Impact of measles elimination activities on immunization services and health systems: Findings from six countries

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Abbreviations

AFRO: African Regional Office
AMEAs: Accelerated Measles Elimination Activities
DHS: Demographic and Health Survey
EPI: Expanded Programme on Immunization
EURO: European Regional Office
HMIS: Health Management Information System
HR: Human Resources
ICC: Inter-agency co-ordinating committee for immunization
ITN: Insecticide treated net
MCH: Maternal and Child Health
MCV: Measles Containing Vaccine
M&E: Monitoring and evaluation
MR: Combined measles and rubella vaccine
MMR: Combined measles, mumps and rubella vaccine
MOF: Ministry of Finance
MOH: Ministry of Health
OPV: Oral Polio Vaccine
PAHO: Pan American Health Organization
PATH: Programme for Appropriate Technologies for Health
SEARO: South East Asian Regional Office
SIAs: Supplementary Immunization Activities
WPRO: Western Pacific Regional Office
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Yaoundé Central Hospital

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Tajikistan: Umeda Sadykova

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1 Introduction

The declaration of smallpox eradication in 1980 is one of the greatest public health achievements of all time and the experience has stimulated global health communities to realize the prospect of eradicating other infectious diseases. A number of prerequisites have been defined to determine the feasibility of eradicating an infectious disease [1]. The key criteria are that an effective intervention is available to interrupt transmission of the agent, that practical diagnostic tools with sufficient sensitivity and specificity are available to detect levels of infection that can lead to transmission, and that humans are essential for the life-cycle of the agent, which has no other vertebrate reservoir and does not amplify in the environment [1].

Two other global eradication programmes have been launched since smallpox eradication. Guinea-worm eradication began in 1986 with the goal of eradication by 1995 and poliomyelitis eradication started in 1988 with its scheduled completion in 2000. However, the target years for eradication of both diseases have long been surpassed. While different problems characterise the two programmes and the reasons for delays in achieving the targets are multiple, one similarity is that the residual disease transmissions are in countries with extremely weak health systems [2, 3]. Following a recent independent evaluation of the polio eradication initiative, it has been acknowledged that the programme needs to more systematically contribute to immunization systems strengthening if interruption of the virus is to be accomplished in the remaining endemic countries [4].

Measles is thought to have the biological characteristics and an effective intervention making it seen by many as another feasible disease to eradicate at the current point in time [5, 6]. However, it is among the most infectious diseases of humans so a very high immunity level is required for its elimination and eradication [7]. Sero-prevalence studies in the US and other industrialized countries suggest that coverage in the range of 90–95% is needed [8]. Moreover, to eliminate measles, the administration of more than one dose of measles vaccine is recommended to ensure that the required levels of immunity are attained after vaccination [7]. The main reason for offering revaccination of measles is to protect those with primary vaccine failure (i.e. where an individual fails to respond to the first dose, usually due to persistent maternal antibody) [9]

Goals to control or eliminate measles have been agreed in many countries and regions. In 1994, the WHO Region of the Americas set a goal of measles elimination by the year 2000, which was succeeded in 2002 [10]. The European and the Eastern Mediterranean regions of the WHO established goals of measles elimination by 2010 [11, 12]. The WHO Western Pacific Region has an
elimination goal of 2012, while the WHO African Region has set a pre-elimination goal to reduce measles mortality by 98% of 2000 estimates by the same year. Only the WHO South-East Asia Region has no elimination or pre-elimination goal. Nevertheless, recently at the 2010 World Health Assembly, milestones towards global measles eradication were endorsed [13]. They include targets on vaccination coverage and reduction of incidence and mortality as following:

1. exceed 90% coverage with the first dose of measles-containing vaccine nationally and exceed 80% vaccination coverage in every district or equivalent administrative unit;
2. reduce annual measles incidence to less than five cases per million and maintain that level, and
3. reduce measles mortality by 95% or more in comparison with 2000 estimates. While there is still no official target date for eradication, the large majority of countries in the world have agreed to regional measles elimination, which on the whole requires similar activities as global eradication would entail.

To achieve these, WHO and UNICEF proposed a comprehensive strategy for measles elimination and mortality reduction. The strategy aims to [14, 15]:

1. Ensure that all children are vaccinated with two doses of measles vaccine:
   • the first dose to be provided by 12 months of age
   • the second dose may occur either at a scheduled age through routine services or periodically through mass campaigns
2. Establish effective surveillance
3. Improve clinical management of complicated measles cases

One of the key concerns in determining the appropriateness of measles eradication is its potential impact on routine immunization services and the overall health system. Experiences from previous eradication efforts have shown that these have strong vertical tendencies due to their targeted and time-limited nature. The debate around vertical versus horizontal modes of delivery has long been part of the public health literature [16-20]. While some authors have taken the view that a horizontal or more integrated approach is preferable as it includes contributions from other sectors and is more sustainable [21], others argue that a more selective or vertical approach is required in view of resource constraints [20]. With the substantial increase in the aid volume for the health sector in developing countries, the debate has gained a new momentum and a new terminology of ‘a diagonal’ approach has been coined arguing that resources earmarked for a particular disease, such as for instance HIV/AIDS, can serve to spearhead improvements in health systems [22, 23].
Lessons from polio eradication activities can help us understand the potential impacts of eradication efforts on health systems and immunization service. The Taylor Commission conducted a qualitative study in relatively well-established health systems in six countries in the Americas in 1995 [24]. They concluded that overall there are more positive implications than negative ones in these countries. The greatest positive impact was found with regard to social mobilization and intersectoral collaboration. Negative implications were more frequent in poorer countries and mainly involved the diversion of resources away from other health activities. Møgedal and Stenson in 2000 conducted detailed case studies on the impact of polio eradication activities on health systems in three countries (Tanzania, Nepal, and Lao PDR) and concluded that there were positive impacts especially in Lao PDR [25]. However, there were also missed opportunities with some negative impacts observed in Tanzania and Nepal. Overall, the message from previous studies on polio eradications is mixed even though there seems to be evidence of health system and immunization system strengthening in countries with stronger health systems.

Measles eradication activities can benefit from the lessons from polio eradication activities. However, there are a number of key differences between the two, including mode of vaccine delivery and waste disposal, the type of health care providers required to carry out the activities, the frequency of the immunization campaigns, etc. It would therefore be useful to conduct an additional study specifically on measles eradication activities. The objective of this study is thus to evaluate the impact of accelerated measles elimination activities (AMEAs) on routine immunization services and the health system. More specifically, the study aims to:

1. Describe the health system and immunization system structure in the country and assess linkages between these and measles vaccination activities.
2. Assess past, on-going and planned integration of measles vaccination activities within the health- and immunization systems.
3. Assess the impacts of measles elimination activities on various key functions of the health- and immunization systems.
4. Develop recommendations on how measles elimination and eradication activities can be used to strengthen routine immunization services and health systems, while mitigating negative impact.

The study was conducted in six countries; Bangladesh, Brazil, Cameroon, Ethiopia, Tajikistan and Vietnam. Findings of the study are documented in six country reports with this report serving as an overall synthesis report.
2 Methods

2.1 Conceptual framework

2.1.1 Health systems framework

The conceptual framework was adapted from the WHO health system framework and the framework proposed by Atun et al. for rapid assessment of disease control programmes in relation to health systems [26, 27]. The aim was to develop a systematic approach for gathering information about the impact of AMEAs on health systems and immunization programmes [28]. Our health systems framework envisions a dynamic health system with eight key functions influenced by external context, especially political, legal, economic, socio-demographic, and technological factors. This is illustrated in Figure 2.1.

Figure 2.1: Health systems framework used in the study

The eight key components of the health system can be described as follows:

1. Governance

Governance is a crucial multi-dimensional concept within health systems strengthening debates, covering political, economic and institutional processes. One element of it is stewardship, which is one of the core functions of a health system. Priority areas within governance are health sector policies, harmonisation and alignment of donor activities, oversight and regulation.
2. **Financing and resource generation**

The financing function encompasses the overall amount of funding as well as its distribution across individuals, population groups, geographical areas, levels of care and services. It concerns the generation of financial resources from different sources; pooling it across population groups; methods of resource allocation; and purchasing of services.

3. **Planning and management**

Planning and management are essential functions of any system and services. The planning function includes activities and processes of developing and maintaining relevant plans of health activities. Management refers to the organization and coordination of health system’s resources and activities to achieve its goals. Effective planning and management is seen as a crucial factor for programme’s implementation success.

4. **Human resources**

Health human resource is considered a key towards the success of any health system. Yet many developing countries are facing a number of health workforce related problems, such as staff shortage, mal-distribution, skill imbalance and low motivation. More importantly, health workforce function is seen by many as an area where potential interactions with and implications from vertical disease programmes are strongest, either positive or negative.

5. **Logistics and procurement**

The areas of logistics and procurement are closely related to planning and management. In our study we separate logistics and procurement from planning and management given its important role in immunization service. Logistics refers to the management of flows of drugs, vaccines, and other materials and involves procurement, inventory, and transportation, among other activities.

6. **Information system**

The generation and strategic use of information is an essential part of all health systems. This function is to ensure that key actors in the system have access to necessary information. It requires relevant data sources, development of indicators for measurement, and data management to create intelligence for effective health system functions. Information system function also includes dissemination and use of information.

7. **Surveillance**

Surveillance is a systematic process of the information system with specific application to diseases and health problems. It is an important component of disease prevention and control. Several approaches exist, including registries, notifiable disease reporting, laboratory based surveillance, and
sentinel site surveillance. Strengthening of laboratory-supported disease surveillance is one of the four measles related activities that are part of the strategy towards measles elimination.

8. Service delivery and demand generation
This function can be considered as the core function of health systems. Service delivery refers to the provision of health services that includes both personal health services, such as medical care and non-personal health services such as mass health education or basic sanitation. Demand for health services can be generated through a number of interventions, including financial and non-financial incentive provision and information, education, and communication activities.

2.1.2 Analytical framework
The study focused on three main areas of analyses as illustrated in Figure 2.2. The first element is a general description of the overall context of the health system, its elements and their functions in order to provide a clear understanding of the country setting. The overall picture of immunization services and measles elimination activities was also described. The second element involves the analysis of the scope and level of integration of measles elimination activities within immunization services and the mainstream health system. The third element is the most important part of this study. It assessed the impacts of measles elimination activities on immunization services and health systems. The factors contributing to the effectiveness of AMEAs or the impacts of the health system on AMEAs were beyond the scope of the study.

Figure 2.2: Overall assessment framework and the three study elements
2.1.3 Definitions of integration

Two definitions of integration appear in the literature. The most common is that integration is a process where disease control activities are merged with multifunctional health care delivery [29]. This results in a horizontal programme that aims to tackle health problems through creation of a system of permanent institutions. A second type of integration is simultaneous delivery of different disease control programmes, such as the Integrated Management of Childhood Illnesses or adding other public health interventions to measles supplementary immunization activities (SIAs) [28]. The study assessed both types of integration.

The extent of integration of measles activities with routine immunization services and the health system was assessed in relation to each of the eight functions of a health system and evaluated at national and sub-national levels, including provider level because the extent of integration at different levels may vary. For example, in some countries financing systems for SIAs at the central level is organized separately from the EPI with separate fund holders and payment mechanisms. However, at the service delivery level, financing for SIAs may be handled by the same staffing and accountancy structure as routine immunization services.

The second type of integration was investigated by documenting whether other services have been delivered during measles SIAs. During the present decade, numerous countries, particularly in Sub-Saharan Africa, have introduced integrated child health interventions where a campaign for multiple health interventions is conducted to deliver more than one intervention at the same time [30]. For instance, insecticide treated bed nets can be delivered with measles vaccine. This is also done in the form of child health days or child health weeks. If integrated child health interventions have been delivered, their advantages and disadvantages in relation to the health system and immunization services were evaluated.

2.2 Country selection

Six countries were included in the study. These were selected so that a variety of geographical regions, population sizes, income levels, and measles vaccination coverage rates were represented. Other key selection criteria were that countries should recently have completed measles SIAs and that some of the countries had introduced a second dose of measles-containing vaccine (MCV2) in their routine schedule. Countries were selected in consultation with the WHO measles advisory committee and WHO regional offices.
Summary statistics of the six selected countries are displayed in Tables 2.1 and 2.2. Brazil and Bangladesh have populations in excess of 150 million inhabitants, while Tajikistan and Cameroon have less than 20 million people. According to World Bank classifications, the countries comprise of four low-income (Bangladesh, Ethiopia, Tajikistan and Vietnam), one lower-middle-income (Cameroon), and one upper-middle-income country (Brazil). Among the six countries, Cameroon and Ethiopia have the lowest health indicators while Vietnam and Brazil ranks the highest. The under-five mortality rates vary from 80 per 1,000 live births in Cameroon to 17 in Vietnam. Similarly, life expectancy varies from 53 years in Cameroon to 75 years in Vietnam.

