A Toolkit for Assessing the Impacts of Measles Eradication Activities on Immunization Services and Health Systems at Country Level

Developed for a multi-country study undertaken between July 2009 – July 2010

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Abbreviations

AFRO: African Regional Office
AMEA: Accelerated Measles Elimination Activities
CMO: Chief Medical Officer
DG: Director General
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
MCH: Maternal and Child Health
MCV: Measles Containing Vaccine
M&E: Monitoring and evaluation
OPV: Oral Polio Vaccine
PAHO: Pan American Health Organization
PS: Permanent Secretary
SEARO: South East Asian Regional Office
SIA: Supplementary Immunization Activities
WPRO: Western Pacific Regional Office
1 INTRODUCTION

1.1 BACKGROUND

Smallpox was eradicated from the world in 1980 and eradication of polio, which commenced in 1988, is currently in its end stages. A number of prerequisites have been defined to determine the feasibility of eradicating an infectious disease (4). 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 (4). Measles complies well with all of these prerequisites and is seen by many as the most feasible disease to eradicate at the current point in time (5-6). As a result, the WHO has started a programme of work to assess the possibility and appropriateness of measles eradication (7). Ongoing studies include cost-effectiveness analysis, appraisals of biological- and programmatic feasibility, measles vaccine supply assessment, post eradication risk assessment, and analysis of the potential impacts of measles eradication on the health system and routine immunization services. These studies, which have been contracted out to different consultancy companies and research organisations, are also scheduled to be completed during 2010. All these studies will assist the World Health Assembly in making an evidence-based decision on whether to embark on measles eradication or not.

Elimination refers to the regional incidence of an infectious disease being reduced to zero. Since importation of infection from other regions of the world is possible in this situation, control measures must be continued. Eradication is in contrast the permanent reduction to zero of the worldwide incidence of an infection caused by a specific agent as a result of deliberate efforts. In this situation intervention measures are in theory no longer needed. However, in today’s world with perceived risks of bioterrorism and difficulties with containing viruses from all laboratories in the world, few believe that measles vaccination will stop in the short term even if the disease is eradicated.

By the end of 2009 all WHO regions have either established measles elimination or control goals (7). PAHO and EURO have instituted combined measles and rubella elimination goals and in the PAHO region it is believed that the goal has been achieved and a certification committee has been formed. In WPRO the goal is measles elimination by 2012. AFRO adopted a pre-elimination goal in 2008 that is very close to elimination. SEARO has recently transitioned from a mortality reduction goal to an
elimination goal. Since eradication is the sum of successful elimination efforts in all countries, the world is in practice acting very similarly to circumstances with an eradication programme in effect.

Measles is among the most infectious diseases of humans and a very high immunity level is therefore required for its elimination (8). Sero-prevalence studies in the US and other industrialized countries suggest that coverage in the range of 90–95% is needed (9). 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 (8). The main reason for offering revaccination for 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) (10).

The WHO-UNICEF comprehensive strategy for measles elimination and reduction of measles mortality aims to (10):
1. Achieve and maintain high coverage (>90%) of the first dose of measles-containing vaccine (MCV1) among all children by the age of 12 months through routine immunization services.
2. Ensure that all children receive a second opportunity for measles immunization, either through a second routine dose or through periodic supplementary immunization activities (campaigns), known as SIAs.
3. Implement effective laboratory-supported disease surveillance.
4. Provide appropriate clinical management for measles cases.

In a recent measles landscape analysis, Cutts and colleagues concluded that "the four components of the WHO-UNICEF comprehensive measles strategy are sound. Where they have been implemented effectively, as confirmed by close monitoring and supervision, impact has been impressive in a very wide range of settings. When impact on measles has not been demonstrated or sustained, this has been due to problems in implementing the strategies or monitoring them properly rather than failure of the strategies per se” (10).

1.2 Study objectives

The overall objective of the present study is to evaluate the impact of accelerated measles elimination activities (AMEA) on health systems and routine immunization services. The impact includes past, ongoing and potential future impact.

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 previous measles elimination activities on various key functions of the health- and immunization systems.

4. Assess potential impacts of hypothetical measles eradication scenarios on various key functions of the health- and immunization systems.

5. 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 will take place in six different countries. Findings of the study will be documented in six country reports and in one overall synthesis report. It will be important to facilitate comparison across countries in order to draw out lessons and implications.

1.3 Selection of Study Countries

The six countries that have been selected to participate in the study are: Bangladesh, Brazil, Cameroon, Ethiopia, Tajikistan and Vietnam. These countries were chosen based on the following eight criteria (listed according to priority):

1. Recent measles SIA or planning for a measles SIA during the study period.
2. Different geographic representation (Africa, Asia, Europe and Latin America should be represented).
3. Different population sizes.
4. Different income levels.
5. Different health sector financing sources.
6. Different measles coverage rates.
7. Examples of implementation of routine 2nd dose of measles vaccine.
8. LSHTM collaborators present in the country.

All the selected countries have recently conducted measles SIAs. Details about these are summarised in Table 1. The countries represent two countries in Asia, two in Africa, one in Latin America and one in Europe. To increase the ability to generalise the results, it was decided not to include any countries with a population of less than 5 million, as it can be hypothesised that small countries can more easily cope manage measles eradication efforts. Of the six countries chosen, Tajikistan and Cameroon are the smallest with 7 million people in Tajikistan and 18 million in
Cameroon. Ethiopia and Vietnam are middle size countries with populations of 81 and 86 million, respectively. Bangladesh and Brazil are large countries with 155 and 189 million people respectively. Three different income levels are represented. According to World Bank criteria, Ethiopia, Bangladesh and Tajikistan are low-income countries. Cameroon and Vietnam are lower-middle income countries and Brazil is an upper-middle income country.

Different financing sources for health are described as Government, private and external donor funding. According to national health accounts, of the six countries, Ethiopia can be described as donor dependent with 42% of total health expenditures coming from external sources. In Tajikistan, Cameroon, Vietnam and Bangladesh, a relatively large proportion of total health expenditures are covered by private out-of-pocket costs; 77%, 71%, 67% and 63%. 2008 measles vaccine coverage rates and information about implementation of a routine 2nd measles dose are summarised in Table 2.

Table 1: Recent measles SIAs in the six study countries

<table>
<thead>
<tr>
<th>Country</th>
<th>Dates of last measles SIA</th>
<th>Number of children/persons targeted</th>
<th>Type of SIA</th>
<th>Type of vaccine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethiopia</td>
<td>May 2009</td>
<td>276,695</td>
<td>Follow-up</td>
<td>Measles</td>
</tr>
<tr>
<td>Cameroon</td>
<td>July 2009</td>
<td>3,435,54</td>
<td>Follow-up</td>
<td>Measles</td>
</tr>
<tr>
<td>Bangladesh</td>
<td>February 2010</td>
<td>20,000,000</td>
<td>Follow-up</td>
<td>Measles</td>
</tr>
<tr>
<td>Vietnam</td>
<td>January 2009</td>
<td>1,036,22</td>
<td>Sub-national follow-up</td>
<td>Measles</td>
</tr>
<tr>
<td>Brazil</td>
<td>End of 2008</td>
<td>69,700,000</td>
<td>Catch-up</td>
<td>MMR</td>
</tr>
<tr>
<td>Tajikistan</td>
<td>September 2009</td>
<td>2,340,440</td>
<td>Catch-up</td>
<td>MR</td>
</tr>
</tbody>
</table>

Source: WHO, Geneva and country information
Table 2: Measles vaccine coverage rates and implementation of routine 2nd dose in the six study countries

<table>
<thead>
<tr>
<th>Country</th>
<th>2008 routine measles coverage (1st dose)</th>
<th>Implementation of routine 2nd dose of measles vaccine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethiopia</td>
<td>74%</td>
<td>No</td>
</tr>
<tr>
<td>Cameroon</td>
<td>80%</td>
<td>No</td>
</tr>
<tr>
<td>Bangladesh</td>
<td>89%</td>
<td>No</td>
</tr>
<tr>
<td>Vietnam</td>
<td>92%</td>
<td>No</td>
</tr>
<tr>
<td>Brazil</td>
<td>99%</td>
<td>Yes</td>
</tr>
<tr>
<td>Tajikistan</td>
<td>86%</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Source: http://www.who.int/immunization_monitoring/data/en/

1.4 HOW TO USE THIS TOOLKIT

This toolkit is designed for all involved researchers to understand the objectives, methods, and the process involved in the six country studies. The scope of the analysis and the research frameworks for health system and immunization services is presented in section 2. Section 3 is concerned with the first element of the study, which is an overall description of the health and immunization systems in the respective country. Element 2, which is concerned with integration is described in section 4 and the most important part of the study, how to measure the impact of AMEA, is explained in section 5. Specific instructions and practical guidance on how to undertake the different elements of the study are explained in section 6, including guidance on selection of study districts, selection of key informants to be interviewed, and the questionnaire templates which should be used. Section 7 briefly describes the analytical approach that will be used and the expected results from this study. Section 8 presents the timeframe for the work.

It is important to note that activities and tools used in each country study may need to be modified or adapted in order to suit the local context. The suggested steps in Section 6 and the materials included in the annexes are provided for guidance only. Final adjustment is to be done via active consultation between local research collaborators and the LSHTM researcher for each country. Nevertheless, the objective, scope and frameworks as well as research questions described in the first 3 sections of this toolkit are common to all study countries.
2 STUDY SCOPE AND FRAMEWORK

This study seeks to understand the impact of measles elimination activities on immunization services and health systems. The context of the study is that anecdotes and brief reports on measles elimination activities provide conflicting messages. On the one hand there is a fear that eradication will damage the health system by promotion of a vertical approach and by diverting resources from other activities. On the other hand, other reports claim that accelerated activities strengthen the health system by providing additional resources and reaching people who would not otherwise be reached. Comparable studies on polio eradication have concluded that the initiative has had a positive impact on areas such as health systems management and social mobilization, but the impact on routine vaccine delivery and health systems were not conclusive (11).

The polio eradication studies concluded that it is intrinsically difficult to define reliable, quantitative indicators for measuring the health systems impact of eradication activities (12-13). Hence, the present study will rely mainly on qualitative information though some quantitative indicators will be collected. The main output from this assessment will be lessons learnt in terms of good and bad practice in the six different case study countries.

The health system and its functions can vary greatly across countries. Before we can understand the impact of measles elimination activities on immunization services and the health system in a particular country, it is important to understand the overall context of the health system and its functions.

A number of frameworks for health systems assessment exist. For the purposes of this study we draw on the WHO health system framework and the Atun et al. framework for rapid assessment of disease programmes (HIV/AIDS, TB, pandemic influenza) in relation to health systems (2004) (14-15). In our framework for the study of measles elimination impacts, we define health systems as comprising eight key components:

1) Governance.
2) Financing and resource generation.
3) Planning and management.
4) Human resources.
5) Logistics and procurement.
6) Information system.
7) Surveillance.
8) Service delivery and demand generation.

Any health system is far from being static and it is influenced by the external context, especially key contextual elements such as political, legal, economic, socio-demographic, and technological factors. The functions of all these health system components and the influence of the external context define the level of outputs and outcomes which are permeated by access, coverage, quality and safety (14). Figure 1 presents the health system framework used in this study.

