MAPPING INFLUENCERS IN THE VACCINE INTRODUCTION DECISION-MAKING PROCESS IN DEVELOPING COUNTRIES

March 22, 2007

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McKinsey&Company
**EXECUTIVE SUMMARY**

McKinsey & Company undertook a four-month pro-bono project to understand the decision-making process in vaccine introduction in developing countries and surface important questions for countries and international organizations to address in order to improve the efficiency, quality and speed of the decision-making process. Our project focused on four countries: Egypt, Mauritania, Mexico and Zambia. We used network analysis, a rigorous analytical technique to map relationships among influencers in the decision-making process, in concert with interviews and secondary research. The effort was guided by an Advisory Board made up of distinguished experts from the Bill and Melinda Gates Foundation, John Hopkins University Bloomberg School of Public Health and the PneumoADIP, and the Program for Appropriate Technology in Health (PATH).

The main objectives of the project were to:

- Test the usefulness of network mapping in the global public health context
- Develop a deep understanding of the decision-making process for vaccination programs in developing countries and identify opportunities for addressing the challenges they face
- Identify possible actions to address these challenges and contribute to the ongoing dialog.

The project surfaced five main themes:

1. There appears to be little cross-country information sharing on either technical or process issues.

2. A perceived lack of current data on disease burden is consistently cited as an obstacle to vaccine decision-making.

3. Global disease-specific experts are often not engaged in the introduction process.

4. International organizations play key roles in shaping the introduction process.

5. Two critical voices in introduction, evaluation and sustainability, the Ministry of Finance and community groups, are often not engaged in the process or involved only on the periphery.

We would conclude that international organizations and country-level health officials can improve the decision-making process around vaccine introduction by understanding how networks of influencers interact. These findings surface important questions for countries and international organizations to address in order to improve the efficiency, quality and speed of the vaccine introduction process.

This report explains the context for the project, outlines our project approach, describes our findings and suggests some next steps.
INTRODUCTION

Vaccination has proved to be one of the most efficacious and cost-effective ways of improving public health. In recent years, new vaccines have significantly reduced morbidity and mortality. For example, deaths from polio declined worldwide from 213,000 in 1998 to 1,000 in 2002\(^1\), and smallpox has been eradicated. These successes heighten the importance of extending the benefits of vaccination throughout the developing world. The United Nations Children's Fund (UNICEF) estimates that 10.6 million children die each year from diseases that can be prevented by vaccination\(^2\). Moreover, as vaccination advances, new opportunities to control disease and prevent needless death and suffering emerge. New vaccines to control rotavirus, human papillomavirus (HPV) and haemophilus influenzae (Hib) provide powerful weapons against infectious disease in both developed and developing worlds. However, history shows that uptake of vaccines takes a significant amount of time. For example, hepatitis B vaccine was on the market as of 1981, but is only now being introduced in some countries.\(^3\)

There are four frequently cited factors that represent substantial obstacles to mass vaccination – the large number of stakeholders, difficult technical issues, under-funded health budgets and implementation challenges.

1. The large number of stakeholders

A wide range of national and international players participate in the effort to extend the benefits of vaccination to the developing world. The Ministries of Health within the developing countries play an important role in the introduction process. Also participating in new vaccine introduction and improving existing programmes are non-governmental organizations (NGOs) such as the World Health Organization (WHO), UNICEF, the Global Alliance for Vaccines and Immunization (GAVI), the Program for Appropriate Technology in Health (PATH) and governmental donor organisations, notably the European Union (EU), Japan International Cooperation Agency (JICA), United States Agency for International Development (USAID), and the UK Department for International Development (DFID). Other important players include private sector organizations, universities and groups or programs like “The Rapid Consortia for Rotavirus in South Africa” and Accelerated Development and Introduction Plans (ADIPs). In short, this group of stakeholders is large and complex.

Arriving at a national decision to introduce a new vaccine requires decisions from a large number of stakeholders with differing levels of vaccine expertise. Mexico’s CONAVA (Vaccine Council), for example, is made up of at least 13 member organisations including indigenous and women’s groups, the Navy and Social Security.

\(^2\) UNICEF press release 2005
\(^3\) Center for Global Development Making Markets for Vaccines, May 2005
2. Difficult technical issues

Introducing a new vaccine raises difficult technical problems. For example, essential data on disease burden requires technical expertise to collect and is not always readily available. Trade-offs must be made between the cost and efficacy of alternative measures to combat disease, such as providing cleaner water in the case of rotavirus. It is often hard to predict the safety and efficacy of a vaccine under local conditions, as clinical trials tend not to be run in developing countries and the difference in nutrition, as well as other factors, may affect the outcomes.

3. Under-funded health budgets

Prevention is often seen as the poor step-child of treatment and public health budgets often do not allow for it. In addition, innovative vaccines can be prohibitively expensive. For example, for Egypt to introduce pentavalent would require an additional 100 million Egyptian pounds, demanding an increase of around 40% in the national vaccine budget. Shortages in talent and resources can mean too few people to administer vaccines or train current healthcare workers. The introduction process often takes a long time, and a high turnover of people slows the process while new people are trained. Long-term financial sustainability is often overlooked due to lack of Ministry of Finance (MoF) involvement and dependency on external donors.

