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# The Expanded Program on Immunization in Pakistan

## Recommendations for improving performance

Tayyeb Masud and Kumari Vinodhani Navaratne

April 2012





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## Health, Nutrition and Population (HNP) Discussion Paper

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# Health, Nutrition and Population (HNP) Discussion Paper

## **The Expanded Program on Immunization: *Recommendations for Improving Performance***

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This paper is based on the findings identified by the independent assessment of Pakistan's Expanded Program on Immunization. This assessment was carried out between January and June 2011 by independent local and international teams. The assessment was funded by the Global Alliance for Vaccines Initiative.

World Bank, Islamabad, Pakistan, April 2012

### **Abstract:**

The Expanded Program on Immunization (EPI) in Pakistan protects against eight vaccine-preventable diseases and immunizes children below 23 months of age. The program was implemented under the Ministry of Health (MOH) until July 11, 2011, when Amendment 18 to the constitution devolved health as a subject completely to the provinces. Currently, the EPI is managed and implemented at the provincial level with coordination provided by the Ministry of Inter Provincial Coordination.

During the last decade, EPI performance has been stagnant with only 40–60 percent of children receiving the vaccines age-appropriately. Vaccine preventable diseases are still a major cause for the high infant and child mortality rates in Pakistan. Evidence suggests that underachievement of the EPI is due to a combination of factors including; inadequate performance in the areas of service delivery, program management, monitoring and evaluation, logistics control, human resources management and financing, as well as community health-seeking behaviors and other demand-side issues.

An assessment of the EPI was conducted at the request of the Secretary of Health, Government of Pakistan from January to June 2011, by a group of independent local and international experts. The assessment provided recommendations to improve program performance in the short and medium terms within the context of the newly devolved health sector.

The recommendations include (i) increasing focus on supervision, monitoring and evaluation, (ii) considering performance-based incentives, (iii) exploring partnerships with the private sector, (iv) expediting polio eradication initiatives, (v) improving management, (vi) increasing targeted capacity development, (vii) concentrating on the target age group for immunization, (viii) developing socially acceptable strategies, (ix) developing a human resource strategy and implementation plan, and (x) improving planning at the local level.

**Keywords:** Expanded Program on Immunization, Pakistan, Program Performance, Coverage.

**Disclaimer:** The findings, interpretations, and conclusions expressed in the paper are entirely those of the authors, and do not represent the views of the World Bank, its Executive Directors, or the countries they represent.

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## FOREWORD

Providing immunization for the control and prevention of vaccine preventable diseases is one of the most important and cost effective strategies implemented by any national health program. Evidence has shown that the benefits of investing in a national program on immunization far exceed investing in treatment for these illnesses.

In Pakistan, the Expanded Program on Immunization aims to immunize all children between 0 and 23 months against eight vaccine preventable diseases that include infant tuberculosis, poliomyelitis, diphtheria, pertussis, neonatal tetanus, hepatitis B, Haemophilus influenza type b (Hib), and measles.

Pakistan has had to face multiple challenges over the last decade, including natural and man-made disasters, as well as an unstable macroeconomic situation. The Government of Pakistan (GOP) has made significant effort to provide relief to millions of displaced people affected by these emergencies.

The challenge for Pakistan is to strengthen the health system and improve performance of the routine EPI coverage from the stagnant low rates that prevail at present, and achieve and maintain high rates of coverage during the supplementary immunization activities for achieving polio eradication.

Amendment 18 to the Constitution of Pakistan was implemented in July 2011, allowing for a devolution of authority from the federal to the provincial level with the elimination of the so-called “Concurrent List,” an enumeration of approximately forty areas where federal law prevailed, including the health sector, which is now fully devolved to the provinces.

Cognizant of the challenges inherent in implementing the amendment, GOP requested the World Bank to conduct a review of EPI to provide them with guidelines and policy recommendations to improve program performance.

This paper is a response to this request. The recommendations presented provide valuable suggestions for improving the performance of the EPI program. This paper should be reviewed by interested policy makers and public and private health care providers, especially at the province level, who are committed to improving the performance of the EPI in Pakistan.

Julie McLaughlin  
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## TABLE OF CONTENTS

TABLE OF CONTENTS .....	VI
ACKNOWLEDGMENTS .....	VIII
ABBREVIATIONS .....	IX
EXECUTIVE SUMMARY .....	X
<i>Introduction</i> .....	<i>x</i>
<i>Summary of Findings</i> .....	<i>x</i>
<i>Summary of Recommendations</i> .....	<i>xi</i>
<i>Conclusions</i> .....	<i>xiv</i>
BACKGROUND AND INTRODUCTION .....	1
<i>Introduction</i> .....	<i>1</i>
<i>Health Delivery Model</i> .....	<i>1</i>
<i>Immunization Program</i> .....	<i>2</i>
<i>Management of the EPI</i> .....	<i>2</i>
<i>Devolution and the Immunization Program</i> .....	<i>3</i>
<i>Rationale for the Review</i> .....	<i>4</i>
<i>Structure of the Report</i> .....	<i>4</i>
SECTION ONE .....	5
PERFORMANCE OF THE EXPANDED PROGRAM ON IMMUNIZATION .....	5
<i>Variations in EPI Coverage</i> .....	<i>5</i>
<i>Age-appropriate Immunization</i> .....	<i>6</i>
<i>Service Delivery Options</i> .....	<i>6</i>
Fixed centers versus outreach services .....	<i>6</i>
Door-to-door .....	<i>7</i>
Campaigns .....	<i>7</i>
<i>Program Performance</i> .....	<i>7</i>
<i>Incentives and Performance-based Financing</i> .....	<i>8</i>
<i>Private Sector Contributions</i> .....	<i>9</i>
<i>Monitoring and Evaluation (M&amp;E) System</i> .....	<i>9</i>
Routine monitoring of immunization program .....	<i>9</i>
SECTION TWO .....	11
MANAGEMENT OF IMMUNIZATION SERVICES .....	11
<i>General Management</i> .....	<i>11</i>
<i>Roles and Responsibilities at Various Levels</i> .....	<i>11</i>
<i>District Commitment</i> .....	<i>12</i>
<i>Accountability and Political Influence</i> .....	<i>12</i>
<i>Planning</i> .....	<i>12</i>
<i>Leadership</i> .....	<i>13</i>
<i>Integration</i> .....	<i>13</i>
<i>Disease-specific issues</i> .....	<i>14</i>
SECTION THREE .....	15
HUMAN RESOURCES .....	15
<i>Human Resources at Various Levels</i> .....	<i>15</i>
<i>Human Resource Development and Capacity</i> .....	<i>16</i>
<i>Human Resource Redistribution at UC Level</i> .....	<i>16</i>
<i>Strategic Use of Vaccination Staff</i> .....	<i>16</i>



<i>Management Issues Related to Human Resources</i> .....	17
SECTION FOUR .....	19
LOGISTICS .....	19
<i>Logistics Procurement and Management</i> .....	19
<i>Cold Chain Maintenance and Repair</i> .....	20
<i>Cold Chain Monitoring</i> .....	21
SECTION FIVE .....	22
FUNDING .....	22
<i>Federal Financing</i> .....	22
<i>Funding at the Provincial Level</i> .....	22
<i>Funding at District Level</i> .....	23
<i>Financing from International Partners</i> .....	23
<i>Funding and Procurement of New Vaccines</i> .....	25
SECTION SIX .....	27
DEMAND .....	27
<i>From a Consumer's Perspective—Impediments</i> .....	28
SECTION SEVEN .....	29
RECOMMENDATIONS .....	29
<i>Enhancing the Performance of EPI</i> .....	29
Interprovincial Coordination .....	29
Planning .....	29
Integration .....	30
Service provision options .....	31
Performance-based incentive and extra payments .....	31
Campaigns .....	32
<i>Logistics</i> .....	32
Cold chain .....	32
Vaccine logistics .....	33
<i>Leadership and Good Governance</i> .....	33
<i>Human Resources</i> .....	34
Human resource development strategy .....	34
<i>Supervision and Monitoring</i> .....	34
Planning .....	34
Recurrent expenses .....	34
Human resources for supervision .....	35
<i>Finance</i> .....	35
<i>Monitoring and Evaluation</i> .....	36
Data quality assessment .....	36
Feedback .....	36
Data reporting .....	36
Reviews .....	36
Target population estimation .....	37
<i>Surveillance</i> .....	37
<i>Demand for Services</i> .....	37
<i>New Vaccines</i> .....	38
BACKGROUND DOCUMENTS REVIEWED .....	39

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The World Bank received grant resources from the Global Alliance for Vaccines and Immunization (GAVI) to conduct an independent assessment of the EPI Program in Pakistan. The authors are most grateful to the GAVI and the GAVI Trust Fund managers who provided the resources.

## ABBREVIATIONS

AFP	Acute Flaccid Paralysis
BCG	Bacille Calmette-Guérin vaccine
BHU	Basic Health Unit
DFID	Department for International Development
DOH	Department of Health
DTP	Diphtheria Tetanus Pertussis vaccine
DQA	Data Quality Assessment
EPI	Expanded Program on Immunization
GAVI	Global Alliance for Vaccines and Immunization
GOP	Government of Pakistan
HepB	Hepatitis B vaccine
Hib	Haemophilus influenza type b
ICC	Inter-agency Coordination Committee
IDP	Internally displaced person
ILR	Ice-lined refrigerator
IMCI	Integrated Management of Childhood Illness
JICA	Japan International Cooperation Agency
LHW	Lady Health Worker
M&E	Monitoring and Evaluation
MCH	Maternal and Child Health
MDGs	Millennium Development Goals
MNT	Maternal and Neonatal Tetanus
MOH	Ministry of Health
MOIPC	Ministry of Inter Provincial Coordination
NID	National Immunization Day
NNT	Neonatal Tetanus
PC-1	Planning Commission Form 1
PCV	Pneumococcal Vaccine
PHC	Primary Health Care
PEI	Polio Eradication Initiative
POL	Petrol/ Oil/ Lubricants
PPHI	Peoples Primary Healthcare Initiative
RI	Routine Immunization
SIA	Supplemental Immunization Activity
SNID	Sub-National Immunization Days
TA/DA	Travel allowance/Daily allowance
TB	Tuberculosis
TT	Tetanus Toxoid
UC	Union Council
UN	United Nations
UNICEF	United Nations Children's Fund
VPD	Vaccine Preventable Diseases
WHO	World Health Organization

## EXECUTIVE SUMMARY

### Introduction

The national Expanded Program on Immunization (EPI) aims to immunize all children between 0 and 23 months against eight vaccine preventable diseases that include infant tuberculosis, poliomyelitis, diphtheria, pertussis, neonatal tetanus, hepatitis B, Haemophilus influenza type b (Hib), and measles.

Immunization coverage in Pakistan has stagnated. The proportion of children who are fully immunized is approximately 43 to 62 percent (depending on the survey and year).

Pakistan has faced multiple challenges over the last decade including both natural and man-made disasters, and macroeconomic instability. These events have displaced large population groups across the country, and challenged the system to ensure access and service delivery.

On top of this, there is major political reform in progress. Amendment 18 became law on April 8, 2010, and is now in the process of enactment. This means that much of the management of health services including immunization has been devolved to the provinces. There are concerns about the capacity of provincial governments to assume effective authority in health. While technical responsibility for the EPI at the federal level has been moved to the Ministry of Inter Provincial coordination (MOIPC), the extent to which federal roles like policymaking, oversight, and monitoring and evaluation will be managed by this unit remains unclear. As a result, different provinces could end up implementing province-specific immunization schedules, administer different vaccine preparations, and employ disparate combinations of strategies. Despite these concerns, the Amendment is a stimulus, particularly to provincial managers. It provides an opportunity for enhanced EPI management to achieve increased coverage and reduced deaths and illness episodes from vaccine-preventable diseases (VPDs).

The challenge for Pakistan is to improve the stagnant low rates of routine immunization coverage while achieving and maintaining high rates of coverage in the Polio campaigns. Cognizant of the challenge, the Government of Pakistan (GOP) requested the World Bank to conduct a review of the EPI and offer recommendations to improve the program's performance.

The current paper is a response to this request. It is based on an independent analysis of the EPI. It makes recommendations to improve the program's performance in Pakistan.

### Summary of Findings

**In the last two decades the EPI program has not achieved the expected reduction of Vaccine Preventable Disease (VPD) burden.** One reason for the poor performance was the reduced focus on EPI (funding and technical assistance) in relation to other specific campaigns (for example, polio). In addition, reduced attention to capacity building of

available human resources on local-level planning, management, logistics, and monitoring, evaluation and surveillance have resulted in poor EPI performance. Further, the management of the program has deteriorated due to increased political interference over the last decade.