**Figure 1: Health systems framework used in the study**

The immunization system has its focus on vaccine preventable diseases and is part of the overall health system. The immunization system has five key elements as described in Table 3 (16). In many countries, the immunization system is fully integrated within the mainstream health service system, but in other countries it functions more as a vertical programme that is only partially integrated and to a certain extent disconnected from other health services. Measles elimination activities are usually part of the immunization system.

**Table 3: Description of the five elements of an immunization system**

<table>
<thead>
<tr>
<th>Elements</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vaccine delivery</td>
<td>The strategies and activities involved in vaccination delivery</td>
</tr>
<tr>
<td>Advocacy and communications</td>
<td>Social mobilization, advocacy, immunization education and promotion</td>
</tr>
<tr>
<td>Disease surveillance</td>
<td>Monitoring disease incidence, laboratory testing, record keeping and reporting.</td>
</tr>
<tr>
<td>Logistics</td>
<td>Transport, cold chain, waste disposal, and delivery of vaccines and other equipment to the place where they will be used.</td>
</tr>
<tr>
<td>Vaccine supply and quality</td>
<td>Forecasting vaccine needs, procuring vaccines, vaccine utilization monitoring and safety</td>
</tr>
</tbody>
</table>

Source: (16)
The study has three main elements. 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, in particular the five key elements, should also be clearly 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. This requires detailed assessment of the immunization activities and their linkage with the health system, including policy, planning, financing, service delivery, logistics, monitoring and evaluation, etc.

The **third element** is the most important part of this study. We aim to assess past, existing, and potential impacts of future measles elimination activities on immunization services and health systems. Past impacts refers especially to evaluation of past measles SIAs, current impact refers to ongoing activities, such as planning for measles SIAs or expanding the measles surveillance system. Future impacts refer to assessment of positive and negative consequences from increasing the activities if a world-wide eradication goal was in place. Four types of measles related activities are the focus of our assessment:

1. Efforts to increase coverage of routine measles vaccination.
2. Measles SIAs.
3. The adoption of a 2\textsuperscript{nd} dose of routine measles vaccination.
4. Strengthening of surveillance and laboratory systems.

For countries with experiences in any of the four areas, we will assess the past and existing impacts of the activities on the inputs, functions, and outputs of health systems and immunization services. Moreover, in all the six countries, the potential impacts of intensive efforts, such as more frequent SIAs and expansion of the surveillance system, for measles eradication on the health and immunization systems will also be assessed. We will seek to understand how these efforts could be a platform for strengthening routine immunization services and health systems.

The overall assessment framework, shown in Figure 2, illustrates the three study elements of description, assessment of integration, and assessment of impacts. It also shows the focus of the third element of this study on the evaluation of the impacts of measles strategies on immunisation services and the broader health system (unidirectional). In this study we will not assess the impact of
the health system on the measles elimination strategies as it is beyond the scope of this study and already covered by another WHO funded research package (the feasibility analysis).

Figure 2: Overall assessment framework and the three study elements
3 **ELEMENT 1: DESCRIPTION OF HEALTH SYSTEM, IMMUNIZATION SERVICES AND MEASLES ELIMINATION ACTIVITIES**

The first part of the study is an overall description of the health system in each country including the context within each is embedded. The description should be according to the eight health system components summarised in Table 4.

The second step in this part will be to describe the immunisation system in the country according to the same eight components of health system as explained in Table 5.

**Table 4: Summary of key health systems components to be described**

<table>
<thead>
<tr>
<th>Key components</th>
<th>Issues of interest</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Stewardship and governance</strong></td>
<td>Overall health policy and related legislations, describing key goals, challenges and strategies, as well as key actors and the reporting line within each administrative level and between the different administrative levels.</td>
</tr>
<tr>
<td><strong>Planning and management</strong></td>
<td>Multi-year strategic health plan and targets for the health sector. Description of the stakeholders and the process involved.</td>
</tr>
<tr>
<td><strong>Financing and resource generation</strong></td>
<td>Major financing mechanisms adopted (predominantly or a mix of): Tax based, social health insurance, community based health financing, etc. Level of funding for health, covering government expenditure; private expenditure (including out of pocket expenditure); and external aid received (and how funds are channelled – via general budget / sector support; projects); and provider payment system (e.g. salaries, capitation etc.).</td>
</tr>
<tr>
<td><strong>Human resources</strong></td>
<td>General information on human resources policy and numbers and distribution of key health workers (doctors and nurses).</td>
</tr>
<tr>
<td><strong>Logistic and procurements</strong></td>
<td>General procurement and purchasing system for pharmaceuticals and medical equipments; system of storage, transport, and distribution – including description of distribution system from one administrative level to another</td>
</tr>
<tr>
<td><strong>Information system</strong></td>
<td>Overview of the health information system; facility and population based. Overview of monitoring and evaluation system, vaccine utilization monitoring and safety</td>
</tr>
<tr>
<td><strong>Surveillance and laboratory system</strong></td>
<td>The laboratory network and surveillance system: Production, analysis and dissemination (including timeliness and reliability).</td>
</tr>
<tr>
<td><strong>Service delivery and demand generation</strong></td>
<td>Organisational structure, delivery models, and demand for health care.</td>
</tr>
</tbody>
</table>
Table 5: Summary of key immunisation related domains to be described

<table>
<thead>
<tr>
<th>Key components</th>
<th>Issues of interest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stewardship and governance</td>
<td>The ways in which the vaccination programme and measles activities are organised within the wider governance system (e.g. who are the members of the inter-agency co-ordinating committee (ICC)). The position and power of different actors in relation to disease eradication programmes including polio eradication and measles elimination.</td>
</tr>
<tr>
<td>Planning and management</td>
<td>The immunisation policy and plan, forecasting of vaccine needs, reporting line and performance management mechanisms (including measles activities).</td>
</tr>
<tr>
<td>Financing</td>
<td>Types of support (financial and in-kind); sources (government, external partners (e.g. GAVI); level of funding for both immunisation services and specifically for measles activities (second dose; SIAs; surveillance); and system for provider payment (fixed budget per geographical area, per case vaccinated, combination or other) – if different for measles a separate description should be provided.</td>
</tr>
<tr>
<td>Human resources</td>
<td>Mapping of the personnel involved in immunization services; the approximate number of staff should be outlined according to level and the approximate percentage time spent on immunization for each staff category should be specified. A separate section describing human resource issues related to SIAs.</td>
</tr>
<tr>
<td>Logistics and procurement</td>
<td>General procurement and purchase principles; system of storage, transport, cold chain, and distribution – including description of distribution system from one administrative level to another (for both routine immunisation and SIAs).</td>
</tr>
<tr>
<td>Health information and M&amp;E</td>
<td>Current M&amp;E system for immunization service delivery; drawing a flowchart of the M&amp;E system and the type of information involved (if possible) – indicating which organisation is responsible for recording, collecting, analysing and reporting data for vaccines (including measles) across the main administrative levels</td>
</tr>
<tr>
<td>Surveillance and laboratory system</td>
<td>Current surveillance system for vaccine-preventable diseases (including measles); Description of network of laboratories that are involved in vaccine preventable diseases and their capacities</td>
</tr>
<tr>
<td>Service delivery and demand generation</td>
<td>The strategies and activities involved in vaccination delivery and the social mobilization, advocacy, education and promotion activities to generate demand for immunization services.</td>
</tr>
</tbody>
</table>

The third step in this section is to provide a full account of the past and current measles control and elimination strategies and activities in the country. The following issues will be described:

a. Trends in vaccination coverage rates of the first dose of routine measles containing vaccine (MCV1) during the past ten years.

b. Explanation for the observed MCV1 coverage trends. Can any increase be explained by Government commitment? If there is a decrease, can this be explained by the fact that the public health system been distracted by other goals?
c. If a routine 2nd dose of measles vaccine has been implemented, describe when this started and explain the delivery strategies in place for this dose. Include trends in vaccine coverage rates of the 2nd routine dose.

d. Provide a summary of all measles SIAs that has been conducted in the country. Include the target populations, type of vaccine administered, length of the SIAs and the vaccination coverage achieved.

e. Investigate whether other health interventions, such as distribution of bed nets, have been delivered as part of measles SIAs. If so, provide a detailed account of these experiences.

f. Investigate whether measles vaccination has been part of other outreach initiatives, such as child health week. If so, provide a detailed account of this.

g. Describe the overall functioning of the measles surveillance system in place in the country.

h. Provide details on the main challenges that have been identified for achievement of measles elimination in the country.

i. Provide details of any future plans that have been established in the country for accelerated measles elimination activities (AMEA).
4 ELEMENT 2: INTEGRATION OF MEASLES ELIMINATION ACTIVITIES WITHIN THE HEALTH SYSTEM

Before we can understand the impacts of measles elimination activities, it is important to understand how activities are interacting and integrated with routine immunization services and the health system. In this part of the study, we aim to document the extent of integration of measles activities. The assessment will be done in relation to each of the eight critical functions of a health system summarised in the previous chapter.

We will explore the extent of integration of measles elimination activities with routine immunization services and the integration of immunization services with the overall health care system. With information from document reviews and key information interviews, the extent of integration by key system functions at local and national level can be evaluated.

We shall assess the extent of integration at two levels: At national levels and at 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 in a separate programme with separate fund holders and payment mechanisms. However, at the service delivery level, financing for SIAs may be handled by the same structure (staff, accounting system) as routine immunization services.

In addition to the linkage between measles and routine immunization services and the health system, we will investigate whether integrated child health interventions have been undertaken in the six case study countries. 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. 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 will be evaluated.
5 ELEMENT 3: IMPACTS OF MEASLES ELIMINATION ACTIVITIES ON ROUTINE IMMUNIZATION SERVICES AND HEALTH SYSTEMS

Assessing the impact of measles elimination activities on routine immunization services and the health systems is the main part of this study. We will assess the impacts with regard to four main measles related activities that are part of the strategy towards measles elimination, and are partly additional to routine immunization services. They are: (1) Efforts to increase coverage of routine MCV1, (2) introduction/expansion of a 2nd routine measles vaccine dose; (3) periodic SIAs; and (4) strengthening of laboratory-supported disease surveillance.

The choice of activities and the level of achievement with regard to expansion of measles vaccination coverage vary across countries. The framework for an assessment of the impacts therefore needs to be customized based on the experience of the country and the strategy it adopts for measles elimination. For countries with history of any of the four main activities mentioned above, we will assess the past and existing impacts of such activities on health systems and immunization services. Table 6 lists the areas of assessment for past and existing impacts for each case study country based on their measles elimination activities. Brazil is the only study country where measles elimination has been achieved. Hence, in this country only past and existing impacts will be evaluated. In the other five countries the potential (future) impacts of intensive efforts for measles eradication will be assessed by outlining the likely activities that will be needed to achieve this.

We will also assess the ways the polio eradication initiative has affected health system and its impacts on the opinions and perceptions of measles elimination and of a potential future measles eradication initiative. This will be done qualitatively by asking stakeholders about their experience with polio eradication and use their responses to analyse the lessons learned from these activities (see Box 1).

