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BASICS
TRIP REPORT

Preliminary Assessment of Immunization Program Needs in Kazakhstan

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PRELIMINARY ASSESSMENT OF IMMUNIZATION PROGRAM NEEDS IN KAZAKHSTAN

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ACRONYMS

BASICS	Basic Support for Institutionalizing Child Survival
BCG	Bacillus Calmett Guerin
CIS	Commonwealth of Independent States
DPT	Diphtheria, Pertussis, Tetanus
DT	Diphtheria, Tetanus
EPI	Expanded Program on Immunization
GOJ	Government of Japan
MCHS	Maternal and Child Health Services
MOH	Ministry of Health
NIS	Newly Independent States (of the former Soviet Union)
REACH	Resources for Child Health
SES	Sanitary and Epidemiology Station
Td	Tetanus, Diphtheria - (Reduced Diphtheria Component)
TICA	Turkish International Co-operative Agency
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
WHO	World Health Organization

I. EXECUTIVE SUMMARY

A. Background

Since early 1992, USAID has provided emergency commodity and technical support for immunization programs in several Newly Independent States (NIS) of the former Soviet Union. States assisted to date include the Kyrgyz Republic, Turkmenistan, Takjikstan, Uzbekistan, Moldova, and Georgia.

This report describes an initial assessment of immunization program needs in Kazakhstan, which is being considered for assistance for the first time. Like other NIS republics, Kazakhstan requires donor support for equipment and technical assistance as it strives to improve its managerial and technical capacity and moves towards achieving self-sufficiency in the longer term.

B. Main Findings

1. The immunization service has routinely provided high levels of coverage over many years, dramatically reducing incidence and controlling outbreaks of vaccine-preventable childhood diseases.

2. Recent vaccine shortages have caused a decline in the historic levels of immunization coverage. The re-emergence of some diseases appears to be in progress.

3. Vaccine supplies from Russia were greatly reduced in 1993, but the position seems better in 1994. There is no immediate need for emergency vaccine supplies.

4. A proposed UNICEF/Japan/Kazakh agreement would provide funds for hard-currency purchase of vaccines, but the Ministry of Finance has yet to approve Kazakh government contributions. Some doubt exists as to whether that approval will be given and whether the agreement is actually needed.

5. A newly revised immunization schedule makes some changes for the primary series, but the schedule for older children remains largely un-altered.

6. Substantial shortcomings are identified in the vaccine cold chain system with necessary improvements estimated to cost US$1.4 million.

7. There is an immediate need for supplies of disposable syringes and needles and trial quantities of re-usable plastic syringe kits with pressure steam sterilizers and hard water pads.

8. The MOH is interested and willing to participate in a joint government/donor exercise to develop a comprehensive plan of operations for immunization.

C. Summary of Main Recommendations

Disease incidence should be continuously monitored for signs of outbreaks or increasing incidence.

Vaccine supplies from Russia and Uzbekistan should be continuously monitored to detect signs of impending shortfalls for essential needs.

Funds to be provided for vaccine purchase under a proposed UNICEF/Japan/Kazakh agreement may be better applied to improving other aspects of the immunization program.

A national seminar for review and reform of immunization policies and practices should be planned for spring 1995.

Improvements to the cold chain system should be phased in over three to four years.

A trial introduction of pressure steam sterilizers and re-usable plastic syringes should be planned as soon as possible.

A joint government/donor exercise to develop a comprehensive plan of operation should be arranged to follow soon after the proposed national seminar on immunization policies and practices.

II. BACKGROUND

Since early 1992, the United States Government both bi-laterally and under a joint program with the Government of Japan, has funded emergency immunization initiatives in a number of the Newly Independent States (NIS) of the former Soviet Union. The initiatives have been administered by the U.S. Agency for International Development (USAID) and supported by the REACH project which provided technical expertise for field level implementation. The objectives have been to meet short-term emergency needs in the new states and to encourage the development and modernization of program management and operation.

The contract for the REACH project came to an end in March 1994. Technical expertise for field level implementation of immunization support programs could be available from the new BASICS project, which succeeds and enlarges upon former REACH activities.

This report describes an initial assessment of immunization program needs in Kazakhstan. The assessment could be of use to donors in the preparation of a package of technical and material

support for progressive development and strengthening of national immunization services in the republic.

The components of a donor support package will comprise of the provision of cold chain equipment, immunization supplies and materials, and a range of technical assistance covering many aspects of program planning, management, and implementation. Together these components will encourage and lay the groundwork for the achievement of national self-sufficiency in immunization activities in the Republic of Kazakhstan.

III. PURPOSE OF VISIT

The scope of work for this consultancy was to:

1. Conduct an analysis of and give preliminary guidance on cold chain management and vaccine logistics;

2. Determine the need for and timing of additional immunization supplies and equipment and prepare preliminary lists of items and spare parts as may be required;

3. Review vaccine stock positions to determine the size, nature, and timing of further vaccine requirements, if any;

4. Determine the readiness of the cold chain to receive donated vaccine and identify an emergency preparedness plan in case central level MOH stores are found to be inadequate;

5. Identify training needs for the effective use of donated and domestic equipment and supplies at each functional level;

6. Determine if a repair and maintenance system for cold chain equipment functions and identify steps to strengthen the system, if required;

7. Discuss areas for complimentary commodity and technical support with other donors (e.g., cold chain strengthening, policy formulation, training, etc);

8. Determine the readiness of the MOH to engage in a national seminar for reforming and rationalizing immunization policies and practices;

9. Determine the readiness of the MOH to lead a multi-donor exercise for drafting a national plan of operation for immunization and disease control; and

10. Determine the ability of the MOH to fund vaccine purchases using local currency and the willingness of donors to accept and convert such payment through a revolving fund for hard currency vaccine procurement.

IV. TRIP ACTIVITIES

A. Background and Status of the Immunization Program

As with other republics of the former Soviet Union, Kazakhstan has a long established program for the control of vaccine-preventable diseases. From the program's conception in the 1960s, the immunization service has routinely provided high coverage, dramatically reducing incidence and controlling outbreaks of the major childhood diseases. However, disease control has not been achieved by depending on routine primary immunization alone; an extensive series of booster immunizations for children as well as adults, together with outbreak investigation and case management were also used to achieve these results.

Figure 1 shows Kazakhstan's steep declines in disease incidence for diphtheria, pertussis, poliomyelitis, and measles since immunization services commenced. In the case of measles, it must be noted that although control of naturally recurring epidemics took longer to achieve than the other diseases, the cycle of peaks every few years now appears to have been broken since the introduction in the early 1980s of a second dose of measles vaccine for children at school entry. Some transmission of poliomyelitis still occurs, but less than 10 cases per year have been recorded for the past five years. No cases of neonatal tetanus have been recorded in the Republic for the past 20 years.

Recent vaccine shortages have caused a decline from historic high levels of immunization, and a re-emergence of some diseases already appears to be in progress. Appendices 1 through 4 show disease incidence for diphtheria, pertussis, poliomyelitis, and measles for the recent past on an enlarged scale. Diphtheria and pertussis incidence is already showing a marked increase, especially since 1991. Poliomyelitis and measles do not yet display significant increases, but it should be emphasized that in all cases, 1994 data is for the half year to June 30 only. Incidence patterns will need to be reviewed when the full year reports become available in early 1995.

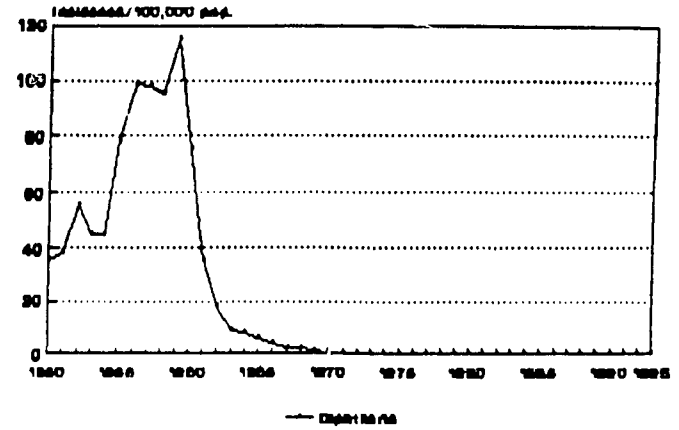
Incidence data reproduced from Republican SES records for all diseases, in both absolute terms and per 100,000 population, are shown in Appendix 5.

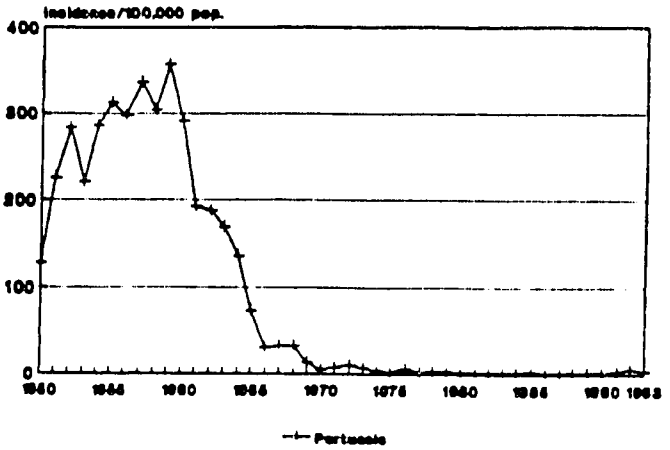
B. NIS Vaccine Supplies

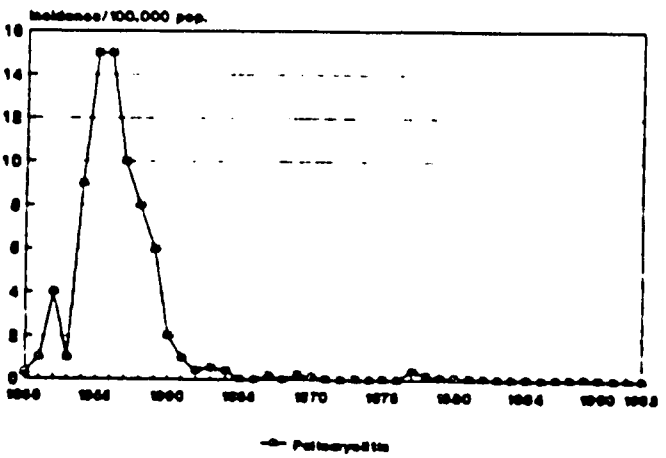
In the past, vaccine supplies for Kazakhstan have been provided entirely from Russia. Until the dissolution of the Soviet Union, the MOH confirms that all vaccine needs were fully and regularly satisfied.