**Poor capacity of EPI human resources has contributed significantly to its poor performance.** The EPI program has not been able to sustain its human resources for several reasons. These reasons include poor worker motivation due to low remuneration, political interference, and underutilization of available human resources (for example vaccinators and Lady Health Workers [LHWs]), reduced opportunities for in-service and other capacity building of staff on logistics and monitoring, evaluation, and surveillance. Further worker fatigue due to polio and other regularly conducted campaigns have reduced the time available for EPI. These factors have resulted in overall underperformance of the EPI.

**Procurement of vaccines and other required items, cold chain monitoring, and maintenance of equipment within the EPI is poorly managed.** The procedures and mechanisms needed to manage the logistics system within the limited available resources have been cumbersome. With the implementation of Amendment 18 in July 2011, and given the possibility of limited resources, the poor capacity of the provinces for procurement may result in stock-outs, poor quality vaccines, and overall negative effects on the outcomes.

**The EPI is under-resourced to achieve expected results.** The EPI is too underfinanced to provide a comprehensive immunization service to the community. Additional resources are needed for vaccines, logistics, recurrent expenses, human resource expansion, capacity building, training, and social mobilization.

**Demand by the communities for immunization services is variable.** Some communities expect door-to-door service by female staff while some others categorically reject immunization. The gap in immunization knowledge among the community impedes them from actively seeking immunization services.

### **Summary of Recommendations**

The EPI needs drastic changes to improve its performance. This is a complex, multifaceted task. Some of the short- and medium-term key recommendations in the main report are summarized below.

**Interprovincial coordination and collaboration needs to be strengthened.** Coordination between provinces to decide on program targets, aspects of policy, and inter-province learning is highly recommended. This can be achieved by setting up a functional interprovincial EPI committee coordinated and managed by the EPI cell of the MOIPC.

**A situational analysis of the EPI should be carried out in each of the provinces.** This assessment could include coverage, mapping of difficult-to-reach populations and fixed service points. The available human resources, logistical demands, funding, and demand aspects of the program should also be included. This assessment could be led and managed by the EPI program manager at the province level with technical assistance from development partners (if necessary).

**There should be an EPI implementation plan for each district within each province.** The plan should consider and address each of the program gaps identified by the situational assessment.

**The responsibility for planning should be delegated to the union council (UC) and district-level staff under the direction of the provincial EPI manager.** This approach is expected to ensure ownership of the program, use local knowledge, and help to make more realistic estimates of eligible children. Appropriate capacity building and guidance will need to be provided to these local teams by the relevant EPI managers.

**Immunization services should be integrated in primary health care (PHC) at point of delivery.** The present process of devolution to the provinces offers an ideal opportunity to consider ways of integrating routine immunization with other PHC modalities, staff categories, and other service providers at the provincial level. Some of the available options include (i) integration of immunization services with maternal and child health (MCH), integrated management of childhood illnesses (IMCI) programs; (ii) integration of immunization with the peoples primary health care initiative (PPHI) model; and (iii) integration of immunization services with the private sector.

**Access to immunization needs to be improved with a well laid out network (geographically demarcated) of fixed centers.** The province should develop a comprehensive plan to expand the number of fixed centers to cover all communities. This could be coupled with a reorganization of outreach services to address hard-to-reach areas, especially in high-risk districts.

**The logistics system should be improved.** Vaccine vial monitors and other cold chain monitoring tools should be introduced to improve the quality of the vaccines. Furthermore, vaccine procurement capacity and cold chain equipment maintenance as well as back-up power systems are all in need of improvements.

**Leadership and good management should be fostered through appropriate training and by example.** Management qualifications should be mandatory for appointment to managerial positions. In-service management training for mid-level managers should be offered regularly and made mandatory for all levels of EPI managers. Funding for this course to be offered regularly in each province should be sought either from the Government of Pakistan (GOP) or from development partners.

**Human resources need to be remapped.** With devolution, the roles of the new federal EPI cell at the MOIPC, of the provincial EPI cells, and of the district cells have changed.

The units should assess their new roles, adjust the staffing structure and incentives, and retrain the staff where necessary to provide the services at each level. This may require the creation of some new cadre positions.

**Mechanisms for staff motivation need to be institutionalized.** All categories of staff should be offered incentives for good performance. Individual or team incentives can include excellence awards, appreciation notes, salary increments, or cash. Further, opportunities for in-service training should be expanded with transparent selection processes.

**Supervision and monitoring should be restructured.** All categories of staff should be encouraged to prepare monthly plans for supervision beforehand, and seek pre-approval at the monthly conference of EPI staff. Managers at all levels must closely monitor the completion of supervision by lower-level staff. This can be carried out by on-site spot checks on the staff based on the program submitted in advance and also by assessing performance at the EPI review conference.

**Essential additional recurrent expenses should be provided either through the budget or from donors.** The allocated budget for recurrent expenditures at the district level is insufficient and additional recurrent funds are needed to increase site visits by supervisory staff for supervision and monitoring of the EPI.

**The LHWs should be better utilized to improve routine immunization services.** Provinces should explore creatively an expanded role for the primary health care workers (especially the LHW) to assist in immunization coverage. As LHWs originate from the communities they serve, their services are particularly valued in those areas. Therefore, as an initial phase, a remapping of LHWs should be conducted across the entire country, especially the uncovered rural and urban poor population areas. This task needs to be led by the province EPI manager in consultation with the planning and administrative units at the province level.

**Financing of the EPI should be reviewed.** As part of the transition following Amendment 18, provincial and area departments of health should activate their new role by beginning immediately to plan fiscal responsibilities. The financial plan should incorporate the additional funding needed (i) to strengthen supervision and monitoring of the routine immunization program; (ii) for costs of improving capacity of EPI staff at the province, district, and UC levels; and (iii) for the increased costs from remapping of staff categories. Partner support could be sought for obtaining increased funding.

**Monitoring, evaluation, and surveillance system of the EPI needs to be strengthened.** It is recommended that existing systems for assessing data quality, feedback, supervision, regular reviews, surveillance of VPDs, data reporting formats and methods for target population estimation should be improved.

**The demand for immunization services needs to be increased.** As the public regularly raises questions and concerns about the advantages of immunization, it is essential to provide accurate information to the communities on immunization. Therefore, it is

recommended that increased efforts and additional resources are allocated to educate the public about the benefits of routine immunization services.

## **Conclusions**

The target population for Pakistan's national immunization program is huge, and millions of doses of vaccine are delivered successfully by government services every year. None the less, as many as 40 percent of the children below five years remain unimmunized or under-immunized, particularly in the poor and rural sections of the country. There are tremendous challenges to overcome in delivering these services, not least, the sheer numbers involved.

This report analyzes the existing situation of Pakistan's EPI. It highlights gaps in program performance and the areas that require strengthening with the implementation of Amendment 18 of the Constitution of Pakistan. The report provides short- and medium-term recommendations for implementation. It is believed that if the recommendations are positively received and implemented over the next five years, Pakistan would improve performance of its EPI. It could achieve higher levels of coverage and larger reductions of deaths and illness episodes due to VPDs in children below five years.



## BACKGROUND AND INTRODUCTION

### Introduction

Pakistan has faced multiple challenges over the last decade, including natural and man-made disasters, as well as an unstable macroeconomic situation. Rising militancy and a critical law-and-order situation have left about 2 million persons internally displaced. The earthquake in 2005 caused over 75,000 deaths and massive infrastructure damage. The unprecedented floods in 2010, which hit all parts of the country, affected close to 20 million people and displaced almost 8 million. There is significant malnutrition, and in affected areas the morbidity and mortality remain incompletely documented. Government and development partners' funds have, necessarily, been diverted to address the needs of those affected. In responding to these crises, special immunization activities have been mounted to prevent outbreaks of measles in the internally displaced persons (IDP) camps.

Pakistan does not have unlimited resources to meet these vast demands; hence there is competition for the resources that are available. Traditionally, at the federal and provincial levels, Pakistan's immunization program managers have actively engaged in the budget process to ensure that appropriate funds were allocated at each administrative level to immunization as part of the health budget. If needed, they have also sought ways to attract additional funds to the program from extra budgetary sources such as bilateral donors as well as from domestic sources within the country including civil society. In addition, they have engaged with other program managers to explore ways of integrating elements of routine immunization with other primary health care initiatives.

### Health Delivery Model

Pakistan has an extensive health care–delivery system consisting of a mix of both public and private sectors. primary health care services are offered through a network of basic health units (BHUs) and sub health centers (5,310), rural health centers (561), maternal child health centers (879), and dispensaries (4,794). Secondary and tertiary care services are provided through *tehsil/taluka*, district, and teaching hospitals (948). In 78 districts (more than 50 percent of the districts in Pakistan), the BHUs function as a public-private partnership arrangement managed by civil servants on secondment to rural support organizations (RSOs) under the Peoples Primary Healthcare Initiative (PPHI). The public sector also provides preventive services through vertical programs, for example, EPI, TB Control Program using DOTS strategy (TB-DOTS), National Program for Family Planning and Primary Healthcare (commonly called LHWs Program), AIDS Control Program, Malaria Control Program (through Roll-Back Strategy), Nutrition Program, and Reproductive Health Program: (managed fully by the federal level until 2001 and partially until July 2011, since then completely by the provincial level). There is also a large network of medical practitioners and approximately 12,000 registered civil society organizations (CSOs) in the country providing a significant proportion of primary health care services.

## Immunization Program

The Expanded Program on Immunization (EPI) has existed for nearly thirty years. The basic objective of the program is to reduce death, disease, and disability due to vaccine-preventable diseases (VPDs), and to contribute to the strengthening of national health systems and the attainment of Millennium Development Goal 4 (MDG-4).<sup>1</sup>

EPI services are provided most exclusively through the public health delivery network through fixed centers and outreach services. The centers are managed by vaccinators with support from lady health workers (LHWs), BHU and other hospital staff; some of the EPI centers in the PPHI-managed basic health units are managed by vaccinators with limited assistance from the BHU staff.

Table 1. EPI Schedule		
Age	Vaccines	
At birth	BCG and OPV 0	
6 weeks	OPV 1	Pentavalent 1
10 weeks	OPV 2	Pentavalent 2
14 weeks	OPV 3	Pentavalent 3
9 months	Measles	
Second year of life	Measles	

Source: Federal EPI Cell

The EPI currently aims to immunize all children between 0 and 23 months against eight vaccine-preventable diseases that include infant tuberculosis, poliomyelitis, diphtheria, pertussis, neonatal tetanus, hepatitis B, Haemophilus influenza type b (Hib), and measles (table 1).

Immunization coverage in Pakistan has stagnated over the last decade.. Table 2 provides information on childhood immunization coverage from various surveys conducted in Pakistan. The data indicates that the different surveys report widely varying results, most likely due to different survey methodologies, including differences in questionnaire design. Based on the Pakistan Demographic and Health Survey (PDHS) findings, the coverage rate increase between 1990 and 2006/07 has been marginal from 35 percent to 47 percent.

## Management of the EPI

The National Immunization Technical Advisory Group (NITAG) at apex level assisted the federal EPI cell, Ministry of Health, and Inter-agency Coordination Committee (ICC) by providing evidence-based policy direction on various immunization-related issues. NITAG is an independent group headed by a senior and widely respected core member

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1. Government of Pakistan, Ministry of Health, *National Health Policy*, (Islamabad, 2001).

who has no affiliation with any government office or any other interest group. The NITAG and ICC guide the EPI cell to make changes in the program as necessary.

<b>Table 2. Trends in Vaccination Coverage Percentage of Children Age 12–23 Months Who Received Specific Vaccines, Pakistan</b>									
Name of survey	BCG	DPT			Polio			Measles	Fully immunized
		1	2	3	1	2	3		
PDHS (1990-	69.7	64.1	60.0	42.7	64.8	60.5	42.9	50.2	35.1
PIHS (1995-96)	73.0	73.0	64.0	58.0	71.0	65.0	58.0	47.0	45.0
PIHS (1996-97)	76.0	76.0	70.0	63.0	80.0	76.0	67.0	49.0	49.0
PIHS (1998-99)	65.0	67.0	63.0	58.0	77.0	76.0	70.0	55.0	49.0
PIHS (2001-02)	67.0	71.0	76.0	63.0	68.0	91.0	89.0	57.0	53.0
PSLM (2004-	82.0	82.0	81.0	80.0	82.0	81.0	81.0	78.0	77.0
PSLM (2005-	82.0	81.0	79.0	77.0	99.0	97.0	96.0	76.0	71.0
EPI (2006)	77.7	74.6		64.5	73.7	68.9	64.4	62.6	56.8
PDHS (2006-	80.3	74.8	66.5	58.5	93.0	90.6	83.1	59.9	<b>47.3</b>
PSLM (2006-		85.0	83.0	82.0	86.0	85.0	84.0	77.0	76.0
PSLM (2007-		83.0	81.0	79.0	95.0	94.0	93.0	76.0	73.0
PSLM (2008-		87.0	85.0	84.0	83.0	82.0	81.0	79.0	78.0
<i>Sources:</i> PDHS 2006/07, PSLM 2007/08, and PSLM 2008/09; PIHS—Pakistan Integrated Household Survey; PSLM—Pakistan Social and Living Standards Measurement Survey; PDHS—Pakistan Demographic and Health Survey.									