Table 6: Country specific impact assessment framework

<table>
<thead>
<tr>
<th>Country</th>
<th>Strengthening routine MCV1</th>
<th>Periodic measles SIAs</th>
<th>Introduction of routine 2nd dose of MCV</th>
<th>Strengthening of laboratory based surveillance</th>
<th>Assessing potential (future) impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bangladesh</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Brazil</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Cameroon</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ethiopia</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tajikistan</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Viet Nam</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Text box 1: Learning from the polio eradication experience

The polio eradication initiative was launched in 1988 with an initial target of the year 2000 for the last case. However, eradication has been delayed due to numerous problems; some related to the virus and the vaccine and others related to the organization of immunization programmes and the eradication initiative (1-2). By mid 2009, polio remains endemic in four countries; India, Pakistan, Afghanistan and Nigeria, and several countries have experienced sporadic importation of the virus from these or neighbouring countries (http://www.polioeradication.org/casecount.asp.)

The strategies used for polio eradication are comparable to the measles elimination strategies. Since the beginning of the polio eradication initiative, the following strategies have been used (3):

1. Achieve and maintain the highest levels of routine immunization coverage with oral polio vaccine (OPV)
2. Establish sensitive surveillance to detect all cases of acute flaccid paralysis (AFP)
3. Conduct SIAs with OPV, first as National Immunization Days or subnational immunization days (SNIDs) to reduce widespread poliovirus transmission, and
4. Carry-out focused campaigns (mop-up campaigns) to eliminate the last foci of transmission

Campaigns have been an essential strategy in the polio eradication initiative and it is still the main tool being used in attempts to halt the epidemic in the last remaining countries. Polio campaigns are often carried out house-to-house, or they are a combination of fixed facility and house-to-house (3).

A key difference between polio and measles eradication is that the measles vaccine is injectable while the polio vaccine used for eradication is oral. OPV can thus be delivered by health volunteers with very limited training while the measles vaccine needs to be delivered by a skilled health worker capable of giving injections.

All the six countries included in the present study achieved elimination of polio several years ago. However, both Cameroon and Ethiopia have recently experienced imported cases (http://www.polioeradication.org/casecount.asp). In Cameroon, a mop-up response with OPV3 was held on 9 October 2009, targeting four high-risk provinces (Extrême Nord, Nord, Adamawa, and Eastern provinces), and OPV vaccinations will be included in Child Health Days from 16 November 2009. This study will investigate whether stakeholders believe that AMEA will be strengthened due to past polio eradication activities and to what extent, if any, they think that polio eradication has caused eradication fatigue in the country.

This study will assess the impact of AMEA on immunisation services and the overall health system by seeking to provide explanations to a series of research questions in relation to the eight key health systems components. The specific questions for each component are presented below.

5.1 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 (more recently the term leadership has been used instead) and it is one of the core functions of a health
system (14, 17). Priority areas within governance are health sector policies, harmonisation and alignment of donor activities, oversight and regulation.

The main research questions to be addressed in relation to the impact of measles elimination activities on governance are:
- Have AMEA strengthened or undermined the government’s policy processes?
- Have AMEA contributed or not to broadening commitments to health and immunisation, and if these have been sustained over time?
- How did the government adopt the AMEA policy? Was it through stakeholder consultation, international meeting or internal debate?
- What was the political process for allocating resources to AMEA?
- Did the citizens play a role in budget allocation and the decision process?

Some of the questions regarding harmonisation and alignment fall under the integration component. Key study questions are:
- Have AMEA resulted in changes in donor behaviour (more or less harmonised policies and application of common instruments)?
- To what extent are donor policies on AMEA aligned to country policies and mechanisms?
- How well were the local needs assessed when AMEA were adopted into the national policy?

Key data sources or tools to be applied will be in-depth interviews; review of policy documents; and review of government expenditure for AMEA.

5.2 Planning and management

Planning and management are essential functions of any system and services, including the health care system and immunisation services. Measles control activities require careful planning and management, in particular for SIAs. It will thus be important to understand the extent to which they impact on broader planning and management functions. This will involve an assessment of the effects on routine immunization services.

Specific research questions related to management and planning are:
- Have AMEA strengthened or undermined the government’s planning and management processes (staff time and resource implications; and on other sectors like education)?
- Have AMEA improved or challenged management systems (e.g. via delegation of authority to lower levels)?
- What have been the major effects on planning from SIAs (positive or negative: e.g. diversion of resources) on other areas of health care?
- What would be the implications in terms of planning of the country’s most likely scenario for achieving measles elimination?
- Do SIAs strengthen or impede current management goals?

We will seek to use in depth-interviews and review of strategic plans as the main sources of data or tools to address these questions, and staff profiling survey when possible.

5.3 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.

To assess the impact of AMEA on financing, we will evaluate changes in the level and sources of funding for immunisation and other areas of the health system such as child health (including government, private and donor sources). The following questions will be addressed:
- Has funding increased or decreased over time and can this development be linked to AMEA?
- Are sources of funding different since AMEA started?
- Is there a different payment system for AMEA than for other services? If so, have these created distortions in the systems?
- Are there signs of aid fragmentation?
- Have donor funds been earmarked for AMEA? If so, is it a burden to the system to channel earmarked funds?
- To what extent has AMEA changed or affected the immunization service payment system?
- Has the resource allocation across geographical areas changed because of AMEA (e.g. increased / decreased funding to remote/deprived areas)?
- If AMEA has increased funding for immunization, what is the opinion of stakeholders with regard to whether this has been the best use of additional resources?
- What are the opinions of stakeholders with regards to the level and source of financing for potential measles eradication activities in the light of competing priorities for health?
Data sources and tools for this part of the study will be review of government expenditure data, trend analysis of health care financing disaggregated for immunisation services and if possible for measles activities, and in-depth interviews.

5.4 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, or 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.

AMEA can impact the health workforce system in many ways. To evaluate its implications, we will assess four main areas of the health workforce system: (1) availability (number), (2) skills, (3) distribution, and (4) motivation of health workers. The assessment of the impacts in these areas will be done through document review, key informant interview, and staff profiling survey (see section 4). We will assess needs and availability with a view of evaluating to what extent new activities, such as SIAs, may take away workforce from current activities.

Key questions that will be addressed are:

- What is the general workload of health sector staff?
- How much productive time do SIAs take away from health staff current activities?

5.5 LOGISTICS AND PROCUREMENT

The areas of logistics and procurement are closely related to planning and management and are also likely to be affected by the scaling up of measles control activities in the context of reaching elimination goals. A well functioning logistics and procurement system will contribute towards equitable access to essential vaccines and other necessary medical products.

In the areas of logistics and procurement our key research questions are:

Logistics
- Has the process of measles vaccine storage and distribution (notably during SIAs) led to benefits on other vaccines distribution processes or the broader health system (e.g. additional staff, additional cold chain equipment after SIAs)?
- Are there any negative impacts from AMEA on other vaccine programmes and on the health system (e.g. set up of parallel system or reduction in the capacity of distribution system for other vaccines; or delays in distribution of routine vaccines?)
- What is the impact of waste management for measles activities, particularly SIAs on routine immunisation and other health care services (positive or negative)?
- Is measles vaccine for SIAs taking up cold chain space with negative effects on other vaccines?
- What is the impact of SIAs on the cold chain at field level (e.g. has it led to an expansion of existing equipment subsequently used for routine immunisation and other health care services)?
- Is there any implication in terms of logistics of the country’s most likely scenario for achieving measles elimination?

**Procurement**
- What is the impact of procurement of measles vaccines on the health system (e.g. procurement capacity and stockpile requirement)? What would be the likely impact on procurement policy and stockpile requirements in the case of the preferred scenario for measles elimination?

Key data sources or tools to be used in investigating these questions will include review of logistics and procurement plans and in-depth interviews.

**5.6 INFORMATION SYSTEM**

The generation and strategic use of information is an essential part of all health systems. The extent to which this function is being affected by AMEA and in which ways will be assessed by an examination of the:
- Monitoring of vaccine coverage for MCV1 and MCV2 (administrative and surveys)
- Post campaign assessments including house-to-house monitoring and the use of rapid surveys
- Identification of high risk-populations and monitoring coverage among high-risk groups
- Validation of data by looking for disease during all house-to-house vaccinations, regular visits to schools and healthcare centres by each district’s supervisor, visiting high-risk areas
- Use of supervisory visits
- Data quality audits
- Use of record of campaign vaccination (vs. verbal feed-back from mother)
- Monitoring of changes in epidemiology.
We will also seek to understand the feasibility of stepping up monitoring and evaluation for measles control in terms of positive and negative effects on staff levels; training needs; and equipment requirements. These assessments will largely rely on review of HMIS forms and in-depth interviews.

5.7 Surveillance and Laboratory System

As mentioned in chapter 2, the strengthening of laboratory-supported disease surveillance is one of the four measles related activities that are part of the strategy towards measles elimination. We will seek to understand the effects of these activities on routine immunisation services and the health system by assessing the following:

- Have there been any synergies with the surveillance system for other diseases (e.g. the polio eradication initiative)?
- How sustainable are these synergies, particularly when the system (or staff) is very reliant on external funding?
- Do other disease surveillance activities, such as rubella surveillance, benefit from the measles surveillance system?
- Are there any disadvantages to other surveillance activities (e.g. parallel systems)?
- What benefits does enhanced surveillance for measles bring to other vaccine preventable diseases in terms of staff and equipment capacity?

We will also investigate the implication of past and existing measles activities on the surveillance system in terms of staff, resources needed, technology and protocols including for outbreak investigation and quality control activities. We plan to elicit the impact on the general surveillance system and health system, where relevant, of the gradual shift towards measles elimination in countries along the three phase scenario outlined in Table 7. We will assess in particular the impact of case-based surveillance at different level of the surveillance system and the work burden it generates or will generate. We will explore the needs for strengthening laboratory equipment and activities needed for certification process (this is particularly important for Brazil).

Review of surveillance plans and in-depth interviews will be used when examining these questions as well as staff profiling survey for laboratories and surveillance offices.
Table 7: Surveillance needs in three phase scenario towards elimination

<table>
<thead>
<tr>
<th>Phase</th>
<th>Surveillance needs</th>
<th>Additional resources needed (staff, equipment, financial) and expected source of funding</th>
<th>Impact on surveillance- and health system</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase 1: MCV1 coverage &gt;80%</td>
<td>Aggregate case reporting with or without lab confirmation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phase 2: Measles mortality reduction – MCV1 coverage &gt;80% plus high-coverage catch-up and follow-up SIAs at appropriate intervals,</td>
<td>Case-based reporting with lab confirmation, plus greater emphasis on measles case management in hospitals</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phase 3: Measles elimination – MCV1 coverage &gt;90% (some regions are going for &gt;95%) plus a high-coverage second dose either delivered as MCV2 or SIAs or both</td>
<td>Case-based reporting with lab confirmation, plus genotyping of a sample of isolated viruses plus greater emphasis on measles case management and prevention of nosocomial transmission in hospitals.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5.8 Service delivery

Within the measles policy community, it has been suggested that improved control of the disease has led to a reduction in the demand for other related health care services, particularly treatment activities. We will seek to assess this quantitatively by analysing trends in the number of hospital beds used for measles (whether there has been a reduction of these, no change or increase) and assess to what extent these can be linked to AMEA. In addition, we plan to explore this further through qualitative interviews.