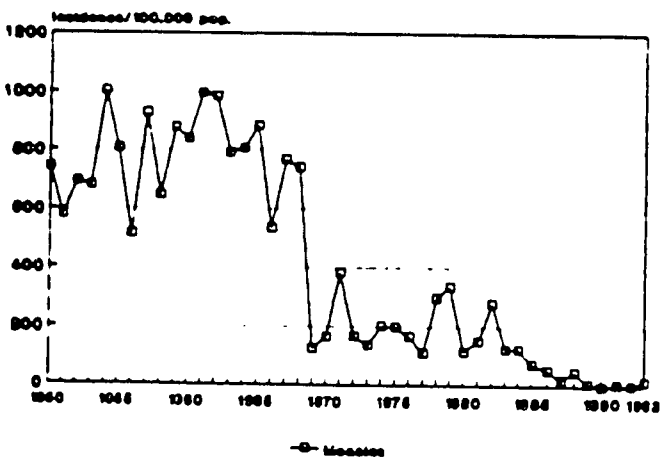
DISEASE INCIDENCE IN KAZAKHSTAN

Incidence/100,000 Population









Source: Rep SES, Almaty

Figure 1

In 1991, some shortages in the supply of measles and, to a lesser extent, BCG vaccines began to be experienced. In 1993, supplies of all NIS vaccines were greatly reduced, with shortfalls ranging between 64 percent and 92 percent, compared to orders placed.

Figure 2 compares vaccine orders and deliveries from NIS sources for the period of 1989-1993. Donor assistance alleviated some of the most severe shortages in 1993 by providing vaccine for at least the primary series of immunizations, but according to MOH figures, substantial shortfalls in overall needs still occurred. Appendix 6 shows the extent of the shortfalls which occurred in 1993 when supplies from all NIS and donor sources are taken into account.

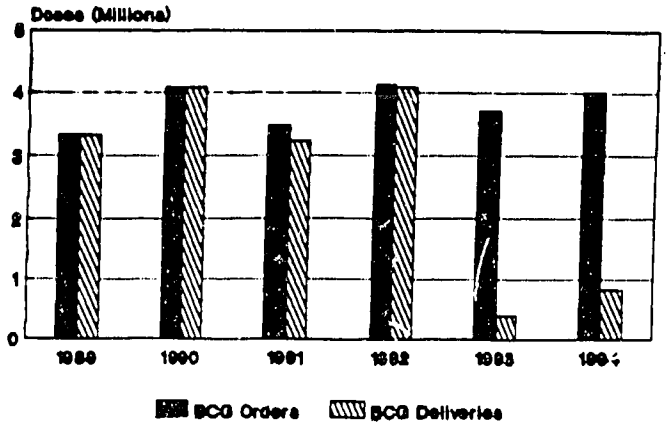
For 1994, vaccine supplies from Russia appear to be somewhat improved, with deliveries to date (July 15th) for BCG and DPT already exceeding the totals supplied in 1993. For polio and measles, deliveries have so far only equalled those of 1993. Recent problems with conversion of local currency have now apparently been resolved, and the MOH reports receiving assurance from the Polio Institute in Moscow that the balance of the 1994 polio order will be sent shortly. For BCG, agreement has been reached with the "Vaccine Production Venture" in Tashkent for the supply of additional stocks, although a consignment expected during this visit was impounded by Kazakh customs due to "documentation problems." Again, the MOH reports that the problem is now solved, and that deliveries of Uzbek BCG, although still not of a quality approved by WHO, will commence soon.

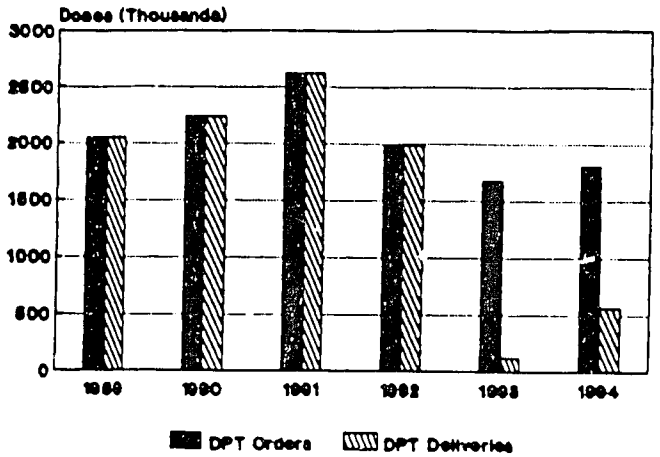
Several donations of DPT have been received from non-NIS sources; one from Kyrgyzstan actually being part of an original donation to that republic from TICA (Turkish aid agency), and another from BOBEK, a Kazakh aid agency organized by the First Lady of Kazakhstan. In addition, donations of non-NIS DPT have been provided by Project Hope (USA) and DPT, Polio and Measles by the Government of Japan through UNICEF. Even without these donations, however, it appears that the MOH has been reasonably successful in arranging its own supplies of vaccine from NIS sources and it seems probable that further quantities will be received over the next few months. The proportion of 1994 NIS orders delivered to date, with proportions delivered in the whole of 1993 for comparison, are shown in Table 1:

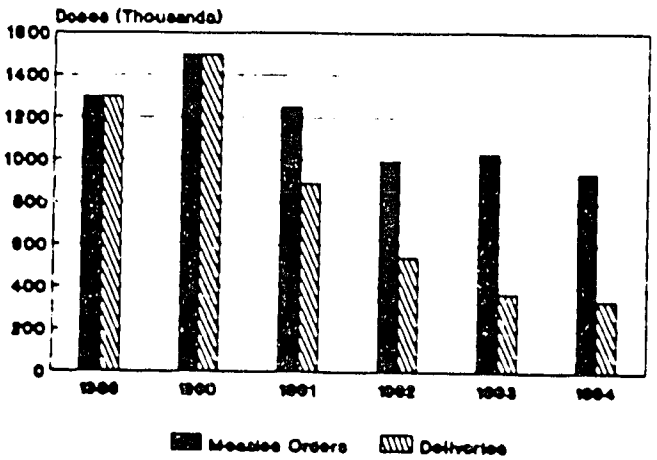
VACCINE ORDERS vs DELIVERIES; KAZAKHSTAN

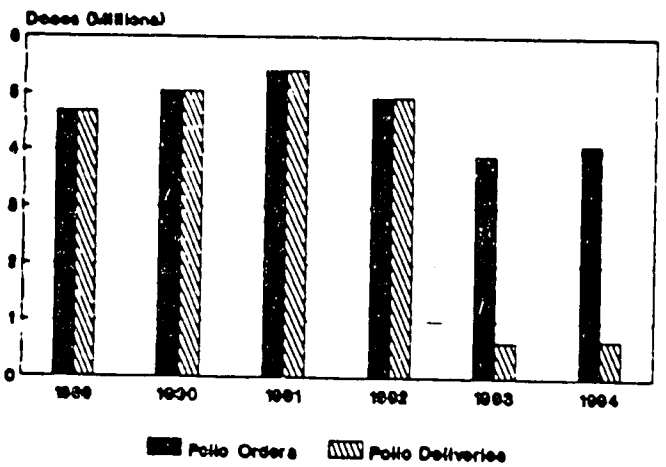
CIS SUPPLIERS; 1989-1994

(s 15 July for 1994)









Data: Moh Almaty

Figure 2

TABLE 1

NIS VACCINE RECEIPTS IN KAZAKHSTAN 1993 and 1994				
	BCG	DPT	Measles	Polio
% of Total 1994 NIS Order Received (to July 15th)	21.0	31.0	36.0	17.0
% of NIS Order Received in Whole of 1993	11.0	8.0	36.0	16.0

C. Need for Emergency Vaccine Donations

Although vaccine receipts for 1994 seem encouraging, outstanding needs, especially for BCG and measles, still appear substantial according to MOH estimates. An assessment of needs for primary series immunizations was made using the standard USAID/BASICS methodology developed during previous work in the NIS.[1] Several donor agencies have provided supplies of vaccine to support primary series immunizations, but estimates of what constitutes the primary need varies considerably according to the source of estimate and the assumptions made in each situation.

An important factor in any calculation of needs is the utilization rate or wastage factor for each vaccine. Donor agencies (and the MOH) commonly use assumed "standard" wastage rates when estimating needs. These "standard" rates almost invariably under-estimate actual needs when applied to the NIS situation. Under-estimates occur for two main reasons:

(a) Russian vaccines were supplied in smaller vial sizes than European or UNICEF vaccines, and NIS staff are unfamiliar with use of 10 or 20-dose vials for all vaccines. Thus, since opened vials are discarded at the end of the day, more than "standard" amounts of donated vaccines are currently wasted; and

(b) under the centrally-planned Soviet model, costs and cost-effectiveness were less important than achievement of targets and completion of the annual plan. Wastage rates were never monitored or considered important, and staff are thus unfamiliar

[1] USAID Emergency Immunization Support Program for the NIS-Protocol for Standardized Evaluations of Vaccine and Cold Chain Supply; JSI/REACH, March 1993; G.A. Larsen.

with this concept and unaware that long-established practices are often very inefficient.

The only satisfactory method of determining the wastage factor to be used is to examine the MOH records showing patterns of vaccine usage over the recent past. Use of actual wastage rates should not be seen as condoning, encouraging, or institutionalizing high vaccine wastage rates. Every attempt is made to reduce wastage, and to educate and assist staff and ministries in the introduction of more efficient practices; however, changes cannot be introduced overnight and modifying the policies and practices of 70 years takes time. Use of actual current MOH wastage rates to estimate needs ensures that sufficient vaccine is provided to cover immediate objectives, while efforts continue to make better use of each vial received.

