of each year, each oblast CES determines the next year's budget for all activities (taking the previous year's expenditure into account) and submits it to the MOF after having it reviewed and approved by the MOH. The MOF includes this amount, known as Article 10,⁶ in the overall oblast health budget line, which then becomes part of the general financial distribution to the mayor's office at the start of the year. The CES budget under Article 10 covers drugs (including vaccines) and other medical equipment (including syringes and the cold chain). Financial reporting is based on Article 10; hence, there is no separate reporting for CES immunization costs in general, or vaccine, syringe, and cold-chain expenditure in particular.
- Epidemiology (EPID) fund. On an hoc basis throughout the year, and as requested directly by an oblast CES, the MOF provides funds to the mayor's office through the EPID fund to cover the costs of controlling outbreaks and epidemics. When a CES does not have enough funds to cover immunization activities for high-incidence diseases such as Hepatitis B and mumps, it may also apply for the use of the EPID fund. All requests must be reviewed and approved by the MOH. EPID fund distributions do not cover capital costs. Reporting on the use of these funds is not disaggregated.
- Services and fines. Income from services provided and fines imposed by the CES can also be used to fund immunization activities.

Oblasts report their expenditure to both the MOF and the MOH. However, there appears to be no system of reconciling reports, whether at the republican or at the oblast level. Nor does there seem to be any systematic financial analysis of immunization activities. As immunization expenditure is not reported separately, there is very little accountability for delivery of services.

Because of economic disparities among the regions, oblast CESs differ significantly in the amount of funds they have available for cold-chain equipment and syringe supplies. This suggests that the delivery of quality, safe vaccinations may not be uniform across the country. Any consideration of funding gaps must take this fact into account.

⁵ They do not at present, as the cold rooms are under repair.

⁶ Oblast salaries, including immunization-related costs, are included in another budget line.

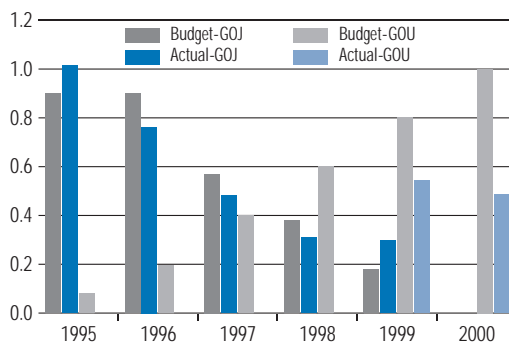
Past and Current Funding

Vaccine costs

Routine EPI vaccines

Since independence, Uzbekistan has relied largely on donor support for the procurement of routine EPI vaccines. Between 1995 and 2000, with the support of the Japanese Government and UNICEF, Uzbekistan participated in a Vaccine Independence Initiative (VII) project. Under the agreement, the Japanese Government would contribute gradually decreasing funds until 2000, by which time the Uzbekistan Government was expected to fully fund routine EPI vaccine procurement. The Japanese Government is set to review the project in October 2000.

Figure 4: Funds Contributed by the Japanese Government (GOJ) and the Uzbekistan Government (GOU) for Routine EPI Vaccine Purchases Under the VII Project, 1995–2000 (US\$ million)



Source: Vaccine expenditure for 1995–1998 is based on data provided by UNICEF, Uzbekistan, and that for 1999–2000, on supply data from UNICEF, Copenhagen. These data differ by up to 20 percent from delivery data provided by RCES.

By 1999, actual needs were significantly less than originally forecast, leading to reduced procurement. Moreover, in 2000, vaccine purchases amounted to only \$460,000 as previous overstocking allowed the purchase of less than a year's supply. Nevertheless, the MOF continued to provide the MOH with the level of funds stipulated in the VII agreement, leading to cost savings of \$770,000 in 1999–2000 for the MOH.⁷ These funds have been set aside for future vaccine purchases. In all, Japan contributed about \$2.9 million, as budgeted (Figure 4).

Additional funds for vaccine purchases have also come from the national Government and the oblasts, which provided \$10 million for the diphtheria epidemic in 1995–1996, and from the WHO, which contributed \$500,000 for polio eradication activities in 1999.

Other vaccines

All purchases of nonroutine vaccines have used a combination of oblast and national funding. However, the amounts spent cannot be quantified for lack of data.

Nonvaccine costs

Most other operating costs since 1995 have been borne by the national and local governments. These include salaries (for full-time vaccinators, and for health care workers who spend part of their time giving vaccinations), training, cold-chain maintenance, surveillance, laboratory services, and the production and distribution of information and education materials. The total expenditure for these operating costs could not be determined for lack of data. UNICEF has provided technical assistance for vaccine procurement and vaccine stock management, and financial assistance of \$131,000 for cold-chain equipment in 1999–2000.

⁷ There are no available data on the contributions of the Government of Uzbekistan before 1998.

Overall

A limited best estimate of the total expenditure for routine EPI immunization in 1999 is given in Table 6 and summarized in Figure 5. Of the \$2.7 million spent, 35 percent went to vaccines and about 62 percent to personnel costs. Donor contributions represented 13 percent of the total.

Table 6: Expenditure for Routine Immunization, 1999 (US\$)

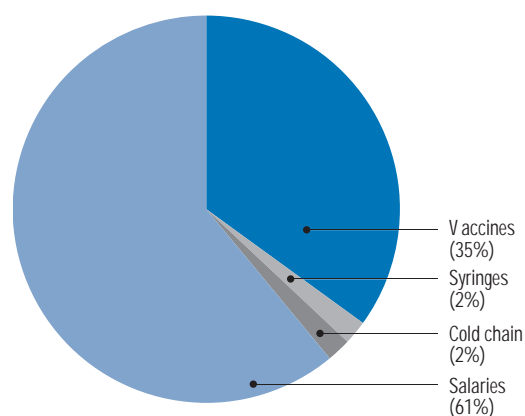
Cost Items	Central Government	Local Government	Japanese Government	UNICEF	Total
Vaccines					
BCG	20,000	80,000			100,000
OPV	346,064		65,340		411,404
Measles	145,793		153,560		299,353
DPT	52,800		79,200		132,000
Subtotal	564,657	80,000	298,100		942,757
Equipment					
Syringes	10,320	41,280			51,600
Cold chain				46,000	46,000
Personnel	335,106	1,340,426			1,675,532
Total	910,084	1,461,706	298,100	46,000	2,715,889

Note: The total expenditure figure given is a minimum. It is based on:

- UNICEF supply figures for vaccines
- Estimated cost of syringes (only 43 percent of the total requirement was supplied; see "Safe Injecting Practices" in the next main section of this report)
- Assumed personnel costs (in the absence of data) as follows: 10,000 vaccinators at 4,500 som per month + 500 CES staff at an average of 15,000 som per month. The official exchange rate for 1999 of 140 som to \$1 was adjusted to 326som to \$1 to bring it closer to the actual value. The adjustment was based on the 2000 ratios between official and bank exchange rates.

Determining the value of other line items is speculative. Therefore, costs such as training, surveillance, cold-chain maintenance, and social mobilization have not been included. Personnel and syringe costs have been apportioned between the national Government (20 percent) and the local governments (80 percent) according to the average distribution.

Figure 5: Expenditure for Routine Immunization, 1999



Data on overall fund distribution and expenditure patterns (Table 7), supplied separately⁸ by the MOH and the MOF, highlight trends in immunization financing.⁹ Both sets of figures indicate that spending from the EPID fund increased significantly between 1997 and 1998—by 413 percent (according to the MOF) and by 247 percent (according to the MOH). Similar increases in Article 10 spending of 83 percent (MOF) and 91 percent (MOH) occurred between 1998 and 1999. The MOH has attributed these increases to inflation, epidemics of influenza and measles, and campaigns against Hepatitis B.

Despite these increases, unofficial records for 1999 indicate that only 70 percent of Article 10 budget requests and 50 percent of EPID fund requests have been met. Inadequate funding has contributed to lowered program quality in areas such as safe injecting practices and cold-chain and laboratory infrastructure.

⁸ These figures cannot be reconciled because of separate (and incompatible) reporting mechanisms and the aggregated nature of the data.

⁹ Although Article 10 includes nonimmunization expenditure, it is used as a proxy.

Table 7: Fund Distribution and Expenditure for Immunization, 1995–1999 (amounts in million som)

Source	1995		1996		1997		1998		1999	
	Amount	% of Total	Amount	% of Total	Amount	% of Total	Amount	% of Total	Amount	% of Total
Article 10										
MOF—distributed to:										
RCES	3.8	2.0	20.1	10.1	14.6	7.0	71.2	30.9	146.1	33.3
Oblasts	183.2	98.0	178.7	89.9	193.2	93.0	159.4	69.1	292.2	66.7
Subtotal	187.0		198.8		207.8		230.6		438.3	
MOH—spent by:										
Oblasts	78.0		147.0		148.0		170.0		327.0	
EPID fund										
MOF—distributed to:										
RCES	0.3	2.7	0.4	0.7	13.1	21.2	40.0	13.8	76.0	18.3
Oblasts	10.9	97.3	53.6	99.3	48.7	78.8	250.1	86.2	338.8	81.7
Subtotal	11.2		54.0		61.8		290.1		414.8	
MOH—spent by:										
RCES		0.0	10.0	17.0		0.0	3.0	3.0	7.0	5.0
Oblasts	4.0	31.0	24.0	44.0	28.0	99.0	98.0	92.0	126.0	93.0
Private	9.0	69.0	22.0	39.0	0.0	1.0	5.0	5.0	3.0	2.0
Subtotal	13.0		56.0		28.0		106.0		136.0	

Source: MOF and MOH, supplied on request, 2000

Note: High inflation rates and an artificial exchange rate make it impossible to represent the figures in meaningful US dollar terms. Expenditures includes only nonroutine vaccines.

Future Financing

Key issues

To strengthen program quality, ensure sustainability, and maximize cost-effectiveness the Government must address important issues. These include: national Government commitment to fund routine EPI vaccination; quality of the cold chain and surveillance systems; and adequate supplies for safe injections, and implementation of safe injection practices. The future cost and financing aspects of these areas are discussed below, and policy and funding options are provided in the next major section of this report.

Vaccine self-sufficiency is a key element in the sustainability of an immunization program. A country is vaccine self-sufficient if it is able to purchase or produce all of its routine EPI vaccine requirements

Vaccine supply: Price, quality, and financial sustainability

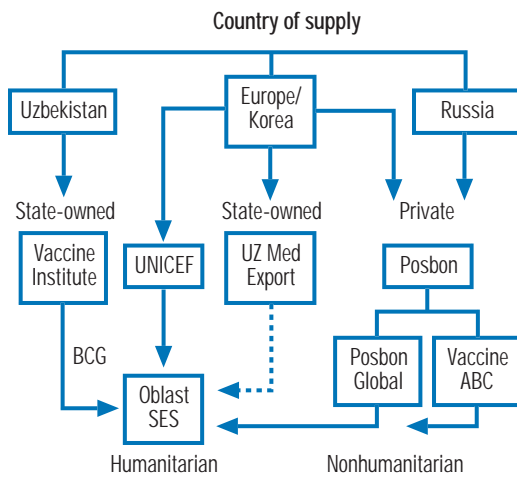
Vaccine self-sufficiency is a key element in the sustainability of an immunization program. A country is vaccine self-sufficient if it is able to purchase or produce all of its routine EPI vaccine requirements. A critical component of self-sufficiency is good-quality vaccines.

The BCG vaccine produced locally by the State Vaccine Institute of Uzbekistan does not meet the minimum WHO standards of international good manufacturing practice. Its efficacy is therefore questionable. The vaccine sells for between 26 som and 34 som (about \$0.045) per dose. Given the price, import difficulties, and the political context of local production, the importation of BCG vaccine is highly unlikely. The Government recently asked the Japanese Government for funds to build a plant that will produce quality BCG vaccines. The Japanese Government may field a technical assessment team for a prefeasibility study. Abt Associates, which did a similar study in 1998, strongly advised against such an investment, citing cost-effectiveness and technical capacity weaknesses.

All other vaccines are imported from Europe, Korea, or Russia, under a dual importing system with three main suppliers (Figure 8).

- The first system is for the procurement of routine or “humanitarian” EPI vaccines including all scheduled vaccines for children below 2 years. It is financed from national-level resources or donor contributions. Under the VII project, the MOF had a yearly budget line for hard-currency distribution to the MOH to make the procurement. The MOH is currently using accumulated savings under this agreement. Humanitarian shipments are individually granted customs clearance and waiver of import duty. UNICEF is currently the prime supplier of these vaccines, but is not called upon to supply any nonhumanitarian vaccines despite its competitive pricing.
- The second system is for “commercial” vaccine imports, including all nonhumanitarian (nonroutine) vaccines on the national schedule. Such imports attract a 20 percent duty and are purchased directly from the oblast level. The two main suppliers are:
 - Uzmedexport, a state-owned supply company. Uzmedexport has traditionally procured vaccines from reputable Western producers such as Pasteur Merieux and Smith Kline Beecham. Its prices are quoted in local currency and, although calculated at the official hard-currency exchange rate, remain reasonable. Total pur-

Figure 6: Vaccine Purchasing Options



chases have significantly declined over the past five years, from \$1.3 million in 1995 to \$85,000 in 1999. Oblasts that do not use Uzmedexport as a supplier cite prepayment conditions and delivery delays (due to hard-currency convertibility procedures), which lead to inflation-related price increases and disruption of immunization schedules.

- Posbon, a private medical supply company. Posbon imports vaccines extensively from Russia, where vaccine quality is not guaranteed. Oblasts pay for the vaccines on delivery. Posbon avoids convertibility constraints by managing all hard-currency transactions through an office in Russia. Posbon prices are significantly higher than Uzmedexport's or UNICEF's.

Costs and financing

Routine EPI vaccines

Routine EPI vaccine requirements are projected to cost just under \$1 million in 2001, decreasing to \$780,000 by 2005, as shown in Table 8. This amount represents no more than 0.3 percent of the national health budget. The Government is providing funds (about \$400,000) for the purchase of vaccines for the first six months of 2001. Starting in mid-2001, the Japanese Government will contribute funds for the purchase of 12 months' supply of vaccine.

Table 8: Projected Costs of Routine EPI Vaccines, 2001–2005 (US\$)

Vaccine	2001	2002	2003	2004	2005	Total
BCG	102,000	96,000	90,000	84,000	80,000	452,000
DPT	298,166	280,627	263,088	245,549	233,856	1,321,286
OPV	377,145	354,960	332,775	310,590	295,800	1,671,270
Measles	208,243	195,994	183,744	171,494	163,328	922,803
Total	985,555	927,581	869,607	811,633	772,984	4,367,360

Note: Population data projections are given in Appendix C. All vaccine prices are based on current UNICEF contract prices (BCG=\$0.10, DPT=\$0.07, OPV=\$0.085, measles=\$0.11). Wastage factors of BCG=2.00 (UNICEF), DPT=1.8 (actual), OPV=1.5 (UNICEF), measles=1.6 (actual) are used; these are all higher than those currently used by RCES.

The Government was self-sufficient in EPI vaccines in 2000 but will nonetheless have Japanese Government assistance in 2001–2002. The Government's ability to abide by the VII agreement (and make cost savings in the process) in conjunction with the provision of \$1 million for a Hepatitis B catchup campaign in 2001 (see "Introduction of New Vaccines" below) indicates it can be self-sufficient if it chooses to be. This is particularly true in the broader context of an expanding economy. The 1998 decree recognizes the importance of self-sufficiency in relation to program sustainability. Government representatives have confirmed that the Government expects to be responsible for routine EPI vaccine purchases after 2002, when Japanese Government funding expires. Continued procurement through UNICEF or through open bidding will ensure high-quality vaccines at sustainable prices.