We will also explore potential benefits of the current measles vaccination strategy on maternal and child health, both in terms of possible add-on activities such as bed nets, vitamin A, co-vaccination with other vaccines, delivered with measles vaccines, and in terms of the opportunity for contact with health care at an older age when children do not necessarily attend health care facilities. Data will be collected to quantify such benefits where available and qualitative interviews will be conducted to explore further.
With regard to outputs and outcomes our research questions focus on the potential changes that AMEA might have in relation to coverage, equity and responsiveness. We will explore the following:

- How can SIAs enhance health system capacity for outreach to more distant areas?
- Are SIAs the only activities for outreach to remote areas?
- Are SIAs the main reasons for the outreach activities?
- Were AMEA the sole funding that led to increased outreach activity?

Data tools to be used in assessing these issues will involve trend analysis of coverage data (HMIS and DHS), disaggregated if possible by socio-economic variables; and complemented by in-depth interviews of health care staff. Drawing on existing data (where available) and key informant interviews, we will seek to establish the changes in availability of essential services ‘before’ and ‘after’ measles SIAs.
6 PRACTICAL GUIDANCE FOR UNDERTAKING THE CASE STUDIES

6.1 PREPARATORY PHASE

6.1.1 ETHICS APPROVAL

As the proposed study involves collection of new data (mainly through interviews), it is necessary to obtain ethics approval from the national ethics committees in all six countries. The study has been approved by the LSHTM ethics committee. The approval letter is included in Annex 5.

6.1.2 SELECTION OF DISTRICT LEVEL STUDY SITES

Interviews for the study will take place at national and at district level. Two districts should be included in each of the country studies. Selection of these two districts should be based on the following five criteria:

1. One district with relatively low, routine vaccination coverage rates and one better performing district. It is expected that AMEA will have the greatest system impact in low performance districts and we would like to test this hypothesis by choosing two with different levels of routine coverage rates.
2. If feasible, select one urban and one rural district.
3. Recent measles SIAs undertaken in the districts would be useful, as key informants will then be more able to respond to questions related to SIAs.
4. Avoid areas with ongoing conflicts.
5. Ensure that transport costs are kept within the travel budget.

Within both districts, interviews should be conducted at the district administrative level and in two primary health care facilities where routine vaccinations as well as vaccinations during SIAs are delivered. It is recommended that the two health facilities are situated in two different areas within the district. If appropriate, it is also recommended to conduct interviews at the regional administrative level of the two districts. In many countries, the regional health offices are heavily involved in measles SIAs, so the impact on these needs to be captured as well.
6.2 Document Review

The country researchers should undertake an initial review of the health system, immunization services and measles elimination activities based on published qualitative, quantitative, and analytical data. The document review includes examination of available national and programmatic policy documents, surveys, studies and evaluation reports with the aim of obtaining a comprehensive understanding of the organization and implementation of AMEA in the context of the national health system. Examples of documents and data to be reviewed are summarised in Table 8. The exact documents are dependent upon the country health system and immunization structures. The first step will be to identify all relevant documents and share these with the LSHTM team. This should be done by preparing a brief mapping report of data available. The report should be divided into health systems documents, immunization systems documents and documents related measles elimination activities. The country researchers and the LSHTM will then work together on deciding which documents are relevant for the research questions.

When the relevant documents have been examined, initial assessment should be done to evaluate and identify gaps, biases and time lags in the data collected. This will aid planning of identification of key informants for interviews as well as the areas of further data collection with assistance from the key informants.

Table 8: Example data and documents for desk review

<table>
<thead>
<tr>
<th>Health systems related documents and data</th>
<th>National health plan/strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>National health workforce policy/strategy</td>
</tr>
<tr>
<td></td>
<td>National health accounts, annual budgets of the Ministry of Health, other health financing reports</td>
</tr>
<tr>
<td></td>
<td>Health workforce statistics by sector and type: Number, distribution, payment systems, Health workforce related reports, including reports by the WHO and the World Bank, health training institution statistics</td>
</tr>
<tr>
<td></td>
<td>M&amp;E system mapping report</td>
</tr>
<tr>
<td></td>
<td>Surveillance system related reports</td>
</tr>
<tr>
<td>Immunization &amp; measles related documents</td>
<td>National immunization policy/strategy (including measles specific)</td>
</tr>
<tr>
<td></td>
<td>Immunization staff statistics</td>
</tr>
<tr>
<td></td>
<td>Immunization training policy and protocol</td>
</tr>
<tr>
<td></td>
<td>Vaccination coverage data</td>
</tr>
<tr>
<td></td>
<td>Measles SIA planning documents and evaluation reports</td>
</tr>
<tr>
<td></td>
<td>Donor reports on financial contributions for immunization and AMEA (consult WHO, Unicef and bilateral donors)</td>
</tr>
<tr>
<td></td>
<td>Measles SIA training material</td>
</tr>
<tr>
<td></td>
<td>Measles surveillance guidelines and reporting format</td>
</tr>
<tr>
<td></td>
<td>Measles surveillance data</td>
</tr>
<tr>
<td></td>
<td>Site supervisory reports</td>
</tr>
<tr>
<td></td>
<td>Measles outbreak investigation reports</td>
</tr>
</tbody>
</table>
6.3 Identification of Quantitative Indicators

A well defined quantitative indicator is characterised by being specific, sensitive, measurable and preferably available from routinely collected data. Only few quantitative indicators that comply with these conditions are available for addressing the research questions of the present study. It is however crucial that full use is made of all quantitative data available. Possible quantitative indicators are summarised in Table 9. While quantitative indicators can be collected in the areas of financing, human resources and service delivery, it is less obvious what data will be available for the other five domains. During the first part of the study each set of country researchers and the LSHTM team should work together on deciding what quantitative indicators are feasible to include in the respective country study.

Table 9: Possible quantitative indicators to include in the study

<table>
<thead>
<tr>
<th>Domain</th>
<th>Possible indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stewardship and governance</td>
<td>NA</td>
</tr>
<tr>
<td>Planning and management</td>
<td>NA</td>
</tr>
<tr>
<td>Financing</td>
<td>• Trends in funding for health, immunization and measles SIA</td>
</tr>
<tr>
<td>Human resources</td>
<td>• Time use of staff on SIAs, measles surveillance, and other elimination activities/control activities</td>
</tr>
<tr>
<td></td>
<td>• Weekly attendance records</td>
</tr>
<tr>
<td></td>
<td>• Use and level of incentive (measles vs. other interventions)</td>
</tr>
<tr>
<td>Procurement and logistics</td>
<td>NA</td>
</tr>
<tr>
<td>Surveillance and laboratory system</td>
<td>• Trend in the number of measles samples processed</td>
</tr>
<tr>
<td></td>
<td>• Trend in number of laboratories that are diagnosing measles</td>
</tr>
<tr>
<td>Health information and M&amp;E</td>
<td>NA</td>
</tr>
<tr>
<td>Service delivery and demand generation</td>
<td>• Number of outpatient visits at health centres before, during and after a measles SIA</td>
</tr>
<tr>
<td></td>
<td>• Number of inpatient confirmed measles cases two years before and two years after a measles SIA</td>
</tr>
</tbody>
</table>

6.4 Key Informant Interviews

6.4.1 Selection of Key Informants

A mix of respondents from different levels and specialties are required for a robust qualitative response. Some respondents should have a wide, but not necessarily deep, sphere of knowledge to be able to provide a picture of how different domains fit together, whilst others should have more specialist knowledge that can bring in-depth information over a narrower spectrum.
This study will use two sampling methods for selection of key informants:

- **Purpose sampling**: This involves selecting participants on the basis of their characteristics, roles or experiences in order to shed light on a range of issues relevant to the research questions. Our aim is to interview as diverse a range of individuals as possible.

- **Snowball sampling**: This involves asking interviewees to nominate other people they know who may be willing to participate in the research. This allows researchers to identify and interview key informants who are not known at the start of the research project. Snowball sampling especially helps researchers collect information on specific issues. However, since the research questions for the present study are relatively narrowly defined, it is likely that purposive sampling will be the main strategy used for the present study.

Interviewees for the study fall into two main categories: Government (including officials at national and district levels) and others. Possible key informants within the Government are summarised in Table 10. Other key informants include international agencies, such as WHO and Unicef, bilateral agencies engaged in immunization activities, such as for instance DFID, USAID and Danida, NGOs, private provider associations at national level; and private facility managers at district level.

**Table 10: Government key informants (need to be adapted to the specific context)**

<table>
<thead>
<tr>
<th>National level</th>
<th>Sub-national level</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Ministry of Finance health officer;</td>
<td>1. Head of sub-national level department</td>
</tr>
<tr>
<td>2. Higher level official at MoH (e.g. CMO, DG, PS)</td>
<td>2. MCH officer</td>
</tr>
<tr>
<td>3. Head of MCH department</td>
<td>3. Chief nurse</td>
</tr>
<tr>
<td>4. Chief nursing officer</td>
<td>4. Finance officer</td>
</tr>
<tr>
<td>5. Head(s) of health programmes (e.g. Malaria)</td>
<td>5. Planning officer</td>
</tr>
<tr>
<td>6. Members of the ICC (immunization coordination committee)</td>
<td>6. Logistics officer</td>
</tr>
<tr>
<td>7. Policy and planning officer</td>
<td>7. Reporting officer (involved in routine surveillance)</td>
</tr>
<tr>
<td>8. Financing officer / manager</td>
<td>8. Laboratory manager</td>
</tr>
<tr>
<td>9. HR planning officer / manager</td>
<td>9. EPI officer</td>
</tr>
<tr>
<td>10. EPI manager / officer</td>
<td>10. Service-level health staff at health care centres and district hospital level</td>
</tr>
<tr>
<td>11. Measles planning officer</td>
<td>11. Immunisation and measles-related staff (incl. staff involved in supervisory visits and village health workers)</td>
</tr>
<tr>
<td>12. Procurement (vaccines) officer</td>
<td></td>
</tr>
<tr>
<td>13. Surveillance manager/officer (responsible for measles reporting)</td>
<td></td>
</tr>
<tr>
<td>14. Outbreak investigation team member</td>
<td></td>
</tr>
<tr>
<td>15. Laboratory officer (if relevant)</td>
<td></td>
</tr>
</tbody>
</table>
6.4.2 Suggested interview sequence

It is recommended to begin with the interviews at the national level, as key informants at this level will provide insights into the overall systems impacts and they are likely to give valuable advice for the field work at regional and district levels. However, if for logistical reasons it is not possible to interview all key informants at the national level within the time frame set for this level, these can be postponed until after the regional and district interviews. The research team must be prepared to allow flexibility in their schedule as timing of interviews can be subject to very late change.

Prior to the district visits, key informants and organisations to be interviewed should be identified and a preliminary simplified stakeholder analysis should be undertaken. Meetings and interviews should be scheduled in advance and formats for the output reports should be completed. Moreover, during the preparatory phase, types of local data to be investigated in detail during the visit should be identified.

6.4.3 Interview process

The interviews should be commenced during the visit of the LSHTM team member. It is recommended that at least one of the districts is visited during the period. The remaining interviews should be completed when the LSHTM team member has left.

