Improving the monitoring of immunization services in Kyrgyzstan

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Following the disbanding of the Soviet Union in 1991, the government of Kyrgyzstan was unable to maintain the previous level of health services. To revitalize the health services, the Ministry of Health (MOH) first focused on improving their immunization services, including the immunization component of the Health Management Information System (HMIS). Secondly, to increase immunization coverage, the MOH set as a priority the elimination of prescribing false contraindications to immunization. To accomplish both goals, the MOH updated the national immunization policies and established a more effective structure for managing immunization services. To support the MOH, the US Agency for International Development (USAID) Resources for Child Health (REACH) and Basic Support for Institutionalizing Child Survival (BASICS) projects provided technical assistance through a resident coordinator and consultants, and by organizing an international seminar. The improvements extended beyond systems and forms, but, instead, emphasized monitoring by the frontline health worker and supervising the quality of health information.

To accomplish their objectives, the MOH appointed a Working Group to define the problems, revise record-keeping procedures, and develop monitoring tools. This group, representing both national and local levels, was composed of MOH epidemiologists, paediatricians and a management information specialist. To reduce the burden of excessive record-keeping and reporting requirements, the Working Group identified four key indicators for the service delivery level: (1) DPT3 immunization coverage rates for children less than 1 year of age; (2) contraindication rates for DPT; (3) usage of DPT vaccine; and (4) daily refrigerator temperatures. Additional indicators were included at district and provincial levels. After a successful 1-year trial, the MOH implemented the revised HMIS nationally. Not only did the quality of the information system improve, but the new approach provided visible evidence, from facility to national levels, that the MOH was approaching their objective of reducing contraindication rates for DPT immunizations to 5% or less, and that vaccine wastage could be substantially reduced. The project demonstrated that giving health workers the basic epidemiologic skills to monitor their own work measurably improved the quality of the data, and by acquiring the new skills, the workers developed a sense of pride in their work.
government’s spending on health by 1994 was actually less than half the amount spent in 1990, due to the country’s deteriorating economic situation (Klugman and Schieber 1996). The termination of subsidies from Moscow and the problems of establishing a new economy, coupled with an inherited, inefficient health care system, resulted in shortages of vaccines and drugs, outdated equipment, impaired logistics, and an inability to pay health workers a living wage.

The Kyrgyz MOH maintains approximately 1390 health facilities, including 269 hospitals and 832 aid posts. There is infrequent supervision for the outlying health facilities. Although the infant mortality rate declined from 80 per 1000 live births in 1960 to 29.6 per 1000 live births in 1991, by 1996 infant mortality increased to 39 per 1000 live births (ITSI 1992; UNICEF 1998). Despite the extreme economic situation, the Kyrgyz MOH still provides widely accessible immunization services. For example, in 1996 the reported immunization coverage for children less than 1 year of age was 80% for measles vaccine and 82% for three doses of DPT (UNICEF 1998).

In March 1992, a USAID REACH staff member, visiting Kyrgyzstan to assess needs for immunization services, noted that neither the MOH immunization schedule nor the policy on contraindications conformed to WHO recommendations (Steinglass 1992). In response, the USAID REACH project organized a national seminar in December 1992 for international experts to exchange information on paediatrics and the vaccine-preventable diseases. After the seminar, the Kyrgyz MOH took steps to eliminate false contraindications and unnecessary booster doses; later, they took steps to improve their HMIS. USAID continued their assistance through their subsequent child survival project, BASICS.

The Soviet health care system

The health care system of the former Soviet Union achieved what many countries strive to achieve: universal access to health services and well-enumerated catchment areas (Tulchinsky and Varakova 1996). Local medical staff conducted house-to-house census in their catchment areas twice a year and kept detailed clinical records. As shown in Figure 2 (Diphtheria morbidity rate, 1955–98, Kyrgyzstan), the Soviet

![Figure 1. Kyrgyzstan](image1.png)

![Figure 2. Diphtheria morbidity rate, 1955–98, Kyrgyzstan](image2.png)
approach successfully controlled infectious diseases. However, the diphtheria epidemic which re-emerged in the early 1990s provides clear evidence of the breakdown of health care systems after the dissolution of the Soviet Union.