Other vaccines

All other vaccine purchases may be subject to high prices and uncertain quality. As there is no single State-owned national supply company, and oblasts buy all non-UNICEF-supplied vaccines independently of one another, no economies of scale are gained, and any negotiating power at the national level is lost. There is no evidence that oblasts seek to act cooperatively to increase purchasing power, demand lower prices, procure directly from manufacturers, or use open bidding. Most vaccine purchases are made through Posbon. As a result, oblasts can expect to pay significantly higher prices and may receive vaccines of poor quality (if the vaccines come from Russia). Private-sector purchases may also encourage profiteering. Table 9 shows the vaccine price differentials and the consequent potential savings to the Government from using UNICEF as a supplier instead of Posbon, given the number of doses purchased in 1999.

Table 9: Vaccine Prices Compared (US\$)

Vaccine	Doses Purchased in 1999	Posbon		Uzmedexport		UNICEF	
		Price per Dose	Total	Price per Dose	Total	Price per Dose	Total
Td	924,532	2.30	2,126,424				
DT	28,000	0.32	8,960			0.05	1,400
Rabies	116,789	8.50	992,707				
Hepatitis B	118,500	1.50	177,750	0.85	100,725	0.58	68,730
Rubella		2.30					
Mumps	101,830	1.98	201,623				
Measles	144,002	2.38	342,725			0.11	15,840

Sources: Prices supplied by Posbon, Uzmedexport, and UNICEF, September 2000

Cold-chain and vaccine management

Good vaccine management and a well-functioning cold chain decrease cost and risk and increase sustainability. UNICEF and WHO consultants assessed the cold chain and vaccine management in 1998 and 1999; their recommendations are summarized in Appendix A. The primary weaknesses identified by the consultants include:

- Inadequate stock-level controls, leading in some cases to significant wastage caused by vaccine expiry
- Inaccurate vaccine forecasting due to the use of incorrect wastage rates and poor accounting for stock levels
- Aging and nonfunctioning cold-chain equipment
- Improper storage of vaccines in refrigerators

Despite some improvements, concerns persist, particularly at lower levels of the system. These include:

- The use of a vaccine management “push” supply system, causing stock to be quickly transferred down the distribution line, where storage facilities and (human) resources are less capable of maintaining the vaccines in an optimal setting
- Generally substandard (WHO) cold-chain equipment. Some equipment at the lower levels is over 20 years old. Freezers and refrigerators remain in disrepair for lack of

spare parts; repair is often more costly than replacement. There is a lack of vaccine carriers and icepacks.

- Freezing of DPT, DT, Td and TT vaccines (all of which must not be frozen) in transit. With the imminent introduction of Hepatitis B vaccine, not only will quality, and therefore coverage, be compromised, but the financial risk is also high. Freeze watch indicators are not used.
- A general lack of understanding of cold-chain and vaccine management issues

The vaccine distribution system clearly needs to be strengthened; however, the current system of providing vaccinations at more than 8,000 facilities is expensive and unsustainable. General health sector reform should reduce the number of facilities significantly (see “Structure and Reform” in the second main section of this report). In the meantime, many vaccine refrigerators at these facilities either do not function or are not managed properly, putting vaccines at risk. The difficulty lies in ensuring that vaccines are delivered intact over the next three to five years without having to invest in a structure that is not cost-effective and is likely to change in the medium term. Table 10 lists the various items of cold-chain equipment in the current inventory.

Table 10: Inventory of Cold-Chain Equipment, 2000

Equipment	Facility				All Facilities (8,143)
	Oblast CES (223)	Polyclinics (884)	Rural Hospital (2,169)	FAPs/SUBs/SVPs (4,867)	
Soviet-style units	121	3	5	2	131
Freezers	121		2	3	126
Refrigerators	468	1,114	3,331	3,714	8,627
Vaccine carriers	704	528	2,355	1,169	4,756
Units needing repair (unspecified)	39	57	230	529	855

Source: RCES

Costs and financing

Conservative estimates¹⁰ place the cost of upgrading the current system to WHO standards, including the purchase of spare parts but minimizing the purchase of refrigerators, at just over \$1.7 million (Table 11). Maintenance costs will increase the total by \$27,000 per year and replacement costs by \$340,000 per year over the life of the equipment (assuming a five-year life). In comparison, it would cost up to \$6 million simply to upgrade all refrigerators at the FAP level (as requested by the MOH).

Any investment in the cold chain must provide for intensive competency-based training in vaccine stock and transport management and ongoing technical supervision and support. Training, supervision, and support are estimated at \$100,000 per year for three years.

The Japanese Government has agreed to provide up to \$1 million in 2001 for the purchase of cold-chain equipment. Under the current system, this leaves a gap of about \$1.01 million, excluding replacement costs but including technical assistance. *The Uzbekistan Government has made investments in the cold chain its top priority for donor assistance.*

¹⁰ Made by previous consultants.

Table 11: Capital Replacements Required to Achieve WHO Standards (US\$)

Equipment	Number	Purchase Price		Spare Parts		Total Cost	Yearly Maintenance
		Unit Price	Total	Unit Price	Total		
Vehicles							
Freezers (20l)	88	800	70,400	160	14,080	84,480	2,112
Refrigerators (40-60l)	554	1,500	831,000	300	166,200	997,200	24,930
Voltage regulators	not available						
Thermometers	not available						
Vaccine carriers (E4/52)	4,868	32	157,480			157,480	
Cold boxes (20 l)	211	345	72,795			72,795	
Ice packs (E5/10)	7,000	0.70	4,900			4,900	
Subtotals	1,316,855		27,042				
Transport (30%)	395,056						
Total	1,711,911		27,042				
Total per year, over 5 years	342,382						

Source: Estimated needs supplied by RCES

Note: Prices are based on 1997 UNICEF prices. Spare parts costs are calculated at 30 percent of the purchase price, and maintenance and repair at 3 percent.

Safe injecting practices

Lack of political commitment, funds, and supply of syringes leads to high-risk injecting practices. The improvement of safe injection practices is among the objectives stated in the strategic plan, and it is a crucial one. The national policy¹¹ on safe vaccination practices, developed in 1999, does not meet WHO standards. Moreover, while the policy states that all syringes for immunization activities should be provided free of charge, only 40 percent to 50 percent were actually supplied in 1999. This amount varies widely between oblasts, with Tashkent supplying as high as 90 percent and Karakalpakstan as low as 3 percent. To some extent, these differences may be attributed to variations in economic wealth between oblasts. As with cold-chain equipment, these regional disparities make access to safe vaccinations inconsistent among the population, and therefore inequitable.

Limited local production also contributes to the lack of syringes. Disposable syringes are manufactured locally by an Uzbekistan-British-German joint venture, Mediz. By MOH estimates, the entire health system needs 400 million syringes, but Mediz can produce only 100 million. To expand its production to 250 million the company is seeking investment capital of \$9.5 million. Fifty-five percent of locally made syringes are bought by the Government; the rest are sold to commercial outlets, such as drugstores, or exported. A small number of syringes are imported, although the exact quantity is unknown.

Because of restricted supply and limited demand (due to resource constraints), syringes are reportedly being repackaged and reused. When supplies run out, parents are asked to bring their own syringes. In a country where syringes retail for \$0.05 to \$0.07, or about 4 percent of the weekly wage, the cheapest alternatives are understandably sought, and

¹¹ Uzbekistan (1999)

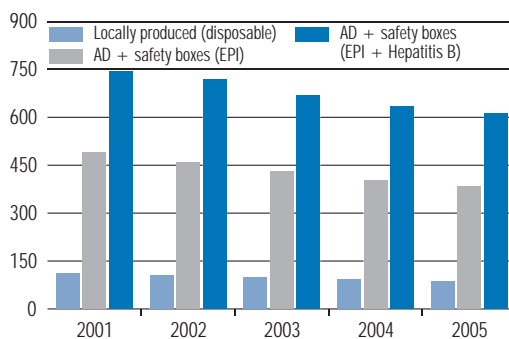
used syringes are cheaper than new ones. The reuse of syringes is, of course, an extremely dangerous practice, particularly where the transmission of Hepatitis B is concerned. Indeed, WHO states that “the reuse of standard disposable syringes and needles places the general public at high risk of disease and death.”¹² Data provided by the RCES indicate that up to 42 percent of 2010 serology–confirmed Hepatitis B cases were caused by unsafe injecting practices.

Equally important for safe injections is the safe disposal of used syringes and needles. Disposal practices in Uzbekistan are unclear, though syringes are supposed to be decontaminated and then buried. The introduction of safety boxes, a strict and supervised waste management policy, adequate waste disposal infrastructure (such as high-temperature incinerators), and technical assistance and training are necessary to ensure the safe disposal of syringes.

Where safe disposal of syringes cannot be guaranteed, WHO recommends the use of auto-disable (AD) syringes for vaccinations. The strategic plan in fact stipulates that only AD syringes should be purchased for vaccinations. Mediz has shown interest in retrofitting its production lines for the manufacture of AD syringes, using cheap technology. WHO can provide technical assistance in this regard.

Safe injecting practices must also be viewed within the broader context of health care delivery. Ensuring the safety of vaccinations reduces risk but does not eliminate it. If syringe needs throughout the health system are not addressed, transmission risks remain an inherent problem.

Figure 7: Costs of Introducing Safe Injection Equipment, 2001–2005 (US\$ thousand)



Note: Assumes these costs: disposable syringes = \$3 per 100 (local manufacture), AD syringes = \$0.0885 each, safety boxes = \$0.63 each, 4 percentage wastage of syringes, transport costs at 30 percent of syringe price and 15 percent of the price of safety boxes. It is also assumed that AD syringes and safety boxes are procured from UNICEF and that an 8 percent handling fee is involved. Syringe needs for Hepatitis B vaccinations are based on quantities provided in the GAVI application.

Costs and financing

Routine EPI vaccinations require 3.5 million syringes a year, costing just over \$110,000 for locally purchased disposable syringes. Figure 7 shows the additional costs involved in introducing AD syringes and safety boxes, for all EPI vaccinations, as well as EPI and Hepatitis B vaccine. AD syringes and safety boxes will cost another \$377,000 in 2001, but the cost is projected to drop to \$296,000 in 2005. Over a five-year period AD syringes and safety boxes will cost \$2.2 million, as opposed to \$0.5 million for locally produced syringes only. If AD syringes and safety boxes for Hepatitis B were included, \$1.2 million more would be required over five years, bringing the overall total to \$3.4 million for five years, or about \$0.7 million per year.

Negotiations between the World Bank and the Government for the purchase of Hepatitis B vaccines (see “Introduction of New Vaccines” below) include a conditionality clause that commits the Government to providing all the disposable syringes needed for the immunization program.

A separate study to estimate the cost of providing adequate waste management infrastructure must be made.

¹² WHO (1998)

Surveillance and disease control

Under-reporting of disease, due to lack of supplies and inadequate reporting, compromises routine epidemiological analysis and needs-based planning. The strategic plan stresses the need to improve surveillance, particularly with the imminent certification of polio eradication and plans for measles elimination. The plan also identifies a critical need for “adequate bacteriological testing at all health facility levels.” According to the RCES, the country lacks about 40 percent of its bacteriological, virological, and equipment needs.

Apart from the need to upgrade laboratory equipment, reporting systems must be computerized. Computers will have to be installed, staff trained, and supervision and backup technical support provided. Beyond this, however, and despite claims regarding the importance of the needs, very little is known about the overall surveillance system and how it can be strengthened.

MOH officials have assigned second priority to laboratory equipment and reagents (after the cold chain) for donor contributions.

Costs and Financing

RCES estimates of the cost of polio, measles, and Hepatitis B diagnostic equipment and supplies indicate that at least \$850,000 will be required over five years to maintain and strengthen the quality of laboratories (Table 12). The Government will bear the cost of reagents (as part of routine operational costs) but must mobilize \$700,000 in extra resources to upgrade equipment.

Table 12: Projected Cost of Improved Laboratory Services, 2001–2005 (US\$)

Item	2001	2002	2003	2004	2005	Total
Reagents	63,600	33,650	23,590	20,590	20,590	162,020
Equipment	504,100	79,280	55,650	30,550	17,420	687,000
Total	567,700	112,930	79,240	51,140	40,015	851,025

Source: RCES

A comprehensive investment, covering all equipment and reagent needs for all diseases including pertussis, could amount to \$5.6 million (given RCES projections).

Introduction of new vaccines

Hepatitis B

In response to rising incidence rates, the Government is committed to introducing Hepatitis B into the routine EPI vaccination schedule for children below 1 year old. The MOH has reported a rapid increase in new Hepatitis B infections in 1999–2000, after steady decreases since 1988. The prevalence of HbsAg among pregnant women is

reported to be 5.1–16.4 percent, and among children below 10 years, 18 percent. While concerns have been raised regarding diagnostic methods and completeness of case detection, increased transmission is highly likely.

Besides routine introduction, MOH also plans to carry out a catchup campaign in three oblasts and Tashkent in 2001, as reflected in the recently completed five-year plan. This plan was developed, as part of the GAVI application process, with the assistance of CDC/WHO.

Introducing Hepatitis B into an already less than optimal cold chain is cause for concern. It creates a significant risk that vaccine effectiveness (particularly through freezing) will be compromised.

Costs and financing

The Government, concerned about safety, refuses to use plasma-derived Hepatitis B vaccine and will instead procure the more expensive recombinant vaccine. Using the Hepatitis B plan, Table 13 projects the *additional* cost of introducing the vaccine (only) into the routine program. The implementation strategy requires a mixture of 1-dose and 10-dose vials, resulting in an average yearly cost of about \$1.4 million. According to World Bank projections, a catchup campaign in three oblasts would cost \$912,000.¹³ A more comprehensive catchup campaign in Tashkent will require about \$1 million, the MOH says.

Table 13: Costs of Introducing Hepatitis B Vaccine into the Routine EPI Schedule (US\$)

Year	Cost				Total Cost
	1-dose vial	10-dose vials	Transport	UNICEF Handling	
2001	595,946	700,946	37,857	103,751	1,508,595
2002	603,636	709,992	38,345	105,090	1,528,063
2003	592,412	627,110	36,239	97,562	1,416,033
2004	581,187	615,227	35,552	95,713	1,389,202
2005	575,663	609,381	35,214	94,804	1,376,001
Total					7,217,893

Source: GAVI application

Note: Projected target population is larger than that used throughout this assessment.

Three sources of funding are available:

- *GAVI*. An application to GAVI to fund the full introduction of Hepatitis B vaccine will be made on 15 October 2000. This funding, which is likely to be granted, will cover vaccine and supply needs for the next five years (from mid-2001).
- *World Bank*. The Government has requested the World Bank to reallocate \$1 million from the Primary Health Care Reform Project for the procurement of Hepatitis B vaccine. The World Bank consultant and CDC Hepatitis B experts support this (for use in a catchup campaign for three oblasts) provided that the Government supplies all the syringes for the immunization program.

¹³ Bass (2000)

- *Government.* The Government has indicated that it has enough resources (\$1 million) for a catchup campaign in Tashkent.

The Government has further indicated in its application to GAVI that it will start budgeting to cover Hepatitis B vaccine costs, syringes, and disposal equipment in 2003. The amount will gradually increase until 2006, when the country is expected to achieve self-sufficiency.

Haemophilus influenzae type b (Hib)

There is no record of the Hib disease burden in Uzbekistan. The MOH plans to seek WHO/CDC technical assistance to determine the burden. Once the need has been evaluated, an introduction plan will be developed if necessary.

Costs and financing

Table 14 shows the cost of introducing Hib vaccines into Uzbekistan, using two different strategies. Broad introduction increases in coverage, from 50 percent rising to 80 percent in the fifth year. Targeted introduction, for those at acute risk, would be administratively and politically difficult but more financially pragmatic. It assumes coverage of 10 percent each year. The cost of introduction in the first year, excluding supplies, would be about \$3 million for broad introduction and \$0.6 million for targeted introduction. The UNICEF price of \$3 per dose is used. There is no identified funding source, although Uzbekistan would be eligible for GAVI assistance.