## Devolution and the Immunization Program

Prior to 2001, Pakistan followed a federally/provincially managed structure to deliver health services. In 2001, some of the powers were devolved to the district governments. The EPI was integrated into district-level preventive programs. In contrast to pre-devolution arrangements, the financial allocation to EPI was not earmarked and was within the general pool of resources annually allocated to the health sector at district level. The change in the pattern of resource allocation badly impacted the performance of routine immunization. Conversely, during the same time, the national immunization days/sub national immunization days (NIDs/SNIDs) received more prominence as donors and UN agencies (UNICEF/WHO) fully financed all activities related to polio eradication at all levels. The monitoring of routine immunization activities at the province and national levels was also reduced because of devolution of health to the district governments.

Amendment 18 of the Constitution was passed by the National Assembly of Pakistan on April 8, 2010. As a result, most functions of the federal Ministry of Health were devolved to the provinces with effect from July 2011. Of particular relevance to this paper, the bill enhances provincial autonomy. It devolves authority from the federal government to the provinces and eliminates the “Concurrent List” in about forty areas including health, a sector that is now fully devolved to the provinces. This means that much of the management of health services including immunization has been devolved to the

provinces. The provinces are also expected to plan and manage their own provincial budgets for the EPI.

There are concerns about the ability of provincial governments to assume effective authority in health. While at the federal level, a Ministry of Inter Provincial Coordination (MOIPC) has been strengthened and some federal Ministry of Health (MOH)–managed units have been moved under its jurisdiction, it remains unclear whether the policy, oversight, regulatory, monitoring and evaluation functions are managed by this ministry. As a result, there is a possibility that the different provinces could end up implementing province-specific immunization schedules, administer different vaccine preparations, and use different combinations of strategies. Further, the existing staffing structures of the EPI cell in the MOIPC and provincial EPI sections have serious shortcomings.

Still, the devolution is nonetheless a stimulus and provides a special opportunity to managers, particularly at the provincial level, to reexamine the management of the immunization program .

### **Rationale for the Review**

The challenge for Pakistan is to strengthen the health system and improve the performance of the routine EPI coverage from the currently stagnant low rates, while maintaining high rates of coverage in the supplemental immunization activities (SIAs) within the devolved health structure. Cognizant of the challenge, the GOP requested the World Bank to conduct a review of EPI to provide them with policy and strategic options to improve the program's performance. The current paper is a response to this request and has been conducted as an independent analysis to provide policy and strategic options that can be implemented to enhance the program's performance in Pakistan.

This is also an opportune time to consider provinces' response in light of Amendment 18, mindful that the authority and responsibility for immunization has been devolved to the provincial governments.

### **Structure of the Report**

The findings are presented in six sections, followed by a conclusion, and lastly, some policy guidelines and recommendations for the provincial departments of health to consider for improving the immunization program.

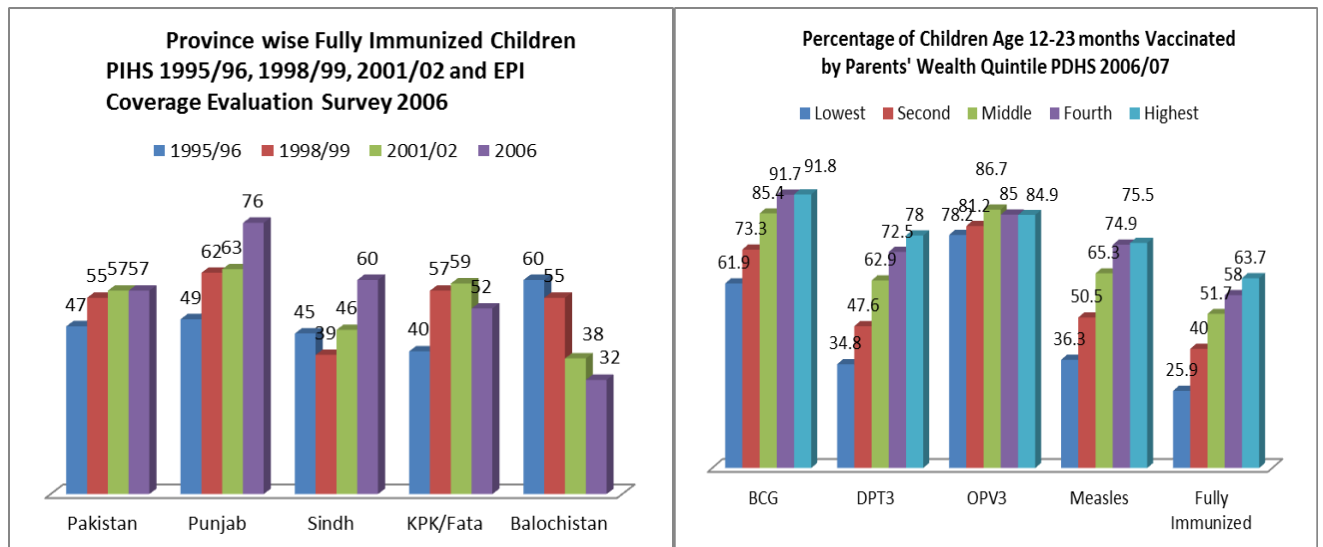
## SECTION ONE

### PERFORMANCE OF THE EXPANDED PROGRAM ON IMMUNIZATION

#### Variations in EPI Coverage

The national EPI schedule aims to immunize all children between 0 and 23 months against eight vaccine-preventable diseases that include infant tuberculosis, poliomyelitis, diphtheria, pertussis, maternal and neonatal tetanus, hepatitis B, Haemophilus influenza type b (Hib), and measles. Hepatitis B vaccine (HepB) was included in the EPI schedule in 2002 while the combination vaccine (DPT/HepB) was started in 2006. The pentavalent (DPT/HepB/Hib) vaccine was started in 2008. In addition, supplemental immunization activities (SIAs) against polio, measles, and tetanus are provided. The target groups are children less than one year of age for routine immunization, up to five years of age for polio eradication, nine months to thirteen years of age for measles elimination, and women of childbearing age (CBA) for tetanus.

**Figure 1. Routine Immunization Coverage as Measured in the Pakistan Integrated Household Survey (PIHS) 1995/96 and Pakistan Demographic Health Survey (PDHS) 2006/07**



Immunization coverage in Pakistan has stagnated. During 1995/96 to 2008/9, according to various surveys, the proportion of fully immunized children ranged between 47 and 57 percent, except for the Pakistan Social and Living Standard Measurement (PSLM) survey series 2004/05 to 2008/09,<sup>2</sup> which reflected a much higher achievement (ranging from 71–78 percent). But the proportion of children fully immunized within the national schedule by 12 months of age is more realistically as low as 40 percent. The rates are

2. Federal Bureau of Statistics, Statistics Division, "Pakistan Social and Living Standards Measurement Survey PSLM Series 2004–05," (Islamabad, 2005).

known to be much less among poorer and rural households across the country. While Punjab was shown to be the best performing province, Balochistan's achievement remained the lowest, except as measured in the Pakistan Integrated Household Survey (PIHS) 1995/96.<sup>3</sup> The percentage of children who are fully immunized also varies widely by wealth quintile. Children whose mothers are in the lowest wealth quintile are far less likely to be fully immunized than children of the highest socioeconomic status (26 percent and 64 percent, respectively). As well as stagnant growth in the proportion of children immunized, the reported coverage indicates a decrease in the absolute number of children immunized during the last two years. In addition, the Polio Eradication Initiative (PEI) has been making slow progress and has been unable to achieve zero cases, with transmission of the virus persisting. One of the key reasons for the EPI not achieving its targets includes inadequate service delivery, resulting in irregular access and poor service utilization.

### Age-appropriate Immunization

Inappropriate efforts have also been expended on immunizing children older than one year of age (outside the target age). Until high uniform coverage of target ages is achieved, immunizing outside the target age group is a luxury Pakistan cannot afford. The current practice of making up missed doses during the second year of life may be incorrectly counted as if given to the under 12-month cohort, and creates errors in the denominator and overestimates coverage.

### Service Delivery Options

#### *Fixed centers versus outreach services*

There are a number of options open to provincial health departments for delivering routine immunization. Currently a large part of immunization services are delivered via outreach (extending from a fixed site), a lesser part by fixed sites, and a small part by mobile teams in remote areas.

Immunization services provided through outreach are expensive and present many logistical problems. Furthermore, the present outreach strategy faces significant challenges from lack of detail in micro-plans; weak monitoring; inadequate supervision; and insufficient human, operational, and other resources. If client use is successfully shifted toward the use of fixed sites, there is an even greater imperative to avoid stock-outs and absentee vaccinators. In a study conducted in Sindh Province,<sup>4</sup> the inability of vaccination teams to access remote areas led to many pockets of undetected (and therefore unvaccinated) populations. Overall, the success of outreach services is dependent on a highly motivated staff, adequate mobility, and a good micro-plan that

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3. Federal Bureau of Statistics, Statistics Division, "Pakistan Integrated Household Survey: Round-1: 1995-69," (Islamabad, 1997).

4. Mangrio N. K, M.M. Alam, and B. T. Shaikh, "Is Expanded Program on Immunization Doing Enough? Viewpoint of Health Workers and Managers in Sindh," *Journal of Pakistan Medical Association* 58, no. 2 (2008): 64-7.

identifies actual numbers and locations of households with children requiring immunization.

### *Door-to-door*

As door-to-door services have become commonplace during polio campaigns, the public has become accustomed to such service delivery. The public now also expects this service for routine immunization; a situation that consumes far too many resources and vaccinator time.

### *Campaigns*

Great effort has been put into campaigns as part of disease control activities for identified vaccine-preventable diseases — polio, measles, and neonatal tetanus (NNT). But this has seriously affected the ability of staff to deliver routine immunization services. There are dangers in relying on campaigns, rather than routine systems, to maintain high coverage. When intermittent campaigns are used to boost poor routine coverage levels, the number of susceptible infants inevitably rises between campaigns in any given birth cohort. This situation allows continued spread of the viruses and bacteria responsible for vaccine-preventable diseases. Campaigns are known to achieve the highest impact only when they are mounted in addition to high routine coverage. Campaigns do not improve routine immunization; it is the latter that ensures campaigns will be successful.

## **Program Performance**

The key reasons that EPI has not achieved its targets have been identified in different studies and are summarized here. Inadequate service delivery, resulting in irregular access and poor service utilization, were found to be the key reasons for this poor performance.<sup>5</sup> The long distance to EPI centers, unaffordable cost to reach these sites, and unavailability of vaccinators and outreach services were the reasons for 12.6 percent of mothers' failing to immunize their children through the routine service.<sup>6</sup> Distance to the health centres was again highlighted in a recent study conducted in 2009<sup>7</sup> where 30 percent of mothers reported that it was difficult to reach the nearest health facility from their place of residence.

Additional reasons from the service provider's aspect include lack of funds for operational costs for vehicles, repair of vehicles and equipment, travel allowance/daily allowance (TA/DA) for the staff, insufficient vaccination staff and supervisors, insufficient cold chain equipment below the district level, failure to develop micro-plans for the routine immunization program, lack of demand for EPI by BHU staff, and excessive demands by the health sector to respond to the SIAs of the Polio Eradication Initiative. In addition, comprehensive service delivery is also compromised because of

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5. Ibid.

6. Government of Pakistan, "Coverage Evaluation Survey 2006." (Islamabad, 2007).

7. Government of Pakistan, Faisal et al., "Understanding Barriers to Immunization in Pakistan," (Islamabad, 2009).



difficulties in reaching internally displaced persons (IDPs), nomads, and those in insecure areas.

Even though national policy<sup>8</sup> recognizes that all union councils (UCs) should have fixed centers, about one-sixth of UCs do not actually provide fixed centers. And the same proportion of government health facilities do not offer EPI services, as revealed in different national and subnational program reviews. Moreover, many fixed centers provide immunization service only once or twice a week. With such limited services at fixed centers, the only alternative to access the target population has been outreach immunization sessions.

Currently, the most common strategy in the rural areas is outreach; whereas urban areas rely more on fixed centers. But as explained above, the number of fixed centers is insufficient to cover every UC, and as a consequence, outreach services become overstretched. This has resulted in an inability to provide adequate routine immunization services at either fixed centers or through outreach.