Actual vaccine wastage rates for Kazakhstan were calculated from the MOH records covering the period 1981-1993. Details are shown in Appendix 7. Mean values for the past five years, applicable for estimating 1994 needs and those for the immediate future, are summarized in Table 2. "Standard" wastage rates as proposed by WHO are shown for comparison:

TABLE 2

VACCINE WASTAGE RATES: KAZAKHSTAN Calculated from MOH records 1989-1993		
	MOH Records	WHO "Standard"
BCG	5.04	2.0
DPT	1.82	1.3
Measles	1.82	1.3
Polio	1.90	1.3

Note from Appendix 7 that wastage rates for 1993 are apparently much lower than the average rates over previous years. Indeed, those for diphtheria, pertussis, and tetanus in 1993 are less than 1.0, suggesting that more immunizations were given than the doses available. This is obviously impossible and points to errors in either the reporting of immunizations administered or in the amounts of vaccine actually received. In either case, the low 1993 wastage rates could not be used as a reliable guide for estimating future needs.

Using actual MOH values from Table 2, vaccine needs for 1994 primary immunizations were calculated taking into account the outstanding backlog of un-immunized infants from 1993 and a 25 percent reserve factor. Provision of additional vaccine to create a reserve or buffer stock is required until such time as a positive vaccine balance at the end of each supply period can be maintained. Comparison of calculated needs with vaccine deliveries received to date from all

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sources indicates that a substantial proportion of primary needs have already been satisfied as shown in Table 3:

TABLE 3

PROPORTION OF PRIMARY VACCINE NEEDS FOR 1994 ALREADY SATISFIED				
% of Primary Need Received (to July 15th)	BCG	DPT	Measles	Polio
	41.0	70.0	85.0	40.0

Table 3 indicates that outstanding primary needs for DPT and measles are now relatively small, and as noted in section 2, arrangements for delivery of further consignments of BCG and polio from NIS suppliers have already been confirmed. The MOH expresses cautious optimism that the further deliveries due from Russia and Uzbekistan (for BCG), together with donations of DPT, measles and polio already received, will enable at least primary series immunization targets to be reached this year. It thus appears that there is no immediate need for emergency vaccine supplies, although the situation will have to be monitored regularly. As far as is known, there are no further vaccine donations scheduled from other agencies in 1994.

Outstanding quantities required for each vaccine are summarized in Table 4:

TABLE 4

OUTSTANDING 1994 PRIMARY VACCINE NEEDS: KASZAKHSTAN (assessment @ 15th July 1994)	
BCG	1,220,000 doses in 20 infant dose ampoules
DPT	762,000 doses in 10 dose vials
Measles	101,000 doses in 10 dose vials
Polio	2,464,000 doses in 10 dose vials

An assessment sheet following the standard USAID/BASICS methodology, from which the data in Tables 3 and 4 are obtained, appears in Appendix 8.

D. Re-Immunization and Disease Control

For re-immunization and disease control programs, the MOH is concerned that supplies of Td and DT vaccines and diphtheria antitoxin from NIS sources are still insufficient. The current diphtheria epidemic in Russia is apparently consuming all available supplies of these vaccines. Manufacturers report being unable to provide exports to the republics for the foreseeable future. The MOH reports that they have not yet been offered donations for any of these antigens, although a French vaccine manufacturer (Pasteur/Merieux) has recently agreed to provide the MOH with credits of approximately US$220,000 to purchase necessary amounts for 1994. The credits also provide for the purchase of mumps and a small amount of yellow fever vaccines, but quantities to be ordered for each antigen had not been decided by the conclusion of this consultancy.

E. Vaccine Supplies for 1995 and Beyond

Regarding vaccine needs in 1995 and beyond, an agreement has been drafted between UNICEF and the Governments of Japan and Kazakhstan which will provide funds for the purchase of UNICEF vaccines for the primary series during the period 1995 to 2000. The agreement commits Kazakhstan to fund, in advance and in hard currency, progressively larger portions of the estimated cost of these vaccine purchases as shown in Table 5:

TABLE 5

ESTIMATED VACCINE NEEDS AND FINANCING IN KAZAKHSTAN
(in 000s of U.S. dollars)

	1995	1996	1997	1998	1999	2000
Vaccine cost	569.4	620.3	675.7	735.9	801.5	872.8
GOJ Contribution	500.0	400.0	350.0	250.0	199.0	0
UNICEF Contribution	50.0	100.0	75.0	0	0	0
Kazakh Contribution (incl. 6% fee)	20.6	127.5	265.7	515.1	638.6	925.2
Kazakh % age Contribution to Vaccine Cost	3.4	19.4	37.1	66.0	75.2	100.0

The agreement is due to be signed at a meeting in Kyoto, Japan in late July 1994 but, reportedly, the Ministry of Finance has yet to approve Kazakh contributions required under this agreement and the MOH expressed some doubt that such approval could be given. Particular concern was voiced over the large and increasing amounts of hard currency to be provided by the Kazakh government during the lifetime of the agreement.

Doubts were also expressed as to whether such an agreement requiring payment for vaccine in hard currency was actually needed. The MOH is now apparently able to obtain a reasonably large part of its vaccine needs from NIS sources for payment in roubles, and this arrangement benefits both the user and the manufacturer. The MOH considered that funds provided under the proposed UNICEF/Japan agreement might possibly be better applied to improving other areas of the immunization service.

The question of setting up a local currency revolving fund for vaccines has not been explored, although the MOH confirmed that it would be considerably easier for the Ministry of Finance to allocate sufficient funds if hard currency was not required. The local UNICEF office was doubtful about accepting payment for vaccines in soft currency. Although UNICEF is likely to have outlets for such funds for other projects in Kazakhstan, they had not yet considered this type of assistance. Other donor agencies, private companies, or joint venture groups could be approached as potential alternative partners for such a scheme.

F. Immunization Schedule

Until recently, the immunization schedule used in Kazakhstan had been very similar to that of other NIS republics, closely following the original Soviet model. This schedule required 26 immunizations and 21 contacts with the health service. In April 1994, the MOH introduced a revised immunization schedule which was widely claimed to conform to WHO recommendations. In fact, only the primary series approximates WHO guidelines, and even here the ages recommended for the administration of DPT and polio doses are slightly later than under WHO guidelines, while that for measles is earlier.

For the immunization of older children and adults, the "new" schedule still closely adheres to the original Soviet scheme, and including the primary series, requires a total of 24 immunizations and 18 contacts with the health service. Polio doses have been reduced from the original nine to seven, including a birth dose (Polio 0) given with BCG; the six Td doses originally needed have been reduced to four, although two new doses of DT have been added, leaving the same overall number of doses in the diphtheria series. A few simultaneous immunizations are now permitted, but there is still much scope for further revision. The list of contraindications has been simplified, but again further revision is needed. The new Kazakh immunization schedule, shown together with the old Soviet schedule for comparison, is attached in Appendix 9.

The MOH recognizes the need to further improve and streamline the schedule and is enthusiastic about participating in a national policy seminar aimed at introducing additional reforms. Such seminars have already been held in other republics assisted by the USAID (REACH) support

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programs with the participation of WHO and an international expert team. The MOH also recognizes that the new schedule, even if officially approved, is far from implementation in practice and that pediatricians, immunologists and others still need substantial explanation, discussion, and reassurance for the policy changes to be effective. Initiating this learning process would be greatly facilitated by a national seminar in which all the key specialists and decision-makers could participate.

Spring 1995 was suggested by the MOH as a suitable time for holding such a seminar. The local WHO and UNICEF offices also expressed their willingness to assist and participate in this activity.

G. Cold Chain System

Substantial shortcomings in the cold chain system were identified, although the assessment was based on only limited field visits during this short initial consultancy and estimates of equipment needs must be considered as preliminary. A more detailed assessment with visits to oblasts in the west, south, and north of the Republic will be required.

The present central storage facility at the Republican SES comprises four underground cold rooms, all for storage at a nominal +4 deg C. Capacity totals almost 250 m^3, with two rooms of 35 m^3 capacity each, and two of 88 m^3. This compares to an estimated storage need of all vaccines (primary immunizations, all re-immunizations plus all disease control measures) of 40 m^3 at +4 deg C. There is currently no frozen storage facility for vaccines at -20 deg C.

While total capacity is very adequate, upgrading of the +4 deg C cooling system is required with proper temperature control, monitoring facilities, and provision of a backup cooling unit. One of the 35 m^3 rooms should be converted to a -20 deg C freezer room which requires a separate cooling system, again with temperature control, monitoring facilities, and a backup cooling unit.

The Japanese ambassador in Almaty has reportedly already agreed to provide the equipment needed for upgrading the central vaccine store, but no details of this offer were available from the Japanese embassy during this visit. The recently announced decision by the Kazakh parliament to move the national capital from Almaty to Aqmola was discussed with the MOH vis-á-vis the possible relocation of the central vaccine store. Officials advised that all MOH functions will continue to be located in Almaty for the foreseeable future and that an upgraded central store should also continue to be based there for the present.

The current distribution system is by direct delivery to each of 21 oblasts but this is proving increasingly difficult to sustain. The MOH proposes the creation of four new regional sub-stores for the five geographic zones of the Republic. (The Almaty regional store would be combined into the Republican central store). Direct vaccine delivery to each of these sub-stores should become possible as regional development accelerates, although vaccine quality control and testing should probably be concentrated in the capital. Smaller cold rooms and freezer rooms will be

required for each of these new regional sub-stores. Based on regional populations, the capacities for each sub-store were determined as detailed in Appendix 10.

For the oblast level, storage at +4 deg C is provided either with small walk-in cold rooms or with a variety of refrigerator cabinets, but again, no facilities exist for frozen storage at -20 deg C. Ice-lined chest refrigerators, chest freezers, and ice-pack freezers are required for each oblast, as are with secure-transport cold boxes for collection and delivery of vaccine from regional stores to the rion level. Storage capacities for +4 and -20 deg C were calculated for each oblast based on populations and a 2-monthly vaccine delivery cycle. Details of estimated equipment needs are shown in Appendix 11. In both Appendices 10 and 11, maximum possible vaccine unit volumes (including packaging) were used as a basis for calculation, considering both imported and NIS-produced vaccine. This results in a cold chain adequately sized for whichever vaccine is being stored. It was noted that this preliminary assessment of cold chain needs appears to contrast sharply with a report prepared by UNICEF in which no immediate need is identified for cold chain equipment at the oblast level.[2]

For rion-level storage, all vaccines should be kept at +4 deg C. There is no need for vaccine freezers, although ice-making facilities are still needed for the ice packs used in vaccine transportation. Present facilities at the rion level appear to be antiquated with very limited ice-making capacity and virtually no adequate cold boxes. Ice-lined chest refrigerators and freezers are required, together with secure-transport cold boxes for vaccine collection and delivery.