Table 14: Costs of Introducing Hib Vaccine, Broad vs Targeted Introduction, 2001–2005

Year	No. of Doses		Price		Total Cost		Transport (4%)		UNICEF Handling		Total	
	Broad	Targeted	Broad	Targeted	Broad	Targeted	Broad	Targeted	Broad	Targeted	Broad	Targeted
2001	918,000	183,600	3	3	2,754,000	550,800	110,160	22,032	220,320	44,064	3,084,480	616,896
2002	864,000	172,800	3	3	2,592,000	518,400	103,680	20,736	207,360	41,472	2,903,040	580,608
2003	810,000	162,000	3	3	2,430,000	486,000	97,200	19,440	194,400	38,880	2,721,600	544,320
2004	756,000	151,200	3	3	2,268,000	453,600	90,720	18,144	181,440	36,288	2,540,160	508,032
2005	720,000	144,000	3	3	2,160,000	432,000	86,400	17,280	172,800	34,560	2,419,200	483,840
Total											13,668,480	13,668,480

Note: Based on UNICEF contract prices, and excluding safe injecting equipment.

Disease control initiatives

Polio

No cases of polio have been reported since 1995, and certification is expected in 2001. To ensure the eradication of the disease, the Government is planning NIDs in 2001, and SNIDs and mop-up campaigns from 2001 to 2004. WHO will continue to provide the required OPV vaccine, which will cost about \$1.4 million over the next four years. There is no

historical basis for projecting additional nonvaccine costs. Surveillance for AFP needs to be strengthened, however, primarily through training and an improved reporting system.

Measles

Cases of measles have risen over the last two years, to 3.6/100,000 in 1998 and 4.9/100,000 in 1999. The MOH hopes to reduce the incidence of measles to less than 1 in 100,000. Most cases affect people over 15 years, 38 percent of whom have received only one dose of measles vaccine. National reports indicate that about half of those over 20 years have received only one dose of vaccine. Campaigns are planned to provide this segment of the population with a second dose.

Long-term measles eradication strategies have not yet been developed; their development would require technical assistance from WHO. Mass campaigns or routine vaccinations may have to be carried out among children of school age. As noted in "Cold Chain and Vaccine Management" above, elimination will demand enhanced surveillance and laboratory testing.

Costs and financing

The one-off second-dose measles campaign will cost \$1.8 million in vaccines, and \$210,000 more in syringes and safety boxes. A third dose for school-age children would require an extra \$300,000 per year, or an additional 30 percent of the current routine EPI vaccine cost. No source of funds for this has been identified.

Financing Needs, Sources, and Gaps

The following analysis is only at a national level. There are not enough data to determine financing gaps at the oblast level, which undoubtedly exist and contribute to uneven access to safe, quality vaccinations across the country.

Projected costs of the routine program

The minimum operational costs for maintaining the national immunization program over the next five years are projected in Table 15. Vaccine needs are based on forecast population growth and actual wastage rates (where possible) but do not take into account current stock levels. Estimates for transport¹⁴ and social mobilization¹⁵ were unavailable and were therefore not included. The basic cost of implementing the program is \$2.2 million for 2001 and \$10.2 million over the five-year period. On average, vaccines account for 43 percent of the total.

¹⁴ Humanitarian vaccines are transported free of charge to the oblasts, which then take over responsibility for distribution. At the rayon level, however, it is not uncommon for staff to pay for public transport costs themselves to ensure delivery.

¹⁵ Given the high coverage rates, social mobilization should not, in any case, figure highly in financing estimates.

National reports indicate that about half of those over 20 years have received only one dose of vaccine. Campaigns are planned to provide this segment of the population with a second dose

Table 15: Projected Minimum Costs, Routine National Immunization Program, 2001–2005

Item	2001	2002	2003	2004	2005	Total
Routine vaccines	985,555	927,581	869,607	811,633	772,984	4,367,360
Syringes/needles (disposable)	111,384	104,832	98,280	91,728	87,360	493,584
Cold chain maintenance	27,042	27,042	27,042	27,042	27,042	135,210
Surveillance	63,600	33,650	23,590	20,590	20,590	162,020
Personnel	933,333	933,333	933,333	933,333	933,333	4,666,667
Training	81,829	81,829	81,829	81,829	81,829	409,145
Total	2,202,743	2,108,267	2,033,681	1,966,155	1,923,138	10,233,985

Note: Assumes locally purchased syringes and excludes safety boxes. Personnel costs assume no change in the number of people from 1999; the apparent decrease reflects the higher exchange rate of 675 som to \$1 in 2000. The health sector restructuring will significantly decrease the cost of personnel, as facilities are closed or consolidated. The timing and extent of this is not predictable and therefore has not been taken into account. All years are in current (2000) dollars. Training is planned (and costed) by RCES.

Projected costs of the strengthened/expanded program

Table 16 summarizes the projected costs of introducing AD syringes, improving the cold chain and laboratory infrastructure, introducing Hepatitis B vaccine, implementing a measles eradication campaign, and certifying polio eradication. These are all objectives stated in the strategic plan. The marginal operational costs in salaries, cold-chain equipment, and surveillance resulting from the introduction of Hepatitis B vaccine and from the measles campaign are not included. Neither is the introduction of HIB vaccine, which is unlikely in the short to medium term.

Table 16: Projected Costs of Strengthened EPI, 2001–2005 (amounts in US dollars)

Item	2001	2002	2003	2004	2005	Total
Basic program	2,202,743	2,108,267	2,033,681	1,966,155	1,923,138	10,233,985
Polio mop-up/NIDs/SNIDs	782,792	283,932	166,804	166,804		1,400,332
Measles campaign	1,954,648	300,000	300,000	300,000	300,000	3,154,648
Hepatitis B						
Routine coverage	1,763,554	1,786,313	1,653,006	1,621,685	1,606,274	8,430,832
Catchup campaign, Tashkent	1,000,000					1,000,000
Catchup campaign, pilot oblasts	912,489					912,489
AD syringes and safety boxes	488,811	460,058	431,304	402,550	383,381	2,166,105
Technical supervision and support	100,000	100,000	100,000			300,000
Subtotal	9,205,037	5,038,569	4,684,795	4,457,194	4,212,794	27,598,391
Investment in cold-chain eqpt	1,711,911	263,371	263,371	263,371	263,371	3,081,440
Laboratory equipment	567,700	112,930	79,240	51,140	38,010	849,020
Total	11,484,649	5,493,882	5,106,417	4,850,717	4,593,186	31,528,851
Increase in operational costs, as % of basic program	318%	139%	130%	127%	119%	

Note: The measles campaign costs do not include AD syringes but the Hepatitis B campaign costs do. The AD syringes and safety boxes are for all routine EPI vaccines. Polio campaign costs are based on target population forecasts provided by RCES and the UNICEF price for OPV. Technical supervision and support is for the cold chain and vaccine management. See also Table 15 notes.

Noncapital additions to the program in the first year will cost more than three times the basic program. Of this increase, 80 percent will be due to the introduction of Hepatitis B vaccine (including targeted catchup campaigns) and a measles campaign. To improve the cold chain and laboratory infrastructure an injection of capital amounting to 103 percent of the cost of the basic program would need to be made in the first year. In the following

years, the program with all improvements, including a budget for the replacement of cold-chain equipment, will cost about 2.5 times as much as the routine EPI program.

Projected funding sources and funding gap

Table 17 identifies likely or committed sources of nongovernment funding.

Figure 8: Funding Gap for Improved EPI, 2001–2005 (US\$ million)

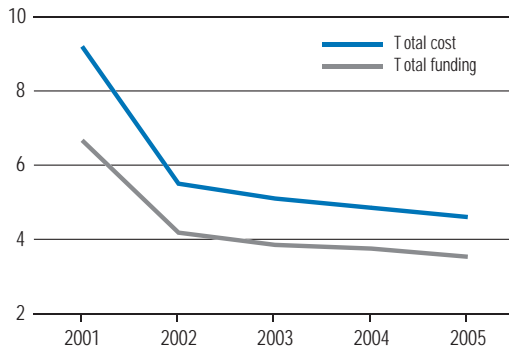


Table 18 shows the gap in funding for an improved EPI over the next five years, assuming current levels of expenditure, the expected commitments from donors (Table 17), and the ability of the Government to meet all routine costs, *including EPI vaccines*, when Japanese funding ends. This analysis suggests that the improvements will require another \$8.6 million over the five-year period.

The largest single unfunded activity is the measles eradication campaign, with 37 percent of the total funding gap. The critical program-strengthening areas of cold-chain and laboratory infrastructure and technical assistance, taken together, account for nearly 40 percent of the funding gap. All improvements, except the measles campaign, would cost \$5.4 million in additional resources. Figure 8 shows the funding gap for each year from 2001 to 2005.

Table 17: Likely Donors, 2001–2005

Donor	Purpose	Period	Amount (US\$)
WHO	Polio eradication	2001–2004	\$1.4 million
Japanese Government	Vaccines and cold chain	2001–2002	up to \$2 million
World Bank	Hepatitis B catchup campaign	2001	up to \$1 million
GAVI	Routine Hepatitis B vaccines and syringes	2001–2005	\$8.4 million
Total			\$10.9 million

Table 18: Total Funding Gap for Improved EPI, 2001–2005 (amounts in million dollars)

	Costs	Sources	Gap	% of Total Gap
Basic program	10,233,985	10,233,985		
Polio mop-up/NIDs/SNIDs	1,400,332	1,400,332		
Measles campaign	3,154,648		3,154,648	37%
Hepatitis B campaign				
Routine coverage	8,430,832	8,430,832		
Catchup campaign, Tashkent	1,000,000	1,000,000		
Catchup campaign, pilot oblasts	912,489	912,489		
AD syringes and safety boxes	2,166,105		2,166,105	25%
Technical supervision and support	300,000		300,000	4%
Subtotal	27,598,391			
Investment in cold-chain equipment	3,081,440	1,000,000	2,081,440	24%
Laboratory equipment	849,020		849,020	10%
Total	31,528,851	22,977,638	8,551,213	
		73%	27%	

Policy and Financing Options

Financing gaps at both national and subnational levels will affect the sustainability, quality, safety, and equitable delivery of the immunization program. Over the next five years, the gaps will primarily affect the cold chain, surveillance, injection safety, and measles control. Closing these gaps does not just mean mobilizing more resources. Cost reduction and policy issues must be addressed to maximize the value of any investment.

Policy Options

The national Government can implement policy decisions to improve financial sustainability, accountability, and equitable access to immunization services. These policy decisions will involve:

- Creating and maintaining a budget line in the national budget (for the procurement of EPI vaccines and supplies) and the oblast health budget (for operational immunization costs)
- Centralizing the procurement and distribution of vaccines, syringes, and cold-chain and laboratory equipment
- Granting hard-currency convertibility and removing the import duty on non-“humanitarian” vaccines
- Improving financial information systems

In all these, the Government must take into account the medium-term needs of the health system, which is only just starting a five-year reform process.

Budget line

The Government has shown political commitment to achieving vaccine self-sufficiency by passing the relevant laws and decrees, but its long-term commitment to EPI vaccine purchase remains to be seen. A dedicated line must be created and *maintained* in the national budget for the procurement of EPI vaccines and supplies, and in the oblast health budget for operational immunization costs. There are clear *advantages* in pursuing such a course of action:

- *Improved sustainability.* Unless the national Government can provide guaranteed funding for ongoing EPI vaccine purchase, program sustainability is threatened. Relying year after year on donors makes medium-term forecasting difficult and compromises program continuity. The oblasts must be similarly committed to ensuring adequate operational support.
- *Improved accountability and transparency.* Each level of government must report against a budget line at the end of each financial year, and take responsibility for correct (and complete) use of funds. Specific immunization lines thus reduce the risk of funds being diverted to other expenditure areas.
- *More equitable access.* Directing oblasts to maintain a budget line will make EPI a priority even (or especially) in the poorer regions. It will also help ensure that quality vaccines are accessible to all children everywhere, irrespective of a region's wealth.

The Government has shown political commitment to achieving vaccine self-sufficiency by passing the relevant laws and decrees, but its long-term commitment to EPI vaccine purchase remains to be seen

A budget line is a fundamental indicator of government commitment, a proxy for sustainability. Immunization partners should expect this as a minimum.

Centralizing procurement

Even in a decentralized system there are strong arguments (such as economies of scale) for centralizing certain elements of national programs. The national procurement and distribution of vaccines, syringes, and cold-chain and laboratory equipment has these primary *advantages*:

- *More equitable* access to safe vaccinations. Syringe supplies and cold-chain equipment (and repairs) are now the responsibility of the oblast CESs. These CESs, as noted above, have significant disparities in resources. As a result, children from economically disadvantaged regions are less likely to receive sterile syringes and vaccines whose quality is maintained because of a well-functioning cold chain. Centralizing the procurement and distribution of vaccines (including non-EPI vaccines), syringes, and cold-chain equipment will make the distribution of these vital components more equitable, irrespective of the health of the oblast budget. The distribution setup for routine vaccines can be expanded to include these commodities.
- *Cost savings*. Costs can be significantly reduced through equipment standardization, bulk stock control, national needs planning, and nationally available technical support. Also, economies of scale and open bidding will lead to the best possible prices.

Together with centralized procurement and distribution, the national Government must take responsibility for the technical management of cold-chain needs. Systemic and sustained technical support to lower levels of the cold chain throughout the country will help maintain overall quality.

Hard-currency convertibility and import duties

Strict currency controls hamper the importation of syringes and nonroutine vaccines (and sometimes measles vaccine). Timely and adequate rights to hard currency would offer these advantages:

- More accessible *quality vaccines* and supplies. Without being assured of quick deliveries by Uzmedexport or access to UNICEF services, oblasts will continue to procure vaccines and supplies through private companies such as Posbon, which cannot guarantee quality.
- *Cost savings*. Posbon is the predominant supplier of nonroutine vaccines partly because it can sidestep convertibility constraints. Once this barrier is removed, Uzmedexport will provide increased competition.

The 20 percent import duty on non-“humanitarian” vaccines significantly increases the price paid by oblasts and thus reduces the availability of the vaccines. How much this duty contributes to Government revenue is not known, but its removal would widen access to the vaccines.

Systemic and sustained technical support to lower levels of the cold chain throughout the country will help maintain overall quality

Although immunization finances are part of the broader health and public sector financial framework, immunization costing can and should be made more responsive and meaningful

Financial information systems

Good financial information systems improve accountability and resource management. The current system does not permit the analysis of national expenditure data. Although immunization finances are part of the broader health and public sector financial framework, immunization costing can and should be made more responsive and meaningful. The national Government could set standard categories of expenditure within a dedicated EPI budget line to facilitate comparative and aggregated analyses, which would uncover areas of inefficiency. The MOH might also assign a full-time person to implement and track financial requirements and resources.

General

The health system is only starting a five-year reform process, which will drastically reduce the number of service facilities and fundamentally alter the way in which services are run. Financing decisions regarding the immunization program must therefore be made with this in mind. Solutions, while required in the short term, must take into account the medium-term reorientation of services.

Financing Options

Routine vaccines

The Government has, or should make available, enough funds for the purchase of EPI vaccines. Donor funding for EPI vaccines beyond 2002 would therefore be unwarranted.