4. Implementation challenges

Before a new vaccine can be introduced, countries need to have their existing vaccine program in good order; however, existing programs often face significant challenges. These include difficulties with distribution and administration, such as cold chain and needle safety; poor infrastructure; under-funding for social mobilization and public education; and lack of resources for epidemiological monitoring. If the current vaccine program cannot manage delivery of existing vaccines, it is very difficult to make the case for adding a new vaccine.

In order to understand better the decision-making process around vaccine introduction, identify opportunities to address these challenges, and test a new methodology in the global public health space, McKinsey carried out a pro-bono Vaccine Network Mapping Project focused on the decision-making process for vaccine introduction in Egypt, Mauritania, Mexico and Zambia.

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4 Interviews with public health officials in Egypt
VACCINE NETWORK MAPPING PROJECT

This section describes the project objectives, methodology, country selection and governance.

Objectives

McKinsey’s Vaccine Network Mapping Project was designed to achieve three objectives:

1. Test the usefulness of network mapping in the global public health context
2. Develop a deep understanding of the decision-making process for vaccination programs in developing countries and identify opportunities for addressing the challenges they face
3. Identify possible actions to address these challenges and contribute to the ongoing dialog

Methodology

Seeking to be descriptive and thought-provoking, rather than evaluative, in our outcomes, we focused on an analysis of the decision-making process for the most recent vaccine introduction in four countries: Egypt, Mauritania, Mexico and Zambia. Our approach consisted of three steps: literature search (secondary research), interviews (primary research) and network analysis.

The first step in each country was to undertake a literature search, through which we sought to understand the vaccine introduction process, the disease burden and outside perceptions of how the introduction process works, as well as to identify the stakeholders to be targeted for the interviews and survey. Sources included PubMed (digital archive of biomedical and life sciences journal literature at the U.S. National Institute of Health) to identify what had been published on the country’s disease burden; WHO and UNICEF websites for data on immunization rates and DALYs (disability adjusted life years); and a variety of articles, including from local country newspapers, to get a sense of external perceptions of the vaccine introduction.

The second step, actual interviews, was in two waves. We did the first wave of interviews, primarily by phone, before visiting the countries. The purpose of these calls was to learn about the country’s vaccine program, understand the high-level process that led to the most recent vaccine introduction, and establish a preliminary list of key players. The interviewees were people closely involved in the decision-making process, including high-ranking health ministry officials, EPI (Expanded Program for Immunization) program officers and key NGO representatives.

We did the second wave of interviews in the four countries. In these interviews we aimed to obtain a much more detailed understanding of the decision-making process, a chronology of seminal events leading up to the introduction, and a comprehensive list of important influencers involved in the decision-making process and how they interacted. We later used this list to determine participants for the network mapping survey. Our in-country interviewees were the full range of people involved in the decision-making process, including Health and Finance Ministry officials, leading scientists, NGO representatives, and ‘informed observers’ who did not...
participate directly in the process but who had a good overview of the local public health system. We conducted between 16 and 31 interviews in each country.

The third step was network analysis, a methodology for mapping the connections among individuals, organizations or other entities, involving a network survey and subsequent analyses. The survey aimed to understand relationships among key influencers who played a role in the vaccine introduction process. Specifically, it looked at how frequently decision-makers in each instance of vaccine introduction exchanged information, how valuable these exchanges were, and what types of information flowed through these exchanges. The survey also included questions on respondents’ demographic characteristics and the level of their expertise in the vaccine. To understand the value of non-individual sources of influence, we included questions on input from relevant documents and events (e.g., meetings).

Participants completed the survey online using a proprietary McKinsey survey tool, by fax, or in-person at the end of an interview. The number of individuals in each country’s network map, all influencers in the decision-making process, ranged from 20 to 26 people across the four countries. Several individuals, a very small minority, did not receive the survey because they were not available when the survey was conducted. For those who received it, the response rates were 77-86% in each country except Egypt, where the response rate was 50%. Based on the survey responses, we created a series of network maps to analyze the relationships among key influencers in the decision-making process for each country. People identified after the survey was under way or who indicated they were not involved in the process were excluded from the network maps.

Overall, the multi-method approach provided a rich picture of how the decision-making process works. However, there were some challenges and constraints to the approach, including the fact that while the survey response rate was high, less than 100% of the influencers completed it so some information about the outgoing connections for those influencers was missing. Additionally, network mapping is ideally suited to understand interactions at a particular point in time and when there is continuity of involvement among people in the network being mapped. Vaccine introductions take place over many years, which meant that not all respondents were involved at the same time. These limitations are discussed in more detail in the Appendix to this report.

Country selection

We selected four countries, Egypt, Mauritania, Mexico and Zambia, for the project. They were chosen to provide a good mix of experiences across countries. Selection criteria used included population, GDP per capita, vaccination rates for diphtheria, tuberculosis, and pertussis, access to clean water, DALYs from infectious disease (measles, tuberculosis, and diarrhea) and receipt of GAVI funding. We chose the countries so that there would be a variety for each criterion. In each country, we focused on the last vaccine introduced – which resulted in three
different vaccines (pentavalent in Egypt and Zambia, hepatitis B in Mauritania and rotavirus in Mexico).