At the peripheral health facility level, although the great majority of centers appear to have basic but adequate refrigerators, there is a need for some additional units, particularly in areas with poor or irregular supplies of electricity. For such areas, absorption-type refrigerators operating on LP gas are required. There is a great need for cold boxes, vaccine carriers, and ice packs for safe storage and transport of vaccine for all the facilities since most have none at all.

Estimates for the types and quantities of equipment for improving the cold chain system are summarized in Appendix 12, and indicate an overall cost of some US$1.4 million. Implementation of the proposed improvements should be planned on a phased-basis, with a time-scale of three or four years required to complete the entire program. Results of the analysis of cold chain needs were shared with the local UNICEF office to facilitate the preparation of their country assistance program and to assist in coordinating donor support for Kazakhstan.

H. Syringes, Needles and Sterilization

There is a widespread preference in the health service for disposable syringes and needles which were routinely used for all immunizations until recent supply shortages forced a return to re-

[2] Program of Cooperation for the EXPANDED PROGRAM on IMMUNIZATION, 1993-1994; UNICEF, Almaty, September 1993.

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sterilizable glass types. The latter are of Russian design with a metal boss for the attachment of the needle. They are extremely difficult to sterilize adequately, even under the best of conditions. The problem is compounded by the practice of individually wrapping syringes in paper before sterilization which, according to tests carried out elsewhere,[3] prevents proper hot air/steam penetration and an incomplete sterilizing cycle.

Larger institutions have hot air sterilizers or autoclaves, but many smaller health facilities have no means of proper sterilization and resort to the unacceptable practice of boiling items in open containers. There is an immediate need for supplies of disposable syringes to cover present shortages, but a move towards the introduction of pressure steam sterilizers with re-usable plastic syringes will be essential. This was proposed to the MOH who expressed a willingness to initiate use of this technology on a trial basis in selected oblasts or areas of the republic.

Supply of a trial quantity of sterilizers, kits of re-usable syringes, and hard water pads should be considered as a priority need and provided as soon as possible. An initial quantity of 300 single rack and 200 double rack steam sterilizers are proposed for conducting the trial, along with 300 sterilizable syringe kits A, 200 syringe kits B, and 250 hard water pads. When the costs of these items and an emergency stock of disposable syringes are added to the cold chain needs described in section G, total equipment costs amount to approximately US$1.83 million. Details of the required syringes, needles, and sterilizers are summarized in Appendix 12.

I. Management and Training

The MOH has already recognized the need to strengthen EPI management and has recently formed a working group which will act as an advisory body to the program. Composition of this group is detailed in Appendix 13, although the inclusion of additional operational staff may be desirable. Formation of the group is a useful step which will undoubtedly benefit the program. During discussions with the MOH, it was suggested that an entirely new management unit might be required for the planning and operational control of immunization activities, possibly modeled on the "Republican Center for Immunoprophylaxis" recently formed in Kyrgyzstan. The MOH considered that such a center would not be needed in Kazakhstan, since their larger area and population has already necessitated the decentralization of program operation and management to the oblast level.

Short-term technical assistance for the newly-formed working group and for the staff at other levels will be needed to develop capabilities in many key areas, including monitoring and evaluation, reporting and recording, and vaccine forecasting and stock control. For the medium term, the MOH has expressed interest in the development of a comprehensive plan of operations and has agreed, in principle, to head a joint ministry/donor working group to prepare such a

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[3] Injection practices in Papua New Guinea; TECHNET CONFERENCE DOCUMENT; A.G. Bass, April 1993.

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document. Local UNICEF and WHO offices have also indicated a willingness to participate in such a planning exercise.

Training needs were identified in many areas, and for staff at the various operational and administrative levels. In addition to the topics noted above, training needs include vaccine storage and handling, cold chain and equipment care, cold chain repair and maintenance for technicians, sterile practices, and sterilization. Guidance in the development of a detailed staff training plan should be another aspect of technical assistance offered to the immunization working group.

V. METHODOLOGY

The activities and assessments described in this report were undertaken in co-operation with staff from the Ministry of Health and other institutions in the Republic. A local interpreter was used throughout and all information, findings and recommendations are made with the knowledge and agreement of senior MOH officials. A list of contacts and persons met appears in Appendix 14.

VI. SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS

1. Recent vaccine shortages have caused a decline in historic levels of immunization. A re-emergence of some diseases already appears to be in progress.

2. Vaccine supplies from Russia were greatly reduced in 1993 and although donor assistance alleviated the most severe shortages, substantial falls in the levels of immunization still resulted.

3. Vaccine supplies from Russia for 1994 appear to be somewhat improved, with deliveries to date for some vaccines already exceeding the vaccine totals supplied in the whole of 1993.

4. It appears that there is no immediate need for emergency vaccine supplies, although the situation will have to be monitored regularly. No further vaccine donations are scheduled from other agencies in 1994 as far as is known.

5. Regarding vaccine needs in 1995 and beyond, an agreement between UNICEF and the Governments of Japan and Kazakhstan will provide funds for the purchase of UNICEF vaccines for the immunization primary series from 1995 to 2000. The agreement commits Kazakhstan to fund, in hard currency, progressively larger portions of the cost of vaccine purchases. The Ministry of Finance has yet to approve the required Kazakh contributions and the MOH has expressed some doubt as to whether this approval would be given.

6. A revised immunization schedule which is claimed to conform to WHO recommendations was introduced in April 1994, but further revision is still required. The MOH is enthusiastic about participating in a national policy seminar aimed at introducing additional reforms, and has pronounced Spring 1995 as a suitable period for this activity.

7. Substantial shortcomings in the vaccine cold chain system were identified with a need to upgrade or supplement equipment for all facilities down to rion level. At all levels, there is great need for cold boxes and vaccine carriers for safe storage and transport of vaccine(s). Estimates for improving the cold chain system indicate a cost of some US$1.4 million. The Japanese ambassador in Almaty has offered to provide equipment needed for upgrading the central vaccine store.

8. The recently announced decision by the Kazakh Parliament to move the national capital from Almaty to Aqmola is thought unlikely to affect the location of MOH functions or the central vaccine store in the foreseeable future.

9. Disposable syringes and needles were routinely used for all immunizations until recent supply shortages forced a return to sterilizable glass types. There is an immediate need for supplies of disposable syringes to cover present shortages. A move towards introduction of pressure steam sterilizers with re-usable plastic syringes will be essential.

10. The MOH has agreed to a trial of the above technology and the supply of a small quantity of sterilizers, kits of re-usable syringes, and hard water pads is needed as soon as possible. When the costs of these items are added to the cold chain needs described above, total equipment costs amount to slightly under US$ 1.9 million

11. The need to strengthen EPI management is already recognized. The MOH recently formed a working group which will act as an advisory body to the EPI program. Short-term technical assistance for this group will be needed. For the medium term, the MOH wishes to develop a comprehensive plan of operations and has agreed, in principle, to head a joint ministry/donor working group to prepare such a document.

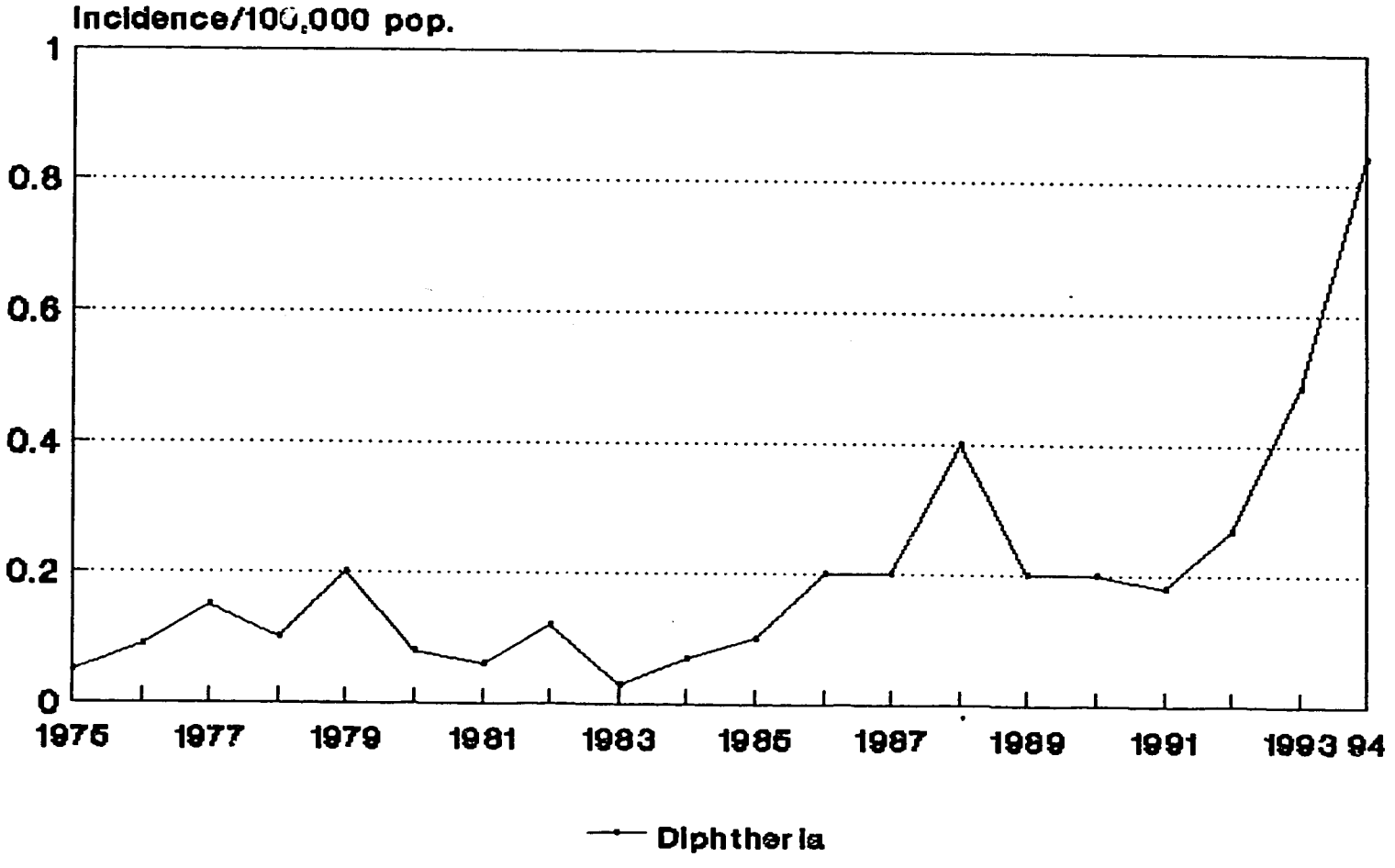
12. Training needs were identified in many areas and for staff at each of the operational and administrative levels. In addition to the topics noted above, these training needs include vaccine storage and handling, cold chain and equipment care, cold chain equipment repair and maintenance for technicians, sterile practices, and sterilization.