Where possible each interview should be conducted by two members of the research team. Interviews are based upon standard interview templates with optional prompts or follow-up questions. The interview guides included herein are intended to provide consistency and coherence in interviews. Interviewers will adapt the tools to the country situation and pilot these with 2-3 respondents. These interviews should be semi-structured, allowing necessary information to be collected in a flexible manner, following the respondent’s logic.

Each module of the toolkit is used for interviewing a number of respondents until data saturation point around the key study themes is reached and no new knowledge is gained. However, in some instances it may be necessary to end the interviews sooner than saturation due to time- and budget constraints. Each respondent is interviewed within one or more modules of the toolkit, depending on their area of knowledge. The respondents could be asked to outline their area of expertise in their own terms, as it may not coincide with their formal job role (e.g. they may have changed jobs recently and be knowledgeable about other issues).

Interviews should take place in a mutually agreed upon place, typically the interviewee’s office.
Issues such as interviewer and participant safety, comfort and convenience, participant confidentiality, and background noise should be considered in selecting the interview site.

6.4.4 RECORDING AND TRANSLATION OF INTERVIEWS

The interviews should be recorded in writing or on audiotape with the permission of the interviewee. Where English is not the primary language, the interview may need to be undertaken in the native language. A 2-page interview summary sheet in English should be prepared after the interview, as described below.

6.4.5 INFORMED CONSENT

It is essential that prior to all interviews the explicit consent of the interviewee be obtained on the understanding that all information provided to the interviewer is confidential and non-attributable. If a translator is being used, this must be made clear to him/her. Consent should be obtained in writing using the form in Annex 4. Information sheet about the study, which can be provided in advance of the interview, are also provided in Annex 4.

6.4.6 INTERVIEW SUMMARY SHEET

At the end of each interview, the interviewers should discuss the findings among themselves and based on this discussion, a two-page interview summary sheet should be written in English for each interview. It is recommended that this is completed the same day as the interview. On the top of each summary sheet, the name and position of the key informant and the names of the interviewers and the translator should be provided. The purpose of the interview summary sheet is to allow the analysis team to get a concise picture of the context and content of the interview, which would allow the analysis team to triangulate information and appropriately address any issue with the field interview team. Furthermore, the summary sheet should serve as a checklist of items addressed in the interview and it should provide an opportunity to reflect on the items included and excluded as well as any outstanding comments and issues in the interview. Since the information in the summary sheet will be used to frame the analysis of the interview data, it is important that these are carefully prepared for each interview.

6.5 STAFF PROFILING SURVEY

In many countries, interactions between the health system and vertical or priority programmes such as measles elimination are strongest at the service provision level. The programmes frequently rely on health care staff at the district or village level, which also provides other health care services. There can be either synergies or conflicts arising from the introduction of these intensive activities. It
is therefore important to study the impacts at service level from health care providers in addition to obtaining inputs from key informants at the administrative level. Staff profiling survey is a tool we use in this study to capture the interactions and potential impacts among the frontline health workers who are in charge of health care delivery for the health system.

The staff profiling survey should be done in the two districts selected for the study. In each district, a questionnaire should be sent to at least 15 health care staff that have had direct experience working on measles related activities, such as planning, vaccine delivery and logistics support. The 15 health workers may include district health officer, nurses and health workers. The questionnaires could be distributed at the beginning of the researchers’ visit to the district and collected before the time they leave. The researchers could also look out for another opportunity to distribute the questionnaire, such as a staff meeting or a training workshop where several primary level health care workers are present. For health workers who will also be key informants for service level interviews, they should be asked to answer the questionnaire first.

The questionnaire is designed to be self-administered and easy to answer (see Annex 3). 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. It should take less than 15 minutes to complete the questionnaire.

All questionnaire answers must be entered into an excel file based on a data entry template developed with assistance from the LSHTM team. Since the data collection is likely to vary between the countries, these data entry templates will not be exactly the same for all six countries. The analyses of staff profiling survey data will be done based on a guideline to be provided by the LSHTM team.
7 ANALYSES AND REPORT WRITING

7.1 GUIDANCE ON DATA ANALYSES

Analysis of the generated data will combine both qualitative and quantitative approaches. The analytical process will, by and large, follow a framework analysis approach (18-19). The first step will involve the process of familiarisation with the data, including data cleaning and checking for consistency. This will be followed by an analysis of the data, drawing on the overall assessment framework and guided by the key health systems components. This will include the analysis and framing of the data in line with the main study parts, i.e. description, integration and impacts. The specific research questions will further guide the process of analysis and structuring of the data. Amendments to the analysis will be made according to any new themes revealed by the data. This will be particularly important for the country level analysis where issues specific to each setting can be captured. The cross-country analysis will seek to build on the country level synthesis and interpretations to draw a broader understanding of the impacts of AMEA on immunization services and health systems. It will also focus on learning lessons from the country case studies which may have wider resonance in similar settings by highlighting both positive and negative experiences.

7.1.1 QUALITATIVE INFORMATION

The qualitative analysis will involve the review of policy documents and analysis of the interview transcripts.

Evidence from the review of policy documents should provide general information necessary to describe the general context and the functioning of immunization services and health systems. Documents will be particularly helpful in the analysis of historical interactions. The analysis of documents should broadly follow the classification of themes outlined in the framework and research questions.

Interview data should be analysed according to the framework approach, as summarised in Table 11.

Data quality will be evaluated through the following key steps:

- Reliability: Objective and comprehensive maintenance of records and careful account of the analytical process.
- Deviant case analysis: Searching for and examining negative cases and events that are not in consonance with identified trends. However, in the case of measles elimination there may be a tendency to exaggerate negative impacts on immunization services and health systems,
• Triangulation: Different data sources (interviews and documentary review) should be
triangulated as to allow for one source balancing the scope for errors and bias of the other.
Triangulation of data from national and local level sources should also take place.

Table 11: The Framework Approach

<table>
<thead>
<tr>
<th>Stage</th>
<th>Description</th>
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<tbody>
<tr>
<td>Familiarisation</td>
<td>Immersion in the raw data: Listening to tapes, reading transcripts, in order to list key ideas and recurrent themes.</td>
</tr>
<tr>
<td>Identifying a thematic framework</td>
<td>Produce a detailed index of the data which labels the data into manageable chunks for subsequent retrieval and exploration.</td>
</tr>
<tr>
<td>Indexing</td>
<td>Applying the thematic framework – systematic indexing of the text.</td>
</tr>
<tr>
<td>Charting</td>
<td>Assigning data to the appropriate part of the thematic framework.</td>
</tr>
<tr>
<td>Mapping and interpretation</td>
<td>Using the charts to define concepts, map the range and nature of phenomena and find associations between themes with a view to providing explanations for the findings.</td>
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</tbody>
</table>

Source: Pope and Mays, 1995 (18)

7.1.2 QUANTITATIVE INFORMATION

Quantitative data collected for the study should be entered into Excel or a standard software database program. The data should be range and consistency checked by the country researchers and the LSHTM counterpart. Where feasible, standard statistical analysis, such as testing for significant differences before and after measles SIA, should be undertaken.

7.2 COUNTRY REPORT GUIDANCE

In each country a report and a policy brief on the health systems impact of measles elimination activities should be prepared. The outline of the report is included in Annex 1. The first four chapters consist of introduction and descriptions of the health system, the immunization system and a review of measles elimination activities undertaken in the country. These sections should be completed in draft form during the first, descriptive part of the study.

Chapters 5 and 6 should be completed after analysis of the data collected during interviews.

Chapter 7 should be competed in draft form before the synthesis workshop and finalised during the synthesis workshop.
7.3 **Synthesis Workshop**

A one week workshop for all the country researchers will be held in Bangkok from 24-28 May 2010. Other stakeholders will be invited to join the last two days of this meeting. The objective of the workshop and subsequent meeting will be to synthesise the country specific findings into an overall analysis that compares and contrasts the results of the different countries. In addition, key recommendations on how to ensure that measles eradication could strengthen health systems should be agreed upon.

Participants at the workshop will be the LSHTM team, all country collaborators, other researchers with relevant direct experience, WHO, the Gates Foundation and the executive committee of the study.

7.4 **Dissemination of Results**

7.4.1 **Dissemination Workshop**

In each country a dissemination workshop should be organised where all key stakeholders are invited. The objective of this workshop is to share the findings with local decision makers. It is recommended to organise this workshop when the final country report has been completed.

7.4.2 **Publications**

The following publications will be prepared as part of the study:

- Six country reports: One report by each of the country collaborators with support from the LSHTM team.
- Six policy briefs: One policy brief per country
- One synthesis report prepared by the LSHTM team with considerable input from country researchers
- One cross-country article to be published in a peer reviewed journal
- We encourage publication of country specific articles. Writing of this article should be led by the country collaborators with LSHTM support as needed.
## Research timeline

<table>
<thead>
<tr>
<th>Methodology development:</th>
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<td>Methodology workshop</td>
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<tr>
<td>Methodology development</td>
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<tr>
<td>Writing of toolkit</td>
<td>X X X X</td>
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<tr>
<td>Tollkit review by countries and partners</td>
<td>X X</td>
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<tr>
<td>Final toolkit sent to countries</td>
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### Work in study countries:

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<tr>
<td>Quantitative data analysis</td>
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<tr>
<td>Writing country report</td>
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### LSHTM visits:

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<td>Cameroon</td>
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<tr>
<td>Ethiopia</td>
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<tr>
<td>Bangladesh</td>
<td>X X</td>
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</tbody>
</table>

### Outputs:

| Draft country report ready | X |
| Synthesis workshop in Bangkok | X |
| Draft synthesis report ready | X |
| Writing final report       | X X X |
| Papers & policy briefs     | X X X X X X |
ANNEX 1: COUNTRY REPORT OUTLINE

Country Case Study: Country X

Acronyms and abbreviations

Acknowledgements

Executive summary

1. Introduction (1 page)

2. Study objectives (1/2 page)

3. Study methods (2 pages)
   3.1. Data sources
   3.2. Summary of type of people interviewed for the study

4. Overview of the health system (5 pages)
   4.1. Stewardship and governance
   4.2. Planning and management
   4.3. Financing and resource generation
   4.4. Human resources
   4.5. Logistics and procurement
   4.6. Information system
   4.7. Surveillance and laboratory system
   4.8. Service delivery and demand generation

5. Overview of immunization services (3 pages)
   5.1. Governance
      5.1.1. Organizational diagram
      5.1.2. ICC members
   5.2. Immunization schedule and trends in vaccine coverage rates
   5.3. Logistics and supply
      5.3.1. Vaccine distribution chain (from national level to health facilities)
      5.3.2. Vaccine procurement
   5.4. Financing of immunization services
      5.4.1. Major funders, in addition to the Government
   5.5. Human resources for immunization

6. Measles elimination activities (4 pages)
   6.1. Routine measles vaccination
      6.1.1. Coverage rates
      6.1.2. Introduction of routine 2nd dose
   6.2. History of measles SIAs
      6.2.1. Dates, target groups, achievements
7. Integration of immunization services and measles elimination activities into the general health system functions (3 pages)
   7.1. Governance
   7.2. Financing
   7.3. Planning and management
   7.4. Human resources
   7.5. Logistics
   7.6. Information system
   7.7. Surveillance
   7.8. Service delivery and demand generation
   7.9. Summary on integration and synergies

8. Impacts of measles elimination activities on immunization services and the general health system (10 pages)
   8.1. Past or existing measles activities impact
   8.2. Future impact based on elimination scenario

9. Discussion on policy implications of findings (3 pages)
   9.1. Aggregated mapping of integration
   9.2. Summary of existing/potential impacts on health systems;
   9.3. Policy implications of findings
   9.4. Areas for improvement

Annexes
ANNEX 2: MODEL QUESTIONNAIRE FOR KEY INFORMANT INTERVIEW

Note: This is a model semi-structured questionnaire for key informant interviews across all countries. It is designed to be further customised by both the country collaborator and responsible LSHTM research person to match local health system context, existing immunization patterns, and measles elimination strategies. The revision will be based on information gained from document reviews. The questionnaire will also be adjusted based on the level of interview i.e. national or local level.