The Soviet health care model placed great emphasis on providing services, but the system directed less attention to routinely monitoring those services. Health workers followed directives from the top and reported upward. Epidemiologists compiled reports, but primarily for the next higher bureaucratic level. The tables generated from excessive data collection were too congested for any practical analysis or timely detection and action on problems.

Outdated policies and procedures further contributed to the needless data collection. For example, the immunization schedule under the Soviet system required four doses of BCG vaccine, while WHO recommends only one dose. Immunization policies required annual Mantoux testing and serologic monitoring to assess the level of immunity in communities. The outdated policies and redundant procedures not only required more clinical time and increased costs, but they also added to the workload of data collection and reporting.

Another disadvantage was separating the management of curative and preventive services. One wing of the MOH provided curative care, while another, the Sanitary Epidemiologic Stations (SES), focused on prevention and the collection of data on infectious diseases. Physicians treated patients while epidemiologists investigated outbreaks and implemented control measures. This inefficient approach for controlling disease was evident during the diphtheria epidemic in the early 1990s. As the epidemiologists investigated outbreaks to determine the contacts requiring prophylaxis, the physicians treated patients and administered prophylaxis independently. Without close coordination, the two groups could not monitor the status of the epidemic or the effectiveness of their control measures (Ion-Nedelcu and Molnar 1996).

Separating the responsibilities between curative and preventive services also increased missed opportunities to immunize children. Paediatricians liberally prescribed unnecessary contraindications against immunization, which left significant numbers of children unprotected, either by not immunizing the child or by delaying immunization (WHO 1995). Because reports of immunized children excluded those with contraindications, immunization coverage rates overestimated the actual level of protection in the population. Without the active coordination between epidemiologists and paediatricians, the problem of excessive contraindications went unchallenged.

Priorities for immunization services

To strengthen immunization services, the Kyrgyz MOH first established a more effective management unit. In 1994, the MOH joined the curative and preventive wings to form a unit to manage immunization services - the Republican Centre for Immunoprophylaxis (RCI). In their 1994-2000 plan, the RCI prioritized improving the information system for immunization services, specifically to simplify recording and reporting procedures, to collect only relevant information, and to decentralize decision making (Ministry of Health, The Kyrgyz Republic 1993).

The MOH also placed a high priority on eliminating unnecessary contraindications against immunization. To conform to WHO recommendations, the MOH issued a decree in March 1995 outlining their revised policy on contraindications. However, without consistent information on the contraindications being prescribed, the MOH could not monitor the effectiveness of their executive order.

The process

In November 1994, the RCI formed a multidisciplinary Working Group composed of national, oblast, and rayon epidemiologists, a paediatrician, and an MOH management information specialist. The seven members included government health staff and faculty from the medical teaching institutions. BASICS consultants and the BA SICS country coordinator were facilitators for the group but not leaders or decision makers. The RCI assigned specific tasks to the Working Group: assess the current information system, determine the indicators and methods for better monitoring immunization services, and identify the steps for introducing the changes into the health care system.

The Working Group first assessed the information system at different levels: the service delivery point, the first level of supervision (polyclinics), and the rayon epidemiologic stations. Their assessments in two rayons revealed the absence of standardized record keeping and reporting, and that monitoring, data analysis, and supportive supervision were not being practiced in health facilities or by the supervisors.

After identifying the problems, the Working Group determined the critical information needed to effectively monitor the immunization services, and, at the same time, reduce the burden of record keeping. They selected five key indicators: immunization coverage of children less than 1 year of age, contraindication rates, drop-out rates, vaccine usage and refrigerator temperatures. To minimize the burden of data collection at the service delivery level, the Working Group decided to monitor only one vaccine, DPT. Monitoring at the service delivery point included: third dose DPT coverage, contraindication rates for DPT, DPT vaccine stock, and refrigerator temperature. At the next higher level, additional indicators were added. For example, the rayon level also monitors the drop-out rate from BCG to the third dose of DPT. The oblasts monitor immunization coverage and vaccine usage for all the vaccines, plus the status of the cold chain equipment in the rayons.