Vaccination coverage data and the year of the first and last measles SIAs in the six countries are summarised in Table 2.2. In all countries the first dose of measles is delivered between 9 and 12 months. Routine 2008 coverage with the first dose of measles-containing vaccine (MCV1) varied from 74% in Ethiopia to 99% in Brazil. These national estimates do however hide great disparities between districts within the countries. Low measles vaccine coverage rates in certain areas of the country are especially a problem in Cameroon and Ethiopia [31]. In Cameroon, vaccination coverage of 80% or more was only achieved in 73 out of 173 districts during 2008. In several regions of Ethiopia, especially in the Eastern part of the country, coverage has traditionally been less than 50% – in the Somali region, DTP3 coverage was less than 10% during 2006.

Three of the countries, Brazil, Tajikistan and Vietnam, have included a second dose of measles vaccine in their routine schedule. As the PAHO region embarked on measles elimination earlier than other regions in the world, Brazil was the first of the six countries to undertake measles SIAs in 1992. Bangladesh did not start measles SIAs until 2005. All the study countries had undertaken measles SIAs within the three years prior to the study.

Table 2.1: Demographic and economic summary statistics of the six study countries

<table>
<thead>
<tr>
<th>Country</th>
<th>2010 projected population</th>
<th>2010 under five mortality rate*</th>
<th>2010 life expectancy (years)</th>
<th>GNI per capita (2008 US$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bangladesh</td>
<td>164,425,000</td>
<td>37</td>
<td>68</td>
<td>520</td>
</tr>
<tr>
<td>Brazil</td>
<td>195,423,000</td>
<td>20</td>
<td>74</td>
<td>7,300</td>
</tr>
<tr>
<td>Cameroon</td>
<td>19,958,000</td>
<td>80</td>
<td>53</td>
<td>1,150</td>
</tr>
<tr>
<td>Ethiopia</td>
<td>84,976,000</td>
<td>71</td>
<td>57</td>
<td>280</td>
</tr>
<tr>
<td>Tajikistan</td>
<td>7,075,000</td>
<td>56</td>
<td>68</td>
<td>600</td>
</tr>
<tr>
<td>Vietnam</td>
<td>89,029,000</td>
<td>17</td>
<td>75</td>
<td>890</td>
</tr>
</tbody>
</table>

* Infant deaths per 1,000 live births

Sources: UN Population Division (esa.un.org/unpp/) and World Bank (data.worldbank.org/indicator/NY.GNP.PCAP.CD)
Table 2.2: Vaccination coverage and measles SIAs in six study countries*

<table>
<thead>
<tr>
<th>Country</th>
<th>2008 estimated DTP3 coverage</th>
<th>2008 estimated measles coverage</th>
<th>Type of measles vaccine used</th>
<th>Age of measles second dose in routine</th>
<th>Year of first measles SIAs</th>
<th>Year of most recent measles SIAs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bangladesh</td>
<td>95%</td>
<td>89%</td>
<td>Measles</td>
<td>NA</td>
<td>2005</td>
<td>2010</td>
</tr>
<tr>
<td>Brazil</td>
<td>97%</td>
<td>99%</td>
<td>MMR</td>
<td>4-6 years</td>
<td>1992</td>
<td>2008</td>
</tr>
<tr>
<td>Cameroon</td>
<td>84%</td>
<td>80%</td>
<td>Measles</td>
<td>NA</td>
<td>2002</td>
<td>2009</td>
</tr>
<tr>
<td>Ethiopia</td>
<td>81%</td>
<td>74%</td>
<td>Measles</td>
<td>NA</td>
<td>1998</td>
<td>2009</td>
</tr>
<tr>
<td>Tajikistan</td>
<td>86%</td>
<td>86%</td>
<td>MR</td>
<td>6 years</td>
<td>2004</td>
<td>2009</td>
</tr>
<tr>
<td>Vietnam</td>
<td>93%</td>
<td>92%</td>
<td>Measles</td>
<td>6 years</td>
<td>1999</td>
<td>2009</td>
</tr>
</tbody>
</table>

* Coverage rates are WHO/Unicef best estimates: who.int/immunization_monitoring/en/globalsummary/
MR: Measles and rubella combined vaccine
MMR: Measles-mumps-rubella combined vaccine

2.3 Data collection

A mixed-method case study approach was used to capture both the outcomes and process factors related to measles activities. A toolkit explaining the methods and step-by-step approach was developed before field work was started [32]. Methods for collecting primary data included key informant interviews, focus group discussions (where appropriate), and a staff profiling survey to assess the impact of AMEAs on human resource issues. Secondary data including policy documents, studies and reports were reviewed to identify themes to be explored in interviews and to fill any information gaps. Hence, the process of research was iterative, as ideas emerging from the interviews informed the methodology and guided collection of further data; opinions were corroborated in secondary data. Data analysis used primarily qualitative approaches [32].

In each country, data were collected at national, sub-national and service delivery level in both rural and urban areas. The chosen areas are seen in Table 2.3.

Key informants were selected on the basis of their expertise in immunization services or in relevant health system areas, representing all administrative levels, different institutions and various areas of expertise in order to triangulate the data obtained. Field work took place between November 2009 and April 2010 with between 22 and 60 key informants interviewed in each country (Tables 2.4 and 2.5).
Ethical approval was obtained from the LSHTM ethics committee and from ethics committees in all six countries. Key informants provided their informed consent.

Table 2.3: Districts where interviews were conducted in the six countries

<table>
<thead>
<tr>
<th>Country</th>
<th>Urban district(s)</th>
<th>Rural district(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bangladesh</td>
<td>Dhaka City Corporation</td>
<td>Sunamgonj</td>
</tr>
<tr>
<td>Brazil</td>
<td>National level interviews in Brasilia</td>
<td>Porto Seguro, Bahia municipality</td>
</tr>
<tr>
<td>Cameroon</td>
<td>Mbalmayo and Bertoua</td>
<td>Doume</td>
</tr>
<tr>
<td>Ethiopia</td>
<td>Kolefe Sub-city, Addis Ababa City</td>
<td>Wegera District, North Gondar Zone, Amhara Regional State</td>
</tr>
<tr>
<td>Tajikistan</td>
<td>Dushanbe</td>
<td>Tursunzade and Faizabad</td>
</tr>
<tr>
<td>Vietnam</td>
<td>Thanh Tri, Hanoi city</td>
<td>Lac Son, Hoa Binh province</td>
</tr>
</tbody>
</table>

Table 2.4: Key informants interviewed according to administrative level

<table>
<thead>
<tr>
<th>Country</th>
<th>National level</th>
<th>Regional level</th>
<th>District level</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bangladesh</td>
<td>21</td>
<td>0</td>
<td>39</td>
<td>60</td>
</tr>
<tr>
<td>Brazil</td>
<td>9</td>
<td>6</td>
<td>7</td>
<td>22</td>
</tr>
<tr>
<td>Cameroon</td>
<td>29</td>
<td>6</td>
<td>18</td>
<td>53</td>
</tr>
<tr>
<td>Ethiopia</td>
<td>21</td>
<td>0</td>
<td>14</td>
<td>35</td>
</tr>
<tr>
<td>Tajikistan</td>
<td>12</td>
<td>0</td>
<td>23</td>
<td>35</td>
</tr>
<tr>
<td>Vietnam</td>
<td>12</td>
<td>0</td>
<td>18</td>
<td>30</td>
</tr>
<tr>
<td>Total</td>
<td>104</td>
<td>12</td>
<td>119</td>
<td>235</td>
</tr>
</tbody>
</table>
Table 2.5: Key informants interviewed according to organizational affiliation

<table>
<thead>
<tr>
<th></th>
<th>Government</th>
<th>International organization or donor agency</th>
<th>NGOs</th>
<th>Academia</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bangladesh</td>
<td>47</td>
<td>7</td>
<td>6</td>
<td>0</td>
<td>60</td>
</tr>
<tr>
<td>Brazil</td>
<td>20</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>22</td>
</tr>
<tr>
<td>Cameroon</td>
<td>36</td>
<td>13</td>
<td>3</td>
<td>1</td>
<td>53</td>
</tr>
<tr>
<td>Ethiopia</td>
<td>25</td>
<td>6</td>
<td>1</td>
<td>3</td>
<td>35</td>
</tr>
<tr>
<td>Tajikistan</td>
<td>30</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>35</td>
</tr>
<tr>
<td>Vietnam</td>
<td>27</td>
<td>2</td>
<td>0</td>
<td>1</td>
<td>30</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>185</strong></td>
<td><strong>35</strong></td>
<td><strong>10</strong></td>
<td><strong>5</strong></td>
<td><strong>235</strong></td>
</tr>
</tbody>
</table>

2.4 Staff profiling survey

In each country, a staff profiling survey was done in the two districts selected for the study. In each district, a standard questionnaire was given to health care workers and professionals working in the EPI programme. The questionnaire is designed to be self-administered and easy to answer. Each questionnaire contains questions on basic characteristics and roles of the staff, their training experience, their workload, and their income with focus on the changes or differences that may have occurred in relation to measles SIAs. Additional questions on management support and job satisfaction are also included.

Questionnaire respondents were individuals who had direct experience working on measles related activities. Before the questionnaires were distributed an introduction was given to a responsible person distributing the questionnaire usually head nurses and matrons. Questionnaires in districts were distributed while the team was doing document reviews and interviews and the completed questionnaires were collected before departure. For some staff, we requested key informants to distribute the questionnaires because of time constraint and collected it back on another day.

2.5 Data analyses

Analyses of the generated data combine both qualitative and quantitative approaches. The analytical process, by and large, follows a framework analysis approach [33, 34] and was carried out as both the country level analysis and cross-country analysis. The cross-country analysis built on the country
level synthesis and interpretations by drawing a broader understanding of the impacts of AMEA on immunization services and health systems and identifying lessons from the country case studies which may have wider resonance in similar settings.

Data quality was evaluated for reliability with deviant case analysis to search for and examine cases and events that are not in consonance with overall trends. Different data sources (interviews and documentary review) were triangulated to balance the scope for errors and bias of the other. Triangulation of data from national and local level sources was also done. Quantitative data collected for the study were entered into Excel and were range and consistency checked. A synthesis workshop was organized to synthesise and verify the country specific findings and to develop policy recommendations on measles eradication and immunization service and health systems.
3  Overview of health systems in the six countries

In this chapter, a comparative overview of the health systems in the six countries is given according to the eight building blocks.

3.1  Stewardship and governance

The six study countries exhibited different degrees of decentralisation within their health systems. Brazil and Ethiopia are the two countries with the highest degree of decentralisation. In Brazil states and municipalities have since 1990s been granted the responsibility of ensuring access to primary health care. In Ethiopia, the first phase towards regional decentralisation started in 1994 and this was extended in 2002 with decentralisation of weredas (districts). The Ethiopian decentralization process was expected to facilitate focus on grass-root problems and ensure more responsive and responsible governance, but due to limited capacities at the lower levels, its short term effect on the health system has been challenging.

Bangladesh, Cameroon, Tajikistan and Vietnam are decentralised to a somewhat smaller extent. However, decentralization of health care delivery has now been an ongoing process in Vietnam for several years, leading to an increasing share of government health spending at the provincial level and below. Similarly, while the health system of Tajikistan is still organized according to the Soviet model of highly centralised, some degree of decentralisation is currently being introduced.

3.2  Planning and management

The Constitution of Bangladesh mandates basic healthcare services for all citizens as one of the fundamental responsibilities of the state. The policy document that shapes the direction of healthcare is the poverty-reduction strategy paper (PRSP) although the current Government has indicated that it will develop a five-year plan. The current government programme is entitled “Health, Nutrition and Population Sector Programme (HNPS)” for the July 2003 to June 2011 period (HNPS 2003-2011). The Ministry of Health and Family Welfare (MoHFW) designed the Programme Implementation Plan.

In Brazil, each tier of Government has a separate planning process. At National level, a four year health plan sets out the overall objectives. This is followed by annual health programmes at state levels and management reports at municipal levels.

In Cameroon, a revised health sector strategy has been adopted within a conceptual framework of primary healthcare. A new 2010-2015 strategy will be implemented under a SWAp framework with
district development being the main pillar: the objective is to enable health districts to provide sustainable, affordable high quality healthcare and health services.

In Ethiopia, planning is conducted as part of the Twenty-Year Ethiopian Health Sector Development Program (HSDP) which started in 1997. It consists of 5-years rolling plans; HSDP III, 2005/6-2010/11 has just been completed and HSDP IV just been launched. HSDP is fully integrated in the country’s Plan for Accelerated and Sustained development to End Poverty and planned and implemented in close collaboration with all international partners.