The main objective of the key informant interviews is to obtain answers to the key research questions (outlined in section 3 of the toolkit) on the existing interactions and potential impacts of measles elimination activities. Additionally, it will serve as an opportunity to gather additional information or linkage to such information on health system and immunization system not already identified from document reviews.

The interviewer(s) should focus on specific section(s) of the questionnaire to match the role/responsibility of the informants. Each interview should take approximately 60 minutes.

### Indication of specific questions to key informants

<table>
<thead>
<tr>
<th>Stakeholders (Administrative level)</th>
<th>Governance</th>
<th>Financing</th>
<th>Planning</th>
<th>HR</th>
<th>Logistics</th>
<th>Surveillance</th>
<th>IS</th>
<th>Service delivery</th>
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<td>X</td>
<td>X</td>
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<td>Department of Health (Regional / District)</td>
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<td>X</td>
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<td>X</td>
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<tr>
<td>Service Providers (National / Regional / District)</td>
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<tr>
<td>Technical Partners (E.g. WHO, UNICEF, UNFPA, UNAIDS)</td>
<td>X</td>
<td></td>
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<td>Laboratories (national/regional)</td>
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</table>
ASSESSMENT OF THE IMPACT OF MEASLES ERADICATION ON IMMUNIZATION SERVICES AND HEALTH SYSTEMS

Interview Guide

SECTION A:
DATE AND ID

Date of interview:
________________________________________________________________________

Name of interviewers: (1) ________________________________________________________

(2) _____________________________________________________________

Name of translator: __________________________________________________________

SECTION B:
INFORMATION ABOUT THE KEY INFORMANT

Exact title and roles in the health or immunization system (present and past if relevant)
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

Has the informant been involved in measles related activities?

PROBE: If yes, what was/is his/her role?

How long has the informant been working-involved in
- the health sector [if relevant]? ____________ years
- immunization service system [if relevant]? ____________ years
- measles related activities [if relevant]? ____________ years

Are you familiar with the measles immunization strategy?

PROBE: To be completed by the interviewer based on the overall interview

<table>
<thead>
<tr>
<th>Detailed knowledge</th>
<th>Aware</th>
<th>Limited knowledge</th>
<th>Not aware</th>
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</table>
SECTION C:

DESCRIPTION OF HEALTH SYSTEM, IMMUNISATION SERVICES AND MEASLES ELIMINATION ACTIVITIES

Before asking the subsequent questions, explain that the first part of the interview will seek to fill information gaps regarding the description of the health system, immunisation services and measles elimination activities.

For respondents not well familiarised with the immunisation and measles strategies (most likely to be the case for health systems respondents) briefly outline the previous/ongoing measles immunization activities in the country e.g. SIAs (a major part of the elimination strategy), strengthening of laboratory surveillance, introduction of routine second dose of MCV.

Health systems questions

For respondents involved in health systems related activities: briefly explain that we are framing the questions around 8 key health systems functions (governance, planning and management, financing and resource generation, human resources, logistics and procurement, information systems, surveillance and laboratory system, and service delivery and demand generation) and the questions addressed to them during this interview will focus on their particular area of expertise:

________________________________________________________________________________________

Select the relevant questions in line with the informant’s area of expertise:

Governance:

- Explain the governance and stewardship arrangements in the health sector and link between different geographical levels of authorities.
- Please tell us about the governance arrangements with the private health care sector.
- What are the key governance challenges within the health sector?

Planning and management:

- Explain how planning is conducted at national and regional levels
- Who are the key stakeholders involved in strategic planning and management?

Financing:

- What are the major financing mechanisms/sources and how do they operate in practice?
  - PROBE: General taxes, social insurance, out of pocket (a combination of)?
- What sources of funding are available and what is the degree of autonomy in disbursing/managing funds at the regional and district level?
- Are there mechanisms of cross-subsidisation (between regions)? If so, how well or not do they work?
- What are the main provider payment systems (e.g. salaries, capitation, fixed budget etc.)?
Human resources:
- What are the key developments in the human resources policy and strategy?
- Please tell us about the availability and distribution of key health workers (doctors, nurses, lab technicians, etc.)?

Logistics and procurements
- Please provide a general assessment of the procurement and purchasing system for pharmaceuticals and medical equipments; system of storage, transport, and distribution – including description of distribution system from one administrative level to another.

Information system
- Please provide a general assessment of the health information system; facility and population based; and monitoring and evaluation system.

Surveillance and laboratory system
- Please provide a general assessment surveillance system and the laboratory network: Production, analysis and dissemination (including timeliness and reliability).

Immunisation services and measles control questions

Stewardship and governance
- How is the immunisation programme set within the wider governance system?
- Who are the key stakeholders?
- Is there an inter-agency co-ordinating committee (ICC) and if so who are the members?
- What is the position of key stakeholders vis-à-vis disease eradication programmes (including polio and measles elimination):
  - Mainly in favour? Mainly against? Neutral?
- What are their sources of power or influence (financial, access to the media, etc.)?

Planning and management
- Please describe the main achievements and challenges of the current measles strategy (MCV1, MCV2, SIAs)
- What are the key issues in terms of policy and planning in the area of immunisation?
- Probe: forecasting of vaccine needs, reporting line and performance management mechanisms (including measles activities).

Financing
- What are the main sources of funding for immunisation and for AMAE? (including donor funding)
- What is or are main the bureaucratic structures stemming from donor resources?
o Probe: e.g. separate project management units, channelling funds directly via a vertical approach?

- What has been the level of funding for?
  o Immunisation services?
  o Measles activities: Second dose; SIAs; and Surveillance?

- What is the main system for provider payment: fixed budget per geographical area, per case vaccinated, combination or other? If different for measles, please indicate how it works.

Human resources

Routine

- Please describe which personnel is involved in immunization services (routine)
- What is the approximate number of staff and their level as outline above?
- Can you estimate what is the approximate percentage time spent on immunization for each staff category, both at district management and service delivery levels?

SIAs

- Please describe which personnel is involved in immunization services (SIAs)
- What is the approximate number of staff and their level as outline above (SIAs)?
- Can you estimate what is the approximate percentage time spent on immunization for each staff category, both at district management and service delivery levels (SIAs)?

Routine or SIAs

- Are you able to use any of the donor funds for salaries of permanent staff/health workers?

Logistics and procurement

- Please provide a general assessment of the procurement and purchase mechanisms; system of storage, transport, cold chain, and distribution – including description of distribution system from one administrative level to another for supplies for both routine immunisation and SIAs.

Health information and M&E

- Please provide a general assessment of the current M&E system for immunization service delivery: if possible draw a flowchart of the M&E system and the type of information involved, indicating which organisation is responsible for recording, collecting, analysing and reporting data for vaccines (including measles) across the main/relevant administrative levels.

Surveillance and laboratory system

- Please provide a general assessment of the current surveillance system for vaccine-preventable diseases (including measles); in terms of how well or not it is operating.
- Please describe the network of laboratories that are involved in vaccine preventable diseases and their capacities and constraints.
Service delivery and demand generation
- Describe the strategy and the related activities for
  - Vaccination delivery
    - Social mobilization in immunization activities
    - Advocacy, education and promotion activities to generate demand for immunization services
- With regard to the observed MCV1 coverage current trend (specify in line with national, state or municipal level), why do you think this is the case?

SECTION D:

INTEGRATION OF MEASLES ELIMINATION ACTIVITIES WITHIN THE IMMUNISATION SERVICES AND HEALTH SYSTEM

Please select the relevant questions in line with the informant’s area of expertise.

Integration of immunization activities (EPI) within the general Health System:

- To what extent are EPI activities integrated into the following health systems functions?
  - Governance:
    - Fully integrated □ Coordinated □ Linked □ Not integrated □
  - Planning and management
    - Fully integrated □ Coordinated □ Linked □ Not integrated □
    PROBE: Is the planning for immunisation activities done as part of regional/district general planning? Is there a district comprehensive integrated plan including EPI activities?
  - Financing
    - Fully integrated □ Coordinated □ Linked □ Not integrated □
    PROBE: Is financing of EPI made through a specific fund? Does financing of EPI differ from other health programmes (% external funding, mobilization of funds, disbursement processes)?
  - Human resources
    - Fully integrated □ Coordinated □ Linked □ Not integrated □
    PROBE: Is EPI staff dedicated to EPI activities at different level of governance?
  - Logistics and procurement
    - Fully integrated □ Coordinated □ Linked □ Not integrated □
PROBE: Is EPI procurement conducted similarly to general MoH procurement procedure? How does the vaccine supply chain compares to other pharmaceutical supply chains in the way it operates?

Information system

- Fully integrated [ ] Coordinated [ ] Linked [ ] Not integrated [ ]

- Surveillance and laboratory system

- Fully integrated [ ] Coordinated [ ] Linked [ ] Not integrated [ ]

- To what extent are immunisation activities integrated with other health interventions (beyond the immunisation programme)?
  - PROBE:
    - With the maternal and child health programme
    - With communicable disease programmes (e.g. malaria)
    - With non-communicable disease programmes (e.g. diabetes)

Integration of measles SIAs into immunisation services (EPI):

- To what extent are measles control activities (SIAs) integrated into the routine immunisation programme?
  - PROBE
    - Governance, planning and management (e.g. Is planning of SIAs integrated into EPI planning?)
    - Financing (e.g. Are SIAs financed similarly than routine activities (source of financing, mobilization process...))?
    - Human resources (e.g. Do SIAs use the same EPI staff as in routine activities; do they any use any specific financial incentives for staff?)
    - Logistics and procurement (e.g. Do SIAs use the same logistical resources than EPI?)
    - Health information and M&E (e.g. Do SIAs use same HIS routine reporting format or specific ones?)
    - Surveillance and laboratory system

- To what extent are measles-control activities part of an integrated set of child health interventions? If so, which set of activities is part of the child health strategy or programme? Do health facilities have dedicated child health days or weeks? Are other services, such as malaria bed-nets, added on to measles SIAs? Are child-health interventions also delivered alongside routine immunization?

- Based on your responses, it seems that measles-control activities (in relation to routine immunisation services) are
  (choose one in line with the key informant’s answers above):
  Fully integrated [ ] Coordinated [ ] Linked [ ] Not integrated [ ]

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SECTION E:

IMPACT OF ONGOING/PREVIOUS ACCELERATED MEASLES VACCINATION ACTIVITIES

NB: If responses are vague, it may be helpful to probe about the most recent campaign, as they may still remember some details, in case they have had some involvement.