### **Incentives and Performance-based Financing**

Extra payments for performance of duties that fall within staff job descriptions can be counterproductive, while some incentives may be useful. Parents can be rewarded with cash for using immunization services.<sup>9</sup> The distribution of food or medicine coupons has been described as improving routine immunization coverage in developing countries.<sup>10</sup> These approaches have not been proved as universally successful and may need further review before being endorsed for Pakistan. At the other end of the spectrum, charges for receiving immunization are a clear disincentive and should be avoided. Performance-based financing is usually a contractual arrangement between a health facility and the Ministry of Health, which sets out the number of additional services to be provided at a specified level of quality during a period of time. If targets are met and verified by a third party, a bonus payment is made. Bonus payments can be shared among staff or used to invest in the facility and services. The community can be involved in verifying results and assessing satisfaction. Performance-based collaboration with the community or local governments may involve staff being paid an incentive by the local community or by local government. The more children immunized, the greater the remuneration. This strategy too needs to be fully evaluated before being widely endorsed. While most health workers are committed to their work and well intentioned, low salaries and tardy payments may cause high absenteeism and a lack of motivation for outreach services among staff. Strategies that offer health workers and managers incentives might provide

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8. Government of Pakistan, *National EPI Policy and Strategic Guidelines*, (Islamabad, 2005).

9. Behl et al., "Community-level Incentives to Increase the Use of Vaccination Services in Developing Countries: An Idea Whose Time Has Come?" *Vaccine* 28, no. 38 (Aug. 31, 2010): 6123–24, Epub July 15, 2010.

10. Chandir et al. "Effect of Food Coupon Incentives on Timely Completion of DTP Immunization Series in Children from a Low-income Area in Karachi, Pakistan: A Longitudinal Intervention Study," *Vaccine* 28, no. 19 (Apr 26, 2010): 3473–78, Epub Mar 1, 2010.



more and better quality health care services to achieve MDGs, as would providing incentives to parents to seek care when financial and other barriers suppress immunization coverage.

### **Private Sector Contributions**

Involvement and participation of the private sector in the delivery of routine immunization is currently very limited. Even though there is a large network of medical practitioners and approximately 12,000 registered civil society organizations (CSOs) in the country, they do not deliver routine immunization. Further, there is an absence of a formal policy and of guidelines on public-private partnership to involve the private sector in the expansion of services, including the delivery of routine immunization.

The majority of provinces indicated general support for involving the private sector in providing immunization services while a few expressed concern about the additional expense of providing the private sector with vaccines and on their performance quality. During discussions, it was disclosed that one provincial government had already established a Private Sector Regulatory Authority with 25 out of 47 private hospitals having registered and providing immunization services free of charge.

Public-private partnerships have not been utilized to the best advantage in the immunization program. Outsourcing has been tried by the government for other disease control programs and in the People's Primary Healthcare Initiative (PPHI) — with some success. It appears that staff performance is considerably improved using the PPHI approach.

### **Monitoring and Evaluation (M&E) System**

#### *Routine monitoring of immunization program*

**Data flow:** All vaccines given at the fixed or outreach sites are recorded on a health card given to the parents and entered in the daily register at the health center. At the end of every session, the data of those who are permanent residents of the specific UC are transferred to the EPI permanent register. At the UC level all immunization reports are signed by the respective facility in-charge and submitted to the district where they are reviewed and consolidated. The data is organized by age of beneficiary children. At district level all reports are compiled by EPI coordinator/district superintendent vaccination (DSV)/deputy district officer of health (DDoH). The data from the district is sent to the provincial EPI section that consolidates the reports of all the districts and sends the provincial report to the federal EPI cell.

The relevant officers are supposed to give feedback to the facility in-charge at the monthly review meetings, but this is seldom practiced. The province is required to hold an EPI performance review meeting at least once in four months. The meeting is attended by all provincial and district supervisors, as well as representatives of the federal EPI cell and EPI partners.

At the federal level — earlier under the MOH and now under the MOIPC — there is an M&E unit headed by an M&E officer. At the provincial level, prior to and since Amendment 18, an officer designated for M&E (senior medical officer, assistant director, or deputy director EPI) manages the M&E-related tasks.

Routine monitoring is not effective, partly because context-specific monitoring tools are not used and partly because supervision on monitoring is weak. Data also does not include information from private providers. This has led to reporting of incomplete, poor quality data creating large discrepancies between the reported data and independent assessments. Efforts are underway to improve the quality of reported data and its use at each level as a way to engage local staff to take greater ownership of the routine immunization (RI) program.

**Target setting:** The census-based data of 1998 plus the growth factor enable some estimates to be made centrally for the purposes of planning and procurement on a gross population basis. However there are many factors that militate against the validity of these estimates at the UC level. Inaccuracies in population figures often arise from variable birth rates, outdated census data, the use of national-level calculations to derive local population estimates, and the impact of both in- and out-migration. To improve the situation, target setting should be carried out at the district level using data derived from the community (community members, volunteers, vaccinators, and LHWs). This avoids the dilemma of coverage level reporting of over 100 percent, and it alerts workers that they may have many more (or less) target-aged infants than estimates suggest. Inaccurate administrative immunization coverage data will result in the incorrect forecast of the requirements for vaccines and ancillary items. Numerous EPI reviews, studies, and observations comparing immunization coverage survey data to coverage calculated by the administrative method have shown that coverage estimates are often inaccurate. Pakistan currently relies on WHO/UNICEF best estimates/ adjusted figures for national coverage levels.

**Surveillance:** Surveillance is an important component of EPI, yet the only well-functioning part is for acute flaccid paralysis (AFP), which is generated and run by WHO. Surveillance in Pakistan is heavily dependent on the polio surveillance infrastructure and human resources. Adequate information is often not available to manage outbreaks of other diseases appropriately.

The integrated disease surveillance (IDS) strategy defined by WHO to encompass all surveillance systems has yet to be implemented. To strengthen disease surveillance in the country, IDS implementation should be linked to the International Health Regulations (IHR) 2005,<sup>11</sup> as both relate to the strengthening of national core capacities for surveillance and outbreak response. From reporting as part of the IHR down to sub-district level, the system should be owned and run by GOP. It would be useful if there were one dedicated surveillance officer for every district.

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11. International Health Regulations (2005) <http://www.who.int/ihr/en/>

## **SECTION TWO**

### **MANAGEMENT OF IMMUNIZATION SERVICES**

#### **General Management**

The extensive health care delivery system in Pakistan consists of a mix of both public and privately provided services. However preventive health services, including EPI, are almost exclusively provided by the public sector. Before the devolution of social services under Amendment 18, the MOH was the government agency responsible for Pakistan's health system. It was responsible for framing health policies and enforcing them at a national level. However, in the post devolution scenario, the functions and roles previously performed by the MOH have now moved to the provinces with some responsibilities (such as procuring vaccines, developing policy, maintaining a central cold store, funding and hosting a federal technical advisory group [TAG] to advise on matters of immunization policy, running a federal reference laboratory, running a national control authority, and compiling and evaluating provincial data into national statistics) maintained at the federal level under the direction of the MOIPC, at least for the present.

#### **Roles and Responsibilities at Various Levels**

Historically, the federal government, through the EPI cell, was responsible for the procurement and supply of vaccines, injection equipment, cold chain and logistics, operational vehicles, trainings, monitoring and evaluation, donor coordination, and technical guidance. The federal level provided strategic directions to the provinces, and the provincial infrastructure ensured implementation. The National Immunization Technical Advisory Group (NITAG) at apex level assisted the federal EPI cell, MOH, and Inter-agency Coordination Committee (ICC) by providing evidence-based policy directions on various immunization-related issues. This is an independent group headed by a senior and widely respected core members who have no affiliation with any government office or any other interest group. The NITAG and ICC guide the EPI cell to make changes in the program when necessary. In addition to program support, districts also received financial assistance from the Maternal, Neonatal and Child Health (MNCH) Program to immunize pregnant women of childbearing age during women's health weeks (An infrequent activity where a whole menu of services was made available at the health facilities through a focused approach for a period of one week).

After the devolution of powers to the district governments in 2001, the EPI was integrated into district-level preventive programs. In contrast to pre-devolution arrangements, financial allocations to EPI were not earmarked within the general pool of resources annually allocated to the health sector at district level. The change in resource allocation pattern negatively impacted the performance of routine immunization. The monitoring of routine immunization activities from the province and national levels was also reduced because of devolution of health to the district governments.

With the 2011 devolution, it is the responsibility of the provinces to procure items (with a provisional arrangement to procure vaccines at federal level under the ongoing planning commission form 1 [PC-1]), provide guidance to and supervise district-level officers undertaking periodic planning for various parts of the program. This includes outreach activities to cover the target population and dropouts, and supervision at field level. The NITAG at apex level is expected to assist the federal EPI cell, under the MOIPC and the provinces, but modalities of this structure are yet to be worked out.

### **District Commitment**

The level of commitment to immunization varies by province and by district, due largely to the current administrative structure of the civil services. The districts are responsible for the regular budget for health, including EPI. Currently, a lack of both interest and of management capacity of the executive district officer of health (EDOH) is playing a role in low coverage for routine immunization at the district level. In BHUs, which are managed under the People's Primary Healthcare Initiative (PPHI), the EPI centers do not receive any assistance from the BHU staff, and the vaccinators in those union councils have an additional task of organizing immunization sessions in the fixed EPI center at the BHU as well as providing outreach services.

Program performance of RI contrasts markedly with that of polio campaigns where most elements function better (that is, planning, training, logistics distribution, implementation, catch-up and post campaign evaluation), most likely due to the performance-based incentives and other support structures including financial and technical support from donors for the PEI.

### **Accountability and Political Influence**

Political patronage and poor accountability in the civil services have eroded the work ethic of staff. There is no reward for high-performing vaccinators, nor are there effective sanctions for poorly performing or nonperforming vaccinators. This has created a state of apathy. The supervisors have lost interest as, for the most part, no action is taken on their reports; and if taken, the decisions are often reversed due to political favoritism. Further, following the 2001 devolution to the districts, and since a majority of the district managers in post have strong political connections, this undermines the provincial-level program managers. It is expected that the 2011 devolution with the increase of powers and financial authority at the provincial level will provide opportunities to improve this situation.

### **Planning**

Traditionally, planning for routine immunization was highly centralized at the federal level. The reason being that provision of resources was based on plans developed centrally. Planning through the development and implementation of district-level micro-plans for routine immunization has been weak. Prior to Amendment 18, target setting for the districts was done centrally at the federal EPI cell, and procurement of vaccines and

other logistics carried out accordingly. Districts were supposed to undertake annual microplanning, defaulter tracing, and monitoring of UC coverage. The reasons for low EPI coverage in some UCs were to be assessed and remedial measures taken. However, over the years, district management rarely performed their mandated functions, nor did the provincial EPI sections assist them in developing and monitoring micro-plans. With the changes from devolution, these responsibilities of oversight for planning are now vested with the provinces, but they have not yet incorporated this role.

## **Leadership**

While it is clear that certain technical problems must be addressed in the Pakistan EPI if stagnation in vaccine coverage is to be overcome, perhaps the most important aspects in need of changing are governance, leadership, and accountability. The lack of appropriate leadership throughout the system is a major detriment to EPI service. Prior to devolution in 2011, although performing all functions centrally, the federal EPI cell was not responsible for program implementation as implementation infrastructure and resources were funded mostly from the provincial and district budgets. But since 2001 when health budgets were distributed directly to the districts bypassing the provinces, the provincial EPI cells lacked the necessary incentive and information to monitor program performance at the district level. The 2011 devolution, which has empowered the provinces, can be used by the provinces to take charge of the EPI performance at district levels.

## **Integration**

In the early days of WHO's EPI, there were very few other health services that were functioning well at the national level. It was therefore necessary for EPI to "go it alone" for a while. This position is no longer valid. Now, if mothers and babies are to be reached successfully within 24 hours of birth and beyond, other services must be integrated with EPI, such as obstetrics, midwifery, MCH, and IMCI as all these elements of the health service also have a strong interest in reaching the mothers and babies at birth. As many births are unsupervised in Pakistan, it will be necessary to increase the proportion of births that are supervised and delivered in a health facility. Integrating EPI activities with these services not only allows for the administration of a birth dose of vaccine (such as polio or BCG), but also incorporates Safe Motherhood's clean birth practices initiative that helps eliminate Maternal and Neonatal Tetanus (MNT).

There are ways Pakistan might effectively integrate immunization services with other elements of primary health care. Training of peripheral health workers should encompass skills that enable them to function in an integrated way. Integration at the UC level is not only important, but also relatively simple to undertake. The introduction of new vaccines offers fresh opportunities to link modalities of immunization, and to link immunization with other primary health care (PHC) deliverables.

The present process of devolution to the provinces offers an ideal opportunity to consider ways of integrating routine immunization with other PHC modalities at provincial level.

Indeed, several provinces have provided excellent examples of such integration. However, caution must be exercised in selecting appropriate local elements for integration and to avoid overloading EPI with too many “extras.”