To introduce these indicators and the practice of monitoring, the Working Group first modified the existing forms and records. They developed worksheets for each level and for each indicator so the medical workers could easily compile data and calculate rates. To apply the indicators through
visual monitoring, the group developed graphs that could easily be constructed by hand. To maintain quality assurance over immunization services, as well as the health information system, analytical supervision checklists were designed for the three supervisory levels: the polyclinic supervising the catchment area health posts, the rayon and the oblast. The checklists not only remind the supervisor about the critical elements of service delivery, but they also remind them to countercheck records with reports to determine the reliability of information. The checklists include columns for aggregating responses to determine scores, thereby allowing for judgement and comparison on performance between facilities and during subsequent visits. The final step before implementing training for the medical workers involved preparing the training manuals for the service delivery and supervisory levels.

In February 1995, the Working Group began a trial in one rayon. They trained 41 health facility staff on the revised records and forms and on monitoring techniques. Next, the Working Group trained the supervisors for 2 days on the same topics as the medical workers, plus analytical supervision. During the following months, the Working Group periodically visited health facilities to determine the effectiveness of the training and the necessary revisions for the materials and methods. By May 1995, the Working Group realized that the medical workers could readily adapt to the revised procedures and to the monitoring techniques; they also discovered that the medical workers were proud of their work and new responsibilities.

Based on the successful 1-year trial, the MOH introduced the revised HMIS nationwide. Donors provided approximately US$3000 for printing manuals and forms, and for training the trainers; the government provided the costs for training rayon and health facility staff. Since January 1997, all health facilities, rayons, and oblasts in the country have used the revised procedures and monitoring tools.

Assessing national expansion

Five months after national implementation, the Working Group conducted an assessment in four oblasts. They visited six rayons, one municipality, six health facilities supervising outlying service delivery points, and 21 service delivery points. For data collection, the assessment teams used the same supervision checklists as the medical workers.

Ninety-five percent (20/21) of the health posts maintained accurate, up-to-date records on their catchment areas and on monthly immunization service statistics. Of the 19 health facilities that had refrigerators, all but one facility had current and accurate records on vaccine stock. All facilities giving immunizations, except one with a broken refrigerator, had well-maintained and well-organized refrigerators with current temperature logs.

In the four oblasts visited, the MOH reached their goal to reduce contraindication rates to 5% or less; they documented their achievement with data and graphs. A few rural health posts had contraindication rates greater than 5%, but their low monthly denominators of fewer than five children caused high rates that were misleading. Five of the 21 health posts calculated contraindication rates incorrectly, but these errors were easily resolved during the visit and did not affect the aggregated contraindication rates for the rayons.

The nationwide assessment showed that supervision was still inadequate. Only two of the six health facilities' supervisors routinely used the supervision checklist. Only five of the 21 service delivery points (24%) could produce a copy of a completed checklist that documented a visit by a supervisor. Unfortunately, even with checklists available, few health workers used them for self-assessment.

The assessment teams concluded that the revised records and forms, and the inclusion of indicators concerning the information system as a part of supervision, enhanced the reliability of routine immunization reports. They also found that the quantitative scores from the supervision checklists generated considerable interest and motivation among health workers.

Because the effort to improve the HMIS involved revising and consolidating records, and introduced only one new, one-page form, the MOH’s information system budget did not increase. Based on the findings of the national assessment, the MOH decided to reinforce use of the supervision checklists and to re-emphasize self-assessment during future seminars and meetings.