APPENDICES

APPENDIX 1

DISEASE INCIDENCE IN KAZAKHSTAN

Incidence/100,000 Population



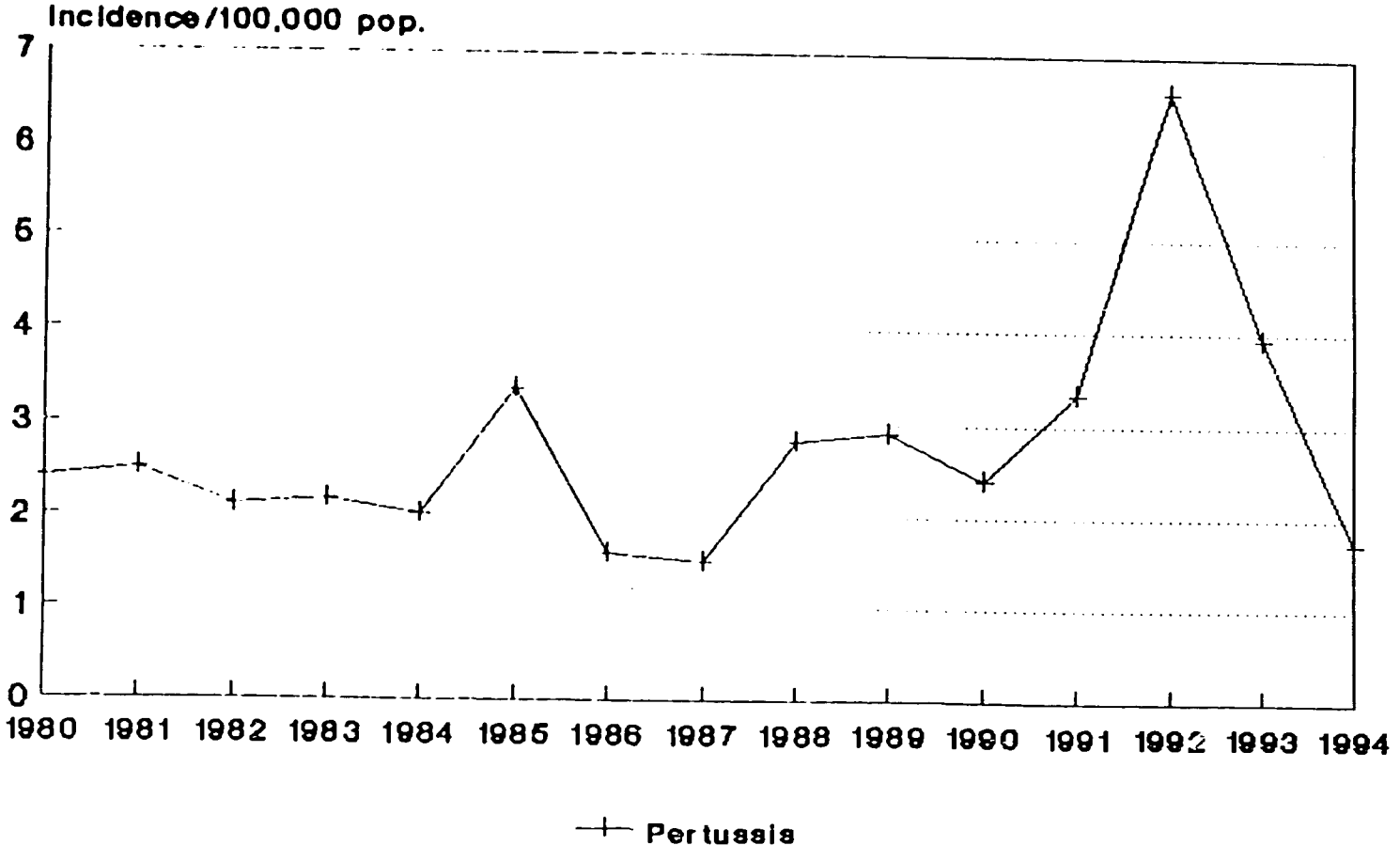
Source: Rep.SES,Almaty

Appendix 1

APPENDIX 2

DISEASE INCIDENCE IN KAZAKHSTAN

Incidence/100,000 Population



Source: Rep.SES,Almaty

Appendix 2

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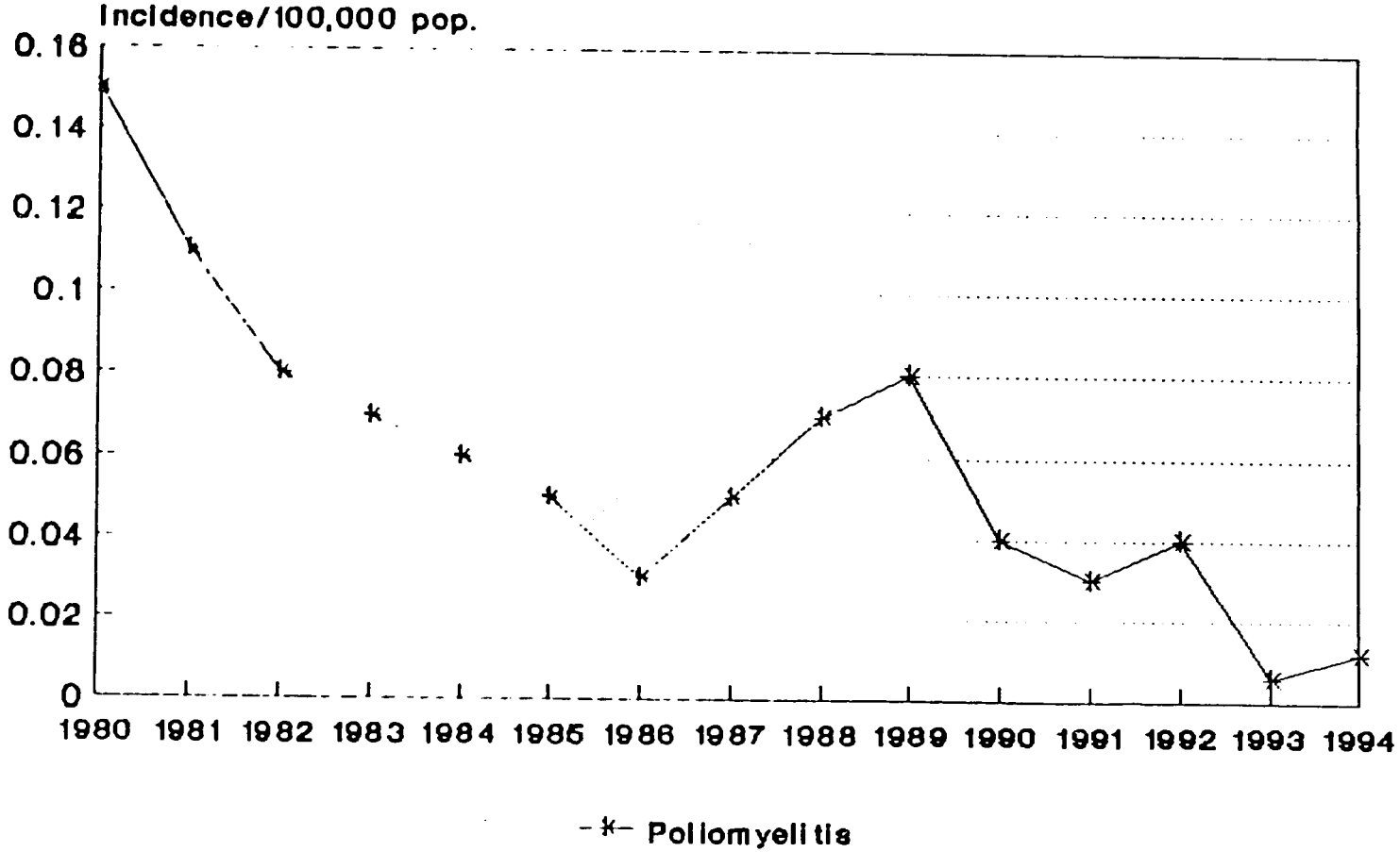
APPENDIX 3