Nonroutine vaccines

Purchasing practices must be improved to ensure that only quality vaccines are purchased, at the best prices. The Government could set up a national (centralized) procurement facility with a revolving or reserve fund for the purchase of vaccines on the immunization schedule, such as TT and MMR vaccines. This would require initial capital and the continuing availability of hard currency. A feasibility study would have to be made beforehand to determine whether:

- the volume of vaccines and the burden of disease warrant such arrangements, considering also that, with future GAVI funding, the significant amounts that oblasts now spend to purchase Hepatitis B vaccine could be used instead to purchase other vaccines (probably mumps vaccine)
- the oblasts are sufficiently interested in participating in such a scheme (as discussions with oblast CES officials suggest)

Vaccine management system, including cold-chain equipment

While there is an obvious need to improve vaccine management and cold-chain equipment, the costs of doing this still have to be determined.

To reduce the risk of investing in a suboptimal cold chain, any funding should be preceded by a comprehensive assessment to establish the most cost-effective distribution strategy

The current distribution system is not cost-effective and will not be sustained beyond the period of health sector reform. At the same time, much of the equipment is old and not functioning, and supplies such as icepacks are nonexistent. To reduce the risk of investing in a suboptimal cold chain, any funding should be preceded by a comprehensive assessment to establish the most cost-effective distribution strategy. It is in this context that realistic equipment requirements can be determined and a medium-term management strategy developed. Such an assessment would need to take into account the use of vaccine vial monitors on all UNICEF-supplied vaccines from early 2001. This will radically change cold-chain and vaccine management.

The significant contribution of the Japanese Government reduces unfunded replacement costs to about \$1.1 million. This amount includes resources for medium-term technical assistance and ongoing training and supervision, which must accompany any provision of cold-chain equipment. Centralized procurement and distribution should be a condition for assistance. Maintenance costs are, and should remain, the responsibility of the oblast government.

Safe injection practices

This is a crucial area that demands more resources and political commitment. A comprehensive safe injection strategy is clearly needed. It should provide for:

- adequate equipment and supplies
- waste disposal infrastructure
- technical support to facilitate implementation, training, and behavior change
- (possibly) applied research into safe injecting practices

The provision of adequate syringes for all EPI vaccines would entail a minimum investment ranging from \$0.5 million (disposable syringes) to \$2.2 million (AD syringes) over five years. At the very least the Government should finance all disposable syringe needs to demonstrate its commitment to providing safe injections and to improving financial sustainability and equity. Any external support should only *supplement* Government funding. As with cold-chain equipment, centralized supply and distribution is the most transparent way of ensuring equitable distribution.

If Mediz cannot secure enough capital to expand production, other financing arrangements that use both private- and public-sector resources need to be explored. Local capacity must be increased.

As vaccine injections account for about 25 percent of health system usage, moving from disposable to AD injection equipment will not solve the overall problem of transmission risk. Although beyond the scope of this paper, financing solutions must be found to ensure that all syringe needs are met.

Surveillance

Investment in surveillance is well justified. Quality immunization programs require strong surveillance systems. The cost estimates given are based on 1998 projections, which may

lack systematic development, use inaccurate prices, or assume a level of need that no longer holds true in 2000. In addition, it is likely that Uzbekistan employs a Soviet-style approach to laboratory use, which may be excessive. Therefore, any investment must be preceded by operational research into surveillance strategies, including laboratory use and needs.

Introduction of new vaccines

In theory, an immunization program should be expanded only when it is sufficiently robust. To introduce new vaccines into a suboptimal cold chain is to risk damaging the vaccines, leading to significant financial loss and limited improvement in disease control. Hence, while there is no need for more donors to support the introduction of Hepatitis B vaccine (all needs are fully covered), investment in the general strengthening of the program, including the cold chain, would provide indirect but crucial support.

Disease control strategies

There is good justification for developing medium-term financing arrangements for measles eradication. The vaccines alone could cost about \$3.3 million over five years. Any financing would need to be made in the context of an elimination strategy. Any assistance must also consider the policy and financial tension between focusing on a single disease and strengthening the program overall. Depending on the outcome of other CAR assessments, a regional approach to measles eradication, with funding for the strengthening of intercountry surveillance, may be a viable option.

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Summary

The Government of Uzbekistan may achieve *cost savings* in the immunization program by centralizing the procurement of all immunization commodities (including nonroutine vaccines) and capital equipment, improving vaccine management and distribution, and rationalizing laboratory needs. In-depth studies of these areas should yield recommendations to improve financial performance. Any investment in the cold chain or laboratory infrastructure (see below) should be contingent on the outcome and recommendations of such an assessment.

Additional funding is needed to *strengthen* the program in the areas of injection safety, cold-chain equipment and vaccine management, and laboratory capacity. Negotiations for funding should aim to achieve donor coordination and an integrated, comprehensive strategy for strengthening these areas.

Lastly, more funding is needed to *expand* the program in the area of measles eradication. While the Government has not identified this as a priority, close attention to disease rates over the next one to two years may cause this to change.

The Government can mobilize funding by increasing national spending, increasing donor funding, or assuming (soft) loan obligations. Government spending is unlikely to

increase substantially in the short term but must do so over the next three to five years if immunization is a real priority. The failure of the Government to fund basic EPI operational costs beyond 2002 would call into question the future sustainability of the program, including the use of Hepatitis B vaccine. Although donor funding and loan obligations may help in strengthening the program, these should not be exclusively relied upon to deliver essential components of the program, such as EPI vaccines and safe injecting equipment.

It would not be appropriate to introduce user fees for EPI vaccinations. Clear economic and public health arguments favor the provision of free immunization services by the Government.

Recommendations

To strengthen and expand the national immunization program of Uzbekistan in a rational manner, the Government must address a number of policy issues, reduce costs, and mobilize resources. Given the evolving structure of immunization services in Uzbekistan, the likely introduction of Hepatitis B vaccine in the near future, and the need to maintain high coverage with good-quality, safe vaccinations, it is recommended that the Government:

To strengthen and expand the national immunization program of Uzbekistan in a rational manner, the Government must address a number of policy issues, reduce costs, and mobilize resources

Make financing more sustainable and improve accountability by:

- Creating and maintaining an identified budget line in the yearly national budget for routine EPI vaccines, associated syringe supplies, and capital equipment
- Directing oblast mayors' offices to include a separate budget line for immunization services, with clearly specified and standardized categories for expenditure
- Ensuring that all the basic operational costs of a routine immunization program are fully funded with internal resources after mid-2002 (when the vaccine funding provided by the Government of Japan expires)
- Ensuring that the amount that would previously have gone to the purchase of Hepatitis B vaccine (now to be funded by GAVI) is used to further strengthen immunization services
- Improving financial information systems, as they relate to immunization in particular and health care services in general, to better guide decisions on cost reduction strategies and future financing needs
- Assigning a national official specifically to track, coordinate, analyze, and report on overall national immunization budget and expenditure data

Improve equitable access to quality, affordable vaccines and the safe administration of injectable vaccines by:

- Continuing to procure vaccines through UNICEF or through open bidding with WHO-prequalified manufacturers, to ensure the supply of quality vaccines at the best prices
- Making sufficient hard-currency convertibility rights available in advance to Uzmedexport or to any oblast purchasing vaccines through UNICEF, to encourage the purchase of quality vaccines at competitive prices
- Removing the 20 percent import duty on vaccines not labeled as "humanitarian"
- Considering restricting vaccine purchases by oblasts to WHO-prequalified manufacturers, to improve quality control
- Considering the international procurement of BCG, to ensure the supply of quality vaccine
- Centralizing the procurement and distribution of essential immunization supplies including EPI vaccines, safe injecting equipment, cold-chain equipment, and relevant laboratory equipment
- Funding this procurement through the national budget (as recommended above) to further reduce the risk of inequitable access due to variations in economic wealth between oblasts

It is recommended that immunization partners demonstrate commitment to a sustainable program by ensuring that any investment in the program is backed by a long-term commitment on the part of the Government to fund all core operational EPI costs

Reduce costs (and improve financial sustainability) by:

- Centralizing the procurement of all vaccines, safe injecting equipment, cold-chain equipment, and relevant surveillance equipment (see the previous recommendation), and facilitating the centralized procurement of nonroutine vaccines, possibly through a revolving or reserve fund mechanism
- Seeking technical assistance to improve vaccine forecasting, wastage calculation, and stock management
- Assessing the cost-effectiveness of the vaccine distribution and delivery system, with a view to implementing a more rational system
- Assessing the cost-effectiveness of CES laboratory needs as they relate to surveillance

Mobilize resources (internal or external) to address gaps in funding for the following:

- *Strengthening of the cold chain.* It is further recommended that:
 - Any investment in cold-chain equipment should be preceded by a comprehensive cost-effectiveness assessment (see the previous recommendation), which takes into account planned reforms in the health sector as well as the introduction of vaccine vial monitors on vaccines procured by UNICEF. Funding should be contingent on the outcome and recommendations of such an assessment.
 - The funding proposal should provide for ongoing technical assistance, support, and supervision over the medium term in the area of vaccine stock, transport, and distribution management.
- *Strengthening of the surveillance system,* through investment in adequate laboratory supplies. Further, given the current lack of information, an in-depth cost study of laboratory needs for an improved, more reliable surveillance system is recommended. Funding should be contingent on the outcome and recommendations of such a study.
- *Improvement of safe injection practices,* including the required supplies and waste disposal equipment. It is further recommended that any investment be guided by a comprehensive strategy addressing all aspects of injection safety, including behavior change. If necessary, the cost of developing the strategy should be included in the funding proposal.
- *A measles eradication campaign,* contingent on the development of a medium-term eradication strategy. The possibility of integrating a national campaign into a regional approach should be considered, and the appropriate resources mobilized.

It is also recommended that *immunization partners demonstrate commitment to a sustainable immunization program* by ensuring that:

- any investment in the program is backed by a long-term commitment on the part of the Government to fund all core operational EPI costs, including and especially vaccines and disposable syringe needs
- improvements or investments in supplies and support are made equally available throughout the county, irrespective of the economic wealth of the region
- identified cost savings from investments in improved cold-chain or surveillance systems are directed back into immunization services

Summary of Findings and Recommendations in Previous Consultants' Reports on Uzbekistan

Alasdair Wylie, WHO Consultant
(30 August–4 September 1999)

- An urgent check must be made at all oblast SESs of the condition of OPV stocks (as determined by VVM), in particular any stock from batches received in 1998 and still not distributed. Each oblast should require each rayon SES to do the same, in respect of all OPV in stock at medical institutions.
- Monthly stock balance reports to RSES from each oblast must show the stock of OPV (and all other vaccines) for each separate batch/expiry date, and this should be done also in the new vaccine log book when introduced.
- OPV must be distributed by oblast SESs in strict rotation (“first expiry, first out”), both for the autumn 1999 mopping up and for routine immunization, provided that it is within the expiry date and the VVM is OK. (All other vaccines should, of course, also be distributed in rotation.)
- The status of implementation of the UNICEF consultant’s 1998 recommendations on vaccine stock control must be checked at the national level and at each oblast.
- A regular national quarterly report on stock balances of all vaccines must be reestablished (to replace the WHO/ISMS discontinued in mid-1998).
- Available data on vaccine usage and immunizations given must be used to calculate future vaccine requirements as accurately as possible, both for routine and for mass immunization. For polio NIDs and mopping-up vaccine calculations, a wastage factor of not more than 1.2 is appropriate in view of available data and experience.

Mopping up

- Mopping up should not be automatically done in all rayons of the five selected oblasts, in particular because of the possible effect on the availability of OPV for routine immunization.
- Criteria for priority rayons for mopping-up immunization in the five selected oblasts, in addition to those at the border, should include any with relatively low routine OPV coverage or “refusals” in previous NID or mopping up. Vaccine requirement should be recalculated once the list of priority rayons has been finalized.
- Vaccine distribution and stock balance data and immunization data from each oblast must be used at the national level to calculate OPV use/wastage for each round.

Cold-chain equipment

- Urgent priority must be given to making all household refrigerators perform as well as possible for vaccine storage and to ensuring knowledgeable and reliable supervision of their use and care.
- Equipment inventory records should specify the make and model of imported equipment and should identify “CFC-free” units by location.

- Procurement of thermometers (E6/27 recommended) should be a high priority and should be sufficient to create reserve stocks at oblast SESs.
- New freezers being procured for rayon/city SESs should be of appropriate size (e.g., Vestfrost MF 204) and should be used primarily for icepack freezing.
- All new imported equipment should have instructions in Russian as a condition of the purchase contract and clear markings identifying them as “CFC-free.”

Training and supervision

- Although it may be better to introduce certain new materials during training sessions/workshops, there should be no further delay in distributing to every corner of the country the UNICEF/CARK MCH Forum pocket folder on safe vaccine handling/safe immunization practices.
- “Best practice” in the use and care of household refrigerators should have first priority in all training workshops and any meetings at oblast and rayon levels, reinforced by early distribution of all new materials referred to above, followed by VVM use and interpretation, supervision methods, and vaccine stock control.
- The planned UNICEF/MOH “regional workshops” on safe vaccine handling/safe immunization practices should:
 - focus on the priority issues identified during this visit and that of the 1998 UNICEF consultant
 - each be preceded by one or two days of fact-finding visits to local SESs and to medical institutions that give immunizations, by the workshop resource persons/facilitators, together with local health officials
 - maximize use of small working groups with practical exercises as the main learning/discussion method, both for the introduction of new materials such as the log book and for case study problem analysis and solution (as in the WHO EPI training materials for mid-level management)
 - should lead directly to rayon-level workshops of not more than two days’ duration, using the same methods
 - Include the preparation of a plan and a proposed method for evaluating the results of the rayon-level workshops between three and six months later
- A suitable checklist for use by rayon officials during visits to medical institutions, and by the chief doctors of the institutions, should be developed during the workshops (sample, Annex 9).
- The activity schedules (section 17) in the MOH’s National Immunization Program for 1998–2002, adopted in 1997, should be revised to include the planned new training workshops at oblast and rayon levels, and related activities such as the evaluation of training results.

Eric Laurent, UNICEF Consultant (August–September 1998)

- Important and uncontrolled vaccine stock fluctuations causing vaccine losses and risks in storage and disturbances in immunization activities; overall lack of controls over vaccine stocks
- Poor vaccine calculations and forecasting due to inaccurate basic data (target population, number of doses, wastage factor)

- Refrigerators aging and often breaking down; no replacement forecasts
- Storage capacity - household refrigerators have sufficient capacity at +4 degrees C almost everywhere, but at oblast and rayon SESs storage capacity and freezing capacity at -20 degrees C insufficient; equipment provided through USAID assistance useful and correctly used
- Knowledge/Practice weaknesses - VVMs not known, found to have turned gray; reconstituted measles vaccine not discarded; vaccine not properly arranged in refrigerators
- Insufficient frozen icepacks in cold boxes
- Mothers having to pay for syringes in several oblasts

Draft EPI National Immunization Plan for Uzbekistan for 2000–2005

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Executive Summary
EPI National Immunization Plan for 2000–2005
Ministry of Public Health, Republic of Uzbekistan

The Ministry of Health of the Republic of Uzbekistan developed the 2001–2005 National Immunization Plan to further progress toward vaccine-preventable disease control, elimination, and eradication in Uzbekistan. It addresses the management of immunization operations, capacity building, safety of injections, and sustainable funding for immunization services. The plan includes targets for vaccine-preventable disease morbidity and immunization coverage, with particular attention to polio eradication, measles elimination, and the incorporation of hepatitis B into the routine immunization program. The plan will be carried out with support and guidance from the partners of the Interagency Coordinating Committee.

Since its independence in 1991, Uzbekistan has experienced significant changes in its health care delivery system, including the delivery of immunization services. In the early to mid-1990s, civil unrest in bordering regions, accompanied by an interruption in the supply of vaccine, contributed to outbreaks of diseases such as diphtheria. Since that time the situation has stabilized, and in more recent years health care reform efforts have resulted in a gradual shift toward privatization of health care and greater access to ambulatory primary care services.