**Project governance**

The project’s Advisory Board consisted of Dr. Steve Landry (Program Manager, Vaccine Preventable Diseases, Bill and Melinda Gates Foundation), Dr. Orin Levine (Associate Professor, John Hopkins University Bloomberg School of Public Health and Executive Director, PneumoADIP) and Dr. John Wecker (Director, Immunization Program, PATH).

The Advisory Board’s roles were to ensure the feasibility and effectiveness of the project approach, provide introductions to key stakeholders, serve as a thought partner with the McKinsey team in understanding the project findings and implications at an aggregate level, and provide guidance on creating end products that would be useful to stakeholder groups.

The project ran from November 2006 to March 2007.

**FINDINGS**

This section of the report outlines our findings against each of the three project objectives.

**Objective 1: Test the usefulness of network mapping in the global public health context**

Epidemiologists were among the first users of network analysis. They found the methodology useful in understanding the spread of diseases, revealing the “hubs” or key people who were the sources or main spreaders of a disease. Although many of the same concepts about different types of roles in a network are relevant, this approach has never, to the best of our knowledge, been used in a global public health context to understand a complex, strategic issue such as the decision-making process for vaccine introduction. Among the reasons are the difficulties of obtaining a sizeable response rate from people who are members of many different organizations, are geographically dispersed, and have been involved in the process over many years.

We set out to test the value of this methodology in a global public health setting and found that it made four significant contributions well beyond what could have been accomplished through interviews and third-party research.

First, the maps revealed information and generated insights that did not emerge from the interviews. They systematically surfaced sources of influence that participants might not naturally recall in an interview, and they gave participants a greater degree of anonymity, making them more willing to “rate” the value of an individual’s contributions.
For example, while participants did not often mention the role of documents or meetings in the decision-making process, the network maps revealed that some documents, especially *WHO Vaccine Introduction Guidelines: Adding a Vaccine to a National Immunization Programme: Decision and Implementation*, were particularly valuable. The maps also showed that, for the most part, participants did not mention cross-country meetings as having input into the decision-making process, despite the fact that influencers often attend many meetings. The notable exception was the International Rotavirus Symposium in Mexico. The maps also revealed who were considered the most valuable “go to” people for information in any given network. In Mauritania and Zambia, while the interviews suggested that certain medical experts’ contributions to the process were not very valuable, the maps showed that their expertise had been essential in the process.

The second significant contribution of the network mapping methodology was to provide a holistic picture of a network that is extremely difficult to piece together from individual interviews because no one individual can possibly know whether and how everyone else in a network interacts. For example, the interviews in Mexico suggested both that several key people lead the introduction process and that there were small islands of loosely connected participants in the decision-making network for rotavirus vaccine. The maps showed a very different picture: many more people who were important influencers and a well connected network with no islands and no disconnected “orphans”.

Third, the network maps provided some detailed perspectives that could guide further investigation of findings and help in developing a roadmap for future improvements to the decision-making process. To understand how to redesign meetings to provide more influential input into the decision-making process, for example, international organizations could turn to the network maps to identify the roles that did and did not cite the meetings as sources of input. The maps also show which roles are and are not connected, so an international organization could identify any additional relationships they wish to build.

The fourth major contribution of the network maps was to provide vivid visual illustrations of how differently the vaccine introduction decision-making process works in different countries. For example, the maps show variation among countries in the roles that were most central and most valuable. They also show important differences in the roles played by international organization representatives and how those representatives interact with other important influencers.

Overall, the network maps provide substantial useful information. The usefulness of the methodology suggests that truly to understand a complex process such as decision-making around vaccine introduction, and how a group of individuals interact, it is important to take a systematic and holistic perspective which interviews and third-party research alone do not provide. The approach holds promise for understanding related issues in the global public health setting as well as in the public sector more broadly.
Objective 2: Develop a deep understanding of the decision-making process for vaccination programs in developing countries and identify opportunities for addressing the challenges they face

While introduction processes differed in each of the four countries, five common themes did emerge:

1. **There appears to be little cross-country information sharing on either technical or process issues.**

Established cross-country meetings (e.g., WHO EPI managers’ meetings) were mentioned in the interviews by only a few individuals as being key inputs to the introduction process. In Zambia, only one or two people referenced regional WHO and GAVI meetings as key sources of input. In Mauritania [exhibit 1], two in-country meetings were each cited by between one and five people. However, when asked what other meetings provided input, participants did not mention any cross-country meetings that provided valuable input to the process. The little cross-country information sharing that occurred outside of formal meetings in Mauritania was described by interviewees as being mostly passive (i.e., referencing other countries’ GAVI proposals).

![Exhibit 1](image)

- **Next steps:** Hold brainstorming session with meeting attendees to determine the usefulness of established meetings and how they could be improved. Consider whether information

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5 Not all of the participants in the survey would have participated in cross-country meetings. If they used input from colleagues who did attend the meetings, they might not have known the original source of the information and might not have cited the meeting in the survey.
from meetings is being disseminated effectively and whether there are any meeting design changes needed to maximize the participants’ investment of time.