DISEASE INCIDENCE IN KAZAKHSTAN

Incidence/100,000 Population

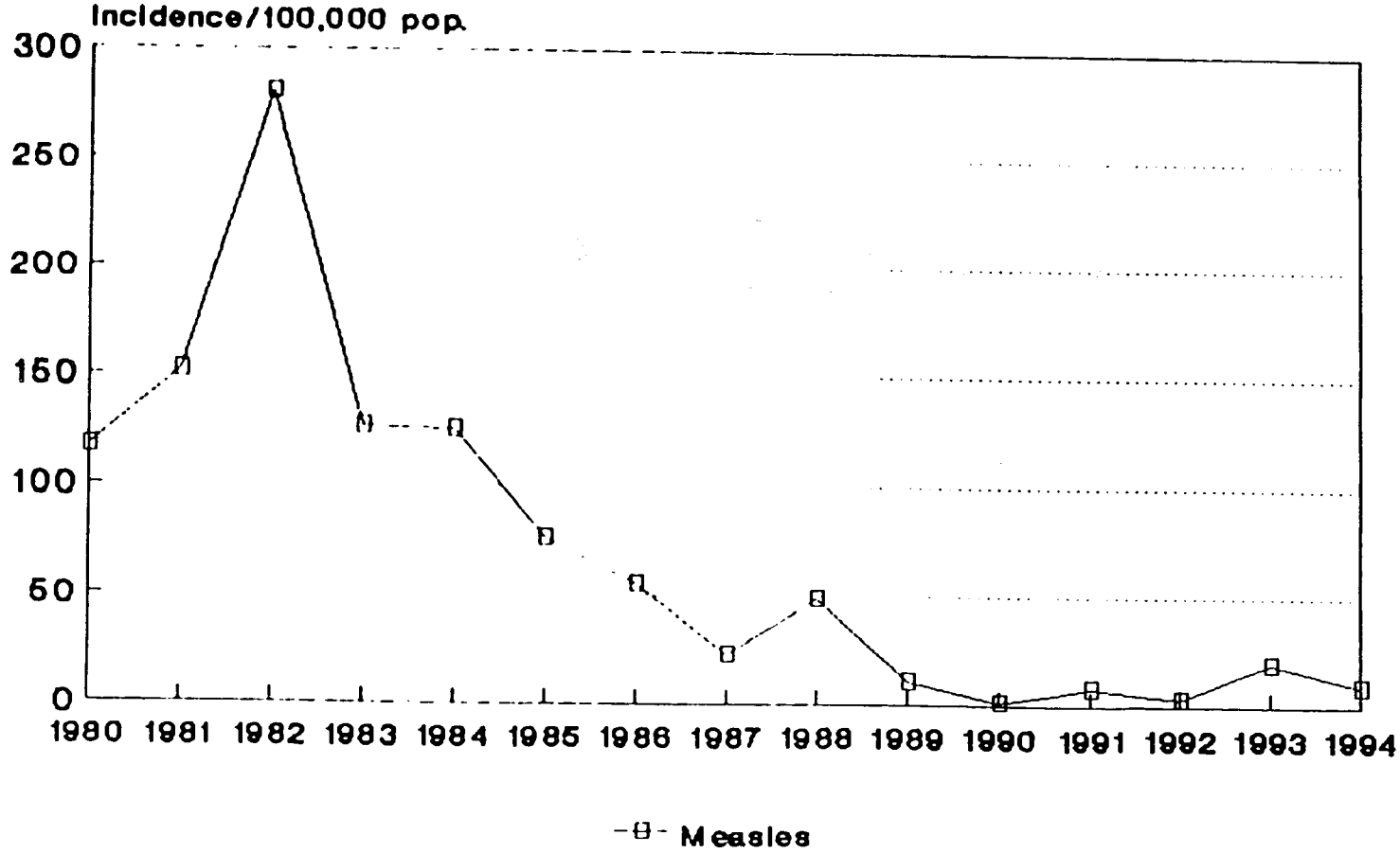


Source: Rep.SES,Almaty

APPENDIX 4

DISEASE INCIDENCE IN KAZAKHSTAN

Incidence/100,000 Population



Source: Rep.SES,Almaty

Appendix 4

APPENDIX 5

REPORTED DISEASE INCIDENCE RATES IN KAZAKHSTAN; 1950-94
(Absolute & Relative per 100,000 population)

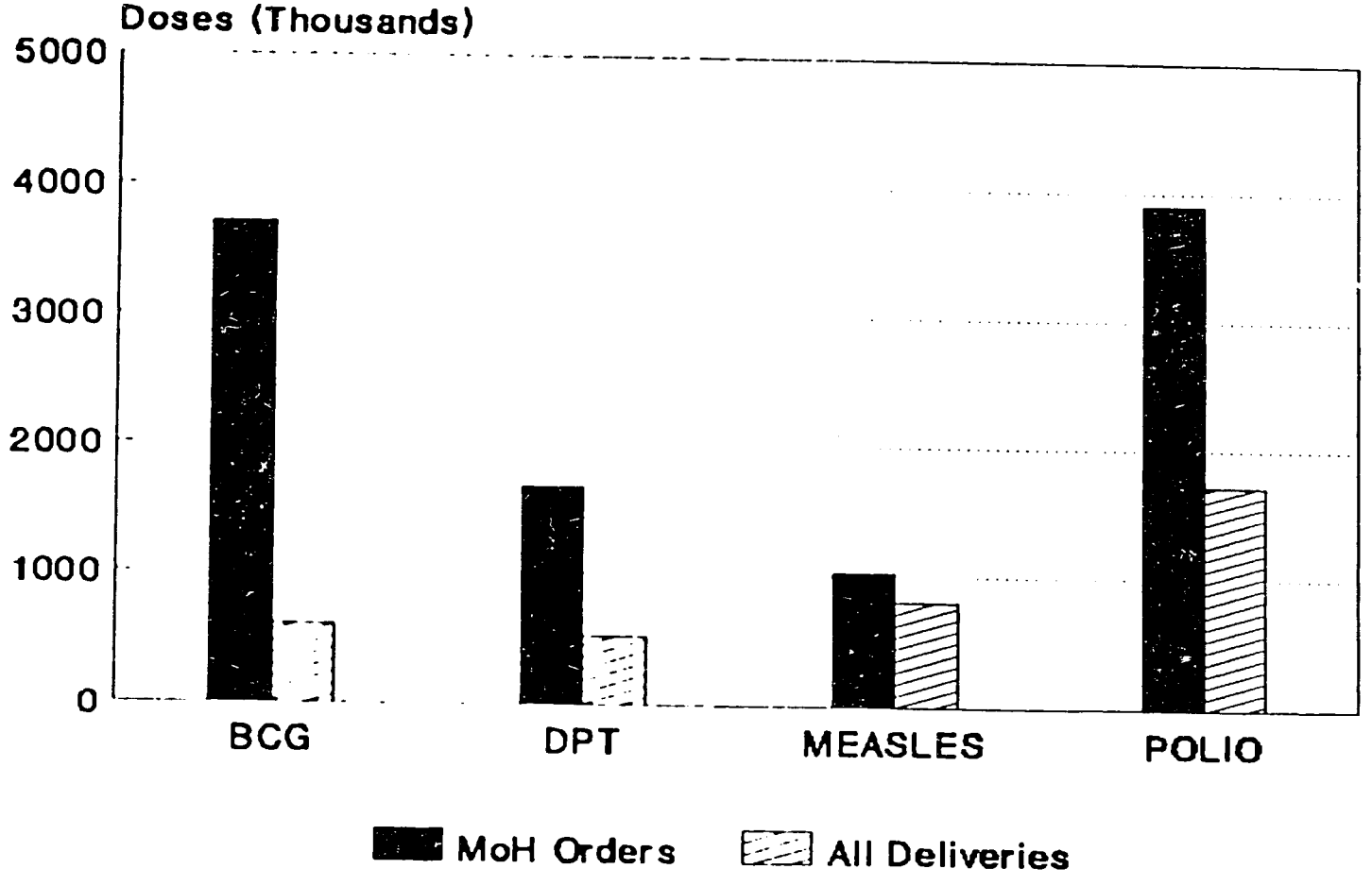
YEAR	DIPHTHERIA		PERTUSSIS		MEASLES		POLIO	
	ABSOL	RELAT	ABSOL	RELAT	ABSOL	RELAT	ABSOL	RELAT
1950	2364	35	8684	128	49969	742	21	0.3
1951	2646	38	15852	226	40305	579	120	1
1952	3992	65	20548	284	50273	696	319	4
1953	3362	45	16200	221	49951	681	110	1
1954	3745	45	24112	286	83624	1002	767	9
1955	6551	78	26099	313	67258	806	744	15
1956	8283	99	24882	298	42776	513	746	15
1957	9385	98	32148	336	88800	928	971	10
1958	8902	95	28483	305	60058	647	801	8
1959	10738	115	32717	357	81593	877	619	6
1960	7500	76	28660	291	82867	841	283	2.03
1961	3708	35	20715	193	106423	996	180	1
1962	2000	17.5	21560	188	112817	986	50	0.4
1963	1056	9.3	19301	169	90238	792	66	0.57
1964	987	8.4	15932	136	94655	808	50	0.43
1965	815	6.7	8885	73.8	106585	885	8	0.07
1966	532	4.3	3824	31.1	65564	534	0	0
1967	324	2.5	4148	33	96623	770	29	0.2
1968	343	2.6	4199	32.7	95350	744	3	0.02
1969	213	1.6	1846	14.3	16327	127	33	0.26
1970	119	0.9	664	5.1	21284	164	24	0.18
1971	71	0.5	1066	8	50623	383	6	0.05
1972	44	0.3	1522	11.2	22760	168	5	0.03
1973	31	0.2	1069	7.7	18886	137	7	0.05
1974	12	0.08	555	4	28493	203	4	0.02
1975	8	0.05	285	2	28339	199	7	0.04
1976	13	0.09	983	6.8	24037	167	5	0.03
1977	22	0.15	407	2.8	16038	110	63	0.4
1978	17	0.1	565	3.8	43829	299	27	0.2
1979	28	0.2	563	3.8	49802	337	21	0.14
1980	13	0.08	367	2.4	17590	118	23	0.15
1981	9	0.06	377	2.5	23085	152	17	0.11
1982	19	0.12	322	2.1	43126	281	13	0.08
1983	5	0.03	337	2.2	19734	127	11	0.07
1984	11	0.07	318	2.02	19788	126	9	0.06
1985	19	0.1	535	3.36	12213	76.6	8	0.05
1986	31	0.2	265	1.6	8966	55.6	5	0.03
1987	33	0.2	239	1.5	3722	22.8	8	0.05
1988	64	0.4	463	2.8	8124	49	11	0.07
1989	30	0.2	480	2.9	1853	11.2	13	0.08
1990	28	0.2	395	2.4	273	1.64	7	0.04
1991	30	0.18	562	3.34	1426	8.48	5	0.03
1992	45	0.27	1117	6.61	647	3.83	6	0.04
1993	82	0.49	665	3.94	3297	19.5	1	0.01
1994 (6mth)	144	0.84	291	1.74	1631	9.56	2	0.01

Source: Republican SES, Almaty

APPENDIX 6

VACCINE ORDERS vs DELIVERIES; KAZAKHSTAN

ALL SOURCES; 1993



Source: MoH, Almaty

APPENDIX 7

REPUBLIC OF KAZAKHSTAN

VACCINE UTILIZATION RATES; 1981-1993

NATIONAL SUMMARY
(000's doses & 000's immunizations)