Routine immunization services are delivered in over 6,000 facilities throughout the country, mostly to the approximately 1 million children less than 2 years of age. Additional efforts, such as National Immunization Days for polio, and targeted measles vaccination campaigns, reach many more children and young adults. The vast majority of these services (over 90%) are delivered through public clinics.

Reported morbidity for all EPI-targeted diseases has declined in the past 2 years with the important exception of measles. In 1999, there were 1,193 reported cases of measles (4.9 per 100,000). Also, there is a very high disease burden for hepatitis B throughout central Asia including Uzbekistan.

Reported immunization coverage rates are high, but the accuracy of these rates is unclear due to the fact that the last census in the country was conducted over 10 years ago, making it difficult to estimate the population-based denominators. Results from a UNICEF-funded MICS survey expected in October should help to provide a clearer picture of immunization coverage.

The immunization program has made significant strides in the recent past as is evidenced by the reduction in morbidity of many vaccine-preventable diseases. Nevertheless, there are still many challenges that face the program. The objectives of the plan, with their accompanying strategies and action steps, are intended to address those challenges and ensure the continued progress of the program. The plan includes the following six objectives:

- Maintain routine immunization coverage >95% at the national and district level for each of the EPI targeted diseases.

- Achieve certification of polio eradication by 2001.
- Reduce incidence of measles to less than 1/100,000.
- Increase the safety of injections for all EPI vaccines.
- Integrate hepatitis B vaccination into the routine infant immunization schedule by 2001, and achieve at least 80% coverage by 2003.
- Evaluate the need for a *Haemophilus influenzae* type b (Hib) vaccination program.

With Uzbekistan on the verge of certification of polio eradication, measles elimination will be the next major challenge. Fortunately, the successful efforts of the immunization program in meeting polio eradication objectives should serve as an example of the potential of the program to eliminate measles. In an effort to control the spread of measles, the Ministry has already carried out special campaigns to target high-risk groups for a second dose of measles vaccination. The five-year plan contains a plan for a formal review to enhance measles elimination activities.

Safe injection practices are a key concern that is addressed in the five-year plan, with practices varying widely in different parts of the country. In some districts, virtually all of the needed syringes are provided by the government, while in others, the government supplies almost none of the needed syringes. This often leaves the burden on parents to supply their own syringes. In addition, assessments have identified a problem with syringe reuse in Uzbekistan. There is also concern that needle disposal is being carried out in a substandard manner in many parts of the country. The plan addresses the need to enforce a policy in accordance with WHO recommendations and to ensure the supply of materials required for safe injections and needle disposal for all vaccination providers.

The plan also addresses important issues regarding vaccine management. Prior reviews showed that there was the need for an adequate inventory control system, better forecasting methods, improvements in the cold chain, and training of vaccine management personnel. Site visits also revealed concerns that refrigerated vaccines are being subjected to colder than acceptable temperatures. This will become a greater issue with the inclusion of hepatitis B vaccination.

The five-year National Immunization Plan demonstrates the commitment of the Ministry of Health to ensuring the health of the citizens of Uzbekistan and protecting them from vaccine-preventable diseases. The achievement of the objectives and strategies outlined in the plan is critical to the success of the immunization program, and will ensure progress toward a self-reliant and sustainable system of vaccine-preventable disease control, elimination, and eradication.

1. Background

1.1 General

Located in Central Asia, the Republic of Uzbekistan is approximately 447,000 square kilometers in area. It is bordered on the west and north by Kazakhstan, on the east by Kyrgyzstan, on the southeast by Tajikistan, and on the south by Turkmenistan and Afghanistan. The terrain is composed primarily of plains which occupy four-fifths of the republic's

territory. The climate is desert continental with temperatures that fluctuate greatly over the course of the year.

With an estimated population of 24.6 million persons in 1999, Uzbekistan has the largest population of any of the former Soviet republics. Tashkent, the capital, is the largest city in Central Asia. The country's population growth rate is 1.9 percent per year. There are approximately 550,000 births each year. Before 1991, Uzbekistan had a centralized health care system with universal access, based on policies from Moscow. Since independence, there has been a gradual shift towards privatization and access to ambulatory primary care services. During the 1990s, civil unrest in neighboring republics has brought in substantial numbers of refugees to border regions, contributing to outbreaks of disease such as diphtheria.

1.2 Organizational structure of the health care system

The Ministry of Health is the main body that plans, manages, and regulates health services. Administratively, the country is divided into 14 regions; these include 12 oblasts, one autonomous republic (Republic of Karakalpakistan), and one municipality (Tashkent city).

Under these divisions are approximately 256 districts (rayons), which contain hospitals, rural clinics, and urban clinics. A new system of rural medical centers has recently been introduced in the more rural areas, with plans to gradually replace the old rural clinics.

In 1997, there were 314,661 physicians and nursing staff involved in health activities, of which 23% were physicians, and 76% were nurses. There was one health professional for every 76 persons in the population.

There are over 6,000 health care facilities that deliver immunizations in the country. Approximately 90% of medical care is government-owned. The remaining belongs to nongovernmental organizations and private practitioners. There is no voluntary health insurance yet, but there are plans to introduce this within the planned health care reforms.

1.3 Socioeconomic situation

- Uzbekistan has a GNP of \$800–\$1,000 per capita
- Health expenditure is 3.1% of GDP (1998)
- 62% of the population lives in the rural areas
- Uzbekistan is the largest producer and exporter of cotton (40% national export)

1.4 Health-related Information

- Total population: 24.6 million
- Target population under 1 year: 550,000
- Population under 5: 2.7 million
- Surviving infants: 509,419

- Population growth rate: 1.9
- Infant mortality rate: 22.3/1000 live births
- Under-5 mortality rate: 35.7/1000 live births
- Life expectancy: 66.1 males and 71.2 females
- Number of health facilities: >10,000
- Health facilities conducting immunization services: 7,920
- Pregnant women receiving prenatal care: 67%

2. Disease trends and vaccination coverage

2.1 Trends of morbidity and mortality from EPI target diseases

The Expanded Program on Immunization (EPI) was launched in 1975. EPI has targeted six immunizable diseases, including polio, tetanus, measles, diphtheria, pertussis, and tuberculosis. Incidence rates of these diseases in Uzbekistan have varied during the last 10 years.

There have been no cases of disease due to wild poliovirus during the last five years. In 1998 and 1999, there was one case of tetanus detected each year. Cases of pertussis have declined during the last three years, from 197 cases (incidence 0.84/100,000) in 1997 to 32 cases (incidence 0.13/100,000) in 1998, and 54 cases (incidence 0.22/100,000) in 1999.

Diphtheria and measles have shown large variations in incidence rates over the last 10 years in Uzbekistan (Table 1). There was a substantial increase in diphtheria incidence from 1993 to 1996 related to the emergence of epidemic diphtheria throughout the former Soviet Union. However, during the last three years, diphtheria has been well controlled in the Republic. Overall, measles declined from 1990 until 1997, but an increasing number of cases have been detected during the last two years.

Table 1: Diphtheria and Measles Incidence in Uzbekistan, 1990–1999

Disease	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Diphtheria										
Cases	12	16	29	137	232	638	163	28	4	5
Incidence	0.06	0.08	0.10	0.60	1.00	2.90	0.70	0.10	<0.10	<0.10
Measles										
Cases	3,943	3,870	2,020	2,319	1,159	295	228	261	875	1,193
Incidence	19.40	18.20	9.50	11.50	5.20	1.30	1.20	1.10	3.60	4.90

TB incidence has increased over 50% during the 1990s, with a rate of ~50/100,000 during the last two years.

2.2 Vaccination coverage

Vaccination coverage is reported by the health care facilities based on number of children vaccinated over the total number of children in the target range. The last census was

conducted in Uzbekistan in 1988. Since then, adjustments have been made to population figures based on number of births and deaths in the region, and movements of persons into or out of the area; however, questions remain about how accurately these estimates represent the actual population. A DHS survey conducted in 1995 confirmed high immunization rates nationwide in Uzbekistan, but did highlight regional differences. A household census conducted by Abt last year found that government figures overestimated population numbers by approximately 30%. A UNICEF-funded and -conducted MICS cluster survey done in August 2000 should provide results of coverage levels in October 2000.

Year	BCG	DPT3	OPV3	Measles	Pertussis
1990	94	92	96	98	88
1991	90	84	89	84	79
1992	98	83	85	84	78
1993	98	49	46	82	45
1994	92	70	75	71	68
1995	95	88	99	80	87
1996	95	95	97	94	95
1997	96	96	98	88	95
1998	97	98	99	98	98
1999	98	98	99	96	98

3. Description of the immunization system

3.1 Organization of the immunization system

The responsibilities of different aspects of vaccination services at the national level are divided among the MOH, the Scientific Institutes of Pediatrics and of Epidemiology, Microbiology and Infectious Diseases, and the Republican Central State Sanitary Epidemiological Control (CES). The organization of the immunization system, as well as reporting requirements, is shown in Attachment 1.

3.2 Safe Vaccination practices

A policy on Safe Vaccination Practices was developed in December 1999. This includes guidelines on: (1) use of disposable syringes for all vaccine administration; (2) adverse events reporting following immunization (AEFI) within 24 hours; (3) training of health personnel concerning AEFI; (4) official instruction on role of various levels and reporting procedures. A special committee at the Republican CES level is responsible for investigating all AEFI cases reported.

3.3 Vaccination management

Most vaccines arrive at the airport, are taken to the RCES for repackaging, and are brought back to the airport several hours later for immediate redistribution to oblasts. A small proportion of the vaccines are stored at the national level before distribution, even though it is estimated that there is adequate storage capacity at this level to store much more vaccine. See Attachment 2 for inventory of current cold-chain equipment.

3.4 Surveillance

The rural clinics, polyclinics, and Feldsher-Obstetrician posts (FAPs) within each rayon or city report cases of disease to the rayon and city CES. Each rayon and city reports cases of disease to the oblast SES, who in turn reports to the RCES, and ultimately to the MOH. Reporting is usually done weekly. For hepatitis B disease, reporting is daily to the RCES and to the MOH. See Attachment 1 for responsibility and deadlines for reporting.

3.5 Laboratory and diagnostic testing

Laboratories for bacteriologic diagnostic services are provided at all health facility levels. Laboratories for virologic testing are provided only at the city and oblast levels.

3.5 Resources and donor support

UNICEF has supplied vaccine for routine immunization and some cold-chain equipment for the last five years. During the next five years, UNICEF plans to upgrade cold-chain equipment (refrigerators), and conduct training in safe injection practices, open-vial policy, and vaccine procurement for MOH staff.

The Japan International Cooperative Agency (JICA) is supplying vaccine for routine immunization from May 2001–2002. Other support includes training for nurses in safe injection practices and provision of cold-chain and hospital equipment. Total funding is \$18 million.

World Bank/USAID has been funding (since 1994) a \$30 million pilot project (three oblasts) to improve primary health care. In one oblast this includes retraining health care workers in finance/management practices.

Through the Asian Vaccine Initiative, the Asian Development Bank (ADB) is exploring areas of potential financial assistance.

4. Five-year plan: Objectives

- 4.1 Maintain routine immunization coverage >95% at the national and district level for each of the EPI targeted diseases
- 4.2 Achieve certification of polio eradication by 2001
- 4.3 Reduce incidence of measles to less than 1 per 100,000 population
- 4.4 Increase the safety of injections used for all EPI vaccines
- 4.5 Introduce hepatitis B vaccine into the routine schedule of immunization for infants by mid-2001 and achieve >80% coverage by 2003
- 4.6 Measure the burden of Hib disease to obtain possible funding for introduction of Hib vaccine

5. Strategies and action steps

Objective 1. Routine immunization: maintain coverage >95% at the national and district level for each of the EPI targeted diseases

Reported coverage for DTP3 and all antigens is greater than 95%. Accuracy of denominator figures is unknown. A UNICEF-conducted cluster MICS survey will provide coverage figures to assess validity of reported coverage. Results from this survey should be available October.

Strategies for achieving Objective 1

Strategy 1.1 Ensure adequate and sustainable funding for the National Immunization Program

Issues UNICEF has been supplying routine vaccines for the last five years, with plans for MOH to gradually assume responsibility for full vaccine purchases. In 2000, the MOH supplied funding for all routine vaccines. However, the MOH was not able to continue funding in 2001. JICA has agreed to fund vaccine for routine immunization for one-year period starting May 2001. The government has expressed a desire to be self-reliant in the ability to obtain vaccines.

Action Steps

- 1.1.a Conduct a comprehensive Immunization Services Assessment
- 1.1.b Establish long-term commitment for routine vaccine and infrastructure funding from the government
- 1.1.c Complete application for GAVI funding
- 1.1.d Explore possibility of additional funding through loans/grants from donors
- 1.1.e Develop and manage budgets, and allocate funds appropriately

Strategy 1.2 Ensure proper vaccine management at all levels to reduce wastage levels for each vaccine

Issues From 1997 to 1999, wastage figures calculated from administrative data showed measles wastage at 28–40% and DTP wastage at 38–45%. Most vaccine wastage appears to be due to management issues, with large amounts of vaccine left over at the end of the year and large amounts of vaccine being discarded because of expiration. MOH staff report wastage figures for DTP and measles at 25–30%. UNICEF uses wastage factor of 2.0 (50% wastage) for measles, and 1.3 (25% wastage) for DTP/OPV. There is no open-vial policy for any vaccines.

Assessments of cold-chain and vaccine procurement/management completed in 1998 and 1999 found several deficiencies of the system: (1) lack of adequate system to control vaccine stocks; (2) inaccurate vaccine forecasting; (3) aging cold-chain equipment; (4) inadequate knowledge on vaccine storage issues; (5) improper storage of vaccines in refrigerators. The MOH desires more cold-chain equipment at the outlying immunization clinics (FAPs), especially in rural areas. An inventory of cold-chain equipment is shown in Attachment 2. They have indicated a need for approximately 4,000 large/medium size vaccine carriers (with sufficient ice packs at the FAP level. The current domestic-style refrigerators at the FAP level need upgrading; therefore, there is also a need for ~4,000 refrigerators at the FAP level.

Action Steps

- 1.2.a Assess status of existing systems and equipment to determine needs
- 1.2.b Ensure that vaccine management policy addresses recommendation in 1.1.a and 1.2.a and is in accordance with WHO recommendations
- 1.2.c Ensure that the vaccine forecasting system takes into account prior usage patterns, inventory, and anticipated needs
- 1.2.d Provide training in vaccine forecasting, storage, and handling
- 1.2.e Provide equipment necessary to maintain the cold chain
- 1.2.f Maintain equipment necessary to maintain the cold chain
- 1.2.g Take action to prevent freezing DT, DTP, Td, and hepatitis B, including use of freeze-watch indicators and spacers in refrigerators

Strategy 1.3 Enforce policies to ensure high immunization coverage at the provider level

Issues The standards for immunization practices (“Rules and Normatives on Organization and Carrying out Immunoprophylaxis of infectious Disease”) were last revised in 1997. These include guidelines on: vaccine schedule, valid contraindications, documenting refusals, and staff responsibility for ensuring high immunization coverage. Rayon-level staff visit the immunization sites to assess compliance with the standards but there is no estimate of how many of these assessments are done. There is no standard form for conducting these provider assessments.

Action steps

- 1.3.a Develop a standard provider assessment form that includes standards of practice (as referenced in “Rules and Normatives on Organization and Carrying Out Immunoprophylaxis of Infectious Disease”), as well as vaccine management and safe injection procedures
- 1.3.b Conduct provider assessments at no less than 300 provider sites annually
- 1.3.c Provide feedback to providers indicating their progress in achieving standards
- 1.3.d Conduct follow-up for providers achieving less than 90% of the standards

Strategy 1.4 Maintain social mobilization strategies at the community level in an effort to reach those in need of immunization

Issues The MOH coordinates a specific program on national television once a week in which medical personnel answer questions from the public on medical-related issues. Other activities that the MOH and local government coordinate include: (1) developing educational materials for the public; (2) putting articles on health-related issues in newspapers; (3) organizing radio broadcasts.