Another finding from the surveys and interviews is that countries are not referencing existing technical information from other countries (e.g., on disease burden). The network maps reveal relatively dense in-country networks, but little regional networking. When asked about leveraging disease burden data from other countries, participants referenced other countries’ data, but did not think that they could use it [exhibit 2]. All influencers in the network maps were local players, except in the case of Mexico, which exchanged information with Brazil about their Rotavirus introduction, and Mauritania, which had a GAVI representative from Geneva. In Mauritania, Zambia and Egypt, only one person in each country was approached by people from other countries to learn about their vaccine introduction [exhibit 3]. Few interviewees in Mexico, Zambia or Egypt cited lessons learned from other countries as a key input.

Exhibit 2

Influencers generally did not report leveraging existing technical information from other countries

<table>
<thead>
<tr>
<th>Understanding of the vaccine product portfolio (5 = highest level of expertise)</th>
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<tr>
<td>5</td>
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<tr>
<td>Zambia disease burden documents</td>
</tr>
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</table>

Circles represent influencers and their color is their degree of expertise in the product portfolio of pentavalent vaccine. The squares are document that were cited for valuable input into the introduction process. The size of the square is based on how many people cited each document. There was little information available on Hib disease burden in Zambia, and WHO launched a Hib Rapid Assessment Tool, which resulted in Hib Prevalence Studies. While some decision makers were aware of the existing technical data in other countries, they did not think they could leverage it.

“There were recent Hib prevalence studies from Botswana and Gambia, but we needed data specific to Zambia” – Zambia survey respondent
Few respondents were contacted by someone from outside their own country for disease/vaccine expertise

<table>
<thead>
<tr>
<th></th>
<th>Did not cite others</th>
<th>Cited others</th>
<th>% of in-country respondents contacted by people from outside their country</th>
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<tbody>
<tr>
<td>Zambia</td>
<td>15</td>
<td>16</td>
<td>6%</td>
</tr>
<tr>
<td>Mexico</td>
<td>12</td>
<td>2</td>
<td>14%</td>
</tr>
<tr>
<td>Mauritania</td>
<td>10</td>
<td>11</td>
<td>9%</td>
</tr>
<tr>
<td>Egypt</td>
<td>8</td>
<td>9</td>
<td>11%</td>
</tr>
</tbody>
</table>

- Next steps: Determine whether influencers do not reference other countries’ technical information because they think that external technical information is not applicable or because they do not know that the information is available. Identify opportunities where neighbouring countries’ data would be helpful and support countries in leveraging the information.

In-country interviewees did not report sharing process information, although they recognized there is value to it. Mauritania was the only country using other countries’ GAVI proposals as a model for its own proposal.

- Next steps: Identify reasons why countries do not seem to be sharing process information (e.g., lack of mechanisms for sharing, sharing being seen as a low priority).

2. A perceived lack of current data on disease burden was consistently cited as an obstacle to vaccine decision-making.

Respondents often indicate that local studies on disease burden are outdated, not representative, or non-existent. Interviewees in Zambia, Mauritania and Egypt all cited the shortage of disease burden data as one of the primary obstacles in the introduction process. In Egypt, interviews revealed that the lack of nationwide data was a major obstacle for developing the case for funding. As limited Hib data was available, WHO launched a Hib Rapid Assessment Tool (RAT) in 2001. Influencers involved in discussions about the pentavalent vaccine introduction said that the lack of nationwide data on Hib prevalence made it difficult to justify the additional funding needed and contributed to an indefinite postponement of the vaccine introduction.
In Mexico, the presence of disease burden data was important for making the case for introducing the rotavirus vaccine. Studies conducted in the late 1980s and early 1990s by local clinicians provided a solid foundation of data (e.g., Dr. Ruiz-Palacios published a rotavirus study in the New England Journal of Medicine in 1996), and in the mid-1990s international experts (e.g., Dr. Roger Glass) came to Mexico to study rotavirus in the Mexican population.

- **Next steps:** Develop a consensus view about what data is sufficient for decision-making. Identify the best way to address lack of disease burden data in each country by generating local data or making greater use of epidemiologically similar countries’ data where it is available.

The interviews and surveys also showed that the private sector is a pivotal player in the large countries. For example, Mexico benefited greatly from private sector involvement when GlaxoSmithKline (GSK) sponsored local Mexican scientists for clinical trials in the early 2000s [exhibit 4]. In Egypt, by contrast, GSK was engaged in early discussions on pentavalent but did not supply data. Mauritania involved no private sector players in the introduction process, relying on UNICEF and GAVI to manage vaccine procurement. Likewise, Zambia relied on UNICEF/GAVI, and GSK offered assistance upon hearing about Zambia’s decision to introduce pentavalent.

- **Next steps:** Explore models for engaging private sector players in smaller countries (e.g., private-public partnerships involving WHO or ADIPs).