In Tajikistan, The MoH regulates and manages health care facilities at the national and regional levels. Separate vertical republican/national centers have responsibilities for overall health policy and program planning, and for population-based services, clinical services, and community-based care. However, the health system inherited from the Soviet period was not favourable to cost-effective and preventive health care services. A number of health programmes continue to operate vertically with lack of coordination and/or little interaction with each other, for example, the Republican Center of Immunoproylaxis (RCIP), Republican Center of HIV/AIDS, Republican Tropical Center, Republican Center of Integrated Management of Childhood Illnesses, Republican Center of Nutrition, Republican Center of Tuberculosis.

Over recent years the thrust of Vietnam’s health sector strategy has emphasized active prevention, public service delivery at the “grass roots” level, the need to mobilize the entire society in support of improved health care, the expansion of health insurance cover, the value of traditional medicine, and the active participation of the private sector under the government’s leadership.

3.3 Financing and resource generation

The level of financial resources available in each country varied greatly following their economic status. The total health spending per capita in 2008 ranged from 904 US$ (Purchasing power parity adjusted) in Brazil to and US$ 30 in Ethiopia.

In all the countries as relatively high share is paid by private out-of-pocket expenditures or through private insurance. In Tajikistan 73% total health expenditures are paid by private sources, reflecting a low level of financial protection. In Vietnam, high annual GDP real growth rate of 7% per year has enabled people to pay increasingly out of pocket, to the neglect of the Government increasing its share of expenditures allocated to health. Thus, only about one-third of health spending emanates from the public sector, with the preponderance paid by private sector sources.
Ethiopia has high reliance on external funding for health which accounted for 42% of total health expenditures in 2008. In 2007, Ethiopia received US$175.7 million in Official Development Assistance for health, up from $68.6 million in 2005. Bangladesh, Cameroon and Tajikistan received around 5-8% of their health spending from external sources while Vietnam has less than 2% and none in Brazil.

Table 3.1: Health care financing in the six countries (2008)

<table>
<thead>
<tr>
<th>Country</th>
<th>Total expenditure on health (US$) (PPP)</th>
<th>Total expenditure on health as % of GDP</th>
<th>Health as percent of Government expenditures</th>
<th>Percent of health expenditure financed by Government or external sources</th>
<th>Percent of health expenditure financed by private sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bangladesh</td>
<td>47</td>
<td>3.5%</td>
<td>7.3%</td>
<td>35.7%</td>
<td>64.3%</td>
</tr>
<tr>
<td>Brazil</td>
<td>904</td>
<td>8.4%</td>
<td>6.0%</td>
<td>44.0%</td>
<td>56.0%</td>
</tr>
<tr>
<td>Cameroon</td>
<td>121</td>
<td>5.5%</td>
<td>7.9%</td>
<td>28.4%</td>
<td>71.6%</td>
</tr>
<tr>
<td>Ethiopia</td>
<td>30</td>
<td>3.4%</td>
<td>9.1%</td>
<td>56.8%</td>
<td>43.2%</td>
</tr>
<tr>
<td>Tajikistan</td>
<td>107</td>
<td>5.6%</td>
<td>4.4%</td>
<td>26.2%</td>
<td>73.8%</td>
</tr>
<tr>
<td>Vietnam</td>
<td>201</td>
<td>7.3%</td>
<td>8.7%</td>
<td>38.5%</td>
<td>61.5%</td>
</tr>
</tbody>
</table>

Source: WHO National Health Accounts

3.4 Human resources

Lack of human resources constituted a serious obstacle in all countries except Brazil and Tajikistan. The shortage is most prominent in Ethiopia and Cameroon. Ethiopia has one of the lowest densities of health workforce in the world. As seen in Table 3.2, the ratio of physicians per 1,000 people was only 0.03 in 2004. During the past few years the country has however invested heavily in training more staff, such as the introduction of a very large health extension worker programme.

Table 3.2: Physicians per 1000 population in the six study countries (most recent)

<table>
<thead>
<tr>
<th>Country</th>
<th>Physicians per 1,000 population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bangladesh</td>
<td>0.26</td>
</tr>
<tr>
<td>Brazil</td>
<td>2.06</td>
</tr>
<tr>
<td>Cameroon</td>
<td>0.19</td>
</tr>
<tr>
<td>Ethiopia</td>
<td>0.03</td>
</tr>
<tr>
<td>Tajikistan</td>
<td>2.03</td>
</tr>
<tr>
<td>Vietnam</td>
<td>0.65</td>
</tr>
</tbody>
</table>

Source: World Development Indicators database

In Bangladesh, a large proportion of human resources for health work in the private sector, but as many as 60% of these are unqualified practitioners. These are traditional healers, homeopathic practitioners, village doctors, and community health workers, and also drugstores that sell allopathic medicine on demand. These informal providers are deeply embedded in the local community and
culture, and they are easily accessible and provide inexpensive services to the villagers, with occasional deferred payment and payment in kind being accepted instead of cash.

In Vietnam, there has been significant increase in the number of health workers, from 2.9/1,000 people in 2001 to 3.5/1,000 in 2008. However, Vietnam has been suffering from a severe shortage of health workers in preventive sector, at primary levels, and mountainous, remote and isolated areas.

### 3.5 Logistics and procurement

In Brazil, each tier of government has the autonomy to develop operational plans for their local health systems by acquiring the materials necessary and utilizing its own resources, as well as to use fund-to-fund transfers. Among the exceptions to this is the purchase of immunobiological products, including vaccines, which are centralized in the Ministry of Health at federal level.

In Cameroon, a National Centre for Procurement of Essential Medicines and Technologies (CENAME) was established in the mid 1990’s to ensure availability of drugs and essential technologies. While CENAME deal with procurement for the State health facilities, regional branches are responsible for distributing drugs and technologies for state health facilities but also not-for profit health facilities at the regional and district levels. Private for profit and not-for profit procurement bodies also exist.

In Ethiopia, procurement is undertaken by the Ministry of Health and Regional Health Bureaus (RBH). Regular program supplies for EPI, tuberculosis, malaria control, family planning, and HIV/AIDS are received by the RHB and forwarded down the system. Other partners, such as NGOs, supply directly to the health facilities or programmes they support. RHB secures additional supplies for emergencies.

In Vietnam, the purchase and procurement of drugs and equipment is in accordance with the Law on Competitive Bidding and joint Circular of the Ministry of Health and Ministry of Finance. In addition, state health care facilities are based on their extent of services, capacity and source of funding to plan and procure equipments, materials and drugs. For instance, for those using government bonds, there will be reviewing and approval process from the central levels with the involvement of Ministry of Health, Ministry of Finance and Ministry of Planning and Investment.

### 3.6 Information system

The quality of Health Management Information systems vary considerably between the countries. In Brazil, the system is very advanced with a common network (DATASUS) registering health indicators, financial information as well as numerous other services and applications. In contrast, only 44
hospitals and two health centres HC were implementing a new HMIS in Ethiopia in 2009. Similarly, in Cameroon the system is fragmented and under resourced, and vertical programmes each run its own data collection system. Birth registration system is weak with more than 50% of births not registered in some rural areas.

In Bangladesh, HMIS data are collected by the public health facilities at the district level and below. Tertiary and non-state sector providers and facilities are generally in poor compliance with their reporting obligations. Information is collected on disease-specific morbidity and mortality based on 37 selected diseases, including non-communicable diseases. Reports are filed monthly. To improve data collection, plans are underway to convert paper-reporting systems into an electronic reporting system, including equipping each upazila (subdistrict health complex) with a wireless modem and to test the equipping of village health workers with personal digital assistants (PDAs).

In Vietnam, the routine reporting system collects data, compiles it and sends it up to the next level, from the commune level to the district to the province to the national level. In general, the system includes information from hospitals and health facilities; the data include reported cases of notifiable diseases, health program coverage and performance, work force, etc. Though there are some hospitals applying information technology for reporting, the majority of hospitals, particularly those at district levels or in remote areas, and other health facilities such as commune and district health centres, reporting remains largely manual and constitutes a substantial part for health workers’ normal activities.

### 3.7 Surveillance and laboratory system

All the countries have implemented an integrated disease surveillance and response system. In Brazil, activities for epidemiological surveillance, prevention and control of diseases follow the principles of decentralization. While the federal level is responsible for national coordination, such as establishing norms and technical procedures, the states execute the activities. In addition, there are some important National Programmes of Epidemiological Surveillance, such as dengue, malaria, leprosy, tuberculosis, hepatitis viruses, HIV/AIDS and immunisation. Some of these programmes rely on technical cooperation with international organisations.

In Vietnam, there are four major types of disease surveillance systems: (i) Monthly EPI disease report, which is a passive surveillance system aggregating monthly reporting of 12 vaccine-preventable diseases, (ii) 24 infectious disease report, which is also a passive system that includes vaccine-preventable diseases and others such as dengue fevers and malaria on a monthly basis, (iii)
Commune health centre reports on national standard forms which accumulate at district level, then provincial level and eventually to the central level at the Ministry of Health. This is an active weekly surveillance for 24 infectious diseases, including vaccine-preventable diseases. In this system, district and provincial epidemiologists implement the activity in district and provincial hospitals. In some areas, active surveillance is also conducted monthly by staff from District Preventive Medicine Centre in commune health centres. (iv) An immediate passive reporting at every level and by public and private facilities for measles, acute flaccid paralysis and suspected neonatal tetanus.

3.8 Service delivery and demand generation

In Brazil, primary health care is seen as a gateway into health service delivery. In order to strengthen access to primary health care in the country, the federal government created two programmes in the 1990s; the Family Health Programme (PSF) (Programa de Saúde da Família) and the Programme of Community Health Workers (PACS) (Programa de Agentes Comunitários). These operate as ‘booster’ strategies to traditional primary health care services. In the PSF, each family health team is responsible for monitoring approximately 3,000-4,500 people or 1,000 families within a specific area. Each PSF team is composed of at least one family doctor, one nurse, one nursing assistant, and six community health workers. The expanded team also contains one dentist, one dental technician and one dental hygienist. The teams work mainly in the primary health care units, through home visits and community mobilisation. The PACS is today considered part of the PSF.

In Ethiopia, the major reasons for this low utilization remain the same in the last ten years. The most important impeding factor is distance - on average 2 hours walk and long (> 7 hours) waiting times. The perception of expensiveness seems to have almost doubled between 1996 and 2004. Distance, thus, remains as a major factor in non-use of health services and most who go to health services continue to do so on foot. There seems to have been very little improvement in roads and transportation conditions to impact on health services utilization.

In Vietnam, primary health care services are covered by a network of commune health centres. Almost 99% of communes in Vietnam have a commune health centre. Among these, 65.9% has a medical doctor and 84.4% have active village health workers, who provide extra support for health staff at commune health centre.
4 Overview of immunization services in the six countries

Immunization services in the six countries face different types of challenges. The strongest programmes were found to be in Brazil and Vietnam while the weakest are those of Cameroon and Ethiopia. Key features of each of the programmes are summarised in Table 4.1.