Action steps

- 1.4.a Sustain strategies to educate the public about immunizations through radio, TV, and other media
- 1.4.b Promote National Immunization Days and mop-up campaigns through social mobilization and other outreach activities
- 1.4.c Issue a decree that all oblasts will provide an immunization passport for new mothers that includes children’s immunization history and schedule

- Strategy 1.5* Improve the quality of immunization services through complete implementation of the State Program for Health Care Reform in the Republic of Uzbekistan for the period 1998–2005, a presidential decree issued in November 1999
- Issues* The decree on health care reform includes: (1) creation of an Urgent Medical Care system; (2) privatization of some health care facilities and private financing for some medical services; (3) shift to primary care services through creation of rural primary care medical centers (SVPs); (4) introduction of a medical insurance system; (5) establishment of an Institute of Health to promote preventive care; (6) introduction of state educational standards for medical and nurse professionals. A commission was established to organize and oversee the implementation of the program for health care reform.
- Action Steps*
- 1.5.a Create an Urgent Medical Care system
 - 1.5.b Privatize certain health care facilities and financing for certain medical services
 - 1.5.c Shift to primary care services through creation of rural primary care medical centers (SVPs)
 - 1.5.d Introduce a medical insurance system
 - 1.5.e Establish an Institute of Health to promote preventive care
 - 1.5.f Introduce state educational standards for medical and nursing professionals
- Strategy 1.6* Provide training and education to national and local immunization providers and staff
- Issues* Training on immunizations and safe vaccination practices is currently being conducted primarily by the RCES. JICA is providing training for nurses at the national level. UNICEF will assist in the development of a textbook on AEFI for medical students.
- Action Steps*
- 1.6.a Conduct refresher courses annually targeting 20% of immunization providers
 - 1.6.b Conduct cold-chain training for technicians
 - 1.6.c Conduct nationwide workshop on new reporting forms
 - 1.6.d Conduct technical training for computer personnel
 - 1.6.e Conduct nursing training at CES level
- Strategy 1.7* Enhance surveillance for all EPI-targeted vaccine-preventable diseases
- Issues* There is a critical need for adequate bacteriologic testing at all health facility levels. Without the necessary supplies, cases of disease will not be identified. This contributes to under-identification of disease cases, especially pertussis. Virologic diagnostic supplies (except for polio) are also lacking at some health facility levels. As the country plans for measles elimination, completeness of testing and investigating of suspect cases will be needed. The RCES reports that approximately 40% of bacteriologic, virologic, and equipment needs lack funding.

Action Steps

- 1.7.a Enhance measles surveillance (see objective 3)
- 1.7.b Conduct quarterly analysis of disease trends and use data for program planning including targeting of special campaigns
- 1.7.c Request that an assessment of lab requirements should be done by a WHO consultant. This is to ensure that diagnostic supplies are available at all levels

Strategy 1.8 Coordinate partners

Issues ICC was established early June 2000 and is currently functioning. There is presentation from government and partners. Meeting of ICC is quarterly. In addition, MOH feels they would benefit from monthly meetings with UNICEF, preferably monthly.

Action Steps

- 1.8.a ICC will conduct quarterly meetings to discuss issues related to immunization funding and program planning and management
- 1.8.b ICC members should be notified of meetings at least one week in advance of the meeting
- 1.8.c ICC meeting minutes will be provided to all members
- 1.8.d Ensure that all donors and partners are members of ICC

Strategy 1.9 Enhance computer capacity and electronic transfer of information

Issues There are currently 10 computers at the RSES level; four are outdated and six are new. At the MOH level, there are five computers. Nine of 14 oblasts have computers now. There is a need for five more computers for the remaining oblasts.

There is no electronic transfer of information occurring at any level.
Computer technical support and training is lacking.

Action Steps

- 1.9.a Submit at least 90% of appropriate reports from oblasts to republican CES in electronic form following installation of computers at remaining oblast offices that currently do not have them

Objective 2: Achieve certification of polio eradication by 2001**Strategies for achieving objective 2**

Strategy 2.1 Conduct additional polio vaccination NIDs and mop-up activities currently scheduled through 2004

Issues There have been no cases of polio reported in Uzbekistan since 1995. Reported coverage for NIDs and mop-up campaigns has been >95%. Current plan are to conduct NIDs through 2002, and SNIDs and mop-up through 2004.

Action Steps

- 2.1.a Conduct NIDs through 2002 according to MOH guidelines
- 2.1.b Conduct mop-up campaigns in targeted high-risk areas through 2003 according to MOH guidelines

- Strategy 2.2* Ensure that indicators of surveillance performance for AFP are met at the oblast level
- Issues* AFP surveillance for <15-year-olds during 1999 was greater than 1.1 per 100,000 (101 cases). At least 91 cases should be reported annually to achieve a minimal acceptable AFP incidence. Cases have been received from each of the 14 districts. Since 1998, over 90% of AFP cases have had adequate specimens.
- Action Steps*
- 2.2.a Educate oblast- and rayon-level staff on AFP surveillance performance indicators
- 2.2.b Generate rayon- and district-level reports and provide feedback to rayon- and district-level staff
- 2.2.c Provide follow-up and technical assistance for those who are at less than 90% of the standards
- Strategy 2.3* Make necessary preparations for review for certification of polio eradication in 2001
- Issues* A MOH specialist was recently assigned to each oblast. This person is responsible for filling out required documents for certification of polio eradication. Each specialist will visit his assigned oblast monthly (one visit has been completed already). Forms must be completed by Nov 2000. The current plan is to receive certification by Spring 2001.
- Action Steps*
- 2.3.a Specialists will be assigned to each oblast to assist with preparations for polio eradication certification
- 2.3.a Complete preliminary oblast-level reports and submit to republican CES

Objective 3: Reduce incidence of measles to less than 1 per 100,000

Status Measles vaccine is currently given at 9 and 16 months of age. Currently, reported coverage for the 9- and 16-month doses of measles is at 95%. Measles incidence has been increasing over the last two years, with incidence rates of 3.6 and 4.9 in 1998 and 1999, respectively. There are a variety of cases and incidence by district, with four oblasts having over 95% of cases last year. Most cases (47%) are in persons >15 years of age; 25% cases are in less than 5-year-olds, including 9% in infants. Of all reported cases in 1999, 52% had received two doses and 38% had received only one dose of vaccine.

From 1990 to 1999, serosurveys conducted annually in each district showed proportion of measles-susceptible persons ranged from 11% to 15%; 30 healthy immunized persons were selected from each age group in each district for testing (total of 48,603 persons). Last year, a protective antibody was found in 89% of persons tested (range 85–93%); the number of susceptible persons exceeded recommended proportions necessary for interruption of measles transmission for all age groups except 1- to 4-year-olds.

In 1999, national reports showed that 50% of population <20 years of age had received one dose of measles vaccine; an additional 45% had received two doses of vaccine. The remaining (5%) had no documented doses. A measles campaign was conducted last year in all districts for all 1- to 20-year-olds who had no documentation of measles vaccine.

Strategies for achieving objective 3

- Strategy 3.1* Initiate a WHO program review to assist with planning for measles elimination
- Issues* WHO/CDC consultants can assist the MOH in developing a long-term plan for measles elimination including consideration of a second dose of measles at school age versus mass campaigns.
- Action Steps*
- 3.1.a Request consultation from WHO/CDC
- 3.1.b Complete review and provide a report of findings and recommendations
- Strategy 3.2* Maintain routine measles vaccination coverage levels >95%
- Issues* Refer to objective 1 for maintenance of high vaccination coverage. Currently, measles vaccination is given at 9 and 16 months of age. Consider adding second dose of measles at school age based on recommendation of WHO/CDC consultants and measles elimination plan.
- Action Steps*
- 3.2.a Carry out planned routine immunization activities (objective 1)
- 3.2.b Determine the need for a routine second dose of measles vaccine based on results of consultation
- Strategy 3.3* Maintain high population immunity
- Issues* Serosurveys can provide information on protective antibody levels for measles in different age groups. However, it is unclear how many of these tests should be done. Currently, approximately 50,000 of these are done annually, which requires a substantial amount of resources. Goals for interruption of measles transmission are not currently being met. High-risk groups identified by current reporting mechanisms should be targeted for immunization and campaigns planned accordingly. Next year, MOH plans to target all persons who have only received one dose of vaccine (~50% of population); donor support would be required.
- Action Steps*
- 3.3.a Continue to vaccinate high-risk groups identified through serosurveys, documentation of children and adults immunized, or other mechanisms.
- 3.3.b Carry out a campaign to provide a second dose of measles vaccine to all persons 2–20 years of age with only one dose of vaccine
- Strategy 3.4* Enhance measles surveillance
- Issues* In preparation for measles elimination within the next five years, there will need to be enhanced surveillance of measles including the ability to conduct viral isolation and strain testing at a national level. Enhanced surveillance will also involve prompt investigation and laboratory confir-

mation of all suspect cases at the local level. Currently, local health facilities often have inadequate capacity to conduct diagnostic tests for identifying measles cases.

Action Steps

- 3.4.a Develop the capacity to conduct viral isolation and strain typing for measles
- 3.4.b Ensure adequate access to antibody testing at the local level
- 3.4.c Include the reporting of suspect measles in the existing MOH policy “On Additional Measures Against Measles,” and follow up in areas with inadequate reports

Objective 4: Increase the safety of injections used for all EPI vaccines

In 1997 and 1998, there were several deaths from measles vaccination, related to poor vaccination practices. Investigation revealed that a protocol and appropriate drugs were lacking for treating AEFIs. In response to this, a policy on Safe Vaccination Practices was developed in December 1999. This includes guidelines on: (1) use of single disposable syringes for each injection; (2) adverse events reporting within 24 hours; (3) training of health personnel concerning AEFI; (4) official instruction on role of various levels and reporting procedures. A special committee at the republican SES level is responsible for investigating all AEFI cases reported.

Although syringes are produced in Uzbekistan by a government-private business partnership, districts receive only 42% of their need for syringes (range 3–91%). Assessments have identified a problem with syringe reuse. Poor injection practices for immunizations as well as drugs were found to be a major contributor to hepatitis B transmission.

Strategies for achieving Objective 4

Strategy 4.1 Implement and enforce an injection safety policy that is in accordance with WHO recommendations

Issues Safe Vaccination Practice guidelines developed in December 1999 need further revisions so as to follow WHO guidelines by incorporating standards on: (1) sufficient supplies; (2) behavioral changes; (3) waste disposal.

Action Steps

- 4.1.a Revise the MOH “Safe Vaccination Practice” guidelines to reflect the recommendations of the WHO aide memoire on injection safety
- 4.1.b Incorporate a safe injections checklist for supervisors to complete during provider reviews (ideally should be combined with the provider review tool referenced in objective 1, step 3a)

Strategy 4.2 Provide an adequate supply of syringes and other supplies necessary to ensure safe injections at each provider site

Issues There are two reasons for the inadequate supply of syringes nationwide: (1) insufficient funds are set aside at the district level to purchase syringes; (2) in-country manufacturer does not have capacity to produce all syringes that are needed. Approximately 400 million syringes are needed annually. The

in-country manufacturer is able to produce only 100 million syringes. Additional syringes are imported, but these still do not meet the overall need. A presidential decree issued in December 1999 specified that appropriate numbers of syringes should always accompany shipments of vaccine but there has been poor compliance with this decree.

Syringes produced in-country are not auto-disable (AD).

Action Steps

- 4.2.a Collaborate with the private sector to retrofit existing production facilities so they can manufacture auto-disable syringes
- 4.2.b Secure the necessary licenses for companies to distribute auto-disable syringes
- 4.2.c Purchase only auto-disable syringes for vaccination
- 4.2.d The government will provide 100% of the needed syringes for vaccination to vaccine providers

Strategy 4.3

Educate vaccine providers in appropriate injection safety procedures

Issues

The policy on Safe Vaccination Practices addresses training of supervisors and primary-level medical personnel involved in delivering vaccinations. The policy needs to be revised to reflect WHO guidelines. Directors of medical universities are instructed to incorporate Safe Vaccination Practices and AEFI in their curriculum.

Action Steps

- 4.3.a Conduct training for immunization providers on appropriate injection safety procedures
- 4.3.b Incorporate review of safe vaccination practices into provider assessment (see strategy 1.3)

Strategy 4.4

Ensure adequate disposal of injection materials at each facility

Issues

The current policy for disposing of used needles is not in accordance with WHO recommendations. Although some immunization sites may have incinerators and/or ovens to dispose of these items, resources are lacking in most sites. The current policy is to sterilize and then bury used needles. This issue should be addressed in the policy on Safe Vaccination Practices according to WHO guidelines. AD syringes and safety boxes for their disposal are the strategy recommended by WHO and UNICEF for ensuring safe injections.

Action Steps

- 4.4.a Make the necessary supplies available at every provider location to safely and properly dispose of vaccination materials and ensure all materials are properly destroyed after disposal

Objective 5: Integrate Hepatitis B vaccination into the routine infant schedule 2001 and achieve >80% coverage by 2003

Status: Incidence of hepatitis B in the Central Asian region varies from 27.1 to 98.2 per 100,000. It is estimated that reported cases represent one-sixth of total cases. Based on the health burden of hepatitis B in Central Asia, with funding from GAVI, MOH plans to

introduce hepatitis B vaccine into the routine infant immunization schedule in 2001. MOH has plans to carry out a catchup campaign (1- to 5-year-olds) in three oblasts next year, based on high incidence rates of disease.

Strategies to achieve Objective 5

Strategy 5.1 Submit a hepatitis B vaccination proposal for possible GAVI funding

Issues GAVI application deadlines must be met to receive funding

Action Steps

5.1.a WHO consultation on hepatitis B

5.1.b Submission of GAVI application

Strategy 5.2 Begin routine hepatitis B vaccination by 2001

Issues The MOH plans to introduce Hepatitis B vaccine at 0, 2, and 9 months. See Plan for introduction of hepatitis B.

Action Steps

5.2.a Development and dissemination of hepatitis B policies to providers

5.2.b Delivery of vaccine to Uzbekistan

5.2.c Distribution of vaccine and related supplies to providers

5.2.d Three doses of hepatitis B vaccine are provided to at least 80% of children

Objective 6: Evaluate the need for a *Haemophilus influenzae* type b (Hib) vaccination program

Status The health burden for *H. influenzae* type b (Hib) has not been documented in Uzbekistan. Therefore, MOH plans to request a consultancy in 2000 for Hib experts to work with MOH and local infectious disease experts to assess the health burden due to Hib in Uzbekistan. Depending on these findings, the MOH may request GAVI funding for introducing Hib vaccine in 2002.