Overview questions

- What do you think were/are the impacts of accelerated measles activities on routine immunization services (if any)?
  PROBE:
  • impact of previous SIAs
  • impact of introduction of routine second dose MCVs (if relevant)
  • impact of laboratory surveillance strengthening

- What do you think were/are the impacts of accelerated measles activities on the overall health system (if any)?
  PROBE:
  • impact of previous SIAs
  • impact of introduction of routine second dose MCVs
  • impact of laboratory surveillance strengthening

Specific questions

- Was there any impact of measles immunization activities on health system governance?
  PROBE:
  • Leadership of key health system stakeholders e.g. Ministry of Health
  • Any changes to the political process of resource allocation to AMEA¹, or to other programmes in view of intensification of measles-control activities?
  • Any changes of laws and regulations?
  • Do you think AMEA tend to strengthen or weaken policy processes (How was AMEA adopted –internal debate, internationally or donors driven? Donors policy aligned on national mechanisms?)

- Was there any impact of measles immunization activities on health system planning and management?
  PROBE:
  • National health strategy and other health plans
  • Priority setting mechanism
  • Planning and management processes (staff time, resources implications) for
    o Routine activities
    o SIAs (both + and – effects, including diversion of resources- do SIA strengthen or weaken management goals?)
  • Management skills of health administrators
  • Do you think measles activities tend to strengthen or weaken planning?
    • What would be the planning implications in a scenario of an eradication strategy?

¹ AMEA= Accelerated measles elimination activities
- Was there any impact of measles activities on health system financing?
  PROBE:
  - Was there a change in the level and sources of funding for immunisation and other areas of the health system?
  - Have donors’ funds been earmarked for AMEA?
  - What do you think the opportunity costs are? Do you think that other health interventions may have been neglected due to increased resources spent on measles?
  - Is there a different payment system for AMEA services? Does it affect or create distortions in the system?
    - Do you think measles activities tend to strengthen or weaken health systems financing?

- Was there any impact of measles activities on the health workforce?
  PROBE: Any changes in the
  - Availability (number) of health workforce
    - Can donor funding be used to expand the number of government health workers?
    - Or do you have to hire staff just for handling specific projects who are temporary and may be on a different salary scale from the government?
    - If so, what are the effects of hiring staff through this mode?
  - Distribution (deployment to rural or shortage areas or to areas of low MCV coverage?)
  - Skills / training
  - Motivation and support
  - Do SIAs take away health staff from routine activities and if yes how much of a disruption does this cause to service delivery?
    - Do you think measles activities tend to strengthen or weaken human resources?

- Was there any impact of measles immunization activities on health system logistics and procurement?
  PROBE: Any changes in the
  - Vaccine and drugs storage and distribution infrastructure including cold-chain system (notably during SIAs)
    - Additional equipment and infrastructure, including waste management equipment?
    - Set up of parallel logistics systems, including for waste management?
    - Impact on other routine vaccine programmes?
  - Logistics management skills, did it improve or get overstretched?
  - Do you think accelerated measles activities tend to strengthen or weaken health systems procurement and logistics (including waste management)?
    - Is there any implication in terms of logistics to achieve elimination?

- Was there any impact of measles immunization activities on health system surveillance and laboratory services?
  PROBE: Any changes in the
  - Laboratory capacity and network- did it improve or get overstretched?
  - Impact on other disease surveillance activities e.g. outbreak investigation (eg. Polio, rubella); were there any synergies or the set up of possible parallel systems?
  - Do you think measles activities tend to strengthen or weaken the surveillance system?
    - How will the goal of measles elimination impact on future surveillance requirements (shift to case base surveillance) - see table 7 in toolkit
- Was there any impact of measles immunization activities on health information system including monitoring and evaluation system?
  PROBE: Any changes in the
  • Information system infrastructure: e.g. greater availability of equipment or overstretched use of existing infrastructure?
  • Monitoring of vaccine coverage (administrative and surveys): was there greater or less use of staff time for monitoring of coverage rates?
  • Use of supervisory visits and data quality audits (including vaccine records): did this increase or decrease?
  • Identification of high risk groups and their coverage; was there improvement or worsening of the processes for identification of these groups?
  • Monitoring and evaluation skills: an increase or decrease?
  • Coordination and networking among all players: public/private, central/regional/local: an increase or decrease?
  o Do you think measles activities tend to strengthen or weaken information systems?

- Was there any impact of measles immunization activities on health care delivery?
  PROBE:
  • Capacity (increase/decrease)
    o In-patient treatment (hospital beds)
    o Out-patients services
  • Coverage of overall health care services (increase/decrease)
    o Increase in vaccination coverage (of other antigens)
    o Capacity to outreach to remote areas (SIAs, routine)
  • Equity of health service delivery
  • Synergies with other health interventions – Adds-on (Vitamin A, co-vaccination, bednets, de-worming)
    o Do you see any advantages or disadvantages in combining measles SIAs with the delivery of other health interventions
  • Responsiveness of the health care system (increase/decrease)
    o Do you think that current measles activities tend to strengthen or weaken health care delivery?

SECTION F:

POLIO ERADICATION EXPERIENCES

- Have you been directly involved in polio eradication activities?
  Yes [ ]
  No [ ]

- If yes, what was your role in these activities?

- Do you think polio eradication strengthened the health system or was a burden on the health system?
- What do you consider the most important differences between polio eradication and measles elimination activities?

- In your responses about measles elimination activities, to what extent has your knowledge about polio eradication formed your opinion?

<table>
<thead>
<tr>
<th>A lot</th>
<th>A little</th>
<th>Not at all</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

SECTION G:

CONCLUDING QUESTIONS

- Are there any other potential impacts (positive or negative) from measles elimination programme on health system?

- Among all the potential impacts mentioned earlier, which would be the most important/significant impact?
  - Most important positive impact___________________________________________
  - Most important negative impact___________________________________________

- Overall do you think measles elimination activities strengthen or weaken the general health system and/or immunization services?

- What are the main challenges in the achievement of measles elimination in your country?

- What are the key facilitating factors of measles elimination in your country?

- And what are the main challenges in the post-elimination phase? And key facilitating elements?

- In your view, how can measles elimination be done in such a way that it contributes to health system strengthening?
## Annex 3: Questionnaires for Staff Profiling

Questionnaire for local (e.g. district level) health staff on immunization service related work and measles activities (campaigns)

### Section A: Basic info and work experience

<table>
<thead>
<tr>
<th>Questions / Characteristics</th>
<th>Answers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td></td>
</tr>
<tr>
<td>Institution</td>
<td></td>
</tr>
<tr>
<td>What is your Position?</td>
<td>Director&lt;br&gt; EPI staff&lt;br&gt; Other please specify</td>
</tr>
<tr>
<td>What is your Qualification?</td>
<td>Medical doctor&lt;br&gt; Clinical officer&lt;br&gt; Nurse&lt;br&gt; Nursing assistant&lt;br&gt;</td>
</tr>
<tr>
<td></td>
<td>Midwife&lt;br&gt; Other health professional:&lt;br&gt; Other:</td>
</tr>
<tr>
<td>Professional experience</td>
<td></td>
</tr>
<tr>
<td>• Years working in health sector</td>
<td># years, # months</td>
</tr>
<tr>
<td>• Years working in immunization service</td>
<td># years, # months</td>
</tr>
<tr>
<td>• Years working on measles immunization activities</td>
<td># years, # months</td>
</tr>
<tr>
<td>• If yes, what is your involvement in measles related activities</td>
<td>planning, financing&lt;br&gt; vaccine delivery during routine immunization activities&lt;br&gt; vaccine delivery during routine 2nd dose campaign&lt;br&gt; vaccine delivery during intensive campaign (target groups)&lt;br&gt; outbreak investigation and surveillance of measles cases&lt;br&gt; technical support, supervision, evaluation&lt;br&gt; logistics&lt;br&gt; others: please specify</td>
</tr>
</tbody>
</table>
**Section B: measles experience**

Please skip this section and go directly to section C if you have no experience/involvement in measles related activities

<table>
<thead>
<tr>
<th>In-service training received</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>In 2009, have you received the following training</td>
<td>□ Immunization</td>
</tr>
<tr>
<td></td>
<td>How many sessions? __________</td>
</tr>
<tr>
<td></td>
<td>- Measles specific training</td>
</tr>
<tr>
<td></td>
<td>How many sessions? __________</td>
</tr>
</tbody>
</table>

If you have not received the above training in 2009, when is the last time you received it? And were they in:

- immunization
- Measles specific training

For measles specific training it helps improve your knowledge/skills on

- campaign planning  - Disagree/ /Agree
- community mobilization  - Disagree/ /Agree
- injection safety  - Disagree/ /Agree
- side effect and shock prevention  - Disagree/ /Agree
- Waste management  - Disagree/ /Agree
- registration and reporting  - Disagree/ /Agree
- case detection and surveillance  - Disagree/ /Agree

Did the measles training requirement interrupt your routine activities

**Management and support**

Do you receive adequate additional support for the campaign from higher level in health sector

- management support  Yes/No
- technical support  Yes/No

**Workload**

**Workload during a regular day**

What is your average number of working hours per day?

What percentage of your time do you spend on immunization services?

What percentage of your time do you spend on measles immunization services?

What percentage of your time do you spend on other health services?

**Workload during campaign activities**

How many measles campaigns did you have in the 3 past years?

- Please specify
  - The date for last measles campaigns
  - Target population of the campaigns (e.g. school children, adults, etc.)

How many days did you spend for campaign preparation?  __________ days

How many days did you spend for the campaign implementation?  __________ days

How many days did you spend for the last campaign evaluation?  __________ days
### Job satisfaction in relation to the measles campaign

<table>
<thead>
<tr>
<th>How do you feel about your work?</th>
<th>Satisfied/ Fair/ Not satisfied</th>
</tr>
</thead>
<tbody>
<tr>
<td>How do you feel about your work when there is no campaign,</td>
<td>Satisfied/ Fair/ Not satisfied</td>
</tr>
<tr>
<td>When involved in routine first dose activities, how do you feel about your work?</td>
<td>Satisfied/ Fair/ Not satisfied</td>
</tr>
<tr>
<td>When involved in routine or campaign (adapt according to country strategy) second dose, how do you feel about your work?</td>
<td>Satisfied/ Fair/ Not satisfied</td>
</tr>
<tr>
<td>During intensive campaigns, how do you feel about your work?</td>
<td>Satisfied/ Fair/ Not satisfied</td>
</tr>
</tbody>
</table>

### Payment of incentives related to measles work

<table>
<thead>
<tr>
<th>How much do you receive personally as additional financial support (incentive) for the measles campaign? (enter 0 if none)</th>
</tr>
</thead>
<tbody>
<tr>
<td>- for intensive campaign preparation</td>
</tr>
<tr>
<td>- for intensive campaign activity day</td>
</tr>
<tr>
<td>- for post campaign evaluation activities</td>
</tr>
<tr>
<td>If yes, how do you feel about these financial incentives received during the campaign?</td>
</tr>
<tr>
<td>If no, do you think there should be financial incentive for the campaign?</td>
</tr>
</tbody>
</table>

### Income

- What are your main sources of income?
- What is your average total income per month?