Table 4.1: Features of immunization services in the six study countries

<table>
<thead>
<tr>
<th>Country</th>
<th>Key features of immunization services</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bangladesh</td>
<td>Programme has improved considerably during the past decade and high coverage rates are achieved. NGOs are heavily involved in vaccine delivery, especially in urban areas. Immunization a high priority of the Government.</td>
</tr>
<tr>
<td>Brazil</td>
<td>Vaccination is highly integrated with primary health care services. In 1977, vaccination was made compulsory, and the presentation of proof of vaccination was made a condition for payment of Social Security family benefits. Coverage rates of around 95% are consistently achieved throughout the country.</td>
</tr>
<tr>
<td>Cameroon</td>
<td>Vaccine delivery is dominated by campaigns. Routine services are weak. Campaigns are conducted for polio, measles, maternal tetanus (women of child-bearing age), and yellow fever (all aged 9 months and above excluding pregnant women). The routine strategy involves vaccination at fixed posts as well as outreach with mobile units targeting the population beyond 5km from health centres.</td>
</tr>
<tr>
<td>Ethiopia</td>
<td>The main challenges are persistent low vaccination coverage rates in the emerging regions of Gambella, Afar and Somali. Ethiopia has one of the lowest densities of health workforce in the world. A new system of health extension workers might help to increase coverage in future years.</td>
</tr>
<tr>
<td>Tajikistan</td>
<td>The immunization programme is highly vertical and operates within a health system which has largely collapsed after independence from Soviet Union. At the district level operational management of vaccination is the responsibility of 65 district EPI directors. A recent polio outbreak indicates that real vaccination coverage rates are considerably lower than reported.</td>
</tr>
<tr>
<td>Vietnam</td>
<td>Strong programme that benefits from high commitment of the Government. Immunisation is primarily provided by commune health centres on fixed one to two monthly days. Outreach activities at vaccination points closer to the community are also conducted. At provincial level, there is usually 2 to 3 staff members assigned specifically to EPI services.</td>
</tr>
</tbody>
</table>
4.1 Inter-agency co-ordinating committees

Inter-agency co-ordinating committees (ICCs) exist in all countries except in Brazil. In Ethiopia these committees have even been established in some of the regions too. Members of the respective, national committees are summarised in Table 4.2

<table>
<thead>
<tr>
<th>Country</th>
<th>Members</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brazil</td>
<td>NA</td>
</tr>
<tr>
<td>Cameroon</td>
<td>Ministry of Public Health, WHO, UNICEF, NGOs (Helen Keller International, Plan International, Rotary, International Federation of Red Cross and National Red Cross), civil society organisations</td>
</tr>
<tr>
<td>Ethiopia</td>
<td>MOH, Ministry of Education, Regional Health Bureaus, USAID, JICA, Irish Aid, WHO, UNICEF, faith based organisations, NGOs, Rotary International</td>
</tr>
<tr>
<td>Tajikistan</td>
<td>MOH, MOF, WHO, UNICEF, JICA, Swiss Agency for Development and Cooperation, Aga Khan Foundation, World Bank, Project Hope (a USAID-funded project)</td>
</tr>
<tr>
<td>Vietnam</td>
<td>MOH, WHO, UNICEF, PATH, JICA</td>
</tr>
</tbody>
</table>
5 Measles elimination activities in the six countries

5.1 Routine measles vaccination

National coverage rates of the first dose of measles containing vaccine during the period 1999-2009 are illustrated in Figure 5.1 for the six countries. Wide differences can be seen. Brazil has consistently sustained coverage rates close to 100% during the period. One of the reasons for this is that in 1999, as part of the measles elimination strategy, Brazil decided to step up its efforts towards reaching the goal of elimination by 2000. A task force was created and one of the goals was that all municipalities reached 95% routine measles vaccine coverage.

Vietnam has similarly achieved coverage rates above 90% in all the years, except in 2007 where coverage was 83% due to procurement problems that led to stock-out of the vaccine. Ethiopia and Cameroon have experienced dramatic improvements during the past decade. While coverage rates were 46% and 48%, respectively, during 1999, these had increased to 74% in Cameroon and 75% in Ethiopia in 2009. However, there are still great within-country disparities in these two countries with several areas reporting less than 50% coverage. Bangladesh has made considerable improvements and has managed to reach MCV1 coverage rates of 89% during the past three years. Coverage rates in Tajikistan have fluctuated between 79% and 94% during the period.

Figure 5.1: MCV1 coverage in the six countries

Brazil, Tajikistan, and Vietnam have included MCV2 in the routine immunization schedule, but this is not yet the case Bangladesh, Cameroon, and Ethiopia. However, in Bangladesh the Scientific and
Technical sub-committee of the National Committee for Immunization Practices has recently decided to incorporate a routine second dose for children aged 15 to 18 months from 2011.

In Brazil the second dose is given as MMR vaccine at 4-6 years. In 2008 coverage of this dose was 69% compared to 98% for the first dose. Coverage of MMR2 is especially low in regions without a Family Health Program.

Tajikistan has had a routine second dose in the schedule since the 1986 when the country was part of the USSR. In 1993, after considering the age at which most children got measles, the age of the first dose was decreased from twelve to nine months, and the age of the second dose from six to three years. However, in 2001 the old schedule was resumed.

In Vietnam a routine second dose was introduced in 2006 targeting all first grade children at the time of school entry. With more than 90% of children attending primary school this is deemed an efficient strategy for delivery. Effective collaboration between staff at district and commune levels with the school authorities and good defaulter tracking by the commune health centre facilitates the programme. The vaccine is delivered through effective collaboration with schools and local people committees, who organise a measles vaccination day for all first grade children in the schools. During 2006, the measles second dose was implemented in 43 out of 64 provinces and coverage reached 98%. In 2007, however, measles vaccine stock-outs led to a severe decrease in coverage to only 17%. In 2008, vaccine supply returned to normal and coverage of MCV2 rose to 97%

5.2 Measles SIAs

5.2.1 History of measles SIAs

Bangladesh implemented catch-up SIAs for all children between 9 months to 10 years in 2005 and 2006 in a phase-wise manner. These SIAs was the largest public health activity that has been undertaken in the history of Bangladesh; approximately 33.5 million children were targeted to be vaccinated by 50,000 qualified vaccinators and 750,000 mobilized volunteers, through more than 100,000 schools and 150,000 EPI centres. The achievement of measles catch-up SIAs was coverage of 93%. Follow-up SIAs were conducted in 2010 covering 20 million children between 9 months and 5 years.

Brazil the first national vaccination campaign was organised for children aged 9 months to 14 years, regardless of their previous vaccination situation in 1992. However, there was no continuity to the strategy and after 1992 routine vaccination against measles did not attain the expected level, remaining below 95%. A new outbreak of measles emerged at the end of 1996, in the state of Santa
Catarina. It spread to 18 states in 1997 and registered a total of 53,664 confirmed cases (C.V.E. SESSP, 1999). In June 1997, with the purpose of containing the outbreak, various campaigns against measles were conducted at state level. In total there were four national measles campaigns, with the last in 2004. The first one, in 1992, was a catch up campaign and subsequent campaigns were follow-up. All campaigns achieved coverage rates above 95%. In early 2008 the country held catch-up SIAs against rubella using combined measles, mumps and rubella (MMR) vaccine with a target population of almost 70 million people.

In Cameroon there are two types of measles campaigns, namely preventive SIAs and outbreak response campaigns. There are also Mother and Child Health and Nutrition Days (SASNIMs), which include a minimum package of interventions, such as vitamin A, mebendazole, Intermittent Preventive Treatment of malaria for pregnant women (IPTp) and vaccination. The package can vary according to regional needs, such as yellow fever vaccination provided in at risk areas or ITNs in malaria endemic regions. Measles has sometimes been the focus of SASNIMs, including the one organised in July 2009, but in other SASNIMs, measles vaccination has only been provided opportunistically to unvaccinated children. For instance during the 2008 SASNIM, it was estimated that SIAs contributed to vaccinating 16% of children (133,264) against measles in addition to routine coverage. Cameroon held catch-up SIAs in 2002 for over 7 million children between 9 months to 15 years of age, follow-up SIAs for children 9-59 months in 2006/2007, and another follow-up in July 2009 reaching over 3 million children.

In Ethiopia, measles SIAs and vitamin A supplementation have been conducted as part of an overall Ministry of Health measles control strategy since 1998. From 1999 to 2001 SIAs for children under five were carried out in phases and covered some 12 million children. Catch-up measles SIAs and vitamin A supplementation was started in 2002-2004 in view of the upward shift in the age of measles cases. The first phase of catch-up SIAs covered 23.4 million children aged 6 months to 14 years with a measles vaccine coverage rate of 82%. Two follow-up SIAs covering children 6-59 months of age in all districts in 2005/2006 and again in 2007/2008 reached over 10 million children reached in each of these SIAs. Recent follow-up SIAs were conducted in May 2009 for a smaller target group and the next SIAs are planned for 2010.

In Tajikistan measles epidemics have occurred in a cyclical fashion since 1990 and it has been necessary to supplement the two doses of routine vaccination with SIAs. In 2004, catch-up SIAs for people between 1 and 18 years of age and all primary health care workers were conducted in six areas; Dushanbe, DRS, Sugd, Khatlon, and GBAO. During the same campaign, individuals between 19 and 28 years in universities and military settings in Sugd Region were targeted. The coverage of
these SIAs was estimated to exceed 97%. In 2009, a national MR follow-up for children between 12 months and 14 years was conducted. The total target population was 2,398,100 and coverage achieved was 97.3%. The original target population also included women of childbearing age, but because of funding shortages for vaccine procurement the vaccination of this age group was postponed. Currently the vaccination of this age group is ongoing on a mop-up basis. After the SIAs, MR vaccination was introduced into the routine immunization schedule.

In Vietnam, measles SIAs were initially carried out only in selected pilot areas. In 1999 and 2000, measles SIAs were organised in Hai Phong city and in five provinces; Hanoi, Thua Thien Hue, Da Nang, Can Tho, Ba Ria Vung Tau and Hoa Binh. Children aged 9 months to 10 years were targeted and coverage rates as high as 99% were reached. Following this successful model, a mass nationwide campaign was organised in 2002 and 2003, also targeting children between 9 months and 10 years. The SIAs were carried out in 2 stages; first in 31 provinces in the Northern region March-April 2002, followed by 33 provinces in the Central, Southern and Highlands regions during March-April 2003. Again, coverage of 99% was achieved. In response to 2005 and 2006 measles outbreaks, SIAs were carried out in 17 mountainous provinces in the Northern region targeting all 6 to 20 year olds (1 to 20-year-olds in five provinces with the highest risk) during 2007. In 2008, SIAs were conducted for 7-20 year olds in five provinces of the Central and Highlands regions, reaching 97% of the target population. However, in October 2008, a large measles outbreak began among university students in Ha Noi, which spread throughout the country with more than 5,000 confirmed cases. Hence, sub-national follow-up SIAs were carried out in five provinces during 2009 targeting over one million children and adolescents between 7 - 20 years of age.

### 5.3 Measles surveillance activities

All six countries have implemented case-based measles surveillance as part of the control and elimination activities.

In Bangladesh, case-based surveillance was implemented after the first measles SIAs in 2005-2006. After the SIAs, measles outbreaks reduced substantially, and the measles surveillance system was changed from a community-based surveillance system to a case-based surveillance system with separate laboratory support set up for confirmation of measles cases. If a health worker suspects a measles case, he/she collects specimens of blood or urine and sends these along with reported case information to the central laboratory for confirmation.

Brazil signed a technical cooperation agreement with PAHO for the amount of US$ 2.1 million in 1999. The objective was strengthening of measles surveillance activities. A Task Force was created
which worked full-time and was exclusively dedicated to strengthening and/or forming state level epidemiological surveillance teams, investigate all suspected cases of measles and rubella and undertake, in a timely fashion, targeted vaccination of all suspected cases.

In Cameroon, measles surveillance is part of the integrated disease surveillance and follows similar protocols as three other diseases targeted for elimination; yellow fever, polio and maternal tetanus. Cameroon has operated a case based surveillance for measles since 2002 and for yellow fever since 2003. Confirmation is based on serological diagnosis conducted by the Centre Pasteur du Cameroun in Yaoundé. Staff both in health facilities and in the laboratory have been trained for all four diseases, and the reporting protocol is the same. Under-reporting of suspected measles cases is however known to occur. Health workers may fail to report suspected cases, or information about those occurring in the community may not reach the health care system. In health care facilities, there is not always focal point for surveillance activities. Some staff lack the skills to carry out specimen collection, while supervision remains weak. In addition, some districts have reported receiving results up to several weeks after the laboratory has confirmed the case to the central EPI unit.

In Ethiopia, case based measles surveillance was introduced in 2003 as part of the Integrated Diseases Surveillance and Response (IDSR) system. Measles surveillance is closely linked to the robust surveillance system developed for polio. Measles is one of 19 diseases and conditions included in the new Public Health Emergency and Surveillance (PHES) system and more specifically one of the few immediately reportable diseases along with yellow fever, avian influenza, neonatal tetanus and polio.

In Vietnam, measles is part of the monthly EPI disease report. To confirm a case, a blood sample of the suspected patient needs to send to one of the two national measles laboratories; at the National Institute of Hygiene and Epidemiology or the Ho Chi Minh City Pasteur Institute. Rubella detection is a by-product of the measles case-based surveillance system as in Vietnam there is no existing surveillance system for rubella.
6 Integration of AMEAs in the EPI and Health System

6.1 Integration of EPI within the health system

It was found that in most countries, with the exception of Brazil and to some extent Bangladesh, EPI generally operated as a vertical programme, with its own funding stream, dedicated staff at national level, specific procurement and logistics systems, and separate planning and information system. Brazil has by far the most integrated system; all EPI functions are integrated with routine health services. In the other countries, EPI functions that were less integrated with wider health systems functions were financing, logistics and health information. Logistics tended to be managed separately from other supply chains within the Ministries of Health, and procurement was often carried out through the UNICEF procurement facility. In many cases, this separation was determined by historical patterns of government funding and donor investment. The information system was not integrated in Vietnam, with separate reporting forms specifically for vaccine preventable diseases.