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**Exhibit 4**

GSK Mexico played a key role in collecting data to support the rotavirus vaccine introduction

Interactions among decision makers on Rotavirus vaccine introduction. All frequency levels, N = 26, No. of ties = 264

The circles represent influencers and their color indicates organizational affiliation. The larger the circle, the more respondents cited the influencers for interactions (i.e. the higher number of incoming ties that person has). Here, we see that an individual from GSK (yellow circle) was considered one of the key influencers; he was cited by 12 respondents for input, most of which were considered valuable.
3. Global disease-specific experts are often not engaged in the introduction process.

Most countries have dense but isolated networks with few, if any, ties to anyone outside the country [exhibit 5]. In Zambia, for example, all disease-specific expertise on Hep B and Hib was provided by medical professionals from a local university. Similarly, in Mauritania, the Ministry of Health and WHO relied on medical experts (pediatrics and epidemiology) from the National Hospital, but did not involve any global disease-specific experts.

<table>
<thead>
<tr>
<th>Reason cited for interactions*</th>
<th>Expert in vaccine/disease</th>
<th>Economic/financial</th>
<th>Healthcare issues</th>
<th>General influence or experience</th>
<th>Functional expertise</th>
<th>Expert in vaccine/disease</th>
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<tbody>
<tr>
<td>High</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td>Low</td>
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All technical experts playing a role in Hep B vaccine introduction were local

Value added interactions in Mauritania
N = 24, No. of ties = 142

The circles represent the influencers and their color represents the primary (or secondary) reason they were sought out for value added input. The larger the circle, the more that individual was cited for valuable interactions. Here, we see that individuals cited for disease/vaccine expertise are primarily local experts.

* The reason for interactions was calculated as the most frequently (or second most frequently) cited reason for interaction indicated for each individual. For individuals with fewer than 3 interactions where different reasons were cited, only one reason is indicated on the map.

When countries leverage out-of-country ties, there are significant benefits. In Mexico, for example, the Rotavirus Technical Committee drew upon individuals who were rotavirus experts (e.g., Dr. Roger Glass) [exhibit 6]. The annual Rotavirus Symposium was cited as an excellent forum for technical experts and interviewees highlighted the 2004 Symposium in Mexico as a pivotal point in their decision to introduce the rotavirus vaccine. In contrast, our interviews in Egypt, Mauritania and Zambia suggested that influencers consulted medical professors at local universities, but did not actively seek experts outside their country. Zambia and Mauritania did involve WHO consultants in tasks such as writing the GAVI proposal, but they were not cited as key sources of disease-specific expertise.

- Next steps: Characterize the potential value of technical expertise to the decision-making process (e.g., efficiency, quality, speed) and determine whether there is a need to promote engagement of disease-specific experts in the introduction process.
4. International organizations play key roles in shaping the introduction process.

Many of the most frequently cited influencers identified in the surveys were from international organizations. For example, in Zambia five out of the six most frequently cited influencers for value-added input were from WHO, UNICEF and USAID [exhibit 7]. These organizations had a strong voice in Zambia’s Interagency Coordinating Committee (ICC) decisions. In addition, they have been supporting the Ministry of Health (MoH) to become more independent in planning and budgeting by giving annual funds upfront and making the MoH responsible for prioritizing how funds are spent. International organizations have been encouraging collaboration between Zambia’s MoH and MoF by advocating government funding of traditional vaccines and giving funds to the MoF rather than directly to the MoH. In Mauritania, UNICEF went beyond its usual role in handling the implementation to play a larger role in submitting the third GAVI proposal. In Egypt, WHO initiated Hib considerations and was cited as an important advisor to the MoH on technical issues. Only Mexico reported little influence from international organizations. For example, the Pan-American Health Organization’s (PAHO) involvement there was limited. This is not surprising, however, given that PAHO focuses primarily on other countries in the region6. Additionally, the PAHO’s Revolving Fund did not play a role for rotavirus in Mexico.

6 Interviews with public health officials in Mexico
Influencers from international organizations are among the most sought out individuals for value added input in pentavalent vaccine introduction

Value added interactions in Zambia
N = 24, No. of ties = 255

The circles represent the influencers and their color indicates organizational affiliation. The larger the circle, the more that individual was cited for valuable interactions. International influencers (USAID/ZIHP, UNICEF, WHO, USAID) were five of the six individuals most cited for value added interactions in the decision making process.

- Next steps: Understand, codify and share best practices among international organizations, recognizing the differences between countries.

One way the WHO has influenced the process is through its publications. When prompted, influencers in all four countries referenced the WHO Vaccine Introduction Guidelines – Adding a Vaccine to a National Immunization Programme Decision and Implementation as the most valuable document. The majority of participants who cited these guidelines said that they used them for process input [exhibits 8 and 9].