### Impacts on immunization service and other health services

- Have you ever skipped other important health work related activities because of the campaign? | Yes/No |
- Do you think measles elimination activities slow down immunization service delivery? | Yes/No | If yes, please specify ________ |

### Section C: Overall perception on measles elimination campaigns

<table>
<thead>
<tr>
<th>It improves routine immunization services</th>
<th>Agree/Not agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>If yes, please specify_______________</td>
<td></td>
</tr>
<tr>
<td>It slows down routine immunization activities</td>
<td>Positively</td>
</tr>
<tr>
<td>If yes, please specify</td>
<td></td>
</tr>
<tr>
<td>It impacts on routine health service delivery</td>
<td>Positively</td>
</tr>
<tr>
<td>If yes, please specify</td>
<td></td>
</tr>
<tr>
<td>Measles elimination goal should be continued</td>
<td>Supportive</td>
</tr>
<tr>
<td>Against</td>
<td></td>
</tr>
<tr>
<td>No opinion</td>
<td></td>
</tr>
</tbody>
</table>
**ANNEX 4: INFORMATION SHEET AND INFORMED CONSENT**

**Research information sheet:**

**IMPACT OF MEASLES ERADICATION ACTIVITIES ON ROUTINE IMMUNIZATION AND HEALTH SYSTEMS**

This research is being led by:

*(Add all contact information of local research institute here)*

Please feel free to phone the above number if you have any concerns or further questions about the research.

**Background**

This is a one-year study that is currently taking place in six different countries, among those XX. We work in partnership with the London School of Hygiene and Tropical Medicine in the United Kingdom.

The study is part of the World Health Organization’s effort to assess the feasibility of measles eradication. The study will contribute to decision-making about whether or not the world should embark on a measles eradication programme. One of the issues that need to be clarified before this decision can be made is whether such an effort will be a burden to the health system or whether it could strengthen routine services.

**Objective and method**

One of the key strategies of measles eradication would be recurring measles vaccination campaigns. XX has extensive experience in undertaking these campaigns and it is especially the lessons learned from these the study seeks to capture. The study will perform a comprehensive evaluation of the health system impacts associated with the measles control activities undertaken in XX. Focus will especially be on assessing the impact of the 2008-2009 measles campaigns.

In particular we will examine some of the following issues in the interview: Has government funding for immunization services increased or decreased with the accelerated measles immunization activities? Did measles activities rely on existing health care personnel or new personnel? What was the time allocation for existing staff for the campaigns? Is the measles surveillance system integrated within infectious diseases surveillance system and has it contributed to strengthening of the surveillance of infectious diseases?

Is the surveillance of measles incentivized? Has the capacity and coverage of immunization services increased/decreased during intensive measles campaign? Have measles campaigns disrupted other services?

**Participation**

You are being asked to take part in an interview because we believe you may be able to contribute to our understanding of the impact of measles immunization activities on the health system.
Taking part in the research is entirely voluntary and withdrawal is possible at any time without having to give a reason.

If you agree to take part in this research we would like to ask you some questions for about an hour. In order to ensure data reliability and analysis, we plan to record and transcribe this interview. However, you are free to indicate that you would prefer the interview not be recorded.

The research will in no way inconvenience you apart from the hour it will take you to participate in this interview.

**Confidentiality**

We will write reports and other outputs based on what you and other people being interviewed say. However, XX is responsible for maintaining strict confidentiality throughout this study. No quotes or other results arising from your participation in this study will be included in any reports, even anonymously, without your agreement

Recorded information you give us during this interview will be held in a secure, locked place on the premises of XX. This information will not be distributed during or after the research.

If you have incurred any costs taking part in this interview we will reimburse you fully.

The ethical committee that approved this study is the: ........................................
IMPACT OF MEASLES ERADICATION ACTIVITIES ON ROUTINE IMMUNIZATION AND HEALTH SYSTEMS

Research participant consent form

(Add all contact information of local research institute here)

The purpose of this form is to allow the use of your interview for research purposes. Please fill in the form according to your wishes.

I hereby assign copyright of my contribution for research purposes to the XX.

Name:

Signature:

Date:

Please tick one only:

I permit the use of my name with quotations from the interview

I wish to be consulted before publication of names quotes

I wish quotes to be used anonymously and for background only
ANNEX 5: LSHTM ETHICS APPROVAL LETTER

LONDON SCHOOL OF HYGIENE & TROPICAL MEDICINE
ETHICS COMMITTEE

APPROVAL FORM
Application number: 5596

Name of Principal Investigator: Piya Hanvoravongchai and Ulla Kou Griffiths
Department: Public Health and Policy
Head of Department: Professor Anne Mills

Title: Impact of measles eradication activities on routine immunization and health systems

This application is approved by the Committee.

Chair of the Ethics Committee: [Signature]
Date: 29 September 2009

Approval is dependent on local ethical approval having been received.
Any subsequent changes to the application must be submitted to the Committee via an E2 amendment form.
ANNEX 6: TOR FOR COUNTRY STUDY

1. Title of project
   Impact of Measles Eradication Activities on Routine Immunization Services and Health Systems in XX

2. Name and affiliation of principal investigator
   XX

3. Project period
   Start date: 01/09/2009
   End date: 31/05/2010
   A total of 9 months.

4. Background
   The Region of the Americas has interrupted indigenous transmission of wild measles virus since November 2002, but continues to get importations of measles that result in costly outbreak response efforts. Three other WHO regions (European, Eastern Mediterranean, and Western Pacific) have also established measles elimination goals. The Africa and the South East Asian regions have established measles mortality reduction goals. The overriding global goal for measles control is a 90% reduction in measles deaths by 2010 compared with 2000 levels.

   Measles is thought to have the biological characteristics and an effective intervention (measles vaccine) that makes eradication of the disease possible. However, debate continues as to whether the world should target measles for eradication given its highly infectious nature, the relatively weak state of some national immunization programmes and surveillance systems, opportunity costs, the lack of clarity as to optimal post-eradication vaccination strategies, and the fact that polio eradication is not yet completed.

   As part of the World Health Organization's effort to assess the feasibility of measles eradication, The London School of Hygiene and Tropical Medicine are assessing the potential impact of measles eradication activities on health- and immunization systems. A mixed-method approach will be employed using both quantitative and qualitative assessment at various levels of health systems including global, national, and in-country service unit levels. The study in X will be one of six country-level studies to be conducted as part of this project. The work will require extensive reviews of documents, compilation of data, interviews, and focus group discussions.

5. Research objectives and strategy
   The objective of the study is to evaluate the potential impact on health systems and routine immunization services of measles eradication activities. More specifically, the country study aims to
   
   • Describe the health system and immunization system structure in the country and assess linkages between these and measles vaccination activities.
• Assess past, on-going and planned integration of measles vaccination activities within the health- and immunization system.
• Assess the impacts of previous measles elimination activities on various key functions of the health system.
• Assess potential impacts of hypothetical measles eradication scenarios on various key functions of the health system.
• Develop recommendations on how measles eradication activities can be used to strengthen routine immunization services and health systems, while mitigating negative impact.

The country study will be carried out on two levels; national and service level, using both qualitative and quantitative approaches. At the national level, the country collaborator will be responsible for conducting document reviews and for collecting readily available relevant secondary data based on the protocol provided by the LSHTM team. Data sources for resource tracking may include national health accounts, public expenditure reviews, and government reports on health and immunization budgets, as well as reports from external development assistance if available/applicable. Data on immunization policies and the trends of immunization coverage will also be compiled. In addition, necessary information to describe the degree of interaction and level of integration of the accelerated measles vaccination activities with routine immunization programmes and with the mainstream health system structures and processes will be collected.

The LSHTM team and the country collaborator will work together to identify relevant interviewees for interview and/or focus group discussions. We expect to interview key policy makers and implementers of supplementary measles vaccination activities and immunization services as well as health leaders and health systems experts at both national and local levels. Pre-developed semi-structured questionnaires will be used for the interviews. The LSHTM team will prepare these questionnaires.

At the service unit-level, two districts will be selected for service level assessments. In each district, relevant documents and statistics related to measles vaccination and immunization services will be compiled. In addition, key health facility managers and health workers (including community health workers if available) will be interviewed using semi-structured questionnaires to elicit past experiences of measles vaccination campaigns and its potential impacts on health and immunization systems.

It is expected that preliminary information will be sent to the LSHTM team not less than 2 weeks prior to the country visit by the LSHTM team. At least one LSHTM researcher will join the country collaborator in the country-level and service-level interviews and focus group discussion. It is expected that these activities can be completed within the period of 2 weeks. The country collaborator may be required to collect additional data to complete necessary data requirements as identified in the protocol to be provided by the LSHTM.

A second activity for the country collaborator is assistance in collection of cost data. Two other groups have been contracted by WHO to conduct a cost-effectiveness analysis of measles eradication. For this analysis, the average costs per child vaccinated are needed. These data will be collected both for measles campaigns and for vaccination through routine services. The groups conducting the cost-effectiveness analysis will join the LSHTM team during the country visit to collect these data. It is however likely that some follow-up will
be needed to make sure we receive all these data. The country collaborator should assist with this follow-up and communicate directly with the cost-effectiveness groups on this.

**Country-level data analyses** using national and service level data will be done in collaboration with the LSHTM team. The country collaborator will be responsible for drafting a summary country report based on a template provided by the LSHTM team. The report should describe the health and immunization systems, the degree and integration of measles immunization activities in the main stream health system, and the (potential) impact of measles elimination activities on health and immunization systems.

**Comparative analyses** across the six countries will be done by the LSHTM team. The main goal will be to highlight positive or negative experiences towards immunization services and health systems that may result from a measles eradication programme.

A **synthesis workshop** will be organized towards the end of the project to pull together findings from all the study countries, compare and contrast these and formulate key recommendations. The country collaborator is required to attend this workshop to present his/her country experience and to provide necessary information based on activities conducted in the country.

Before the end of the project, a dissemination workshop should be organized in the country to provide feedback to the stakeholders interviewed for the study. At least one person from the LSHTM team will participate in this workshop.

6. **Summary of key activities by the local collaborator**

Based on the study methods described above, a number of key activities are expected from the country collaborator. These are as follows:

- Identify one researcher to be the main responsible staff for the project. Ideally, this person should have technical knowledge on health and immunization systems. It is expected that this person will be active in corresponding with the LSHTM team and will be able to participate full time during the 2-week country field work period.
- Collect data on selected indicators of health- and immunization system functions in relation to measles immunization services based on the template provided by LSHTM.
- Identify key experts on health systems and immunization services at national level.
- Arrange a meeting with each key informant for individual interview or focus group discussion.
- Work with the LSHTM team to identify two districts for service level study and collect basic data related to health and immunization service systems in these two districts.
- Arrange local travel to the two districts for LSHTM researchers and the local collaborator.
- Participate in key informant interviews in the two districts.
- Record and translate all interviews and focus group discussion.
- Follow-up on the cost data collection in collaboration with the two groups undertaking cost-effectiveness analysis of measles eradication.
- Draft a country report based on the template provided by the LSHTM team.
- Participate in the Synthesis Workshop towards the end of the project to draw lessons from all the study countries.
- Organise one dissemination workshop in the country.
REFERENCES