EPI functions that were most integrated into health systems were service delivery and vaccine-preventable disease (VPD) surveillance. At service delivery level, vaccination services were mostly well integrated with primary care services and delivered by general or multi-purpose health workers, though they retained a vertical element when vaccinations were offered through dedicated outreach services. Across all study countries, VPD surveillance was one of the most integrated health functions, notably owing to the integrated disease surveillance system that shares resources and data collection and reporting and laboratory diagnostic procedures across several diseases.

Governance of EPI was more difficult to assess, with EPI in some countries having a high degree of integration with mother and child (MCH) teams, as in Ethiopia and Bangladesh, while elsewhere it was independent from other programmes and had limited contact with other departments. Governance of the EPI programme tended to be less integrated within the health system at higher levels, while being more integrated at district level or below. This was also the case for overall planning. However, in Tajikistan staff involved in conducting routine measles activities had limited formal collaboration with family doctors whose role it is to organise primary health care in a specific area, or with MCH staff. Vaccination services in Tajikistan were seen as separate from the rest of primary care activities; a system inherited from the Soviet model prior to independence in 1991.
6.2 Integration of measles activities within routine EPI

While measles vaccination was reported to be fully integrated within routine EPI programmes in all countries, measles SIAs were implemented separate to routine programmes in some study countries. For instance, SIAs tended to attract a high proportion of external funds, with the exception of Brazil, Vietnam and increasingly Bangladesh. In Tajikistan for example, a large proportion of donor support for measles immunisation is provided to SIAs as this is determined by global funding partners. In Cameroon, external partners were responsible for the procurement of vaccines and for delivering vaccines and adds-on during SIAs.

A specific planning exercise in preparation for SIAs was conducted in most countries, often led by the ICC. Dedicated reporting forms were adapted from routine reporting forms or developed as separate reporting formats, for example in Ethiopia, sometimes to accommodate reporting on additional public health interventions delivered during SIAs.

Strong collaboration was reported between EPI and other programmes when additional interventions were planned and delivered in an integrated fashion with measles SIAs, or when cross collaboration was needed within government, for example, with Ministry of Education as in Vietnam or with NGOs. For example in Tajikistan, primary care staff visiting remote locations for vaccination used the opportunity to deliver several interventions such as breastfeeding and nutrition advice to the family, and other routine check-ups of children as part of measles SIAs.

A summary table illustrating integration of EPI within the health system and AMEAs within the EPI for all six countries is seen in Table 6.1 below.
Table 6.1: Integration of measles elimination activities with EPI and health systems

<table>
<thead>
<tr>
<th>Country</th>
<th>Governance</th>
<th>Financing</th>
<th>Planning</th>
<th>Human resources</th>
<th>Logistics</th>
<th>Information system</th>
<th>Surveillance</th>
<th>Service delivery</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cameroon</td>
<td>EPI &amp; Health System</td>
<td>Measles SIAs &amp; EPI</td>
<td>EPI &amp; Health System</td>
<td>Measles SIAs &amp; EPI</td>
<td>EPI &amp; Health System</td>
<td>Measles SIAs &amp; EPI</td>
<td>EPI &amp; Health System</td>
<td>Measles SIAs &amp; EPI</td>
</tr>
<tr>
<td>Ethiopia</td>
<td>EPI &amp; Health System</td>
<td>Measles SIAs &amp; EPI</td>
<td>EPI &amp; Health System</td>
<td>Measles SIAs &amp; EPI</td>
<td>EPI &amp; Health System</td>
<td>Measles SIAs &amp; EPI</td>
<td>EPI &amp; Health System</td>
<td>Measles SIAs &amp; EPI</td>
</tr>
<tr>
<td>Tajikistan</td>
<td>EPI &amp; Health System</td>
<td>Measles SIAs &amp; EPI</td>
<td>EPI &amp; Health System</td>
<td>Measles SIAs &amp; EPI</td>
<td>EPI &amp; Health System</td>
<td>Measles SIAs &amp; EPI</td>
<td>EPI &amp; Health System</td>
<td>Measles SIAs &amp; EPI</td>
</tr>
<tr>
<td>Vietnam</td>
<td>EPI &amp; Health System</td>
<td>Measles SIAs &amp; EPI</td>
<td>EPI &amp; Health System</td>
<td>Measles SIAs &amp; EPI</td>
<td>EPI &amp; Health System</td>
<td>Measles SIAs &amp; EPI</td>
<td>EPI &amp; Health System</td>
<td>Measles SIAs &amp; EPI</td>
</tr>
<tr>
<td>Bangladesh</td>
<td>EPI &amp; Health System</td>
<td>Measles SIAs &amp; EPI</td>
<td>EPI &amp; Health System</td>
<td>Measles SIAs &amp; EPI</td>
<td>EPI &amp; Health System</td>
<td>Measles SIAs &amp; EPI</td>
<td>EPI &amp; Health System</td>
<td>Measles SIAs &amp; EPI</td>
</tr>
<tr>
<td>Brazil*</td>
<td>EPI &amp; Health System</td>
<td>Measles SIAs &amp; EPI</td>
<td>EPI &amp; Health System</td>
<td>Measles SIAs &amp; EPI</td>
<td>EPI &amp; Health System</td>
<td>Measles SIAs &amp; EPI</td>
<td>EPI &amp; Health System</td>
<td>Measles SIAs &amp; EPI</td>
</tr>
</tbody>
</table>

Note: *Not enough information to analyse the level of integration of measles SIAs and EPI in Brazil

Full integration: The large majority of the elements of the programme are fully integrated.

Coordination: Most elements of the programme share common strategies, policies, or activities with the system. Or, there is a fair mixture of integrated and non-integrated elements

Linkage: There are some interactions between the programme and the system but no coordinated activities.

No integration: The large majority of the elements of the programme has formal interactions with and is not integrated into the system.

Adapted from: Shigayeva, A., TB and HIV/AIDS control programmes in Central Asia: Health Systems Challenges to Sustainability, PhD thesis [in progress]. London School of Hygiene and Tropical Medicine, 2010.
### 6.3 Integration of other services with measles SIAs

A summary of the most recent measles SIAs conducted in the six countries are seen in Table 6.1. It is seen that all countries included at least one additional intervention alongside the most recent SIAs.

Of the six countries, Cameroon has by far the greatest experience with integrated SIAs. In this country, interventions added to measles SIAs are selected based on programme needs and capacity to source materials. Negative as well as positive opinions regarding the delivery of multiple interventions during SIAs were expressed by both health care workers and community agents. Supervision for multiple interventions is often weak and cannot be conducted adequately. In the 2009 SASNIM campaign, it was reported that the number of interventions was not aligned with the resources available. The complexity of the 2009 SASNIM lay in the multiple target populations covered by the numerous interventions, the lack of available personnel, multiple monitoring sheets and an insufficient number of community volunteers. In some cases volunteers were reported to have abandoned their positions. Linked with the lack of personnel were the limited focus on monitoring of performance, and sometimes inadequate waste management. An issue that has remained unclear is how the complexity of the package of interventions affects delivery of measles vaccine and the coverage rate for measles.

### Table 6.1: Summary of most recent measles SIAs in the six study countries

<table>
<thead>
<tr>
<th>Country</th>
<th>Year of most recent SIAs</th>
<th>Target population</th>
<th>Type of SIAs</th>
<th>Vaccine used</th>
<th>Additional interventions included in SIAs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bangladesh</td>
<td>2010</td>
<td>20,000,000</td>
<td>Follow-up</td>
<td>Measles</td>
<td>Vitamin A and polio vaccine</td>
</tr>
<tr>
<td>Brazil</td>
<td>2008</td>
<td>69,700,000</td>
<td>Catch-up</td>
<td>MMR¹</td>
<td>Health education on dental care, hypertension, diabetes and sexually transmitted diseases</td>
</tr>
<tr>
<td>Cameroon</td>
<td>2009</td>
<td>3,435,546</td>
<td>Follow-up</td>
<td>Measles</td>
<td>Vitamin A, polio, catch-up EPI vaccines, TT² for women, IPTp³, anti-helminthics⁴, yellow fever vaccine in selected districts</td>
</tr>
<tr>
<td>Ethiopia</td>
<td>2009</td>
<td>276,695</td>
<td>Follow-up</td>
<td>Measles</td>
<td>Vitamin A and anti-helminthics⁴</td>
</tr>
<tr>
<td>Tajikistan</td>
<td>2009</td>
<td>2,340,440</td>
<td>Catch-up</td>
<td>MR³</td>
<td>Mebendazole⁴ for school children</td>
</tr>
<tr>
<td>Vietnam</td>
<td>2009</td>
<td>1,036,222</td>
<td>Sub-national follow-up</td>
<td>Measles</td>
<td>Vitamin A</td>
</tr>
</tbody>
</table>

¹Combined measles, mumps and rubella vaccine; ²Tetanus toxoid vaccine; ³Intermittent preventive treatment in pregnancy; ⁴Mebendazole or albendazole for deworming; ⁵Combined measles and rubella vaccine
There might also be unintended consequences to adding interventions to SIAs. The Cameroon 2006 campaign involved the distribution of ITNs. The distribution proved so popular that children were reported to have been vaccinated several times so that families could receive additional ITNs. There is sometimes confusion generated by the multiplicity of interventions provided at the same time. It was for instance reported that there has been confusion between polio and measles vaccinations which were provided with different approaches: for instance during one campaign, OPV was delivered on a door to door approach while measles vaccination was provided at temporary fixed posts. Finally, campaigns involving the distribution of interventions with a specific routine schedule such as vitamin A (which is scheduled to be provided every six months between the sixth month and the 59 month) may disturb the routine distribution schedule and confuse the message for families.

From a delivery point of view, it is notably reported that de-worming have proved popular during SIAs in Cameroon. A member of a local community in Cameroon noted that “many people cannot afford de-worming drugs”, so the SIA constitute an opportunity to access these medicine. Several informants in Cameroon noted the cost-effectiveness of multiple interventions: “Putting together resources means that the cost of delivering each intervention is lower”. However, this has not been consistently measured in Cameroon.

In Brazil, SIAs are always conducted on a Saturday. During this day, opportunities are taken to inform the public about other health campaigns, such as diabetes, hypertension, HIV/AIDS), etc. However, no direct interventions are given.

In Tajikistan, a few respondents were of the opinion that SIAs represent an ideal opportunity to integrate add-on health activities, but others expressed a concern regarding the extent to which this will be beneficial for the health care system. The concern is that if a range of activities are integrated into SIAs, their main objective can “be diluted” and it can also distract health workers from measles vaccination delivery. In addition, having multiple add-on can decrease the number of children vaccinated per day, thus prolonging the SIAs. A few respondents stated that ideally the routine services should be strengthened, but this has to happen over time, as the resources in the health system increase and the socio-economic situation improve.
7 Impacts on health system and immunization service

7.1 Governance
According to key informants in all countries except Brazil, measles elimination activities helped stimulate collaboration across partner agencies to improve EPI programme governance and service delivery. Moreover, AMEAs were seen as a vehicle for catalysing support among stakeholders who have not before been involved in health system changes, such as community representatives and volunteers. This has resulted in building stable partnerships across departments of the Ministry of Health and across sectors which have been sustained and used to promote other essential services. Open involvement of civil society organisations (CSOs) has also improved the accountability of the EPI. CSOs have been helpful in raising awareness about the importance of immunisation and health in general at both national and local level. In Bangladesh, Tajikistan and Vietnam, AMEAs receive attention from national political leaders and have fostered their active involvement and investment. AMEAs are thus perceived in most countries as helping to stimulate collaboration across units and departments in the Ministry of Health, which can improve other health care programmes such as nutrition, healthy lifestyle, and infectious disease surveillance. In Bangladesh, various governmental agencies partnered with private groups such as TV channels and mobile phone companies to promote and coordinate SIAs.

“Often curative medicine receives more attention than preventive medicine. However, the success of measles campaigns can be used as the most persuasive evidence to lobby for preventive medicine” (Health staff, Vietnam).

“After the SIAs local authorities are more attentive and responsive to child health care issues....” (Deputy Chief Doctor of Central District Hospital, Tajikistan).

At the same time, some key informants were concerned about the vertical nature of AMEAs, particularly regarding the imposition of fund conditions by donor agencies and the use of SIAs as the main driving strategy. Donor earmarking of funding support for measles activities was cited as undermining local governance capacity in resource allocation decisions in most countries. Some key informants in Cameroon and Ethiopia believed that implementation of measles SIAs as a priority activity separate from general health system strategies contributed to fragmented policy-making and priority-setting. In Tajikistan, it was reported that the use of conditionalities by external funders during SIAs at times have undermined government’s ownership. In Ethiopia and Tajikistan, there
were some concerns that measles SIAs may have reduced incentives for adequate investment in broader health service delivery systems to improve primary healthcare.