Strategies to achieve objective 6

Strategy 6.1 Utilize the CDC rapid assessment tool for estimating the burden of *Haemophilus influenzae* type b (Hib) disease

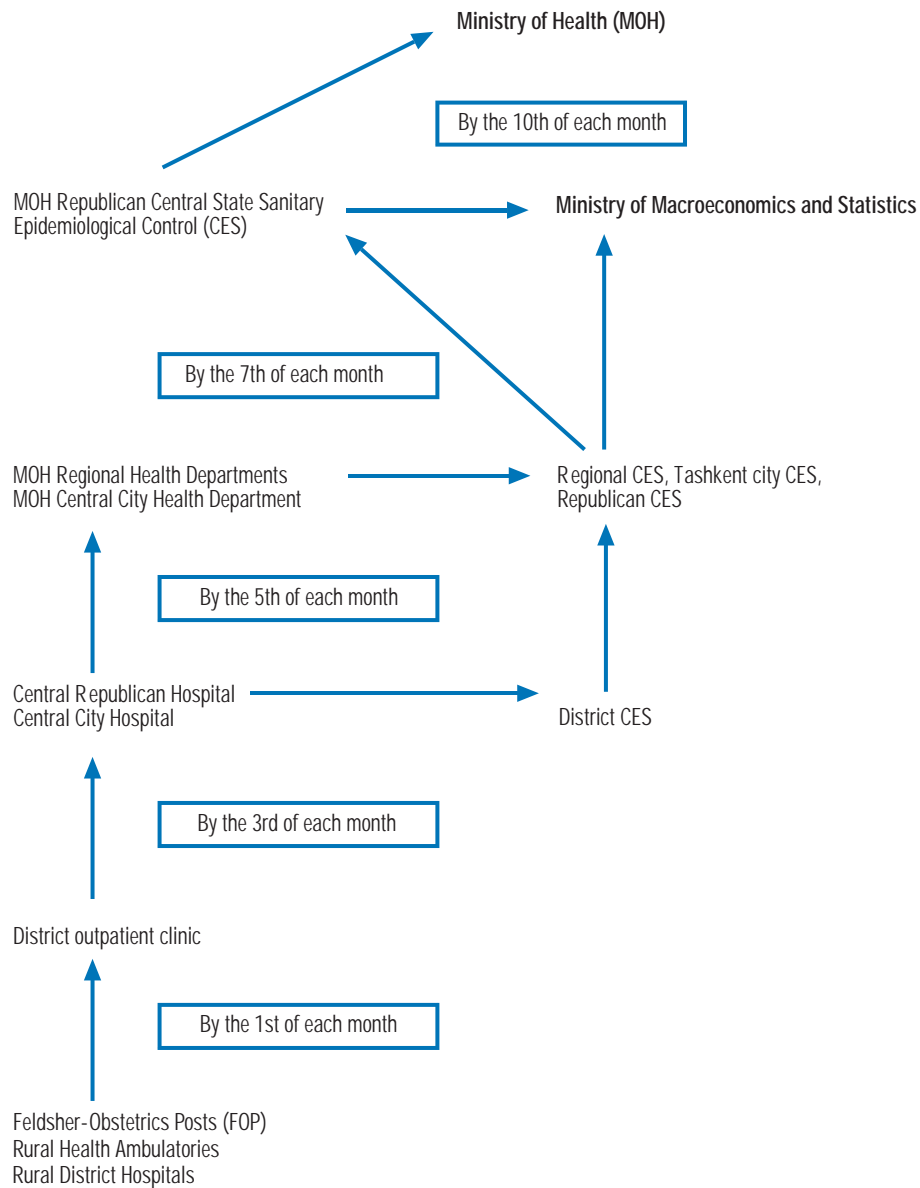
Issues None

Action Steps

6.1.a Conduct rapid assessment to determine burden of Hib disease in Uzbekistan

6.1.b Evaluate need for Hib vaccination program in Uzbekistan

Attachment 1: Organization of Immunization System and Disease Reporting in Uzbekistan



Attachment 2: Inventory of Cold-Chain Equipment

Type of Cold-Chain Equipment	Type of Facility				Total
	SES (n=223)	Polyclinics (n=884)	Rural Hospitals and Ambulatory Centers (n=2,169)	FAPs (n=4,867)	
Soviet-style units	121	3	5	2	131
Freezers	121	0	2	3	126
Refrigerators (domestic)	468	1,114	3,331	3,714	8,627
Units needing repair	39	57	230	529	855
Vaccine carriers	704	528	2,355	1,169	4,756
Total	1,453	1,702	5,923	5,417	14,495

Budget

Costs for Routine Immunization Activities, by Year, 2001-2005 (in US\$)

At 1999 Prices

Item	2001	2002	2003	2004	2005	Total
Operational Costs						
Vaccines						
BCG	110,000	108,634	106,614	104,594	103,600	533,442
DPT	384,199	379,429	372,373	365,317	361,846	1,863,164
OPV	416,295	411,126	403,481	395,835	392,074	2,018,811
Measles	243,936	240,907	236,427	231,947	229,743	1,182,961
Subtotal	1,154,430	1,140,096	1,118,895	1,097,693	1,087,263	5,598,378
Syringes/needles (locally produced)	127,050	125,473	123,139	120,806	119,658	616,126
Safe injecting equipment (safety boxes)	34,707	34,276	33,638	33,001	32,687	168,309
Cold-chain equipment/Spare parts	118,125					
Personnel	800,000	800,000	800,000	800,000	800,000	4,000,000
Training*	81,829	81,829	81,829	81,829	81,829	
Social mobilization/IEC						
Surveillance (including laboratory equipment)						
Stationery/Communications						
Monitoring and evaluation						
Other						
Capital Costs						
Cold-chain equipment						
Vehicles						
Total	2,316,141	2,181,674	2,157,501	2,133,329	2,121,438	10,910,083

Vaccine Requirements: Summary

Vaccine*	2001	2002	2003	2,004	2005	Total
BCG	110,000	108,634	106,614	104,594	103,600	533,442
DPT	384,199	379,429	372,373	365,317	361,846	1,863,164
OPV	416,295	411,126	403,481	395,835	392,074	2,018,811
Measles	243,936	240,907	236,427	231,947	229,743	1,182,961
Total	1,154,430	1,140,096	1,118,895	1,097,693	1,087,263	5,598,378

*Forecast vaccine needs do not take into account existing stock levels

Routine immunization needs assume:

- AD syringes produced/purchased locally
- Includes only costs for personal at delivery point
- Transport not included
- Training distributed over five years, though likely to be bunched
- Surveillance/Lab equipment and cold-chain figures to be supplied

Wastage Rates

BCG	UNICEF	2.0
DPT	Actual	1.8
OPV	UNICEF	1.5
Measles	Actual	1.6

Syringe Purchase

Vaccine	2001		2002		2003		2004		2005	
	Doses	Safety Boxes	Doses	Safety Boxes	Doses	Safety Boxes	Doses	Safety Boxes	Doses	Safety Boxes
BCG	550,000	5500	543,171	5,432	533,070	5,331	522,969	5,230	518,000	5,180
DPT	2,200,000	22000	2,172,684	21,727	2,132,280	21,323	2,091,876	20,919	2,072,000	20,720
Measles	1,100,000	11000	1,086,342	10,863	1,066,140	10,661	1,045,938	10,459	1,036,000	10,360
	3,850,000	38,500	3,802,197	38,022	3,731,490	37,315	3,660,783	36,608	3,626,000	36,260
+ 10%	385,000	3,850	380,220	3,802	373,149	3,731	366,078	3,661	362,600	3,626
	4,235,000	42,350	4,182,417	41,824	4,104,639	41,046	4,026,861	40,269	3,988,600	39,886
AD syringe										
Local price (\$3/100)	127,050		125,473		123,139		120,806		119,658	
Internationally procured price (\$7/100)	296,450		376,418		369,418		362,418		358,974	
Safety boxes										
5-liter (100 syringe) (UNICEF price)		26,697		26,366		25,876		25,385		25,144
Shipping (30%)		8,009		7,910		7,763		7,616		7,543
		34,707		34,276		33,638		33,001		32,687

Budget for Polio

Vaccine requirements

Routine immunization (<2 years)

Population growth rate = -0.012

-0.019

-0.019

-0.010

-1.000

Polio

10-dose vials

Using Projected Wastage Figures

Year	Birth Cohort	Doses (5)	Wastage	Total Doses	Price/Dose	Total \$	Administration
2001	550,000	2,750,000	1.3	3,575,000	0.087	311,025	18,662
2002	543,171	2,715,855	1.3	3,530,612	0.087	307,163	18,430
2003	533,070	2,665,350	1.3	3,464,955	0.087	301,451	18,087
2004	522,969	2,614,845	1.3	3,399,299	0.087	295,739	17,744
2005	518,000	2,590,000	1.3	3,367,000	0.087	292,929	17,576

Using Standard UNICEF Wastage Figures

Year	Birth Cohort	Doses (5)	Wastage	Total Doses	Price/Dose	Total \$	Administration
2001	550,000	2,750,000	1.5	4,125,000	0.087	358,875	21,533
2002	543,171	2,715,855	1.5	4,073,783	0.087	354,419	21,265
2003	533,070	2,665,350	1.5	3,998,025	0.087	347,828	20,870
2004	522,969	2,614,845	1.5	3,922,268	0.087	341,237	20,474
2005	518,000	2,590,000	1.5	3,885,000	0.087	337,995	20,280

Polio Mop-ups—20 dose

Year	Birth Cohort	Doses (2 + 25%)	Wastage	Total Doses	Price/Dose	Total \$	Administration
2001	2,155,848	5,392,498	1.3	7,010,247	0.073	508,243	
2002	768,889	3,069,206	1.3	3,989,968	0.073	289,273	
2003	1,227,682	3,069,205	1.3	3,989,967	0.073	289,273	
2004	748,088	1,803,090	1.3	2,344,017	0.073	169,941	
2005	748,088	1,803,090	1.3	2,344,017	0.073	169,941	

Budget for Measles

Vaccine requirements

Routine immunization (<2 years)

Population growth rate = -0.012

-0.019

-0.019

-0.010

-1.000

Using Projected Wastage Figures

Year	Birth Cohort	Doses (2)	Wastage	Total Doses	Price/Dose	Total \$	Administration	Transport	Total
2001	550,000	1,100,000	1.3	1,430,000	0.11	157,300	9,438	31,460	198,198
2002	543,171	1,086,342	1.3	1,412,245	0.11	155,347	9,321	31,069	195,737
2003	533,070	1,066,140	1.3	1,385,982	0.11	152,458	9,147	30,492	192,097
2004	522,969	1,045,938	1.3	1,359,719	0.11	149,569	8,974	29,914	188,457
2005	518,000	1,036,000	1.3	1,346,800	0.11	148,148	8,889	29,630	186,666

Using Actual Wastage Figures

Year	Birth Cohort	Doses (2)	Wastage	Total Doses	Price/Dose	Total \$	Administration	Transport	Total
2001	550,000	1,100,000	1.6	1,760,000	0.11	193,600.00	11,616	38,720	243,936
2002	543,171	1,086,342	1.6	1,738,147	0.11	191,196.19	11,472	38,239	240,907
2003	533,070	1,066,140	1.6	1,705,824	0.11	187,640.64	11,258	37,528	236,427
2004	522,969	1,045,938	1.6	1,673,501	0.11	184,085.09	11,045	36,817	231,947
2005	518,000	1,036,000	1.6	1,657,600	0.11	182,336.00	10,940	36,467	229,743

Using Standard UNICEF Wastage Figures

Year	Birth Cohort	Doses (2)	Wastage	Total Doses	Price/Dose	Total \$	Administration	Transport	Total
2001	550,000	1,100,000	2.0	2,200,000	0.11	242,000.00	14,520	48,400	304,920
2002	543,171	1,086,342	2.0	2,172,684	0.11	238,995.24	14,340	47,799	301,134
2003	533,070	1,066,140	2.0	2,132,280	0.11	234,550.80	14,073	46,910	295,534
2004	522,969	1,045,938	2.0	2,091,876	0.11	230,106.36	13,806	46,021	289,934
2005	518,000	1,036,000	2.0	2,072,000	0.11	227,920.00	13,675	45,584	287,179

Plus targeted vaccination: 1 dose—50% of population (1-20 years)

Budget for DPT

Vaccine requirements
 Routine immunization (<2 years)
 Population growth rate = -0.012
 -0.019
 -0.019
 -0.010
 -1.000

Using Projected Wastage Figures

Year	Birth Cohort	Doses (4)	Wastage	Total Doses	Price/Dose	Total \$	Administration	Transport	Total
2001	550,000	2,200,000	1.3	2,860,000	0.077	220,220	13,213	44,044	277,477
2002	543,171	2,172,684	1.3	2,824,489	0.077	217,486	13,049	43,497	274,032
2003	533,070	2,132,280	1.3	2,771,964	0.077	213,441	12,806	42,688	268,936
2004	522,969	2,091,876	1.3	2,719,439	0.077	209,397	12,564	41,879	263,840
2005	518,000	2,072,000	1.3	2,693,600	0.077	207,407	12,444	41,481	261,333

Using Actual Wastage Figures

Year	Birth Cohort	Doses (4)	Wastage	Total Doses	Price/Dose	Total \$	Administration	Transport	Total
2001	550,000	2,200,000	1.8	3,960,000	0.077	304,920.00	18,295	60,984	384,199
2002	543,171	2,172,684	1.8	3,910,831	0.077	301,134.00	18,068	60,227	379,429
2003	533,070	2,132,280	1.8	3,838,104	0.077	295,534.01	17,732	59,107	372,373
2004	522,969	2,091,876	1.8	3,765,377	0.077	289,934.01	17,396	57,987	365,317
2005	518,000	2,072,000	1.8	3,729,600	0.077	287,179.20	17,231	57,436	361,846

Budget for BCG

Vaccine requirements
 Routine immunization (<2 years)
 Population growth rate = -0.012
 -0.019
 -0.019
 -0.010
 -1.000

Using Projected Wastage Figures

Year	Birth Cohort	Doses (1)	Wastage	Total Doses	Price/Dose	Total \$	Administration	Transport	Total
2001	550,000	550,000	1.3	715,000	0.10	71,500			71,500
2002	543,171	543,171	1.3	706,122	0.10	70,612			70,612
2003	533,070	533,070	1.3	692,991	0.10	69,299			69,299
2004	522,969	522,969	1.3	679,860	0.10	67,986			67,986
2005	518,000	518,000	1.3	673,400	0.10	67,340			67,340

Using Standard UNICEF Wastage Figures

Year	Birth Cohort	Doses	Wastage	Total Doses	Price/Dose	Total \$	Administration	Transport	Total
2001	550,000	550,000	2.0	1,100,000	0.10	110,000.00			110,000
2002	543,171	543,171	2.0	1,086,342	0.10	108,634.20			108,634
2003	533,070	533,070	2.0	1,066,140	0.10	106,614.00			106,614
2004	522,969	522,969	2.0	1,045,938	0.10	104,593.80			104,594
2005	518,000	518,000	2.0	1,036,000	0.10	103,600.00			103,600

Cold-chain—Inventory as at December 1998

Equipment	Facility				Total (n=8,143)
	Oblast SES (n=223)	Polyclinic (n=884)	Rural Hospital (n=2,169)	FAPs (n=4,867)	
Soviet-style units	121	3	5	2	131
Freezers	121		2	3	126
Refrigerators	468	1,114	3,331	3,714	8,627
Vaccine carriers	704	528	2,355	1,169	4,756
Units needing repair	39	57	230	529	855
Current requirements			Unit	Price/Unit (US\$)	Total Price (US\$)
Vaccine carriers (E4/52)			3,500	32.35	113,225
Ice packs (E5/10)			7,000	0.70	4,900
Repairs/maintenance					
Total					118,125

Objective 1: Routine Immunization—Maintain >95% Coverage for all EPI Vaccines at the National and District Levels