	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	Mean Util. Rate 1981-1993	Mean Util. Rate 1989-1993
BCG															
Vacc Used:	3745	3745	3745	3745	3745	3745	3745	3745	3340	4080	3240	4080	604		
Imms Given:	789.63	808.19	807.28	822.78	822.8	834.4	849.04	800.41	808.38	662.77	702.48	772.92	599.28		
Vacc.Util.Rate:	4.74	4.63	4.64	4.55	4.55	4.49	4.41	4.68	4.13	6.16	4.61	5.28	1.01	4.45	5.04
DIPHTHERIA															
Vacc Used:	3389	3389	3389	3389	3389	3389	3389	3389	3540	3476	3492	3044	581.2		
Imms Given:	991.15	1010.0	1004.8	1014.2	1060.0	1079.1	1122.4	1082.9	1066.1	996.96	964.15	968.66	857.08		
Re-Imms :	834.82	904.75	911.42	978.33	1014.7	1090.6	1166.1	1146.3	1000.5	1117.1	1186.3	1217.3	996.95		
Total :	1825.9	1914.8	1916.3	1992.5	2074.8	2169.8	2288.5	2229.3	2066.6	2114.1	2150.5	2186.0	1854.0		
Vacc.Util.Rate:	1.86	1.77	1.77	1.70	1.63	1.56	1.48	1.52	1.71	1.64	1.62	1.39	0.31	1.54	1.59
PERTUSSIS															
Vacc Used:	2229	2229	2229	2229	2229	2229	2229	2229	2056	2246	2620	1992	527.2		
Imms Given:	970.58	979.4	978.84	989.79	1034.5	1051.4	1083.2	1005.3	1000.4	920.11	877.35	873.83	756.62		
Re-Imms :	372.17	340.07	318.34	314.98	313.61	325.94	341.52	328.52	338.42	316.65	302.18	288.51	254.13		
Total :	1342.7	1319.4	1297.1	1304.7	1348.1	1377.3	1424.7	1333.8	1338.9	1236.7	1179.5	1162.3	1010.7		
Vacc.Util.Rate:	1.66	1.69	1.72	1.71	1.65	1.62	1.56	1.67	1.54	1.82	2.22	1.71	0.52	1.62	1.82
TETANUS															
Vacc Used:	3389	3389	3389	3389	3389	3389	3389	3389	3540	3476	3492	3044	581.2		
Imms Given:	1822.2	1801.9	1947.7	1954.5	2021.4	1821.1	1756.0	1596.5	1492.9	1335.7	1223.6	1219.6	1056.7		
Re-Imms :	1287.2	1304.8	1312.9	1326.6	1331.9	1386.5	1244.6	1197.7	1069.1	1165.3	1208.1	1243.3	1012.1		
Total :	3109.4	3106.7	3260.6	3281.1	3353.4	3207.6	3000.7	2794.3	2562.1	2501.0	2431.7	2463.0	2068.8		
Vacc.Util.Rate:	1.09	1.09	1.04	1.03	1.01	1.06	1.13	1.21	1.38	1.39	1.44	1.24	0.28	1.11	1.36
OPV															
Vacc Used:	4783	4783	4783	4783	4783	4783	4783	4783	4638	5042	5400	4929	1721.5		
Imms Given:	1002.7	1023.5	1027.8	1034.0	1074.1	1094.3	1142.9	1100.5	1088.6	1053.9	989.45	977.57	670.14		
Re-Imms :	1319.5	1156.4	1146.8	1153.4	1198.1	1227.3	1258.2	1256.5	1305.1	1981.6	1257.4	1253.4	690.02		
Total :	2322.3	2180.0	2174.7	2187.5	2272.2	2321.7	2401.1	2357.0	2393.8	3035.5	2246.8	2231	1360.1		
Vacc.Util.Rate:	2.06	2.19	2.20	2.19	2.10	2.06	1.99	2.03	1.94	1.66	2.40	2.21	1.27	2.02	1.90
MEASLES															
Vacc Used:	1000	1000	1214	1214	1214	1214	1214	1214	1300	1500	889	539	799.3		
Imms Given:	307.97	344.47	573.27	604.18	616.47	517.86	688.15	734.5	362.16	337.65	311.78	310.45	364.6		
Re-Imms :	0	0	0	0	0	0	0	0	252.42	292.4	258.43	123.69	368.16		
Total :	307.97	344.47	573.27	604.18	616.47	517.86	688.15	734.5	614.58	630.05	570.21	434.14	732.76		
Vacc.Util.Rate:	3.25	2.90	2.12	2.01	1.97	2.34	1.76	1.65	2.12	2.38	1.56	1.24	1.09	2.03	1.82

APPENDIX 8

MINISTRY OF HEALTH - KAZAKHSTAN

CALCULATION OF VACCINE NEEDS; PRIMARY SERIES ONLY-1994
(Updated 15th July 1994)

STATE: KAZAKHSTAN	BCG	DPT	MEASLES	POLIO
1.1994 Inf.Pop.(0-11mth)	315160	306335	306335	306335
1993 backlog;(0-11mth)	15000	74600	0	127000
Total for immun.1994:	330160	380935	306335	433335
2.Prim.Doses Needed/Inf;	1	3	1	4
3.Waste Factor;	5	1.8	1.8	1.9
4.Reserve Factor	1.25	1.25	1.25	1.25
5.Doses for Prim.Series: (1x2x3x4)	2063500	2571311	689254	4116683
6.Stock Balance @ End 1993; doses	0	0	0	0
7.Total to be ordered; 1994 Primary Series: (5-6)	2063500	2571311	689254	4116683
8.MoH orders placed;(all 1994 immunizations):	4000000	1800000	940000	4100000
9.Deliveries already received in 1994: CIS	844000	565000	338820	682000
MoH Kyrgyz/TICA	0	230000	0	0
Project Hope	0	100000	0	0
Bobek, Kazakhstan	0	80000	0	80000
UNICEF/Govt Japan	0	835000	250000	891000
10. Total rec'd to date:	844000	1810000	588820	1653000
% of primary needs	0.41	0.70	0.85	0.40
% of total CIS order	0.21	0.31	0.36	0.17
11.% Shortfalls in:-				
1993 CIS Deliveries	89	92	64	84
1992 CIS Deliveries	1	0	46	0
1991 CIS Deliveries	7	0	29	0
1990 CIS Deliveries	0	0	0	0
12. Further deliveries expected in 1994:				
Balance of CIS orders	3156000	1235000	601180	3418000
Further CIS orders	0	0	170000	0
Donations Promised	0	0	0	0
13.Outstand.Deficit for 1994 primary series: (5-10)	1219500	761311	100434	2463683
14.Outstand.Deficit for 1994 total needs: (8-10)	3156000	-10000	351180	2447000

APPENDIX 9

IMMUNIZATION SCHEDULES - KAZAKHSTAN

	FORMER (SOVIET) SCHEDULE	REVISED MoH SCHEDULE (APR 1994
3-4 Days	.....	..BCG1.....OPV0
4-6 Days	..BCG1	
2 Mths	.....	.....DPT1 OPV1
3 Mths	.....DPT1 OPV1	..... DPT2 OPV2
4 Mths	.....	.....DPT3 OPV3
4.5 Mths	.....DPT2 OPV2	
6 Mths	.....DPT3 OPV3	
8 Mths	.....	.....MEASLES1
12 Mths	.....MEASLES1	
14 Mths	..... OPV4	
15 Mths	.....	.....MUMPS1
15.5 Mths	..... OPV5	
17.5 Mths	.....MUMPS1	
18-24 Mths	.....	.....DPT4 { OPV4
24 Mths	.....DPT4 OPV6	{ OPV5
25.5 Mths	..... OPV7	
6 Years	.....	..BCG2
6-7 Years	.....MEASLES2	
7 Years	..BCG2.....	.....OPV6 MEASLES2
7-8 Years	..... OPV8	
9 Years	.....Td1.....	.....DT1
11-12 Years	..BCG3	
12 Years	.....	..BCG3
15 years	.....	.....DT2
15-16 Years	..... OPV9	
16 Years	..BCG4 Td2	
17 Years	.....	..BCG4
26 Years	..... Td3	.....Td1
36 Years	..... Td4	.....Td2
46 Years	..... Td5	.....Td3
56 Years	..... Td6	.....Td4
Totals:	BCG=4 DPT=4 OPV=9 MUMPS=1 Td=6 MEASLES=2	BCG=4 DPT=4 OPV=7 MUMPS=1 DT=2 MEASLES=2 Td=4

MINISTRY OF HEALTH - KAZAKHSTAN

REVISED SCHEDULE OF IMMUNIZATION
APRIL 1994

NOTES & GUIDELINES ON CONTRAINDICATIONS

NOTES TO THE REVISED SCHEDULE:-

- The earlier immunization begins, the higher will be the degree of protection.
- DPT immunization beginning from 3 months of age with a 4 week interval provides effective protection and reduces the period during which the child is un-protected, especially for Pertussis.
- For imported vaccines, immunization should be according to manufacturers instructions.
- This regulation replaces the present MoH schedule for immunization, and rules for organization and implementation dated 14 January 1986.

TEMPORARY CONTRAINDICATIONS:-

DIAGNOSIS	CONDITIONS FOR IMMUNIZATION
1) Acute Diseases with high temperature and general disorder	Immediately after recovery.
2) Neurological Disorders (encephalopathy with convulsion syndrome, infantile spasms)	Pertussis component should not be given.
3) Children with allergic tendencies	Immunize during remission with de-sensitizing drugs.
4) Children who are Sero-Positive for Tuberculosis	Give all vaccines normally, (except BCG).
5) Children with chronic heart, lung, kidney, liver or skin diseases	Immunize during periods of remission.
6) Hemolitic diseases of the new-born	Immediately after recovery.

7)	Premature babies with a birth weight less than 2000 grams	When weight exceeds 2000 grams.

NOTE:-

Children who have previously suffered diphtheria, polio, pertussis, measles or paratitus, but who are without documentary confirmation should continue to be immunized as normal.