### 7.2 Planning and management

AMEAs helped develop strategies and skills required for planning and management for EPI at all government levels. It stimulated inter-departmental and inter-sectoral planning. In Tajikistan, it was a frequently stated assessment that the most important impact of the SIAs has been to contribute to strengthen planning skills at local level. This especially includes strengthening the capacity to identify, map and target hard to reach populations both for EPI and other health care outreach activities. In Ethiopia, preparations for SIAs required the development of innovative strategies to reach the Afar and Somali regions.

> “My skills for planning and management improved after being trained to do measles SIAs, and it is beneficial for planning and managing other health programs in my commune.”
> (Health staff, Vietnam).

In Bangladesh, Tajikistan and Vietnam the management skills learned from measles activities were applicable to other mass preventive activities, such as for emergency response planning. In Tajikistan, a recent experience with measles SIAs enabled the Ministry of Health to mount a quick response within a short period of time in order to respond to the polio outbreak of April 2010 and to conduct four rounds of intensive polio campaigns and achieve high vaccination coverage rates.

Key informants in Bangladesh and Tajikistan mentioned the stimulation of the culture of long term planning in the health sector as one positive impact of measles elimination campaign. However in Cameroon, informants reported that measles SIAs could interfere with routine planning of other EPI activities and other health activities at regional and district level because of short notice given from the national level.

> “We must stop everything at once to produce results” “activities that were planned in March have then to be shifted to April because of SIAs” (District informant, Cameroon)

### 7.3 Financing and resource generation

Findings from key informant interviews show mixed patterns of impact of AMEAs on financing of immunisation services and health systems. In all countries except Brazil, the measles elimination strategy helped increase opportunities for fund-raising from local and international partners to deliver additional public health interventions together with measles vaccine. AMEAs have achieved a high profile in all six study countries due to increased advocacy and visibility, and in Tajikistan the
Government increased its contribution towards vaccine procurement from 3% to 17% annually between 2004 and 2008.

At the same time, there was also concern that the motivation to strengthen routine immunization services and the health system in general could be reduced in some countries, because external funds are often channelled primarily to finance measles SIAs rather than routine vaccination services. Earmarking of funding for SIAs by donors was perceived in some countries such as Cameroon as possibly detrimental to longer-term investment in routine vaccination services. Where the provision of funds for AMEAs was unreliable, this created difficulties for national EPI programmes due to lack of a predictable budget.

In Bangladesh and Brazil, resources were perceived by some key informants to be diverted from other VPD control activities particularly routine vaccination activities to be spent in measles SIAs. However, there was no quantitative evidence from actual budget allocations to show a decrease in funding for non-measles EPI funding in these countries. In Vietnam, there were reported tensions in financing at the district and province level to cover the non-vaccine operational costs of SIAs which were not supported by the EPI programme. However in Brazil a significant decrease in measles cases after elimination was achieved in 2002 freed up resources to be spent on medical care but there has been no study to quantify the actual savings accruing from elimination.

Nevertheless, in Tajikistan, Bangladesh, and Vietnam, skills in fund raising were developed and the programme helped motivate governments and other funders to invest more money in EPI. In Tajikistan, previously successful SIAs with high coverage rates have attracted more donors such as USAID, JICA, TICA to invest into EPI. Furthermore, a separate line budget for vaccines became available partly because of the success of the measles elimination strategy.

### 7.4 Human resources

In Bangladesh, one of the positive impacts is that the SIAs helped staff members increase their ability to work under pressure and to manage workloads. Training offered during the SIAs helped improve their skills to be used in routine immunization programme and the allowances provided for training and travel made them motivated. Additionally, the SIAs contributed to the development of inter-personal communication and management skills among the staff members involved from different sectors. They created an opportunity for workers in other areas to learn more about the EPI, and can be mobilized for other EPI activities in the future. The successful vaccination campaign also enhanced the credibility of staff members in the eyes of the community. There were however some negative effects as well. Some key informants stated that SIAs increased the workload of the
staff. For example in Sunamgonj, one health assistant complained of extra burden during the campaign that jeopardized the quality of services provided. And due to shortage of qualified staff, several key informants reported disruption of normal work of some non-EPI staff such as staff nurse, medical officer, and paramedics who had to join the SIA programme. There were also reports of staff demotivation from late arrival of funds in some areas.

In Brazil, according to various interviewees, measles elimination activities brought positive outcomes to the human resources component of immunisation services by strengthening their capacity. Municipal level technical teams were trained by national level consultants and this has formed a critical mass of expertise on the control (surveillance) of measles and provided a blueprint for the control for other vaccine-preventable diseases. Epidemiological surveillance in general was also strengthened with additional support and extra training of approximately 10,000 technical staff on epidemiological surveillance procedures. The negative effect on workload and health service delivery during SIAs was also reported to be very limited since SIAs were scheduled to take place during weekends or holidays – when staff from routine services would be off duty.

In Cameroon, measles elimination activities yield both positive and negative impacts on health professionals. Overall a positive impact of measles vaccination on staff’s capacity and skills was reported by key informants. Training provided in the run-up to the campaign involves organizational, technical and reporting and communication components as well as surveillance of adverse events and waste management. Skills used during the planning and implementation of SIAs involve establishing large scale coordination operations and daily communication that are regarded by some as an opportunity to strengthen emergency response capacity. Negative impacts most frequently reported concern the high workload during measles related SIAs. During campaigns, routine activities slow down because the vast majority of the health care staff were mobilized to deliver vaccination. Regional stakeholders report that supervision activities literally “empty the regional delegation for the time of the campaign” that extends to 2 to 3 weeks. Some health centres were reportedly left empty because staff had to deliver outreach activities for measles and other campaigns. Even in better staffed facilities the impact could be substantial. “I was alone during the campaign (to carry out all other activities)”. Pressure on human resources was worse when there were compounded logistical difficulties.

In Ethiopia, a large number of in-service training on preparation, implementation, monitoring and evaluation of SIAs given to most of the health workforce contributed to improved skills of EPI staff on all components of immunization and surveillance activities. The trainings on SIAs were also deemed to have beneficial effect on health workers motivation in general and contributed indirectly
to improved quality of other services in general and immunization activities in particular. In addition, almost all health workers get additional incomes (in terms of per diems) for participating in SIAs. These per diems were higher than the government’s rates and what most health workers could earn regularly and, reportedly, contributed to keeping health workers in the public sector with presumably spill over motivating effect on the delivery of routine health services at least in the short term. Health care staff was also motivated by the enhanced visibility and better incentive attached to SIAs. The reported negative impacts relate to differences in remuneration system between those in regular public service employment and those seconded by partners. The latter were given much higher remuneration for what was perceived as similar jobs and created dissatisfaction among regular staff. EPI and other staff also felt overloaded with additional work during SIAs related to covering the work of those on campaign activities and also in filling additional forms not related to their routine work.

In Tajikistan, AMEAs led to increasing the stock of EPI-trained workforce. Non-EPI staffs from other health departments and programmes as well as retired personnel and community workers were trained to support the vaccinators. These non-EPI staff represents a reserve stock of health professionals who can temporarily fill vacancies that can be mobilised if needed. As noted by respondents, the sense of accomplishment and respect which health workers helps them realize how important their work is for the children and for the population in general. Relationship with the media and communication skills of MOH staff were reported to improve due to the SIAs. Most key informants or PHC staff reported that the disruptive influence of the SIAs was minimal. However, some informants mentioned a short period of disruption of other health care services during SIAs as non-EPI staff was mobilized. Moreover, training opportunities and incentives during SIAs are attractive due to the influx of additional funding and to some extent this discourages health professionals from performing efficiently in routine vaccination work after the SIAs. Some respondents mentioned that incentives create problems for the health system as a whole as it reduces the motivation to work on other health services.

In Vietnam, AMEAs mean additional activities for existing staff. However, most staff reported that the workload increased may be minimal since the actual time spent on measles campaigns was quite low. The positive impact of measles SIAs on health system was the improvement in technical capacity of human resource. According to a district health staff, “knowledge and skills of my CHC staff on reporting, injection technique, campaign planning, and community mobilization improved a lot.” For EPI, there were improvements in the quality of human resources to carry out better immunization services because EPI staff at provincial, district and commune levels received trainings
before campaigns and the implementation of the campaigns itself. Specifically, before the campaigns to strengthen the network capacity in surveillance and response, injection safety, service delivery, planning/management for campaigns, how to do IEC for hard to reach population, how to control immunisation in practice, cold chain, vaccines and adverse events following immunisation. Measles campaigns also helped mobilise community human resource to support immunization activities including volunteers from women’s union, school, Red Cross, youth union etc.

In summary, key informants in all countries except Brazil stated that additional staff training provided as part of preparations for AMEAs helped improve the knowledge and skills of health staff on immunization planning, management, and service delivery as well as disease surveillance, laboratory diagnosis and information management. In addition to staff quality, the stock of health workforce also increased in all countries although mostly these were volunteers that were mobilized for measles SIAs or temporary staff for other EPI activities. They included, for example, school nurses, youth and women’s groups. The use of incentives and different remuneration mechanisms for measles-related staff showed mixed results. The incentives provided by AMEAs helped motivate staff in Ethiopia and Bangladesh while there were negative impacts on other staff not directly involved in AMEAs. In Tajikistan and Cameroon because of the difference in the remuneration system and the lack of support provided to them. There were reports of EPI staff feeling overloaded from additional work from measles elimination in Ethiopia, Vietnam, Cameroon, and Bangladesh. A significant proportion of staff in Cameroon and Ethiopia and to a lesser extent in Bangladesh and Tajikistan reported that they had to interrupt other important tasks because of measles SIAs. However, some key informants in Bangladesh, Tajikistan and Vietnam stated that immunization staff became more energized and motivated to work on other EPI activities because of the feeling of success or achievement developed from expanding vaccination coverage.

The staff profiling surveys were conducted at district level in all six countries (Table 7.1 and 7.2). Although not representative and may not be statistically significant in a number of countries, it confirms some of the key findings from key informants’ interviews. Majority of staff in all countries answered that they had better skills in regard to immunization services and injection safety as well as adverse events following immunization (AEFIs), and contaminated sharps disposal. The average number of days spent on measles SIA activities varied widely across different countries but generally more time was required for planning than actual implementation. Majority of staff in the surveys believed that AMEAs strengthen routine immunization in general although a minority thought they slow down routine activities. Most importantly, staff in all six countries overwhelmingly supported the measles elimination goal.
Table 7.1: Staff’s workload and payments in relation to measles SIAs

<table>
<thead>
<tr>
<th></th>
<th>No.</th>
<th>Estimated days spent on measles SIAs (average in parentheses)</th>
<th>SIA Payments (% of salary)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Planning</td>
<td>Implementation</td>
</tr>
<tr>
<td>Cameroon</td>
<td>16</td>
<td>2-21 (6.3)</td>
<td>3-10 (6.1)</td>
</tr>
<tr>
<td>Tajikistan</td>
<td>25</td>
<td>30-180 (73)</td>
<td>15 (15)</td>
</tr>
<tr>
<td>Ethiopia</td>
<td>36</td>
<td>67% (3+ days), 28% (2 days)</td>
<td>60% (6+ days), 27% (4-5 days)</td>
</tr>
<tr>
<td>Vietnam</td>
<td>351</td>
<td>1-15 (7.0)</td>
<td>2-12 (2.5)</td>
</tr>
<tr>
<td>Bangladesh</td>
<td>60</td>
<td>62% (&lt;2wks), 27% (3-6wks)</td>
<td>65% (8-14 days), 18% (1-7 days), 17% (15+ days)</td>
</tr>
</tbody>
</table>

Note: Data from Ethiopia and Bangladesh are provided as category (not as days) so it is not yet possible to obtain the range or to calculate average number of days. We are following up for revised information to be able to present it as days.