WHO Vaccine Introduction Guidelines (Adding a Vaccine to a National Immunization Programme: Decision and Implementation) is the most frequently cited document for input into the decision making process in all four countries

<table>
<thead>
<tr>
<th>Country</th>
<th>Respondents who cited WHO guidelines for input*</th>
<th>Type of input cited for WHO guidelines**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Egypt</td>
<td>9</td>
<td>Technical 3 Process 6 Total 9</td>
</tr>
<tr>
<td>Mexico</td>
<td>15</td>
<td>Technical 11 Process 4 Total 15</td>
</tr>
<tr>
<td>Mauritania</td>
<td>10</td>
<td>Technical 6 Process 3 Total 9</td>
</tr>
<tr>
<td>Zambia</td>
<td>13</td>
<td>Technical 1 Process 10 Total 11</td>
</tr>
</tbody>
</table>

* Either in type of input (process or technical) or value of input questions
** Not all respondents identified both the type and value of input for the document
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Annex 3: Checklist for post-introduction evaluation

• Next steps: Determine how familiar people are with the WHO guidelines, how they use the document in practice, and what best practice characteristics of that document can be applied to other resources.

Another international organization that has been playing a shaping role in some countries is GAVI. It has been significant in stimulating, initiating and structuring country vaccine introduction programs, often resulting in very different processes in GAVI vs. non-GAVI countries. For example, GAVI requirements for vaccine introduction have had a significant impact on Mauritania’s immunization program, pushing them to increase diphtheria/tetanus/pertussis (DTP) coverage from 31% in 2001 to almost 80%7. GAVI also led Mauritania to set up an ICC with a quarterly meeting schedule, which added more structure to Mauritania’s vaccine introduction process. Non-GAVI countries Mexico and Egypt have had equivalent committees, CONAVA and the Vaccine High Committee, but unlike Mauritania’s ICC, these have met on an ad hoc basis. Another effect of GAVI has been that since funding for the vaccine is provided by an external source, presenting and defending the case for the vaccine to the MoF has not been a critical step in the introduction process. Therefore, as GAVI countries, Mauritania and Zambia did not have to undergo the rigorous process Mexico went through to gather the data and technical expertise needed firmly to prove the need for the new vaccine to its MoF.

7 Interviews, Mauritania 2002 GAVI proposal
5. Two critical voices in introduction and sustainability, the Ministry of Finance and community groups, are often not engaged in the process or only involved on the periphery.

Very limited connections tie the MoFs and community organizations into the decision-making process. In Zambia, interviews and surveys suggest that the MoF representative did not play a central role at any point in the decision-making process [exhibit 10]. Although Mauritania and Zambia did develop Financial Sustainability Plans as required by GAVI, many worry whether they will meet their stated targets for MoF funding through 2013 and 2015 respectively, and no formal plan is in place to address unexpected future gaps in funding. Interviews in Egypt and Mexico showed that funding for vaccines is renegotiated annually, making it difficult to establish a sustainable long-term plan. However, there does seem to be a trend towards increased finance function involvement earlier on in the process. For example, Egypt is considering adding an MoF representative to the Vaccine High Committee, and Mauritania has decided to involve someone from the MoF earlier in the next introduction process.

Exhibit 10

The Ministry of Finance representative in Zambia was not cited as having played a key role in the process. Interactions at all frequency levels, N = 24, No. of ties = 317. Density* = 57.4% Distance* = 1.1

The circles represent the influencers and their color indicates organizational affiliation. The larger the circle, the more that person was cited for interactions. Zambia has a dense network, meaning there are lots of connections among influencers. The MoF representative was involved but not as well connected in the network as the majority of other players, who were frequently cited for interactions.

* Density indicates the number of actual connections as a share of all possible connections in the network. Distance shows average distance for people to get to all other people.

Other players absent from the network maps were representatives from community groups. Some interviewees cited this lack of community group involvement as contributing to low public engagement in the vaccine introduction process. For example, in Zambia, community groups were involved towards the end of the introduction process when the Universal Child Immunization (UCI) office launched a major campaign to educate community and religious group leaders in the “reluctant” regions. Mauritania demonstrated the benefits of early community group involvement when it committed to social mobilization in its 2002 GAVI proposal. The Disease Prevention unit of the MoH created a social mobilization committee to work in parallel with the technical committee, involving religious leaders, women’s groups and
schools to help increase acceptance levels by dispelling dangerous myths about the Hep B vaccine (e.g., that it was made from rats’ brains and caused sterility).

• Next steps: Explore ways to improve the connection between the MoH/NGOs, MoF and community organizations (e.g., through attendance at meetings, involvement in health economic analysis).

Objective 3: Identify possible actions to address these challenges and contribute to the ongoing dialog

Our findings suggest that the vaccine introduction decision-making process can be improved by both building on existing strengths and acting on opportunities for improvement. The possible actions we have identified might be considered by organizations on both global and country levels. Based on the criteria of ease and impact, we considered where international players, such as WHO, UNICEF, GAVI etc., could most usefully focus their efforts in the near term, as well as where country-level players (e.g., health ministries) could most productively engage.

Global-level opportunities include:

■ Global/regional meetings: Based on feedback from the interviews and surveys, cross-country sharing is important and is not happening as often, or perhaps as effectively, as it could to improve the decision-making process. International players could identify the strengths and needs of established meetings and adapt their design to maximize the value of the time spent by participants. For example, international organizations might check that the right people are attending the meetings (e.g., should it be the EPI coordinator or someone from another group?). Another area for consideration is the meeting content: organizations might consider whether the meetings are providing a sufficient platform for sharing new vaccine introduction experiences – at both the process and the technical level.