Discussion

During the past 20 years, one of the authors observed several attempts to improve national health information systems in Africa and Asia. These projects worked toward developing more effective systems based on a country’s needs, but international consultants designed and directed the projects from the top, the national level. Intentions emphasized ‘using data at the point of collection’, but automation drove the efforts, not fundamental or manual analysis by the frontline health worker. The quality of the information going into the system received less attention than the end product – the monthly or quarterly report. Sustainability was not advanced by depending on external consultants to implement change or by using external financial resources to develop an ‘ideal’ computerized system.

The Kyrgyz followed a genuine ‘bottom up’ approach, starting with assessment and continuing through training at the base of the health information system, the health post. Their design included easily calculated, graphical indicators. Instead of introducing a new or automated system, they revised existing forms, records, and procedures. They first concentrated on building a reliable foundation; then, in the final phase, they incorporated the national level. The Kyrgyz HMIS Working Group focused their attention on the people collecting the data – the health workers – not only to advance the quality of information but also to encourage timelier detection and reaction to problems.

MOHs and donors emphasize routine supervision over health services. Yet, little attention is directed at the routine supervision of health information systems. The supervision
checklists developed in Kyrgyzstan not only remind health workers about the critical factors for giving safe and effective immunizations, but also remind them to compare their records with the reports. By spot-checking recorded information with reported information, the supervisor can easily assess the reliability of health facilities’ reports. Health workers can also use the supervision checklist to review their own performance rather than wait for the rare visit by their supervisor. Furthermore, the analytical and quantitative format of the checklists provides clear feedback and motivation for both the supervisor and the health worker.

In many countries, health workers rarely receive adequate wages and have little chance for advancement. In Kyrgyzstan, health workers showed pride and enthusiasm over opportunities to display their work and to make decisions based on the information they collect. As one local epidemiologist described, ‘...monitoring changes our role from mere executors to masters of our work.’ The Kyrgyz experience demonstrates one non-monetary, but important, incentive. The additional attention by the MOH and supervisors on collecting and using information, and on providing quality services, energized the health workers. This valuable lesson was also demonstrated in Indonesia where training in epidemiology for provincial-level health staff resulted in more relevant information for local planning and problem solving, and also promoted the health workers’ self-confidence (Solter et al. 1986).

As illustrated in Figures 3 and 4, contraindication rates declined significantly during the 12-month trial period in 1995, as well as during the subsequent year, reducing the Rayon’s contraindication rate from 17% in 1995 to only 5% in 1996. After nationwide implementation in January 1997, the national rate had fallen to only 1.2% by June 1998. Even though an MOH decree in March 1995 ordered physicians to reduce the number of contraindications, monitoring contraindication rates probably contributed to reducing contraindications by continuously drawing attention to the problem at every level. Without monitoring, the MOH would never know if its order had been successful.

Achieving changes in policy and practices through monitoring was also evident in another country following a similar approach for improving their HMIS. The trial oblast, in a USAID BASICS and Program for Appropriate Technology in Health (PATH) health information and management reform project in Ukraine, also showed a high rate of 16% for contraindications at the beginning of the project, with a distinct decline to 8% after 12 months of active monitoring (Weeks 1998). Unlike Kyrgyzstan, however, the Ukraine MOH had not issued a new national policy on contraindications. Nevertheless, the discussions on contraindications that evolved during training to introduce revisions to the information system and the practice of maintaining up-to-date graphs on contraindications rates, no doubt increased the medical workers awareness of unnecessary contraindications. Presenting these data from the trial oblast to national health authorities convinced the authorities of the magnitude of the problem of unnecessary contraindications.

With the severe economic difficulties confronting many countries, a reliable information system that detects problems locally and promotes cost-effective services is essential.

![Graph](https://example.com/graph.png)

**Figure 3.** Percentage of infants with contraindications to DPT, by month, catchment area A, A lamudin rayon, Kyrgyzstan
As an example, after comparing 1995 and 1996 vaccine usage ratios (the number of doses of vaccine used to give one immunization), the Alamudin rayon SES clearly demonstrated to the MOH and donors the cost saving advantage of providing vaccines in vial sizes appropriate for immunization session attendance. The local epidemiologist, after observing high vaccine usage ratios, conducted a follow-up investigation and clearly documented that a large donated supply of vaccine in 20 dose vials, with a short expiration date, resulted in excessive vaccine wastage. In the following year, as shown in Figure 5, a change to 10 dose vials reduced vaccine wastage by half.