Table 7.2: Staff’s perception on the roles of AMEAs

<table>
<thead>
<tr>
<th></th>
<th>Staff skipping important tasks because of measles SIAs (%)</th>
<th>Staff agreeing that measles SIAs improve routine immunization (%)</th>
<th>Staff agreeing that measles SIAs slow down routine immunization (%)</th>
<th>Staff supporting measles elimination goal (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cameroon</td>
<td>75% (16)</td>
<td>93% (15)</td>
<td>60% (15)</td>
<td>100% (16)</td>
</tr>
<tr>
<td>Tajikistan</td>
<td>N/A</td>
<td>100% (25)</td>
<td>24% (25)</td>
<td>100% (25)</td>
</tr>
<tr>
<td>Ethiopia</td>
<td>72% (29)</td>
<td>93% (30)</td>
<td>18% (9)</td>
<td>100% (30)</td>
</tr>
<tr>
<td>Vietnam</td>
<td>21% (336)</td>
<td>94% (301)</td>
<td>6% (301)</td>
<td>99.7% (345)</td>
</tr>
<tr>
<td>Bangladesh</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>87% (60)</td>
</tr>
</tbody>
</table>

7.5 Logistics and procurement

Because measles vaccine requires temperature-controlled transport and storage though what is referred to as the cold chain system, AMEAs were reported to contribute to the improvement of functions of cold chain inventories and logistics in some countries. In Cameroon and Tajikistan,
investment in storage and better management of contaminated sharps and health waste became useful for services beyond the EPI programmes. Training and additional investment in logistics and procurement management also benefited routine EPI activities in Bangladesh, Ethiopia, Tajikistan and Vietnam. In Bangladesh and Cameroon, key informants noted an improvement in the availability of vaccines and injection equipment used for routine immunization services. In Tajikistan, the benefit extended to the drug delivery system since the skills learned from vaccine management were also applied to other pharmaceutical products. In Cameroon, the vaccine management software that was developed for routine vaccines stocks was also used for other health products in some areas.

One perceived negative impact was reported from Ethiopia and Cameroon. Key informants stated that because the procurement and logistics system in EPI activities was separated from the Ministry of Health mechanism for other products, it was not conducive to the development of local capacity in procurement. In addition, it was noted in Cameroon that a large share of the additional logistical capacity that was deployed during measles SIAs was rented rather than purchased, which meant that it was not available to support the routine programme in the long term.

7.6 Information system

One main positive impact on the national health information system from AMEAs as shown in Bangladesh, Ethiopia, Tajikistan and Vietnam is the improvement in birth child registration and information that is valuable for other EPI activities and health programmes. A review of the denominator in connection with the measles SIAs in Tajikistan exposed the considerable weaknesses in birth registration and facility procedures and currently agreement on the denominator is still not achieved. This has motivated a series of studies and analyses, and it is expected that this process will lead to changes in many other child health services. Additionally, because planning for effective immunization programmes requires good information on target population, the measles SIAs contributed to the mapping of targets and hard-to-reach populations for EPI outreach activities in Cameroon and Tajikistan. In Bangladesh and Vietnam, it was shown that data quality for EPI coverage improved and there was better reporting, monitoring and evaluation for other EPI activities.

However, in all countries except Vietnam, Cameroon and Tajikistan, the national information requirements from SIAs generated many forms to be filled and submitted separately from the routine reporting system, thus creating some additional workload. In some countries, vaccination cards were not filled which led to incomplete records of vaccination history that would be necessary.
for health evaluation in the future. In Ethiopia, data collected during SIAs were passively transmitted to top level and are not utilised at kebele and wereda levels for EPI planning and management.

7.7 Surveillance

All countries reported that AMEAs contributed to better disease surveillance skills among EPI staff. The national surveillance system also benefited through integrated surveillance for a number of diseases. New laboratory equipment purchased for measles could also be used for other diseases.

For some respondents in Brazil, the strengthening of the public health laboratory network was a key part of the national measles elimination plan. In this country, a number of interviewees reported that the training of the disseminators, the creation of the Task Force and the training of approximately 10,000 technical staff were all determining factors for the improvement of epidemiological surveillance, which incorporated all the activities necessary for the control of infectious diseases: notification, investigation, blood collection and targeted vaccination, and the monitoring (through the rapid survey approach) that helped to identify areas at risk of other attacks, thereby leading to the systemization of the epidemiological surveillance procedures for other diseases than measles.

In Ethiopia and Cameroon, incentives provided for reporting measles within the DRS system were found to also help improve other disease reporting. At the same time, some key informants in Cameroon voiced concerns over the sustainability of current measles surveillance system that is supported partly by the polio eradication programme. If funding support for such activities were eventually to end it could weaken EPI surveillance in the future.

7.8 Service delivery

One main positive features of AMEAs on immunization services in all countries is that it raises community awareness about the benefit of vaccination and primary health care. SIAs have the resources to advocate for increasing the uptake of vaccines through national and local media, reaching out to a much large population than routine programmes. Increased community engagement during measles SIAs was also reported in most countries, through involvement of volunteers and local health committees.

It was reported that demand for vaccines increased through social mobilization that occurred during measles SIAs. However in Cameroon, with an increasing number of SIAs, there were concerns that the population was becoming more passive, possibly awaiting the next campaign rather than completing the routine vaccination schedule.
Measles SIAs were shown to provide a platform for additional public health interventions in Bangladesh, Cameroon, Ethiopia and Tajikistan. Services provided together with measles vaccine included the provision of other vaccines such as yellow fever, polio, tetanus, BCG, or pentavalent vaccines as well as other health activities, for example, delivering insecticide-treated bed nets (ITNs), vitamin A supplementation, deworming medicine and nutritional screening. Several countries reported that measles SIAs provided the opportunity to trace and vaccinate defaulters for other vaccines, thus contributing to enhanced routine vaccination coverage. Measles SIAs also stimulated collaboration between state and non-state private providers to jointly provide services together. However it was pointed out that multiple integrated interventions in SIAS could put some pressure on service delivery and could be complex to manage.

It was also shown that coverage with other EPI vaccines increased in Bangladesh and Cameroon because of AMEAs. In Cameroon, Tajikistan and Vietnam there was an increase in outreach activities to hard-to-reach populations, thus facilitating access to vaccination for these populations. The quality of immunization service delivery especially in regard to injection safety and hygiene was reported to be improved in all countries except Alphabetical order. Health care providers reported better detection and management AEFIs. In Tajikistan, SIAs have expanded coverage among groups that are geographically isolated for parts of the year, those in poverty or having high rates of migration or having other cultural specificities that obstruct access to routine care, for example for Roma populations.

“SIAs help us to reach unreached children” (District Director of Immunoprophylaxi, Tajikistan)

One proxy indicator of the function of routine immunization service at the national level is the coverage of DPT3 among target population. In all countries except Brazil, there were clear trends of increasing DPT3 coverage over the last 2 decades despite certain degree of temporary fluctuations in some countries. When comparing the coverage with the availability of SIAs in certain years, we found no clear. The trends in coverage of DPT3 in relation to the SIAs in six study countries are presented in Figure 7.1 below.

The effects on other health care services were mixed. In Ethiopia and Cameroon health care services had to be interrupted during the SIAs because of inadequate preparation due to short notice of the event and shortage of staff. Some health centres and hospitals had to stop or only provide a limited service. However, in Bangladesh, key informants stated that health care utilisation such as antenatal care and other primary health care had increased due to public mobilization associated with AMEAs.
In Vietnam, there was no evidence on the negative impact from measles elimination activities on overall health service delivery. Because the MCV2 campaigns and intensive campaigns were infrequent and were well planned in advance, service provision at commune health centres was not significantly interrupted (the commune health centres only discontinue their regular services for 1 day when the second dose campaigns happen, all the emergency services still continue as usual).

Figure 7.1: DPT3 coverage and the availability of measles SIAs in six countries from 1992 to 2009

7.9 Lessons learned from polio eradication

Polio eradication can provide insights to potential future measles eradication. Both programmes require high-quality case-based surveillance, adequate case management, high levels of population immunity from routine vaccination, and both employ SIAs where routine vaccination coverage is low. There are however also some critical differences. For polio SIAs, two doses of oral polio vaccine (OPV) with an interval of at least one month have been needed in most countries and in certain settings SIAs must be repeated frequently. In the remaining polio-endemic areas polio SIAs are currently conducted up to once per month. For measles SIAs, only one round is required and the interval may extend up to several years, depending on the level of routine vaccination coverage. OPV has the advantage that it can be administered by trained volunteers in addition to health workers. As measles vaccine is injectable it must be given by qualified health workers, and the contaminated sharps waste requires appropriate disposal. Hence, polio rounds can be completed in
a shorter time and are in principle less costly than measles SIAs, but completing polio eradication requires more rounds.

While polio SIAs frequently includes distribution of vitamin A, they do generally not include other interventions, such as for instance de-worming, as we have seen is frequently done with measles SIAs. It has been documented that when repeated rounds of polio SIAs take place in areas with very few other public health services, they create resentment among the population and may reduce compliance [35, 36]. This could be one of the reasons why it is difficult to achieve sufficiently high SIAs vaccination coverage rates in places with weak health systems.

One of the main recommendations of a 2009 independent evaluation of the global polio eradication initiative (GPEI) was that eradication needs to be considerably more integrated into routine vaccination services [37]. The evaluation concluded that separation of GPEI from routine services in Afghanistan, Pakistan, India and Nigeria has led to reduced emphasis on routine vaccination resulting in low routine coverage rates [37]. As a response to this critique, the new GPEI strategy states that polio field staff must increase the time they spend contributing to immunization services strengthening [4]. It is however important to remember that immunization services consists of several components that are all interlinked, such as logistics, training, supervision and communication, and it may be questionable to what extent only additional polio staff time is sufficient for strengthening services. The efforts of the GPEI to strengthen routine services should be evaluated to inform sustainable country-level strategies for implementation by a measles eradication initiative.

Lessons learnt from polio eradication in Cameroon show that reports of “fatigue” following the multiplication of polio NIDs, both with staff and with the population could also affect measles. However, stakeholders note that measles activities tend to have more adhesion from the population because people remember the morbidity and mortality associated with the disease. Another lesson learnt is the high cost of supervision at all geographical levels that would need to be factored into the resources needed for an elimination strategy. Some stakeholders note that the strong focus on polio in the past might have had adverse effects on other antigens.

Finally, it has been suggested that measles elimination activities may have a positive effect on the eradication of polio, both for vaccination coverage and in strengthening further integrated surveillance. It is noted by one informant that measles elimination activities being carried out by qualified health care personnel may mean that these might be more credible with the public than non-qualified polio vaccinators, possibly reinforcing the credibility of vaccination as a whole.
8 Discussion

Our findings show that the impact of AMEAs on EPI programmes and health systems are highly varied. There are both positive and negative implications in most of the health system and immunization functions. The results also vary with the existing system capacity and context as well as the way the AMEAs were implemented. On balance, a positive impact was acknowledged in Bangladesh, Brazil, Vietnam and Tajikistan while more negative impacts were reported in Cameroon and Ethiopia. Weaker health system may not be able to sufficiently benefit from the AMEAs, while in more developed systems, disruption tended to be less pronounced.

Earlier studies on polio eradication emphasized potential negative implications on health systems because of resource diversion from routine immunisation services and other health programmes, particularly in financial and human resources [38]. Our study shows that there is no evidence of a direct financing impact from AMEAs at the national level. This is likely due to the high financial support for vaccines provided by donors. Success in measles SIAs was even quoted to bring credibility to the EPI programme in order to be able to request more support. However, earmarking of funds by donors for SIAs was pointed out by several countries as rigid and not conducive to long term strengthening of routine immunization services. Another problem reported was the delay in disbursement of budget. In Vietnam there was some tension in funding for operational costs which was not funded from the central level.

The concern on workload and interruption of services was found in this study to be valid. Key informant interviews as well as surveys of fieldwork staff confirm delay and interruption of health services to a varying degree during the SIAs. The interruption was more prominent when the planning at district level was not done well in advance. Although the degree of disruption tends to be small because the SIAs implementation did not take long, it was argued that the number of SIAs covering all antigens had a bearing on both planning and service delivery, notably in resource poor countries. Similar to early studies on polio eradication, most of the disruptions could have been prevented with better planning [39]. In fact, the interruption of work tends to be greater for higher level staffs who are involved in planning as much longer time is required for preparation of SIAs than for their implementation itself.

One observation regarding the negative impact is that these were more pronounced in countries with less degree of integration of SIAs in the immunization programme, such as Cameroon and Ethiopia. Bangladesh, even with limited resources, has considerably less problems. According to key informants, the Government decided not to follow international pressure in the early 1990s to invest
in SIAs but spent resources developing stronger primary health care and routine immunization service. The progress took longer, but was more sustainable and with less negative impacts on the broader system. The concerns over opportunity costs and deflected attention to develop routine system were also more frequent in Cameroon and Ethiopia.

A number of common positive impacts on immunization service were reported in the country studies. Many of them were the result of having measles activities integrated in the EPI system. Better skills of health staff from immunization service training and program management training and better equipments and information systems for surveillance and monitoring and evaluation also benefited the EPI programme altogether when these activities are not delivered in a newly established or separate system. Better coordination with other sectors helped expand the network and collaboration in future SIAs and mass campaign for other preventive health programmes.