■ Technical expertise: Interviews and surveys suggest that technical expertise is an important part of the introduction process, but the networks vary across countries as to the inclusion of technical expertise in the decisions. International organizations may want to identify measures to demonstrate the value of technical expertise. One way might be to develop and share case examples of where technical expertise has had an impact on the decision-making process. Another way (more relevant for GAVI countries) might be to change the requirements to put greater emphasis on technical expertise and tighter guidelines around specifics (e.g., disease and/or vaccine experts that do not necessarily come from that country need to participate in the proposal process). Another possibility is to identify global disease experts (key opinion leaders) and engage those people [exhibit 11]. Interviewees often cited a lack of current, high-quality disease burden data. Since the data may exist in other countries, international players may want to build awareness that epidemiologically similar countries can and should share data.
Global key opinion leaders in rotavirus vaccine

Network of leading authors publishing on “rotavirus vaccine”
N=1966 authors

Top 20 authors by betweenness* and top 20 authors by degree*, sorted by betweenness score. November 1, 1986 – Present*

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* Betweenness centrality indicates the extent to which a node is on the shortest path between other nodes. Degree centrality indicates the number of ties that each node has.

Source: PubMed, UCINET, NetDraw

Process: We found that sharing process experiences across countries is valuable but is not happening as often as it could. International organizations might evaluate current country/regional networks and global expert networks, determining whether knowledge from new vaccine introductions is being captured, codified, and shared (e.g., develop case studies and share these learnings in regional or international meetings). International organizations might choose to better understand and share these ‘best practices’ from GAVI and non-GAVI countries. They could also build on the high perceived value of the WHO Vaccine Introduction Guidelines (Adding a Vaccine to a National Immunization Programme: Decision and Implementation) by understanding why the guidelines are valued, determining how they are used in practice, and applying the lessons to other resources at the global level.

Country-level opportunities include:

Connectivity: Across the countries, there was a disconnect between the MoH/NGOs, MoF and community organizations during the introduction process. Countries could address this issue by evaluating attendance at local meetings and ensuring that the right people (e.g., people with significant influence in their position) from the MoF and community groups are involved at the appropriate time. Also, in the interests of sustainability, countries may want to consider involving people from the MoF earlier in the process as part of the health economic analysis.

Disease burden data: The lack of disease burden data is often cited as an obstacle. However, further analysis shows there is frequently data from neighboring countries that has not been considered in the decision-making process. Further efforts are needed to...
determine how much data is sufficient, how precise an estimate is needed for decision-making, how to make better use of existing data, and when to generate new, local data.
APPENDIX

Additional country-specific background

Egypt is a medium-sized country of 75 million people, with 16.7% of population living below the poverty line. It is a densely populated country, with almost all the population residing in 5% of its land. Egypt’s national vaccination program dates back to 1980 with five vaccines. Vaccination coverage is high, with approximately 97% of infants and young children immunized against the top six immunizable diseases. Health indicators (e.g., life expectancy, child mortality) have shown significant improvement over the past two decades. As a result, Egypt’s distribution of deaths by disease now resembles that of the developed world. However, its healthcare expenditure is significantly lower than other comparable countries ($192 per capita compared to Mexico’s $550, measured in PPP). As Egypt grows further to resemble the developed world, it faces a new set of challenges: gaps in basic healthcare indicators between urban and rural areas and across governorates; low utilization of healthcare facilities; and high out-of-pocket healthcare spending.

Vaccine introduction decisions in Egypt are made by the Vaccine High Committee, a body of 15 representatives from the Ministry of Health and Population (MoHP), Ain Shams University, Egyptian Red Crescent, Department of Defense, and the Department of the Interior. The introduction process is led by the Preventive Affairs Department of the MoHP, with input from WHO and vaccine manufacturers [exhibits 12 and 13].

### Generalised Vaccine Introduction Process in Egypt (Based on Pentavalent Vaccine)

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* Consists of head of Preventive Sector, EPI director, CDCD director, three governors undersecretaries, Primary Healthcare Undersecretary, Pharmaceutical Department Undersecretary, Vaccines CEO Health Insurance director, and five external experts

** Communicable Disease Control Department, a subgroup of the Preventive Affairs Sector. CDCD oversees the national immunization program (EPI)

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8 UN Global Database, CIA World Factbook, The World Bank, WHO, press articles
**Mauritania** is a small country of 3 million people and is relatively poor (GDP $1.5 billion). The main causes of death are diarrhoeal diseases, measles, malaria and pneumonia. Average life expectancy as of 2005 was 58. Mauritania faces significant public health challenges including: lack of trained medical staff; fiscal constraints leading to high out-of-pocket healthcare spending by the poor; and low utilization of immunization services. As a GAVI country, Mauritania's vaccine introduction decision-making process is led by its ICC, with input from ICC technical committees and local clinicians [exhibits 14 and 15].