Strategies	Action Steps	Responsible Party	Evaluation Criteria	Due Date	Status
1.1. Ensure adequate and sustainable funding for the National Immunization Program	1.1.a. Conduct a comprehensive Immunization Services Assessment to assist in assessing the needs of the National Immunization Program	MOH/WHO	Completion of an assessment according to WHO guidelines	September 2001	
	1.1.b. Establish a long-term commitment for routine vaccine and infrastructure funding for the National Immunization Program from the Government	Ministry of Health (MOH) with agreement of Ministry of Finance (MOF)	Annual budget provided by government that meets vaccine and infrastructure needs for routine immunization program	2001	
	1.1.c. Complete application for GAVI funding	MOH with Interagency Coordination Committee (ICC) approval	Receipt of GAVI funding	October 15, 2000	
	1.1.d. Explore the possibility of additional funding through loans or grants from other organizations	MOH and ICC	Receipt of grants or loans from other organizations	2001	
	1.1.e. Develop and manage budgets, and allocate funds so that potential surpluses and shortfalls are identified and addressed ahead of time	MOH w/ ICC oversight	Number of incidents of shortages due to lack of funding	January 2001	
1.2. Ensure proper vaccine management at all levels to reduce wastage for each vaccine.	1.2.a. Assess status of existing systems and equipment to determine needs	MOH	Completion of a review and estimate of refrigeration equipment needs	April 2000	Completed
		WHO	Assessment of cold-chain and OPV stocks	September 1999	Completed
		WHO/UNICEF	Assessment of Vaccine Procurement and Quality	September 1999	Completed
	1.2.b. Ensure that the vaccine management policy addresses recommendations in 1.1.a. and 1.2.a and is in accordance with WHO recommendations	MOH	Completed policy that incorporates WHO recommendations	December 2000	
	1.2.c. Ensure that the vaccine forecasting system takes into account prior usage patterns, inventory, and anticipated needs	MOH	Wastage is kept within acceptable ranges	January 2001	
1.2.d. Provide training on vaccine forecasting, storage, and handling (includes cold chain training)	MOH/UNICEF	Vaccine stock levels reflect needs at each facility; no open measles vaccine after immunization session	2001		

Objective 1: Routine Immunization—Maintain >95% Coverage for all EPI Vaccines at the National and District Levels (Cont'd)

Strategies	Action Steps	Responsible Party	Evaluation Criteria	Due Date	Status
	1.2.e. Provide equipment necessary to maintain the cold chain	MOH	Number or % of facilities with appropriate equipment	2001	
	1.2.f. Maintain equipment necessary to maintain the cold chain	MOH	Amount of wasted vaccine or number of delays in shipments due to equipment malfunction	2001	
	1.2.g. Take action to prevent freezing DT, DTP, Td, and hepatitis B (in ice-lined refrigerators, this would include using freeze-watch indicators and spacers at the bottom)	MOH	No. of freezing events using 0°C freeze-watch indicators	January 2001	
1.3. Enforce policies to ensure high immunization coverage at the provider level	1.3.a. Develop a standard provider assessment form that includes standards of practice (as referenced in the "Rules and Normatives on Organization and Carrying Out Immunoprophylaxis of Infectious Disease"), as well as vaccine management and safe injection procedures	MOH	Implementation of a new provider assessment form that includes standards of practice, vaccine management, and safe injection procedures	December 2001	
	1.3.b. Conduct provider assessments at no less than 300 provider sites annually	MOH national and local level	Number of reviews completed and reported to MOH	December 2001	
	1.3.c. Provide feedback to providers indicating their progress in achieving the standards	MOH national and local level	Number of providers who demonstrate and understanding of the results of their reviews	December 2001	
	1.3.d. Conduct follow-up for providers achieving less than 90% of the standards	MOH national and local level	% of providers achieving >90% of the standards after follow-up	December 2001	
1.4. Maintain social mobilization strategies at the community level in an effort to reach those in need of immunization	1.4.a. Sustain strategies to educate the public about immunizations through radio, TV, and other media	MOH	Level of participation in advertised immunization events or activities; % of participants in advertised events claiming they learned about the event or activity through the media	2000–2005	
	1.4.b. Promote National Immunization Days and mop-up campaigns through social mobilization and other outreach activities	MOH	Level of participation in NIDs and mop-up activities	2001–2004	

Objective 1: Routine Immunization—Maintain >95% Coverage for all EPI Vaccines at the National and District Levels (Cont'd)

Strategies	Action Steps	Responsible Party	Evaluation Criteria	Due Date	Status
	1.4.c. Issue a decree that all oblasts will provide a immunization passport for new mothers that includes children's immunization history and schedule	MOH	Decree is made and distributed to oblasts	2001	
1.5. Improve the quality of immunization services through complete implementation of the "State Program of the Health Care System Reform in the Republic of Uzbekistan for the period 1998–2005	1.5.a. Create an Urgent Medical Care System	MOH and the Republican Commission of the State Program of Health Care System Reform in the Republic of Uzbekistan	Establishment of the Republican Center of Urgent Medical Care in Tashkent and its regional affiliates, as well as Urgent Medical Care Departments in rural areas	1999	
	1.5.b. Privatize certain health care facilities and private financing for certain medical services	MOH/Republican Commission	Privatization of 60% of medical services	2005	
	1.5.c. Shift to primary care services through creation of rural primary care medical centers (SVPs)	MOH/Republican Commission	Establishment of SVPs	2005	
	1.5.d. Introduce a medical insurance system	MOH/Republican Commission	Establishment of the State Medical Insurance Fund as well as private voluntary medical insurance funds	2005	
	1.5.e. Establish an Institute of Health to promote preventive care	MOH/Republican Commission	Establishment of the Institute of Health	2005	
	1.5.f. Introduce state educational standards for medical and nurse professionals	MOH/Republican Commission	Incorporation of standards based on new, progressive educational and informational technologies	2005	
1.6. Provide training and education to national- and local-level Immunization Program providers and staff	1.6.a. Conduct refresher courses annually targeting 100% (20% per year for five years) of immunization providers	MOH	% trained and level of understanding based on post-training evaluations	December 2005	
	1.6.b. Conduct cold-chain training for technicians	MOH/UNICEF	% trained and level of understanding based on post-training evaluations	December 2001	
	1.6.c. Conduct Republican workshop on new reporting formats	MOH/UNICEF	% trained and level of understanding based on post-training evaluations	December 2001	
	1.6.d. Conduct technical training for computer personnel	MOH/UNICEF	% trained and level of understanding based on post-training evaluations	December 2001	

Objective 1: Routine Immunization—Maintain >95% Coverage for all EPI Vaccines at the National and District Levels (Cont'd)

Strategies	Action Steps	Responsible Party	Evaluation Criteria	Due Date	Status
	1.6.e. Conduct nursing training at SES level	JICA	% trained and level of understanding based on post-training evaluations	2001	
1.7. Enhance surveillance for all EPI-targeted vaccine-preventable diseases	1.7.a. Enhance measles surveillance (see Objective 3)	MOH	See Strategy 3.2 "Enhance Measles Surveillance"	2001	
	1.7.b. Conduct quarterly analysis of disease trends and use data for program planning including targeting of special campaigns	MOH	Special vaccine campaigns are based at least partly on analysis of disease morbidity	December 2000	
	1.7.c. Request that an assessment of lab requirements be done by a WHO consultant. This is to ensure that diagnostic supplies are available at all levels	MOH	% of needed tests that are not completed in a timely manner due to availability of diagnostic supplies	2001	
1.8. Coordinate partners	1.8.a. ICC will conduct quarterly meetings to discuss issues related to immunization funding and program planning and management	ICC	Documentation of quarterly meetings	Quarterly	
	1.8.b. ICC members should be notified of meetings at least 1 week in advance of the meeting	ICC	Documentation of notification in ICC minutes	Quarterly	
	1.8.c. ICC meeting minutes will be provided to all members	ICC	Minutes are complete and shared with all members	Quarterly	
	1.8.d. Ensure that all donors and partners are members of the ICC	MOH	% of donors and partners who participate in ICC meetings	December 2000	
1.9. Enhance computer capacity and electronic transfer of immunization	1.9.a. Submit at least 90% of appropriate reports from oblasts to Republican office in electronic form following installation of computers at remaining Oblast offices that currently do not have them	MOH	% of reports submitted electronically	December 2001	

Objective 2: Achieve polio eradication certification by 2001

Strategies	Action Steps	Responsible Party	Evaluation Criteria	Due Date	Status
2.1. Conduct additional polio vaccination mop-up activities currently scheduled through 2003	2.1.a. Conduct NIDs through 2003 according to MOH guidelines (Includes ordering and distribution of vaccine, public outreach / media campaigns, identification and training of additional staff, and appropriate oversight and evaluations	MOH	Number of children immunized	Spring 2002	
	2.1.b. Conduct mop-up campaigns in targeted high-risk areas through 2003 according to MOH guidelines (Includes ordering and distribution of vaccine, public outreach / media campaigns, identification and training of staff, and appropriate oversight and evaluations	MOH	Number of children immunized in target areas	Fall 2004	
2.2. Ensure that indicators of surveillance performance for AFP are met at the oblast level	2.2.a. Educate oblast- and rayon-level staff on AFP surveillance performance indicators	MOH	% of rayon- and oblast-level staff that demonstrate a knowledge of the performance indicators		Complete
	2.2.b. Generate rayon- and district-level reports and provide feedback to rayon- and district-level staff	MOH	% of rayon- and oblast-level staff that are aware of their surveillance performance rates	Semiannual	
	2.2.c. Provide follow-up and technical assistance to those who are at less than 90% of the standards	MOH	% of rayons or oblasts that meet at least 90% of the standards after follow-up	Semiannual	
2.3. Make necessary preparations for review for certification of polio eradication in 2001	2.3.a. Specialist will be assigned to each oblast to assist with preparation for polio eradication certification	MOH	Number of oblasts receiving a visit by assigned specialist	September 2000	Complete
	2.3.b. Complete preliminary oblast-level reports and submit to Republican CES	MOH	Number of oblasts submitting reports on time	November 2000	

Objective 3: Reduce incidence of measles to less than 1 per 100,000

Strategies	Action Steps	Responsible Party	Evaluation Criteria	Due Date	Status
3.1. Initiate a WHO program review to assist with planning for measles elimination	3.1.a. Request consultation from WHO/CDC	MOH	WHO receives consultation request	December 2000	
	3.1.b. Complete review and provide a report of findings and recommendations	WHO	Final report of findings is provided to MOH	June 2001	
3.2. Maintain routine measles vaccination coverage levels >95%	3.2.a. Carry out planned routine immunization activities (see Objective 1)	See Objective 1	See Objective 1	See Objective 1	
	3.2.b. Determine the need for a routine second dose of measles vaccine based on results of consultation	MOH / WHO	Consensus is established on the need for a second dose		
3.3. Maintain high population immunity	3.3.a. Continue to vaccinate high-risk groups identified through serosurveys, documentation of children and adults immunized, or other mechanisms	MOH	% tested; % of susceptible who are immunized		
	3.3.b. Carry out a campaign to provide a second dose of measles vaccine to all persons 2–20 years of age with only one dose	MOH	% of target population with 2 doses of measles vaccine		
3.4. Enhance measles surveillance	3.4.a. Develop the capacity to conduct viral isolation and strain typing for measles	MOH / ICC	% of cases with positive antibody test that receive viral isolation testing and strain typing	2005	
	3.4.b. Ensure adequate access to antibody testing at the local level	MOH	% of needed tests that are not completed in a timely manner due to availability of diagnostic supplies	2001	
	3.4.c. Include the reporting of suspect measles in the existing MOH policy "On Additional Measures Against Measles," and follow up in areas with inadequate reports	MOH	Oblast-level reports that include the number of suspect cases that were discarded, and the number that were tested	January 2001	

Objective 4: Increase the safety of injections for all EPI vaccines

Strategies	Action Steps	Responsible Party	Evaluation Criteria	Due Date	Status
4.1. Implement and enforce an injection safety policy that is in accordance with WHO recommendations	4.1.a. Revise the Ministry of Health "Safe Vaccination Practice" guidelines to reflect the recommendations of the WHO aide memoire on injection safety	MOH	Number of providers who have a copy and prove knowledge of safe injection policies	January 2001	
	4.1.b. Incorporate a safe injections checklist for supervisors to complete during provider reviews (ideally should be combined with the provider review tool referenced in Objective 1, step 3a)	MOH	Adoption of a standardized provider review tool that addresses WHO recommendations for safe injections	January 2001	
4.2. Provide an adequate supply of syringes and other supplies necessary to ensure safe injections at each provider site	4.2.a. Collaborate with the private sector to retrofit existing production facilities so they can manufacture auto-disable syringes	MOH/World Bank/Manufacturer	% of syringes manufactured that are auto-disable	2001	
	4.2.b. Secure the necessary licenses for companies to distribute auto-disable syringes	Manufacturer	Licenses obtained	2001	
	4.2.c. Purchase only auto-disable syringes for vaccination	MOH	% of syringes purchased that are auto-disable	2001	
	4.2.d. Oblasts will provide 100% of the needed syringes for vaccination to vaccine providers	MOH	% of doses administered with syringes provided by MOH	2002	
4.3. Educate vaccine providers in appropriate injection safety procedures	4.3.a. Conduct training for immunization providers on appropriate injection safety procedures	MOH	% trained and level of understanding based on post-training evaluations	April 2001	
	4.3.b. Incorporate review of safe vaccination practices into provider assessment (see strategy 1.3)	MOH	% of assessments that incorporate review of safe vaccination practices		
4.4. Ensure adequate disposal of injection materials at each vaccination site	4.4.a. Make the necessary supplies available at every provider location to safely and properly dispose of vaccination materials and ensure all materials are properly destroyed after disposal	MOH	% of providers with appropriate disposal supplies (i.e., safety boxes); % of providers with access to proper destruction equipment (i.e., incinerators)	2001	

Objective 5: Integrate hepatitis B vaccination into the routine infant immunization schedule by 2001 and achieve 80% coverage by 2003

Strategies	Action Steps	Responsible Party	Evaluation Criteria	Due Date	Status
5.1. Submit a hepatitis B vaccination proposal for possible GAVI funding	5.1.a. WHO consultation on hepatitis B	WHO	Final report of findings is provided to MOH	September 30, 2000	
	5.1.b. Submission of GAVI application	MOH / ICC	Receipt of GAVI funding for hepatitis B vaccination	October 15, 2000	
5.2. Begin routine hepatitis B vaccination for infants by 2001	5.2.a. Development and dissemination of Hep B policies to providers	MOH	% of providers who demonstrate understanding of hepatitis B vaccination policy	April 2001	
	5.2.b. Delivery of vaccine to Uzbekistan	MOH and/or donors (UNICEF, etc.)	Vaccine is received by MOH	From April 2001	
	5.2.c. Distribution of vaccine and related supplies to providers	MOH	Vaccine is received at provider locations	2001	
	5.2.d. Three doses of hepatitis B vaccine are provided to at least 80% of children	MOH	% of children with three doses of hepatitis B vaccine	2003	

Objective 6: Evaluate the need for a *Haemophilus influenzae* type b (Hib) vaccination program

Strategies	Action Steps	Responsible Party	Evaluation Criteria	Due Date	Status
6.1. Utilize the CDC rapid assessment tool for estimating the burden of <i>Haemophilus influenzae</i> type b (Hib) disease	6.1.a. Conduct rapid assessment to determine burden of Hib disease in Uzbekistan	WHO / CDC	Completion of assessment with an estimate of Hib disease burden	June 2001	
	6.1.b. Evaluate need for Hib vaccination program in Uzbekistan	MOH with assistance from WHO / CDC	Consensus on if and when a Hib vaccination program should begin in Uzbekistan	September 2001	

APPENDIX C

Target Population

Item	Actual					Projected					
	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Population growth (annual %) b	1.81	1.91	1.89	1.61	1.77						
Absolute no. of live births*	664,729	634,842	602,694	553,145	509,419	478,854	450,123	423,115	397,728	373,865	351,433
Change (%)		0.044961	0.050639	0.082213	0.07905	0.06	0.06	0.06	0.06	0.06	0.06
Estimates: For purposes of vaccine forecasts							510,000	479,400	450,636	423,598	398,182
							0.06	0.06	0.06	0.06	0.06

*WHO Health for All database, and WHO/UNICEF joint reporting form, 1999

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