PERMANENT CONTRAINDICATIONS:-

1)	Immunodeficiency states caused by:-	
	- Lymphoma, Hodgkinsons disease, other tumors of the reticulo-endothelial system, lukeamia	Live vaccines should not be given. OPV is substituted by inactivated IPV.
	- combined immunodeficiencies, agammaglobulinemea, hypogammaglobulinemea	
	- while treating with cortico-steroids in high doses, anti-metabolits or radiation	
2)	AIDS sero-positive patients (with or without clinical symptoms)	May be immunized with live vaccines (except BCG). OPV is substituted by inactivated IPV.
3)	Anaphylaxis, collapse or shock, encephalitis, or convulsions caused after an initial dose	Should not be immunized with a second dose of the same vaccine.
4)	Pregnancy	Live viral vaccine should not be given.
5)	Anaphylactic reactions to consumption of eggs	Should not be given vaccines prepared from chicken embryos. eg; yellow fever, flue,measles and mumps vaccines.

OO

APPENDIX 10

MINISTRY OF HEALTH - KAZAKHSTAN

PROPOSED REGIONAL VACCINE STORES -
GEOGRAPHICAL DIVISIONS & COLD CHAIN REQUIREMENTS

1. ALMATY REGION:	- ALMATY OBLAST	960400
	- TALDYQORGHAN	732000
	- ALMATY CITY	1170400
	Population:	2862800

(Reg.Store [within Rep SES]: = 6.8 m3 @+4 deg C; 3.1 m3 @-20 deg C)

2. QYZYLORDA REGION:	- ZHAMBYL	1043600
	- QYZYLORDA	603000
	- SOUTH KAZAKHSTAN	1955000
	- LENINSK TOWN	69700
	Population:	3671300

Regional Store: = 8.7 m3 @+4 deg C; 3.9 m3 @-20 deg C

3. AQMOLA REGION:	- KOKSHETAU	668000
	- NORTH KAZAKHSTAN	619600
	- QARAGHANDY	1299800
	- ZHEZGAZGHAN	491200
	- AQMOLA	866900
	Population:	3945500

Regional Store: = 9.4 m3 @+4 deg C; 4.2 m3 @-20 deg C

4. AKTUBINSK REGION:	- WEST KAZAKHSTAN	673500
	- ATYRAU	451200
	- MANGGHYSTAU	339500
	- QOSTANAY	1080200
	- TORGHAY	316200
	- AKTUBINSK	753800
	Population:	3614400

Regional Store: = 8.6 m3 @+4 deg C; 3.9 m3 @-20 deg C

5. SEMEY REGION:	- PAVLODAR	961300
	- SEMEY	838100
	- EAST KAZAKHSTAN	960000
	Population:	2759400

Regional Store: = 6.6 m3 @+4 deg C; 3 m3 @-20 deg C

NATIONAL STORE:

Total Population: 16853400

ALMATY (Republican SES) = 40 m3 @+4 degC; 18 m3 @-20 deg C

APPENDIX 11

MINISTRY OF HEALTH - KAZAKHSTAN

COLD CHAIN CAPACITIES FOR OBLAST VACCINE STORES

OBLAST	POPULATION (000's)	REQUIRED CAPACITY +4 deg C	REQUIRED CAPACITY -20 deg C	cold chain procurement options HF506 (460lt)	SB300 (188lt)	MK302 (204lt)	MK142 (84lt)
Assume 6 x 2mth deliveries per year:							
1. AQMOLA *	866.9	340.7	152.6	-	-	-	-
2. AKTUBINSK *	753.8	296.2	132.7	-	-	-	-
3. ALMATY OBLAST	960.4	377.4	169.0	0.37	0.90	1.85	4.49
4. ATYRAU	451.2	177.3	79.4	0.17	0.42	0.87	2.11
5. EAST KAZAKHSTAN	960	377.3	169.0	0.37	0.90	1.85	4.49
6. ZHAMBYL	1043.6	410.1	183.7	0.40	0.98	2.01	4.88
7. ZHEZGAZGHAN	491.2	193.0	86.5	0.19	0.46	0.95	2.30
8. WEST KAZAKHSTAN	673.5	264.7	118.5	0.26	0.63	1.30	3.15
9. QARAGHANDY	1299.8	510.8	228.8	0.50	1.22	2.50	6.08
10. KOKSHETAU	668	262.5	117.6	0.26	0.63	1.29	3.13
11. QOSTANAY	1080.2	424.5	190.1	0.41	1.01	2.08	5.05
12. QYZYLORDA *	603	237.0	106.1	-	-	-	-
13. MANGGHYSTAU	339.5	133.4	59.8	0.13	0.32	0.65	1.59
14. PAVLODAR	961.3	377.8	169.2	0.37	0.90	1.85	4.50
15. NORTH KAZAKHSTAN	619.6	243.5	109.0	0.24	0.58	1.19	2.90
16. SEMEY *	838.1	329.4	147.5	-	-	-	-
17. TALDYQORGHAN	732	287.7	128.8	0.28	0.69	1.41	3.42
18. TORGHAY	316.2	124.3	55.7	0.12	0.30	0.61	1.48
19. SOUTH KAZAKHSTAN	1955	768.3	344.1	0.75	1.83	3.77	9.15
20. ALMATY CITY	1170.4	460.0	206.0	0.45	1.10	2.25	5.48
21. LENINSK TOWN	69.7	27.4	12.3	0.03	0.07	0.13	0.33

* Locations for proposed regional stores

APPENDIX 12

ASSESSMENT OF PROGRAMME NEEDS : KAZAKHSTAN

Equipment type, capacity, brand, model, & PIS ref.	Unit Cost US$	Recomm Spares US$	Repub SES	Regio Store	City SES's	Oblas SES's	Rion SES's	Cent. Rion Hosp.	Poly clin Adult	Poly clin Child	SUB	SVA	FAP	MAT	Total Qty Req'd	Total Costs US$
a) COLD CHAIN EQUIPMENT			(1)	(4)	(50)	(17)	(219)	(240)	(68)	(18)	(833)	(1212)	(5096)	(44)	(7802)	
1.Cold Room;+4degC;new/upgd															(7511)	
w/backup cooling unit	20000	2000	* 1	* 4											5	110000
2.Freeze Room;-20degC; new/																
upgd w/backup coolng unit	20000	2000	* 1	* 4											5	110000
3.Thermo-record Cold/Freeze																
Rooms; J.Richard, E6/38	541	20	* 4	* 8											12	6732
4.Freezer; -20degC,460lt																
V'frost HF5506	400	115	*	*		* 12									12	6180
5.Freezer; -20degC,188lt																
V'frost SB300, E3/27	409	85			* 50	* 5	* 110								165	81510
6.Icepack Freezer;																
E'lux TFW791, E3/26	1520	140	* 2	* 4		* 17									23	38180
7.Refrig;ice-lined,204lt																
V'frost MK302, E3/68	601	105			*	* 25	*								25	17650
8.Refrig;ice-lined,84lt																
V'frost MK142, E3/57	427	100				1	110	*	*	*			* 500	*	611	321997
9.Refrig;ice-lined, 40lt																
V'frost MK/MF4010,E3/75	600	55					110				*	*			110	72050
10.Refrig;gas/elect, 24lt																
E'lux RCW42EG, E3/21	842	56											* 300		300	269400
11.Cold Box, 20lt,w/out																
icepacks,Igloo, E4/29	65	0	* 5	* 16		* 34									55	3575
12.Icepack for Igloo 20lt,																
62 per box, E5/16	0.36	0	* 5	* 16		* 34									3410	1228
13.Cold Box;4.4lt,w/out																
icepacks,Igloo, E4/73	24	0			* 100	* 34	* 438	240	*	*	* 833	* 1212	5096		7953	190872
14.Icepack for Igloo 4.4lt,																
18 per box, E5/16	0.36	0			* 100	* 34	* 438	240	*	*	* 833	* 1212	5096		143154	51535
15.Vacc.Day Carrier, 0.85lt																
Inalsa, E4/68	10.95	0						*480	* 136	* 90	*1666	* 2424	* 5096	* 44	9936	108799
16.Stem Thermometer,E6/27	1.4	0	* 10	* 40	* 100	* 85	* 438	*720	* 136	* 90	*2499	* 3636	*10192	* 44	17990	25186
b) IMMUNIZATION EQUIPMENT																
1.Syringe for BCG;																
0.05ml,disposable,1000	70	0						*300		*	*			* 50	350	24500
2.Syringe for Measles/DPT																
0.5ml,disposable,1000	120	0						*100		* 20	* 200	* 320	* 1360		2000	240000
3.Steam sterilizer kit;																
single rack, E9/08	77	0										*	* 300	*	300	23100
4.Steam sterilizer kit;																
double rack, E9/09	107	0								*	* 200				200	21400
5.Steril.syring kit A,E8/07	22	0										*	* 300	*	300	6600
6.Steril.syring kit B,E8/08	39	0								*	* 200				200	7800
7.Hardwater pad;sterilizers																
single/double rack; E10/4	21	0								*	* 100	*	* 150	*	250	5250
c) MAINTENANCE TOOLS/EQUIP.																
1:Tool kit,refrig repair,w/																
consumables & refrigerant	2500	0	*	5		* 17									22	55000
2.Cold chain Spare Parts;																
CIS refrigs;local purchase	10000	0	*	3											3	30000
Estimated Totals:																1828544

APPENDIX 13

MINISTRY OF HEALTH - KAZAKHSTAN

MEMBERS OF IMMUNIZATION PROGRAMME WORKING GROUP

1.	Asiya A. KURMANGALIEVA	- Assistant to the Deputy Minister for Sanitation & Hygiene (Chairperson)
2.	Prof.I.K. SHURATOV	- Director, Institute of Epidemiology, Immunology & Infectious Diseases
3.	Prof.B.V. KARALNYK	- Chief, Laboratory of Immunodiagnostics
4.	N.G.ZHAIKBAEV	- Chief, Laboratory of Childrens' Infectious Diseases
5.	Prof.K.O. OMAROVA	- Deputy Director, Scientific Research Institute of Paediatrics
6.	Rufina S. IVANOVA	- Deputy Chief Doctor, Republican SES
7.	Gulnara M. KEMBABANOVA	- Leading Specialist, SES Dept, MoH
8.	Tamara P. PALTUSHEVA	- Deputy Chief, MCH Dept, MoH
9.	Sofiya K. AYUPOVA	- Chief Paediatrician, MoH

APPENDIX 14

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