In the coming years, efforts will be made to curb extra-budgetary spending through the International Monetary Fund (IMF) partnership. Offshore oil drilling, which began in February 2006, is expected to increase real GDP growth several-fold. The Ministry of Health’s priorities going forward are 1) EPI, 2) HIV/AIDS treatment and prevention, and 3) procurement of essential medicines.
Mexico has a population of 106 million. Income distribution in Mexico has deteriorated since 1990, and the country is now one of the four worst countries in Latin America for income distribution. Life expectancy is relatively high at 75, with vaccination rates at 98% coverage. However, Mexico still faces a number of healthcare challenges, including: inequalities in access due to disparities in health finance; high healthcare administrative costs; inequalities in quality of care across regions; and fiscal...
constraints. The vaccine introduction decision-making process, beyond the MoH and CONAVA, involves the President, Treasury, Congress and, in some cases, disease-specific committees [exhibit 16]. Some of the most influential individuals in rotavirus vaccine introduction process were experts from local medical and research communities [see the pink circles on exhibit 4].

Zambia is a small country with population of 11 million and is one of the poorest countries in the world, ranking 166 out of 177 countries in the United Nations Development Programme report. It is one of sub-Saharan Africa’s most highly urbanized countries, with 44% of its population concentrated in a few urban zones. HIV-AIDS is a significant issue, with 17% prevalence among the adult population. Life expectancy is 40 years and the child mortality rate is 182 per 1,000 births. The main causes of death among children under five are neonatal causes, diarrhoeal diseases, HIV/AIDS, malaria and pneumonia. Lack of human resources (e.g., not enough qualified medical staff at the appropriate level, particularly nurses, healthcare sector restructuring) is a challenge. Nevertheless, regular interactions among the ICC and the technical working group members contributed to a well structured vaccine introduction process [exhibit 17]. Many of the key decision-makers are from international organizations, and play an important role in the decision-making [exhibit 10].
Reading a network map [exhibit 18]

Exhibit 18
READING A NETWORK MAP
SELECTED ELEMENTS OF A NETWORK MAP

Network of individuals citing each other for input

Network of individuals citing documents and events for input

- **Node**: individual or document/event, which provided input on decision making in vaccine introduction
- **Shape**: Circle indicates an individual respondent, square is a document or event
- **Color**: Color represents affiliation with a particular organization, demographic characteristics or a type of non-individual contributor (document or event)
- **Size**: Larger size indicates higher number of times (number of incoming ties) an individual or document/event is cited by others for input in decision making process (in-degree centrality)

- **Tie or link**: illustrates connection between 2 nodes:
  - In a network of individuals, a link with an arrow pointing to another individual indicates that the respondent provided or received information to/from that individual
  - In a network of documents/events and individuals, the same link indicates that the respondent cited the specific document/event for input

- **Location of nodes**:
  1. The number of ties – the higher the number of ties the more central a node is
  2. Direct links – people who are connected are located next to each other
  3. Tie length – the length of the tie is equalized
Methodological limitations

- The combination of literature searches, interviews, surveys and network analysis provided valuable insights into the vaccine introduction process that none of the methods alone could have revealed, and the project demonstrated the value of network mapping. However, the project methodology presented two challenges in drawing general conclusions from the findings:
  - Case study approach – The project focused on only the latest vaccine introduced or considered in each country. However, the process in any country may differ from one vaccine to another, so the differences observed across countries may be specific only to those vaccines, and it may not be appropriate to generalize.
  - Small sample size – Since the study only looked at four vaccine introductions in four countries, the themes drawn from the findings may not be applicable to all other developing countries. In addition, because the four sample countries do not represent all regions, some of the themes may not be applicable to countries in other parts of the world.

- In addition to the limitations of the case study approach and small sample size in drawing general conclusions, there were constraints associated with the network mapping methodology that may have affected the findings:
  - Response rate – The response rates were relatively high (over 75% for three of the four countries) and compare favorably with response rates (e.g., similar to those obtained when we have used network analysis with private sector companies). However, with a less than 100% response rate, the maps are missing some connections between influencers. Consequently, people who did not respond to the survey may appear in the periphery of the network – and it is not clear whether this is because they did not complete the survey or because they are, in fact, peripheral in the network. In this project, we mitigated this limitation through efforts to gain responses from all important influencers. In most cases, the key individuals in each network responded to the survey.
  - Historical vs. current perspective – Network analysis works best for recent periods of time, because respondents are more likely to recall whom they interacted with and the frequency and nature of those interactions. Therefore, asking about networks that existed up to five years ago during the latest vaccine introduction process may provide less accurate results as respondents may find it difficult to remember the details of previous relationships and interactions.
  - Timeframe – Network mapping works well for short, limited periods of time. However, over longer periods of time with high turnover among the influencers (as was the case in many of the countries’ introduction processes), it can be more difficult to understand the network of interactions since networks become more complex and it is less likely that individuals in the network will know each other.
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- Michael D. Conway, Director, Philadelphia
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- Anna Tarasova, Senior Research Analyst, North American Knowledge Center
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A sample survey is available upon request [please contact Anna Tarasova at Anna_Tarasova@McKinsey.com]