### **Disease-specific issues**

*Polio:* The PEI has not yet been successful in eradicating poliomyelitis virus. The PEI has been well funded and advertised and has claimed everyone’s attention at the expense of other health initiatives including routine immunization. With approximately 120 days a year spent by immunization staff on polio NIDs/SNIDs, the time and effort left for the routine immunization program is grossly inadequate. Furthermore, repeated rounds of NIDs/SNIDs since 1994 have resulted in fatigue of all cadres of staff involved in polio eradication.

*Measles* is an important cause of death and disability among children in Pakistan. Approximately 2.1 million children are infected with measles annually, resulting in approximately 21,000 deaths from complications. With routine measles vaccine coverage of only 50 percent or so, an ever-increasing number of infants are not reached. As an emergency response to this situation, the Government of Pakistan (GOP) partnered with global efforts to reduce measles morbidity and mortality: The GOP decided to give a second opportunity for vaccination against measles to all susceptible children aged 9 months to less than 13 years who would be vaccinated through this campaign, irrespective of previous vaccination status and measles infection. This program demanded additional immunization staff time. Furthermore, it should be noted that campaigns of this nature to immunize wider age groups do not necessarily protect the primary target age group of under-ones.

*MNT* is a serious problem in much of the country with 42 districts considered high risk and 36 as intermediate risk districts for MNT in Pakistan. In 2005, the GOP committed to intensify efforts in achieving the immunization targets with an objective to reduce the morbidity and mortality related to MNT.

Evidence suggests that these short-term efforts to combat selected diseases have had negative effects on the coverage and performance of the routine immunization program in Pakistan.

## **SECTION THREE**

### **HUMAN RESOURCES**

It is critical to have adequate numbers of appropriately trained and equitably distributed human resources to implement a successful immunization program.

#### **Human Resources at Various Levels**

With the passage of Amendment 18, it is now the responsibility of the provincial departments of health to ensure sufficient human resources to enable the program to function at optimum levels.

The existing staffing structures of the federal EPI cell under the MOIPC and provincial EPI sections have serious gaps. The number and location of sanctioned staff positions, those currently employed (directly through the GOP and contracted by donors) and those currently vacant are not always easily available to the planners at provincial level. While some provinces (for example, Balochistan) report that the staffing plan at the province level was available at district level, the actual human resources required at field and other levels (the vaccinators, sanitary inspectors, supervisors) need to be reassessed. In addition to the EPI staff, the federally funded National Program for Primary Health Care (through the LHWs in the communities) has also been supporting the EPI at district level. The Lady Health Workers (LHWs) of this program have been trained in some of the districts to vaccinate the children in their catchment areas. Following changes in the management structure after devolution, some provinces have initiated a mapping of human resource information by district.

The draft national EPI policy proposes at least two vaccinators for each UC. But the average number in post is only 1.3 vaccinators per UC. Sindh Province had adequate numbers based on the EPI policy while all other provinces reported a much lower number of vaccinators than was required. Proportions of vaccinators available against the standards were 52 percent, 70 percent, and 72 percent; in Punjab, Khyber Pakhtunkhwa (KPK), and Balochistan Provinces, respectively.

In addition to filling all vacant posts in all categories of staff, some provinces also need to add certain staff categories to improve their performance. In the Punjab Province, the EPI section recommended two additional posts of medical officers and an in-charge stores department should be created. The Balochistan Province felt that the provincial EPI cell was inadequately staffed and identified an additional need for two new posts of deputy program manager and four medical officers for surveillance. In the KPK Province, the creation of five new positions was considered essential to improve the management and monitoring of EPI activities: (a) information officer for collation, analysis, feedback, and utilization of the information gathered, (b) logistics and supply officer for timely managing procurement, proper storage, and uninterrupted supply to the districts, (c) training officer for assessing training needs, and regularly organizing the in-service training, (d) social mobilization officer for planning and supporting activities for



sustained behavior change, and (e) surveillance officer. In addition, a full-time position of financial manager currently supported by UNICEF also needs to be created by the government. Sindh Province recommended the creation of four to five medical officer posts as field surveillance officers.

### **Human Resource Development and Capacity**

Poor capacity in program management at district and sub-district levels was reported. Among the currently posted EDOHs, most have not received any training in the management of EPI. Some clinical specialists with no public health background have also been assigned to key EPI posts.

Generally, in-service training for routine immunization staff is not planned and implemented for the different levels of staff. Training is erratic as it is often based on donor funding availability. The regular EPI budgets from the government usually do not allocate funds for continuing education or for in service training.

Career development plans for EPI workers do not exist within the health system. This was identified as one of the major reasons for poor motivation to work in the program. Exploring the possibility of salary increments based on performance or seniority under each category of staff may be an option for consideration.

### **Human Resource Redistribution at UC Level**

Routine immunization is provided through a network of fixed centers and outreach services. Approximately 6,000 EPI fixed centers provide these services to the target population. While it is essential to have the required number of vaccinators at the UC level to manage fixed and outreach services, currently there is a significant mal-distribution of vaccinators. Reasons for this mal-distribution include the poorly managed transfer system and sometimes the influence of politicians, which allows the majority of vaccinators and other category of staff to work in easy-access urban areas rather than in rural areas.

### **Strategic Use of Vaccination Staff**

Although paramedic cadres such as LHWs are engaged in immunization in certain areas to compensate for the shortage of vaccinators, for the most part, potential resources, especially these trained LHWs, are restrained from providing immunization independently. LHWs are a numerous and valuable resource — over 100,000 in the country. While in some locations they administer all EPI vaccines (except BCG) to all the children in their catchment areas, in most provinces the task of these women is limited to supporting the work of the vaccinator by informing clients in their catchment area and bringing them to outreach sites for immunization by vaccinators. LHWs also participate in various immunization campaigns against EPI target diseases, for example, polio, MNT, and measles. In Punjab Province they do not immunize except for administering oral polio vaccine on NIDs. In Sindh Province, some are trained to give injections. This



cadre of staff offers great potential for improving routine immunization services. While there has been resistance in some places to expanding the role of the LHW to include administering vaccine, other locations have shown that this approach is feasible.

Staff responsible for routine immunization experienced greatly increased demands on their time due to the special campaigns arranged for selected vaccine-preventable diseases such as polio, measles, and MNT. These campaigns reduce the time available for routine immunization. Polio eradication efforts are the greatest cause of time consumption; such loss of time for routine immunization activities should be minimized.

The Tracking Study<sup>12</sup> undertaken to look at issues in polio coverage during campaigns indicated that frequent NIDs/SNIDs for polio have adversely affected routine immunization coverage. On average, approximately 8 to 12 NIDs/SNIDs are conducted in most districts a year. Each NID/SNID involves vaccinators, field supervisors, assistant superintendent vaccination, tehsil superintendent vaccination, and district superintendent vaccination (the backbone of EPI) for about 15 days each. Hence routine immunization staff spend up to 120 days a year on polio NIDs/SNIDs. The remaining 140 to 180 working days are grossly insufficient to achieve the desired coverage of the target population for routine immunization through outreach and fixed services. In addition, the population of UCs has also increased by two to three times compared to the 1980s. Furthermore, funds are provided as incentives to most of the staff (ranging from district managers to field teams) for organizing NIDs/SNIDs. These strategies have only improved the coverage and the staff capacity for the polio SNIDs/NIDs. Evidence suggests that the approach of using the regular immunization program staff for the PEI has had a negative impact on their performance for routine immunization.

### **Management Issues Related to Human Resources**

***Mobility of vaccinators.*** The geographical area covered by many of the UCs is quite large. The lack of appropriate transport facilities and limited recurrent resources to provide per diem allowances for vaccinators are major barriers to reaching the target mothers and children in distant and hard-to-reach areas. Poor planning and management of these issues is known to hamper the program.

***Weak or absent supervision and monitoring.*** The quality of supervision and monitoring is variable in the provinces. Reasons mentioned for weak supervision include lack of transport and recurrent resources for per diem and maintenance costs for supervisory visits. Furthermore, supervisory visits are unstructured due to poor supervision by the higher level of managers and poor capacity of district managers to assess coverage reports through desk reviews.

***Political patronage of many vaccinators hampers sanctions against nonperforming staff in all provinces.*** It is widely understood that some vaccinators are given favors such as preferred transfers based on their links to politicians and other higher authorities. Due

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12. SoSec Consulting Services, "Household Polio Tracking Study Phase VII," (Islamabad, 2011).

to these external pressures, managing human resources is difficult. According to supervisors, this situation not only demoralizes vaccinators, but also discourages them from reporting poorly performing coworkers.

## SECTION FOUR

### LOGISTICS

Logistics for EPI includes the provision of (a) vaccines, diluents, injection equipment, and safety boxes; and (b) cold chain equipment covering items like cold rooms, refrigerators, ice-lined refrigerators (ILRs), cold boxes, carriers, and ice.

#### Logistics Procurement and Management

Prior to the implementation of Amendment 18, provincial and district EPI sections received all types of logistical support from the federal EPI cell and resources from the federal development budget. The federal EPI cell prepared a project document (PC-1) every five years to secure funding for the EPI through the development budget. Gaps in funding were reported, especially during 1999–2004 period, but gaps in funding and technical inputs have, whenever possible, been covered by other partners such as Global Alliance for Vaccines and Immunization (GAVI), UNICEF, WHO, and Japan International Cooperation Agency (JICA). Provinces have been responsible for coordinating with the districts and allocating received shipments of vaccines and other logistical support. The provinces were responsible for major repairs for the provincial cold rooms and sometimes for district-level cold chain equipment.

With the implementation of Amendment 18, all logistical responsibility was fully devolved to the provinces. As an interim measure, in discussion with all provinces, it was decided that the procurement of vaccines should be managed at the federal level until June 30, 2012, during which interval the federal government (managed through the MOIPC) would also continue to provide resources for vaccines. EPI allocations would continue to be part of the federal government budget until 2014. Beyond 2014, the total allocation for EPI will be part of the provincial budgets.

These changes may not be in the country's best interest as the advantage of bulk purchasing will be lost. Also, the expertise for vaccine purchase is not likely to exist at every provincial level, potentially leading to costly mistakes in purchasing.

The provinces will continue to procure other EPI-related goods such as syringes and cold chain equipment; the district governments have no role in the procurement of these items. The district governments receive all these commodities through an established logistics and cold chain supply system. The non-salary budget of district governments for EPI is limited and spent locally on the procurement of small items such as stationary, ice for cold boxes, limited amounts of gasoline for operational vehicles, and repair and maintenance of operational vehicles.

The nationwide Barrier Study conducted in 2009<sup>13</sup> revealed the following positive scenarios with respect to EPI logistics:

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13. Faisal et al., "Understanding Barriers to Immunization in Pakistan," (Islamabad: Government of Pakistan, 2009).

- In general there was no shortage of diluents, injection equipment, and safety boxes.
- BHUs had functioning refrigerator/ILRs, and most had functional thermometers.
- All vaccinators knew that vaccines should be kept at temperatures between +2 and +8 degrees Celsius.
- Proper equipment for transporting the vaccines for outreach services was found to be available and functioning.

The supply of vaccines from the federal level to the provinces has been interrupted from time to time, and stock-outs ranging from one to three months have occurred for different vaccines. Also, some districts have faced problems in acquiring vaccines regularly from provincial stores (mainly in KPK Province and Balochistan) due to transport or petrol, oil, lubricants (POL) costs. The program faced a setback in 2008 during the introduction of the pentavalent presentation (DTP/Hib/HepB), which replaced the tetravalent (DTP/HepB) vaccine. Due to a delay in registration and supply of the new product, the introduction could not be initiated in a timely fashion, and there was a total stock-out of vaccines for some months. According to the government, this was the most likely cause of the fall in DTP-3 coverage in that year. By early 2009, introduction of the new vaccine had been completed throughout the country.

The figures for stock-outs of vaccines during 2009–10 at federal and provincial levels were collected from the JICA office.<sup>14</sup> Examples of stock-outs at the national level included zero stock of BCG during June 2009 and the first two months of 2010, and of measles vaccine in January 2010; in Punjab Province, frequent shortages of pentavalent vaccine in 2009 and 2010, frequent stock-outs of BCG and measles vaccines in 2009 and 2010, and two stock-outs of Tetanus Toxoid (TT) in 2010; and in other provinces, short episodes of shortages were also observed.

### **Cold Chain Maintenance and Repair**

The national EPI cell provided maintenance services for its own equipment through a small workshop run by trained refrigeration technicians. The refrigerators do not have a backup power arrangement to prevent breakdowns of the cold chain. The upkeep and maintenance of cold rooms was supervised on a three-shift basis backed by the availability of adequate spare parts. The provincial EPI sections have their own arrangements for maintenance and repair and were also satisfied with the functioning and adequacy of the cold chain including back-up repair facilities.