Giving local staff basic epidemiologic skills to monitor and assess their own work can be threatening to those at higher levels. The added responsibilities for subordinates may be seen as a loss of control and professional prestige. In Kyrgyzstan, changing the practices by the local medical staff also involved ensuring ownership at the national level. To encourage participation and ownership by the national level, the project funded visits by health officials from other oblasts to observe the new HMIS in the trial rayon. Visits were also supported for MOH officials from other central Asian countries to observe Kyrgyzstan’s new approach for using information, as well as a visit by Kyrgyz MOH officials to another country to share their experiences. The project also promoted the inclusion of the Kyrgyz experience in the agenda at international meetings. These activities generated pride for the MOH, a critical factor for sustainability.

Improving the health information system in Kyrgyzstan required a lengthy and interrelated process, including: (1) changing national policies; (2) establishing a more effective management structure; and (3) building a participatory process for implementing change. Directing attention to the information system alone would not have produced the desired outcome. A more effective management structure had to be established to initiate, oversee and coordinate the effort, as well as to ensure optimal use of the information after reform. Obtaining consensus among the varying opinions of epidemiologists, clinicians and specialists necessitated repetitive group discussions over many months. Producing clear, concise instruction manuals required 6 months of field-testing and meticulous revisions. However, the evolution of a strong sense of ownership at both the national and local levels and the high quality of the simplified materials promoted national expansion and sustainability.

The health workers in Kyrgyzstan readily accepted change because the existing records, forms, and practices were revised, not recreated; the streamlined record keeping reduced their workload. In addition to simplifying the system and the low maintenance cost, the emphasis placed on use of the data by the frontline health worker contributed to the success of this initiative. The Kyrgyz HMIS Working Group learned that introducing the practice of routine monitoring at all levels was more valuable than the actual revisions to the system. Incorporating simple monitoring tools into the health information system advanced the local use of the data, which, in turn, resulted in more reliable information for planning, monitoring and supervising immunization services.
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Acknowledgements

The authors would like to thank Drs Glinenko Victor, First Deputy Minister, and Abykarimov Sabyrjan, Director, Department of State Sanitary Epidemiologic Surveillance, Ministry of Health, the Kyrgyz Republic for their support during the project and national expansion. The improvements in the HMIS in Kyrgyzstan and this paper would not have been possible without the dedication of the HMIS Working Group members: Dr Sogomonyan Eduard, Kyrgyz Research Institute of Medical Ecology and Prophylaxis; Dr M. Khalchenko Vera, Epidemiology Department, Alamudin Rayon Sanitary and Epidemiologic Station; Dr Akmatov Kuvatbek, Medical National Academy; and Dr Gjoldosh Kallov, Republican Center for Immunoprophylaxis. The authors are grateful to the following USAID/BASICS staff for their review and contributions to the draft manuscript: Robert Steinglass, Rebecca Fields and Lora Shimp. The authors also appreciate the valuable editorial assistance from Pat Shawkey.

BASICS is a global child survival project funded by the Office of Health and Nutrition of the Global Programs, Field Support and Research of the US Agency for International Development, contract number HRN-C-00-93-00031-00, formerly HRN-6006-C-00-3031-00. The work from which this paper evolved was funded by the USAID Global Bureau and the USAID Europe and Eurasia Bureau, and also by the former USAID REACH project, contract number DPE-5982-Z-00-9034-00. The BA SICS Project is implemented by the Partnership for Child Health Care, Inc. Partners are the Academy for Educational Development, John Snow, Inc., and Management Sciences for Health. Subcontractors are the Office of International Programs of Clark Atlanta University, Emory University, the Johns Hopkins University's School of Hygiene and Public Health, Porter-Novelli and Program for Appropriate Technology in Health.

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