Additional positive impacts beyond immunization sector also occurred when other health care interventions were tagged along with measles immunization services during the SIAs or outreach services where existing health care delivery system was weak. Our study showed that integrating additional interventions into measles SIAs is mostly done in African countries such as Cameroon and Ethiopia. The range of interventions varied from one (vitamin A) to several (vitamin A, mebendazole, IPTp, routine vaccination catch up), for example, in Cameroon. Immunization programmes have long been viewed as a natural vehicle for public health interventions and benefits previously reported include increased coverage of the combined interventions, higher efficiency of service delivery, and enhanced equity for multiple interventions in hard to reach population [28, 30, 40]. It has been argued that key success factors of integration of integrated interventions with SIAs are programme compatibility and the existence of a robust EPI programme [28]. We note that in our study, integrated interventions are primarily used in countries where the health system is relatively weak. Both the number and the effectiveness of integrated interventions in SIAS are seldom evaluated. In Cameroon as in other countries, coverage achieved for additional interventions was reported to be high (87% coverage rate achieved for de-worming in the 2009 measles SIA) but there were reports that the large number of additional interventions was complex to plan and deliver [41]. Previous studies have also highlighted that the delivery of ITNs may result in low utilisation rates because population is not properly educated on how to use the nets [42]. The same study concluded that delivery of ITN during routine EPI services is likely prevent more malaria deaths than when distributed during campaigns with 4-yearly intervals [42]. There is scarce evidence to compare the effectiveness of delivering adds-on during campaigns and routine [43].
The co-delivery of routine vaccination and other interventions such as growth monitoring, health education, and simple curative treatment has been reported in our study countries but does not seem to be supported by a formal and clearly funded mechanism. Our study has shown that in some weaker health systems, there is an opportunity to use the routine EPI programme with its high coverage to access communities with an integrated care package that respond to local. However, this means that integration of interventions will need to be better defined, formalized and appropriately funded and evaluated. More importantly, integration of a number of vertical programme activities together should not be seen as alternative to strengthening of routine health system as the vertical approach may not be sustainable without continued external funding. Review of national immunization programs in 50 countries shows large funding gaps in most of these countries [44] and the situation could be worsened in future years due to economic difficulties when several wealthy governments are under pressure to lower their international aid as well as ongoing effort to introduce new vaccines.

In Cameroon and Ethiopia, key informants stated that measles SIAs are likely to have a negative impact on routine coverage. On the other hand, in Tajikistan it was reported that during measles SIAs hard-to-reach populations were briefed about the benefits of vaccination, which could lead to increased coverage of other vaccines. A number of past studies on polio eradication have sought to quantitatively assess the impact of polio national immunization days (NIDs) on future routine coverage rates [45-47]. These analyses were done to test either the positive hypothesis that NIDs result in a boost to the routine system or the negative hypothesis that NIDs divert resources away from routine services. The results of these studies were inconclusive. In the study by Aylward et al. five Western Pacific countries it was concluded that routine coverage of BCG, DTP and measles had either stayed constant or increased during the five-year period where NIDs were conducted [45]. However, in two studies by Bonu et al., one from North India [46] and one on sub-Saharan Africa and South Asia [47], it was concluded that there is no or only little evidence in certain countries that NIDs led to increased coverage of non-polio vaccines. In four African countries decreasing coverage rates were observed during the NID period. In our study, we did not replicate these detailed analyses but statistics on national level DPT3 coverage as a proxy of capacity of routine immunization service showed no clear impact of measles SIAs on routine coverage to support key informants’ assertion of negative or positive impacts in Cameroon, Ethiopia, or Tajikistan. It is worth noting that many factors may act as potential confounders including changing overall health system contexts, new strategy for immunization service such as RED, or additional investment from GAVI ISS and HSS funding.
Nevertheless, all efforts must be made to ensure that potential negative impacts on health systems are avoided if the measles eradication goal is to go ahead. Challenges are higher in low coverage areas where resources are scarce and the system is weak. But avoiding negative impacts alone is not adequate. The movement should also strengthen routine immunization system and contribute to removing health system bottlenecks. A diagonal approach to disease control financing [48] has been proposed as a way to promote positive synergies between vertical programmes and health systems [49]. In this study, measles eradication activities in none of the six countries were shown to have such explicit objective to help strengthen health system capacity other than improving immunization services and surveillance. A number of recommendations based on our findings are proposed as Do’s and don’ts in relation to measles eradication for immunization services and health systems in Annex 1 attached.

A number of previous studies on eradication programmes have recommended a number of health system strengthening actions that should be done with the elimination or eradication activities. For example, Melgaard et al. (1999) recommended that strengthening existing systems should get priority over new systems and donor financing for eradication should be extended to other health system investments [50]. The WHO Workgroup on Disease Elimination/Eradication and Sustainable Health Development [51], while acknowledged the tensions between the concepts of eradication and sustainable health development, also recommended that “potential benefits of eradication to health development should be identified at the outset … [and] measurable targets should be set for achieving these benefits. The eradication programme should be held accountable for the attainment of these wider objectives”.

The Reaching Every District (RED) approach to improve immunization coverage developed by WHO, UNICEF, and other partners in 2002 is an important strategy for immunization service that could be conducive to routine immunization system and health system strengthening[52]. It contains five operational components including re-establishing outreach services, supportive provision, linking services with communities, monitoring and use of data for action, and planning and management of resources. As of 2008, RED has been implemented at various degrees in at least 53 countries [53]. National policy towards measles elimination and eradication should employ the RED approach to all districts and the opportunity provided by the RED strategy should be used to address health system bottlenecks at the district level such as inadequate health workforce, etc. GAVI health system strengthening funding is one possible channel for eligible countries to obtain necessary resource to address those barriers. The establishment of the Health System Funding Platform (HSFP) by GAVI, the Global Fund, the World Bank, and WHO could serve as a more harmonized opportunity for
countries to obtain financial support to strengthen their health system functions to improve health and immunization service delivery.

There are also other innovative solutions for positive synergies between measles eradication activities and health system strengthening but it is beyond the scope of this study. It is an area that should be explored and supported. For example, there are novel interventions to help bring in children to routine services e.g. conditional cash transfers that has been shown to be effective in increasing the use of preventive services and improving health status [54]. A recent study in Rajasthan using clustered randomised controlled method confirms that improving reliability of services help improve immunisation rates but providing small incentives could have large positive impacts on the uptake of immunization services [55]. The impact of measles elimination activities on health service system will also be different if new model of vaccine delivery such as inhalation vaccine is developed and used to lower demand for skilled health workforce.
9 Study Limitations

A number of limitations in this study should be recognised. Assessing the impact of AMEAs is not straightforward conceptually. Separating the impact of the measles vaccination programme from other ongoing immunization efforts is difficult because in all six countries there are varying degrees of integration of AMEAs in the existing immunization services. The health system is not static with ongoing changes and reforms that complicate the assessment of impact. Nevertheless, effort has been made in all aspects of the study to differentiate the implications of AMEAs from other ongoing activities.

Findings of the study may not be generalisable to a wide range of countries, and there may be inherent bias through selection of informants. However, the case study design sought to employ a range of complementary methods and efforts have been made to improve the validity of the findings by triangulating data sources, and placing data within the context of the existing literature.

Quantitative findings from staff profiling surveys should also be interpreted with care. The surveys were conducted in two districts of each country which may limit validity of the findings.
10 Conclusion

This study in six countries shows that the impacts of measles elimination activities on immunization services and health system are mixed. There are both positive and negative implications in most of the health system and immunization functions. The negative implications include perceived diversion of priority from other necessary health interventions which tend to be more palpable in countries with low resources that rely more on SIAs and vertical approach to measles elimination. Positive impacts from activities to improve measles vaccination delivery include staff training leading to improved planning, monitoring and evaluation skills, additional cold chain and diagnostic laboratory equipment, and better management and information systems that will benefit other EPI activities and other primary health care services.

A number of Do’s and Don’ts regarding AMEAs are proposed (Annex 1). The integration of additional services into the planned delivery of measles vaccine could help improve access to health care especially to those difficult to reach. Potential negative implications regarding EPI programmes and health systems must be avoided and opportunities to address health system barriers and strengthen routine service delivery should be taken that will also benefit other public health priorities. Obviously, strategies and actions need to be customized specific to the nature and context of existing health system in each country and the strategy and activities recommended for measles elimination.
Annex 1: The do’s and don’ts of measles eradication for Health System Strengthening

Governance and leadership

Do

▪ Strengthen the capacity of immunization coordinating mechanisms (ICC) as a representative body of wider health sector in the governance and leadership of immunization activities

▪ Promote the coordination of immunization related activities particularly in the area of workforce development, monitoring & evaluation with other health programmes especially maternal and child health programmes.

▪ Improve coordination of external technical assistance for measles vaccination and EPI with other technical assistance notably MCH and primary care programmes;

Don’t

▪ Establish a measles elimination program separate from the existing EPI and national immunization systems

Planning

Do

▪ Encourage strategic health system gap analysis in the preparation of measles elimination and immunization plans

▪ Maximize alignment of measles elimination activities’ planning with overall EPI and health sector planning frameworks

▪ Collaborate across public health programmes to promote joint planning and share programmatic policies and strategies particularly at district level e.g. having yearly integrated planning of EPI and other activities

▪ If SIAs are necessary, the planning process should start early. Staff at operational level should be informed well in advance to be able to allocate available time and reorganize existing tasks to fit the SIAs schedule

Don’t

▪ Develop measles elimination plans in isolation from overall immunization planning

Financing
Do

- Include budget requirements to address health system bottlenecks in the costing of measles elimination activities and overall immunization programme
- Align budgets and programme-specific financial flows within MTEFs or equivalent resource allocation tools;
- Pool domestic and international measles vaccine funding into a "mini-basket" fund for EPI that can be used flexibly

Don't

- Create parallel administration, reporting and monitoring systems for different sources of external funding;

**Health workforce**

Do

- Use a systematic approach based on job descriptions to: (a) clearly determine human resources needs measles vaccination activities; (b) develop long-term strategic plans, and (c) develop medium-term implementation plans to enable alignment with general human resource development strategies and plans;
- Collaborate and coordinate with other public health programmes, with other departments and services in the ministry of health and with other units in the provincial/district health services to ensure synergy and consistency with overall local health sector plans and capacity-building frameworks;
- Integrate skills and knowledge that would be beneficial to overall immunization service delivery if trainings for measles activities are to be provided
- Pre-service training?
- Specific reinforcement of skills on surveillance (as we are in elimination phase?)

Don't

- Develop measles-specific solutions to speed up the implementation of interventions such as intervention-specific incentives;
- Factor in opportunity cost related to time spent in training when developing plans
**Logistics and procurement**

Do

- Develop national procurement, distribution and stock management systems that are harmonized and (when relevant and possible) integrated within general supply systems;
- Ensure that urgent temporary systems, if required are planned with central authorities and that support is provided to replace them by integrated systems as quickly as possible.

Don’t

- Develop or maintain parallel systems for measles vaccine delivery when vaccine logistics systems are in place or under development.

**Surveillance**

Do

- Promote and reinforce integrated surveillance
- Plan actions to strengthen the capacity of laboratory services for measles surveillance in concert with relevant planning units, public laboratory authorities, other public health programmes, and across public and private providers, in order to avoid duplication and unnecessary transaction costs;
- Costing additional laboratory needs in the run-up to elimination and allocate adequate financing to cover these.

Don’t

- Develop or maintain parallel systems for surveillance and laboratory when strong general surveillance systems are in place or under development.

**Information system**

Do

- Ensure that the measles recording and reporting system is harmonized within national EPI and national health information systems while sharing experiences on how it can be used as a model for analysing and making full use of routine data for local performance improvement;
- Ensure that records of vaccination history of children are included/ improved (cards/etc) especially during SIAs
- Align monitoring requirements with overall poverty and health monitoring master plans in the country and work with donors to consolidate reporting demands;
- Share information from target population surveys and measles monitoring and evaluation to help
map immunization and health system deficiencies and opportunities;
  - Seek common platforms for any service- or population-based surveys.

Don’t
  - Create new indicators without careful consideration of overlap and inconsistency with general health system performance indicators;
  - Demand unnecessary process indicators or special reports on performance beyond routine reporting requirements.

**Service delivery**

Do
  - Harmonize management and supervision structures with general health system managerial structures, including mechanisms for working with the private sector;
  - Use measles eradication and routine EPI to strengthen RED approach
  - Promote access to other primary care services such as routine distribution of vitamin A, family planning interventions, and basic access to essential drugs, notably in outreach activities
  - Evaluate opportunity to deliver add-on interventions during measles SIAs

Don’t
  - Plan or implement supervision and quality control in isolation from EPI and general health service supervision and quality control;
  - Create incentives structures that distort priority-setting and/or performance in other areas of work among managers and supervisors.

*adapted from the Stop TB Programme [56]*
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