However, repair and maintenance of the cold chain at district level and below was mostly through the provincial EPI or the electro-medical equipment workshops in the province. Most of the executive district health officers are reluctant to place orders for the repair of out-of-order equipment as their financial powers are limited, and they fear audit objections. Approval from a higher level takes a much longer time, and this causes

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14. JICA, "Federal Level and Province-wise Stock-out of Vaccines 2009 and 2010," unpublished data (Islamabad).

considerable delays to needed repairs. Further, the annual budget allocations in many districts are insufficient for the maintenance and repair of cold chain equipment.

### **Cold Chain Monitoring**

At present there is no feedback system in place to monitor the cold chain. The monitoring is done primarily at the health facility–level with supervisory staff providing on-the-spot guidance and feedback; however the status of the cold chain is neither compiled nor reported at any level.

## **SECTION FIVE**

### **FUNDING**

Traditionally, the federal EPI cell prepares a PC-1 every five years to secure funding through the government's development budget. The federal EPI budget should ideally include provision for vaccines, syringes, cold chain equipment, transport, and other logistics.

A large proportion of EPI funding was previously through GOP resources. However with the advent of GAVI support for the pentavalent vaccine and the PEI, as well as other partner support (UNICEF, WHO, JICA, and the World Bank [WB]), the government share is now limited to providing the 12 percent copayment for purchase of the pentavalent, BCG, measles and polio vaccines for routine immunization, and for some disposables provided by GAVI.

#### **Federal Financing**

GOP prepared a long-term financial sustainability plan for 2003–12<sup>15</sup> to forecast funding needs for the EPI. The total cost of strengthening and upgrading EPI, including the addition of pentavalent vaccine, was estimated at more than US\$1billion. The share of federal and provincial governments was estimated at 22 and 14 percent of this requirement, respectively — 6.4 percent is already committed by GAVI, while another 46 percent (US\$509 million) is likely to be provided by GAVI for the period 2008–12. The remaining 11 percent (US\$119 million) was planned as support from the other EPI partners, who have collectively supported much larger amounts in the past.

#### **Funding at the Provincial Level**

There are some differences at provincial levels; the PC-1s of Punjab and Sindh Provinces fill in their budgetary gaps by channeling budgetary support from their development budgets. The provincial governments cover the cost of repair of vehicles, capacity building, social mobilization, buffer stock, machinery and cold chain equipment, TA/DA of district staff, and POL charges through their provincial development budget.

The provincial EPI sections do not receive any discretionary funds directly from the federal EPI cell or from any of the donors. Although partners and donors do provide some funds directly to the Provincial Department of Health, these are for certain earmarked activities, such as in-service training.

One of the consequences of the availability of GAVI funds has been that the provincial PC-1s are now supported by the GAVI grant, and not from the provincial development budgets; the delay in release of GAVI funds from the federal level has thus led to delays in availability of funds for the provincial immunization programs.

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15. Government of Pakistan, "Financial Sustainability Plan 2003-2013," (Islamabad, 2003).

With the implementation of Amendment 18, total financing for EPI is expected to flow from the provincial allocations from 2014 onwards.

### **Funding at District Level**

Under their current budgetary arrangements, the district governments cover salaries of EPI staff and funds for non-salary activities. Along with the permanent vaccination staff from the district governments, vaccinators have also been recruited on a contractual basis and are paid from GAVI funds. A review of some of the district budgets revealed that there were no separate budget lines for EPI.

Shortages in non-salary budget have been identified in two areas at the district level: POL and repair and maintenance. Both these areas are crucial for the performance of routine immunization. Lack of POL restricts field visits carried out by vaccination staff with motorbikes, and prevents the supervisory staff from conducting required supervisory visits. Similarly, if funds are short for repair and maintenance of cold chain equipment or vehicles, the entire project suffers.

The Sindh Province has adopted a policy of fixed allocation of POL and TA/DA. Both the supervisory staff and vaccinators are entitled to fixed allocations irrespective of the geographic areas within which they operate. However, the fixed quota allocation for POL is not rigorously followed. The lower-level supervisory staff and a majority of the vaccinators are often deprived of POL as most of the POL allowance is consumed by the mid-level district management.

### **Financing from International Partners**

GOP has appreciated support from partners in funding the EPI. In early 2000, the newly formed GAVI began immunization services support (ISS) funding to Pakistan. It also provided support for injection safety, health system strengthening, civil society, and new vaccines. GAVI also enabled Pakistan to introduce the HepB vaccine in 2001, first as a monovalent formulation, then in 2006 as a tetravalent formulation (DTP/HepB). It also supported the introduction of Hib vaccine in pentavalent formulation from 2008 onwards. WHO and UNICEF have been instrumental in promoting the polio eradication agenda and the measles and MNT campaigns, and in dispensing technical advice about the introduction of new vaccines. UNICEF has assisted in the procurement of certain vaccines. Other donors include the World Bank, JICA, USAID, DFID, Rotary International, and AusAID. Partners have been particularly helpful and generous in responding to unforeseen events such as the need for measles vaccine following the recent floods. Furthermore, partners have been instrumental in initiating polio eradication efforts, in designing the national immunization schedule, and in vaccine and cold chain procurement.

Program implementers noted that whenever external partners initiated an aspect of the program, the ownership and responsibility by national staff was reduced. With time, these

external funds have actually replaced GOP funding without overall increase in resources for the EPI in Pakistan. The implementers expressed concern about funding expensive new vaccines for only a limited period as the country finds it difficult to maintain these investments for the longer term.

The federal EPI cell has been the technical focal point for coordinating all donor and UN agencies. With the implementation of Amendment 18, under a temporary arrangement, this task will be carried out by the EPI cell under the direction of the MOIPC, but overall coordination with donors will be the responsibility of the Economic Affairs Division.

The GAVI unit is a part of the EPI cell under the direction of the MOIPC, and ensures that activities committed for EPI in the GAVI PC-1 are effectively utilized. GAVI is the main source of donor funding for routine immunization. GAVI<sup>16</sup> supports logistics, vaccines, and vehicles. Since 2003, the GAVI Board approved US\$48.864 million, both as an investment and as a reward for meeting DTP-3 immunization targets. Up to December 2010, GAVI disbursed US\$34.202 million, and an amount of US\$14.662 million from GAVI is still available for disbursement to the Government of Pakistan for EPI.<sup>17</sup> Describing the precarious nature of funding, a senior member of the EPI section in a province said, “EPI is surviving on GAVI funding. If GAVI funding finishes, routine immunization will finish.”

JICA and the World Bank (International Development Association) support the PEI in Pakistan; funds are utilized for the procurement of polio vaccines required for SIAs. JICA also provides funds for operational costs of the SIAs.

UNICEF primarily supports routine immunization and the Polio Eradication Initiative in various ways.<sup>18</sup> Along with other partners, UNICEF covers all the expenses for in-service training ranging from the mid-level manager training and training of trainers to basic training and refresher courses for the vaccinators. These expenses include technical support to the trainers; printing of the training material; TA/DA to the participants; logistics expenses for the trainers; and refreshments served during the training sessions. Additionally UNICEF provides logistics support in some areas, micro planning at UC level, funding and execution of coverage evaluation surveys, acts as procurement agent on behalf of the GOP and other donors for the procurement of vaccines and cold chain equipment, and provides some cold chain equipment from its own budget.

WHO provides technical assistance for a range of efforts including polio eradication. The funds are utilized by WHO for acute flaccid paralysis surveillance and operational costs for supplemental immunization activities. The technical assistance provided by

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16. GAVI Alliance. “Country Information Fact Sheet, Pakistan,”  
[http://www.gavialliance.org/performance/country\\_results/index.php?countID=52](http://www.gavialliance.org/performance/country_results/index.php?countID=52), accessed April 10, 2010.

17. The Daily News International, “City News Section (January 22, 2011). We may put in health correspondent??

18. UNICEF. *Annual Report 2009*.



WHO for EPI and polio eradication covers micro planning at the UC level for polio eradication; guidelines for injection safety measures, adverse events management, and cold chain maintenance; and guidelines concerning the use of various antigens.

### **Funding and Procurement of New Vaccines**

New vaccines offer the potential for averting death and disease for thousands of infants and children each year throughout the country. Pakistan has one of the highest infant mortality rates in the world, and over 50 percent of deaths in post-neonatal children are attributable to pneumonia, diarrhea, or meningitis—diseases that can be partially prevented through immunization with newer vaccines. A recent World Bank study<sup>19</sup> highlighted that the pneumococcal vaccine (PCV) would have the greatest impact at about 10,300 deaths avoided per year, followed closely by haemophilus influenza type b (Hib) vaccine at about 9,500, and rotavirus (RV) with 5,700 deaths prevented. Of all these vaccines, only Hib vaccine has already been introduced, as it is included in the pentavalent vaccine that was introduced recently.

In the study, the cost-effectiveness figures for PCV and rotavirus vaccines were \$225 per disability-adjusted life years (DALY) and \$201/DALY, respectively. The financial cost for purchasing these three new vaccines is expected to peak in 2017. This cost is estimated to be 40 percent of the total national immunization expenditures, and 15 percent of the total government health expenditures. Thus, the study concluded that even though the introduction of these three new vaccines is a worthwhile investment from a technical perspective, it would present financial challenges in the future unless overall health spending increases substantially. The World Bank study therefore recommends that before introducing new vaccines to the routine immunization program, policymakers should give careful consideration to long-term financing capacity after GAVI support ends.

Two of the vaccines (PCV and RV) are under discussion largely because agencies external to Pakistan have encouraged their introduction. While there is a high enough disease burden to justify their introduction, the impetus to use them has not risen from within the country, and there has not been full local ownership of the plans. These two vaccines have been discussed at federal level and a decision has been made to introduce them shortly with GAVI supporting 80 percent of the purchase costs and the government paying the remaining 20 percent. Thus, with the implementation of Amendment 18, 20 percent of the purchase price will be met by GOP initially (and by provinces thereafter if procurement passes to the provinces in 2014), and the remaining 80 percent by GAVI. The cost of pneumococcal vaccine is high, approximately \$21 per child (\$7.19 per dose) as is rotavirus, approximately \$15 per child (\$5.27 a dose) at current costs (these prices could decline over time), compared with three doses of DTP/HepB vaccine of at about \$2 per child.

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19. Brenzel et al., “Cost-effectiveness and Financial Consequences of New Vaccine Introduction in Pakistan,” (Washington, DC: World Bank, April 25, 2011).

To provide perspective, the cost of one dose of pneumococcal vaccine exceeds the government's total commitment of Rs 350 (about \$4) for *all health care* for one individual for a year.

The GOP will need to find the resources to finance and sustain the use of these vaccines once introduced beyond the period of initial support from the GAVI. There are also hidden costs to be considered including increased cold storage requirements (most new, expensive vaccines are likely to be mono-dose vials and bulky) and administrative costs (possible additional visits by vaccinators and clients). The World Bank study found that the budgetary requirement for investing in cold chain would be small relative to the expense of the actual vaccines, and would represent a good return on investment. But if external support for the EPI budget were to come to an end before substantial falls in vaccine price, introducing these vaccines would mean a sharp increase in government health expenditure (GHE). However, in recent years GHE has been growing by 7 to 8 percent per year. If this rate continues, GHE would still reach only US\$100 million in the short term, which is less than half of the requirement for purchase of the three new vaccines. With this growth alone, assuming that it is not allocated to any other health priority, the GOP could “afford” pentavalent vaccine, and possibly a phased-in approach to PCV. In 2010, GHE was approximately 0.5 percent of GDP, which by international standards is very low.<sup>20</sup> Even if government health expenditure in Pakistan were to grow steadily at 10 percent per year, and GDP were to grow at only 3 percent, by 2020 government health expenditure would be about 1 percent of GDP, still well under the 2 percent for health spent elsewhere and envisaged in Pakistan's Fiscal Responsibility Act. All this suggests that even though introducing PCV and RV would involve a sharp increase in the financial requirements for vaccination, financing the full cost of these vaccines would require a greatly increased government commitment to health and immunization.

The actual amount GOP and GAVI might have to pay for these two vaccines cannot be calculated with complete certainty. Variable factors include the accuracy of population projections, vaccine wastage rates, and effective vaccination coverage rates. An option for GOP would be to introduce one or both vaccines in selected areas with highest mortality, gradually phasing in the new vaccine to other geographical areas.

It is important that discussions on the above issues take place now, as other new vaccines are likely to become available in the coming decade, together with external pressure to adopt them. The new vaccines may include HIV, malaria, and TB vaccines. All are likely to be at least as expensive as rotavirus vaccine. It would therefore be unwise for GOP to assume that provinces will automatically agree to purchase the extremely expensive pneumococcal and rotavirus vaccines (or any other new vaccines) in the future, even if there were an international agreement between GOP and partners or manufacturers.

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20. According to WHO's statistical information system, the median for the 47 countries with GNI per capita less than Pakistan's (using the international dollar, which is adjusted for purchasing power parities) was 8.4 percent.

## SECTION SIX

### DEMAND

There is inadequate demand throughout Pakistan for vaccinating children against vaccine-preventable diseases. The lack of public awareness about the immunization service and its benefits was found to be the second most common contributing factor for low coverage. The Coverage Evaluation Survey—Punjab 2003<sup>21</sup> highlighted that parental lack of awareness about the need for immunization was one of the most important reasons for low coverage in Punjab Province. The EPI Coverage Evaluation Survey 2006<sup>22</sup> also found that lack of awareness about both the need for immunization and the need for subsequent doses were the most commonly given reasons (18 percent and 10.2 percent, respectively) by mothers for failing to immunize their children.

A research study conducted in a children's hospital in Lahore<sup>23</sup> on mothers' knowledge about routine immunization revealed the following:

- 77 percent of mothers had correct knowledge about the necessity for immunization at birth.
- About 28 percent had correct knowledge about the number of visits required for vaccinations, 26 percent had incorrect knowledge, while 46 percent had no knowledge.
- Regarding the proper interval between doses, 52 percent had correct knowledge, 6 percent had incorrect knowledge, and 42 percent no knowledge.
- Only 37 percent of mothers had correct knowledge about the timetable for giving measles vaccine, 8 percent had incorrect knowledge, and 55 percent did not know the schedule.
- For vaccination against tetanus, 66.8 percent of mothers had correct knowledge and 33 percent had no knowledge.
- About 67 percent of mothers had knowledge about antenatal tetanus toxoid, but still failed to get immunization during their pregnancy.
- Socioeconomic status was not statistically significant regarding awareness about EPI.

The study findings revealed an insufficient focus on providing timely and adequate information to mothers and child caregivers to modify their attitude and practices toward routine immunization.

Service delivery, vaccine availability, and demand are the three basic ingredients of routine immunization, but to date, there has been inadequate funding and ownership of demand creation by GOP. Great service delivery without demand will fail—and vice versa. However, public demand must be generated in ways that are sensitive to local

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21. Government of Pakistan, *Coverage Evaluation Survey — Punjab 2003*. (Lahore, 2003).

22. Government of Pakistan, *Coverage Evaluation Survey 2006*. (Islamabad, 2007).

23. Javed et al., "Immunization Rates in Children in Relation to Maternal Education," *Pakistan Paediatric Journal* 33, no. 2 (2009).

conditions. For instance, a social mobilization message in northern Pakistan may be totally ineffective in other parts of the country. A television pitch has zero impact where people have no television. A radio slot will not work if it is in the wrong language. Developing the right messages and selecting the appropriate delivery mechanisms need professional input.

Currently, meager resources from the federal, provincial, and district budgets are spent on communication and to create beneficiary awareness of routine immunization, even though sufficient funds are allocated for social mobilization in the ongoing federally funded PC-1 and GAVI and also through UNICEF. The main route of awareness creation is through vaccinators, other outreach workers (for example, LHWs), and supervisors. Even BHUs and other curative health staff have limited roles in creating awareness among mothers and child caretakers. On the other hand, large resources are being spent during each round of polio NID/SNID for social mobilization through print and electronic media and interpersonal communication.

Awareness about polio is satisfactory, whereas it is limited about routine immunization. Participants in all the survey districts were aware that routine immunization gives protection from vaccine-preventable diseases but could collectively name only four to five diseases of the eight that can be prevented by routine immunization.

Furthermore, messages for increasing immunization usage have not been marketed under a “brand.” Marketing tools such as brand logo and targeted select messages should be used to increase immunization usage and to remove community barriers to its usage. Information that hepatitis B vaccine (as a part of pentavalent vaccine) protects against life-threatening adult liver disease can be used as a “tool” to attract the public to use immunization services. Especially in remote areas, religious leaders should be engaged to inform the public about immunization services — a model that has proven successful in many other settings. Relevant information can be given out every week during Friday prayers.

### **From a Consumer’s Perspective—Impediments**

Women in many rural communities are reluctant to allow male vaccinators to administer vaccines during outreach sessions. But, the most frequently reported reasons for refusals by parents was a lack of information and understanding about the benefits of routine immunization, a fear of side effects, and a misperception that oral polio vaccine causes infertility. Parents expressed a desire to know more about routine immunization, especially about the diseases these vaccines prevent. It was generally felt that refusals to immunize were limited to polio campaigns and that refusal did not occur to any extent for routine services. It was stated that mainly ignorant, illiterate, and conservative individuals — religiously minded laborers, some grandparents, traditionalists, and nomads — were more likely to refuse routine immunization, as they do not have enough knowledge about its benefits to their children. However, this may be a rather polarized view of lack of compliance, and may represent only a part of the picture.

## SECTION SEVEN

### RECOMMENDATIONS

The target population for Pakistan's national immunization program is huge, and millions of doses of vaccine are delivered successfully by government services every year. Nonetheless, many children remain unimmunized or under-immunized, particularly in the poor and rural sections of the country. There are tremendous challenges to overcome in delivering these services, not least the numbers involved.

Even though polio is not yet eradicated from Pakistan, the immunization community has become skilful at conducting polio campaigns. This skill has not transferred to routine immunization services to the same extent. Focus must return to routine services, not just as an end in itself, but to build an effective platform from which to mount all other immunization activities, including polio eradication efforts and the introduction of new vaccines.

As Amendment 18 has passed responsibility to provinces for the implementation of EPI, the provincial immunization programs need to develop strategic directions for the districts and provide guidance to them on how strategies should be carried out.

This section provides recommendations for the federal, provincial, and district levels as they plan the way forward.

#### **Enhancing the Performance of EPI**

The need for raising routine immunization coverage is highlighted by this report, and it emphasizes the need for improved service provision and better access. This is a complex and multifaceted task. There is considerable variation in coverage from one district to another; as would be expected, the rural districts tend to have lower coverage.

##### *Interprovincial Coordination*

An interprovincial coordination committee needs to be formed with representation from the EPI staff from all provinces. Review meetings should be held regularly (say, quarterly) at the federal level under the guidance of the federal EPI cell in the MOIPC. The main objectives of this committee would be to review province-level program performance, facilitate discussions, reach agreement on EPI policy-related issues, and provide opportunities for inter-province learning. Some of these issues include the introduction of new vaccines, human resource allocations based on populations to be covered, standardized training protocols for EPI staff, and introduction of guidelines.

##### *Planning*

Each province should conduct a situational analysis to best understand the current status and conduct a mapping of the EPI program and its performance. This assessment can include coverage by UC or district levels, mapping of difficult-to-reach populations and

areas, existing fixed service points, and areas covered mainly by outreach. Available human resources, logistics, funding, and demand aspects of the program should also be assessed.

This assessment should be led and managed by the EPI program manager at the province level; if required, with technical assistance from partners.

Each province should prepare detailed implementation plans by district, considering the terrain and geographic area, existing vulnerable populations, difficult-to-reach areas, demand-side issues, and available staffing and other resources. The difficult-to-reach areas and other demand-side issues would be best addressed by instructing community and religious leaders in selected areas on the advantages of immunization.

To ensure ownership of the planning process, micro-plans need to be created at district level by UC- and district-level local staff, and supervised by district- and province-level EPI managers. The current practice of planning and target setting made by staff not part of the actual delivery have proved to be unsuccessful. It is important for UC and district planners to use their local knowledge on number and location of all eligible children in the region to arrive at realistic estimates.

Aspects of the micro-planning that relate to the immunization workload of LHWs and vaccinators should be carefully thought out and executed with the involvement of the medical officer in charge of the health facilities.

### *Integration*

The present process of devolution to the provinces offers an ideal opportunity to consider ways of integrating routine immunization with other PHC modalities, staff categories, and other service providers at the provincial level.

The provinces might be able to effectively integrate immunization services with MCH, IMCI by giving peripheral health workers the required skills and the appropriate guidelines to enable them to function in an integrated way to deliver services. Integration at the UC level is not only important, but also relatively simple to undertake.

As the PPHI model currently being implemented in selected districts for curative health care seems to be providing good health care services, it is recommended that this (PPHI) model be used to integrate EPI into the package of services currently on offer as a way to increase overall EPI coverage.

Involvement and participation of the private sector in the delivery of routine immunization is currently very limited even though there is a large network of medical practitioners and about 12,000 registered civil society organizations (CSOs) in the country. This integration can be developed by laying out an appropriate policy, developing the guidelines and the necessary acts (similar to the setting up of the Private Sector Regulatory Authority in one province) on public-private partnership for expanding the use of public services, including routine immunization. Opportunities for maintaining

an EPI room or post in every private health facility should be explored along with the possibility of using private sector vaccinators. The district officers should monitor the performance and quality of these services including the state of the cold chain in private facilities, and organize training of vaccinators in the handling of vaccines as appropriate. Private practitioners should be encouraged to promote immunization for small children and women of childbearing age at every visit. Provinces should be proactive in involving the private sector in undertaking immunization. Vaccines could be provided free of charge to all private facilities or practitioners who request them. As a courtesy, the private sector could provide data on administration to the district office once a month. Practitioners should have a partnership for cost recovery with the province. Models for outsourcing immunization services should be planned, implemented, and evaluated by province-led teams in collaboration with partners. If successful in the Pakistan context, they should be considered for scale-up.

#### *Service provision options*

As a consequence of campaigns, the public has become accustomed to home visits by vaccinators, thereby making them reluctant to seek routine immunization services at fixed centers and outreach. Door-to-door delivery is not sustainable and should be avoided despite its attractiveness for clients. Although outreach seems to be a good way to reach the population and will be needed for some time to come, especially in some locations, there are other strategies that can reduce the current reliance on outreach activities. Options include ensuring that vaccines and vaccinators are available at all times through a well laid out network of fixed centers, or at specific times that are well announced. Furthermore, clients should be made aware of these services at the fixed centers to achieve optimum utilization.

The province should also develop a comprehensive plan to expand the number of fixed centers to reach all communities. This could be coupled with reorganizing the outreach services to address hard-to-reach areas especially in high-risk districts according to the WHO's Reaching Every District<sup>24</sup> strategy.

#### *Performance-based incentive and extra payments*

The main focus of the EPI should be on fully immunizing children at the appropriate age, according to the EPI schedule. Incentives and performance-based payments may be introduced on a pilot basis to increase staff motivation and EPI coverage.

Evidence indicates that extraordinary payments for regular “within job description” duties are counterproductive, while other incentives can be useful. Parents can be rewarded with cash for attending immunization services. The promise of food or medicine coupons has been described as improving routine immunization coverage in

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24. WHO Regional Office for Africa. “Implementing the Reaching Every District Approach. A Guide for District Health Management Teams,” (2008), <http://www.afro.who.int/en/clusters-a-programmes/ard/immunization-and-vaccines-development/ivd-publications.html>



developing countries. At the other end of the spectrum, charging for immunization services should clearly be avoided, as it is a disincentive.

Performance-based financing is usually a contractual arrangement between a health facility and the Ministry of Health, which stipulates the number of additional services to be provided at a specified level of quality during a period of time. If targets are met and verified by a third party, a bonus payment is made. Bonus payments can be shared among staff or invested in the facility and services. The community can be involved in verifying results and assessing satisfaction. Performance-based collaboration with the community and local governments may involve staff being paid an incentive by the local community or by local government: the more children immunized, the greater the remuneration.

The discontinuation of extraordinary payments should be considered, with the exception of POL and per diem allowance for outreach and mobile teams during routine immunization. Funding for performance-based incentives could be explored with development partners through “buy down arrangements,” disbursement-linked indicators, and results-based financing options.

### *Campaigns*

It is hard to justify campaigns against measles and MNT while routine immunization coverage is so low. Vaccinators are increasingly diverted from routine immunization by these competing demands. They use up large quantities of vaccines, and in the case of measles vaccine, campaigns have contributed to a major stock-out that could have severe consequences on the immunization program if not rectified immediately. The policy on campaigns should be revisited at the interprovincial level under the direction of the EPI cell of the MOIPC. It should consider limiting campaigns against measles and MNT to specific crisis situations (such as responding to a flood crisis) while increasing the monitoring and surveillance of these diseases through the routine program.

The PEI also has direct negative effects on the routine immunization program. Studies have shown that the PEI requires nearly half the working time of all EPI staff categories (some categories like vaccinators are more than others). As polio eradication is a global public good, every effort should be made to finish the job quickly, so that any negative impacts on the routine immunization program can be minimized.

### *Logistics*

#### *Cold chain*

Because power failures are likely to be a reality for the foreseeable future, every health facility storing vaccines should have a back-up plan for power failures. This may include a back-up generator or plans for moving vaccines quickly to another location with a back-up power system such as nearby commercial premises. Community leaders should be consulted at the micro-planning stage to identify appropriate alternative arrangements for maintaining the cold chain.



Vaccine vial monitors and refrigerator temperature maintenance charts are important tools that can be introduced at low cost to monitor the cold chain.

### *Vaccine logistics*

That vaccine procurement remains a central government responsibility even after 2014 offers certain advantages. This maintains the financial advantage of bulk purchasing at the federal level. It also ensures the quality of vaccines and a smooth supply to the provinces. If procurement is devolved as suggested, the federal government (EPI cell, MOIPC) should (i) inform all provinces of procedures and guidelines to purchase vaccines, (ii) provide the necessary technical assistance for maintaining quality, and (iii) enhance procurement capacity, either through financial support from donors or by using GOP funds.

Provincial teams should ensure they are competent in (i) vaccine management within stores and at each facility level, (ii) keeping records of vaccines by batch numbers as a quality assurance measure, (iii) developing vaccine logistics planning, (iv) introducing the software used at the federal level for vaccine management. These capacities can be developed by providing certificate training to store keepers and logistics-related managers. The training program should be developed with technical assistance from the federal EPI cell and WHO. The required infrastructure for establishing a logistics management system will also need to be assessed with support from WHO and the federal EPI cell.

### **Leadership and Good Governance**

Leadership and good management should be fostered through both appropriate training and by example. Management qualifications should be mandatory for appointment to managerial positions. In-service management training for mid-level managers should be offered regularly and made mandatory for all levels of managers. Funding for conducting this course regularly in each province should be sought either from the GOP or from the donors.

Any issue of corruption should be dealt with in a straightforward manner at all levels. Transparency and zero tolerance are strongly encouraged, especially among senior managers. Guidelines should be developed that include sanctions for staff implicated in corrupt practices. Provinces should promote good governance and transparency at community level by displaying a public notice board outside every health facility with a “citizens’ charter” giving details of the vision of the immunization center, the time and days of service provision, available services, the cost of such services, and a grievance response mechanism. This information often encourages users and improves access to facilities while it also increases the community–service center interaction and transparency.

## **Human Resources**

With devolution, the role of the new federal EPI cell at the MOIPC has changed. The unit needs to assess its new role, adjust the staffing structure, and retrain the staff to provide the support and guidance required by the provinces.

### *Human resource development strategy*

The EPI cell should also provide guidance and technical support (through partners, if necessary) to provinces to prepare an explicit human resources strategic plan at the interprovincial and provincial levels.

The human resources strategic plan should provide adequate incentives for trained staff to function appropriately with a well laid out career structure and merit based transfer scheme. Opportunities for promotions and salary increments may be offered. New staff categories needed for the program at the province and district levels should be identified. The method of recruitment and appointment of vaccinators and EPI staff should be revised to ensure that selections are only merit-based. Furthermore, these field workers should be selected from appropriately qualified candidates from the community they will serve in.

Each province, with the added responsibility for total management of the EPI, should reassess the roles and capabilities of existing staff (including more direct utilization of LHWs for immunization) and seek approval for cadre revisions accordingly.

Career development plans for EPI workers do not exist within the health system. This was identified as a primary reason for poor motivation to work in the program. Exploring the possibility of performance-based salary increments under each category of staff may be an option for consideration.

Planning and formalizing continuing medical education in the form of in-service training, study tours, and best practice learning for all levels of EPI staff on a periodic basis will increase the quality of the EPI program while increasing staff motivation and retention.

## **Supervision and Monitoring**

### *Planning*

Supervision and monitoring needs to be improved and restructured with the identification of supervisory staff categories for each staff level.

Every month, all categories of staff must prepare supervision plans in advance and seek approval at the monthly conference of EPI staff. Managers at all levels must closely monitor the supervision by staff under them by, carrying out spot checks on the staff based on the advanced program submitted, and also by reviewing the monthly performance at an EPI review conference.

### *Recurrent expenses*

Recurrent expenses for transport, per diem, and maintenance costs must be planned at the budgeting stage, and provided for site visits to improve monitoring. It would be helpful to

develop structured guidelines for supervision and monitoring for each category of staff. The guidelines should be developed in each of the provinces under the leadership of the EPI manager in the province. The structured guidelines should develop supervision and monitoring guidelines and norms.

The budget should reflect the additional funding requirements with increased resource allocations for performance-based incentives and supervision. Additional funding may be required for a limited period from partners.

#### *Human resources for supervision*

Provinces should look creatively at expanding the role of the primary health care worker (especially the LHW) to assist in immunization coverage. Such ideas may need to be piloted before being operationalized. Changes in the terms of reference of the relevant workers need to take into account the other staff categories already in place (for example, vaccinators).

The cadre of LHWs is a great source for improving routine immunization services, as female health workers are preferred by the community. Further, as LHWs originate from the same communities they serve, their services are especially valued in most areas. Therefore, as an initial phase, a remapping of LHWs should be conducted so that LHWs cover the entire country, especially the uncovered rural and urban poor population areas. This task needs to be led by the province EPI manager in consultation with the planning and administrative units at the province level.

#### **Finance**

A large proportion of the EPI funding was previously through GOP resources. However with the advent of GAVI support for the pentavalent vaccine and PEI, as well as other partner support (UNICEF, WHO, JICA, and WB), the government share is now limited to providing the 12 percent copayment for purchase of the pentavalent, BCG, measles, and polio vaccines for routine immunization, and for some disposables provided by GAVI.

As part of the transition following Amendment 18, provincial and area departments of health should activate their new role by immediately beginning to plan, especially their fiscal responsibilities. It is to their advantage to develop PC-1s as soon as possible, based on detailed implementation strategy documents that clearly identify goals over time and define priority interventions.

The provinces will also need to re-estimate the recurrent funding requirements for each of the districts. The re-estimate should incorporate the additional funding requirements needed to strengthen supervision and monitoring of the routine immunization program, costs for improving capacity of EPI staff at the province, district, and UC levels; and the increased costs due to remapping of staff categories. Partner support could be sought for providing the increased funding requirements.

The process of allocating funds at the district level by the district council and other officers should be made transparent, with a published annual report for the public and higher levels of government.

## **Monitoring and Evaluation**

### *Data quality assessment*

Regular assessment of the data quality at different levels using the standard WHO Data Quality Self-assessment (DQA) tool should help to identify the gaps in the routine immunization data monitoring and reporting system.

### *Feedback*

Information generated from monitoring systems and surveys should be widely shared through feedback newsletters, web updates, press releases, and news updates. The feedback information should be used at province-level review meetings and also locally and nationally for advocacy and program improvement. The feedback reports must commend the districts and UCs that report data that meets standards of timeliness and completeness established at the province level to improve staff motivation and encouragement.

### *Data reporting*

Completeness and timeliness of reported EPI routine data needs to be improved. This issue can be addressed by training appropriate staff on the data monitoring reports used, including the district register for monitoring age-appropriate immunization. Appropriate arrangements like monthly deadlines for reporting data to the province level should be in place for reporting data on time.

New data-reporting mechanisms should be added for monitoring dropout rates and defaulters from the immunization program. This can be easily calculated if the age-appropriate immunization register is maintained for each of the children in the community for the first five years of life.

### *Reviews*

The EPI data should be reviewed by each level (UC, district, and province) at monthly review meetings. These meetings should be led by the province EPI cell or manager. The review must be conducted in such a way that each UC is assessed against the standard of the expected program targets and VPD surveillance data. The immunization microplan at UC and district levels should update the measures taken to address the coverage and other program gaps identified through data analysis.

The province-level EPI cell needs to plan and conduct immunization coverage surveys regularly to validate administrative immunization coverage data, using the standard EPI cluster survey methodology.<sup>25</sup> This may be supplemented at district levels with the Lot

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25. WHO/IVB/04.23, *Immunization Coverage Cluster Survey*, <http://www.who.int/vaccines-documents/DocsPDF05/www767.pdf>

Quality Assurance method.<sup>26</sup> New technologies such as Google Earth<sup>27</sup> and Global Positioning Systems<sup>28</sup> should be explored for carrying out coverage surveys.

### *Target population estimation*

Target population estimates should be carried out at the district level using data derived from the community and UC levels (community members, volunteers, vaccinators, and LHWs) to improve the accuracy of the estimates. The national- and province-level targets for the districts should also be provided for comparison and target monitoring. The estimates generated through the district and nationally provided targets help to assess excessive under- or over- reporting in some areas. Accurate population estimates will improve the quality of administrative immunization coverage data. Furthermore, accurate estimates will also improve the forecast calculations for vaccines and ancillary item requirements, creating fewer stock-outs.

### **Surveillance**

The VPDs currently covered by surveillance include polio, measles, and MNT. The surveillance should be expanded to cover all EPI target diseases. It is recommended that the surveillance system should be managed by the EPI cell under the MOIPC for better ownership and capacity development. If necessary, technical assistance should be continued by partners, especially the WHO. For planning purposes, EPI staff with data management capacity should be selected at the provincial level to analyze incoming data for managers at the provincial and district levels.

The integrated disease surveillance (IDS) strategy defined by WHO to encompass all surveillance systems has yet to be implemented. To strengthen disease surveillance in the country, IDS implementation should be linked to the International Health Regulations (IHR) 2005,<sup>29</sup> as both relate to the strengthening of national core capacities for surveillance and outbreak response. From reporting as part of the IHR down to the sub-district level, the system needs to be owned and run by GOP. It would be useful if there could be one dedicated surveillance officer for every district.

### **Demand for Services**

Increased efforts and resources are needed to educate the public about routine immunization services. EPI cell at the MOIPC should consider increasing its investment

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26. WHO/V&B/01.26, "Description and Comparison of the Methods of Cluster Sampling and Lot Quality Assurance Sampling to Assess Immunization."

27. Kamadjeu, "Tracking the Poliovirus Down the Congo River: A Case Study on the Use of Google Earth in Public Health Planning and Mapping." *Int J Health Geogr.* no. 8 (Jan 22, 2009): 4; and Lozano-Fuentes et al., use of Google Earth.

28. Vanden Eng et al., "Use of Handheld Computers with Global Positioning Systems for Probability Sampling and Data Entry in Household Surveys," *Am J Trop Med Hyg.* 77, no. 2 (Aug. 2007): 393–99.

29. International Health Regulations (2005), <http://www.who.int/ihr/en/>

and take ownership of this activity. Vaccinators and LHWs must present timely, accurate information to mothers and child caregivers to modify their attitude and practices toward routine immunization. Other community members and health service providers including curative health staff should also be able to provide immunization information. This should be included in the pre-service and in-service training curricula of these workers.

Branding with the use of a special logo and a few target messages should be used as marketing tools to increase immunization usage and to remove community barriers to its usage.

In some areas, information dissemination should occur through religious leaders. They can give out appropriate information every week during Friday prayers.

### **New Vaccines**

Even though new vaccines offer tremendous possibilities in disease control, given Pakistan's limited resources, the cost of introducing new vaccines may come at the expense of EPI performance improvement.

Although Amendment 18 authorizes the provinces to decide on the introduction of new vaccines, it is recommended that vaccines should only be introduced with the advice of the Immunization Technical Advisory bodies at the federal, interprovincial level (for example, NITAG). These committees will need to consider the epidemiological imperative, including other preventive strategies, before adopting new vaccines. However, from a fiscal perspective, they should exercise caution in introducing any new vaccine as the current costs of individual new vaccines far exceed the current total cost of vaccines. They should recognize the long-term fiscal and programmatic implications of such an introduction, and more importantly, avoid provincial and federal budget commitments that will be impossible to fulfill in two to five years.

Furthermore, it is recommended that the GOP should withhold nationwide introduction of new vaccines until current political and fiscal uncertainties are sorted out. An option for GOP would be to introduce one or both new vaccines (PCV and RV) in selected areas with highest mortality, gradually phasing in the new vaccine/s to other geographical areas.

If procurement of vaccines is to be devolved to provinces as proposed in Amendment 18, before agreeing to introduce any new vaccine, GOP (EPI cell under the MOIPC) should confirm that all provincial finance and planning and development departments are prepared to take on funding responsibilities in years to come when partners phase out support for procurement of each proposed new vaccine.

Partners are also encouraged to explain to relevant national officers the advantages and disadvantages of new vaccine introduction, avoiding the temptation to promote organizational or global agendas that might be contrary to national interests.

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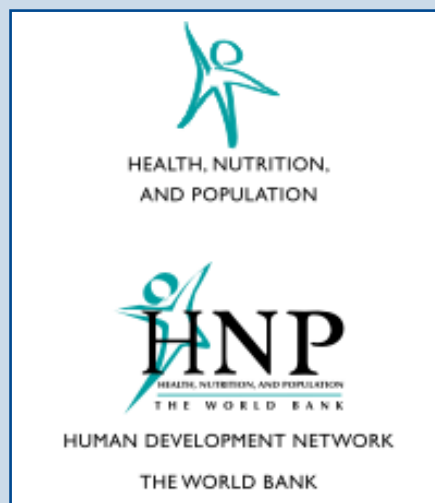
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