Essential Service: Childhood Immunization

The Story of Fatima’s Children: Mohamed & Mariam

Fatima and her five children live fifteen kilometers from Kasemeni health center. Fatima has brought her three-year-old daughter, Mariam, to the health center because the girl has a fever, a rash, red and watery eyes, and a runny nose. Fatima tells Mary, the nurse, that her daughter needs a measles immunization because she believes the girl has measles. Mary examines the girl and confirms the mother’s fear that the girl has measles. Luckily, it is a mild case, and the girl is well nourished and strong. She explains to Fatima that she can give the child some medicine to reduce her fever, but measles immunization only prevents measles before the disease affects the child. Fatima says that she came to the health center two times to receive immunization for her daughter, and she asks why the immunization did not work.

Mary asks to see Mariam’s vaccination card and finds that she has received BCG, OPV1, DPT1, OPV2, and DPT2, but has not received OPV3, DPT3, or measles vaccine. She praises Fatima for
bringing the card and for knowing how important immunization is for her children. Then she explains how important it is that children come to the health center five times before they reach one year of age to get all the necessary immunizations. Immunization can only prevent disease if the child receives the correct number of injections and drops. The measles immunization cannot be given until the child is nine months old. It is usually the last immunization the child receives and, consequently, is often forgotten. The nurse also gives Mariam her third dose of OPV and DPT as well as one dose of vitamin A. She then explains to Fatima how to give the child medicine to reduce the fever.

Fatima then takes out her baby boy Mohamed’s card and asks the nurse to check it. Mohamed is eight months old, and he has had only one dose each of BCG, OPV, and DPT. The nurse explains that he needs one dose of OPV and DPT today and one more dose after one month. During the next visit, Mohamed will also receive measles vaccine so he does not get measles like his sister. Mary has noticed that many women bring their children for one or two immunizations, but many fail to complete immunization for their children. Consequently, coverage of OPV3, DPT3, and measles in her area is well below the national and district targets. Mary decides to check the records from last year to see if there are certain villages where immunization coverage is particularly low.

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**Elements of Childhood Immunization Services**

- Confirm age of child
- Check previous vaccination status (using vaccination card, BCG scar, and mother’s history)
- Ensure appropriate interval between doses
- Explain importance of immunization
- Administer all appropriate vaccines, even if the child has a cold or fever
- Advise on side effects and actions the mother can take to relieve pain and lower fever
- Advise on care of BCG immunization site
- Advise on when to return for the next dose and how many more doses are needed
- Record doses and dates on immunization card
Reflection

Many mothers like Fatima have heard about immunization and understand its importance. In spite of this, they may not come to the health center to have their children immunized or return to complete the immunization schedule. Health workers know that if a child is not fully immunized, it will not be protected from diseases like diphtheria, whooping cough, tetanus, tuberculosis, polio, and measles. Moreover, the more children that are immunized in the community (the higher the coverage), the lesser the chance that these diseases will spread to other children.

Consider these questions:
♦ How does this story relate to your work at the health facility?
♦ Do most women bring their children for immunization? Do they complete all the necessary doses?
♦ Do you know what percentage of children under one year of age in your area are fully immunized?
♦ Which area has the lowest immunization coverage? Why?
♦ How can you encourage more women to complete immunization for their children?

To answer these questions, begin by looking at the data that you collect at your health center and the data available on the community. From this data, you can calculate indicators related to the coverage and quality of immunization services.
Self-Evaluation

Step 1: Choose and Define an Appropriate Indicator

From community and facility data you can calculate indicators of the strengths and weaknesses of immunization services. There are four basic indicators that health workers can use to conduct self-evaluation of this service (see box). To begin, the health workers should select only one indicator and analyze it. Here we suggest starting with the first indicator in the box—coverage of DPT 3—which is a key indicator for assessing the effectiveness of childhood immunization services.

Define the Indicator for Coverage of DPT3

\[
\frac{\text{Number of children aged 0-11 months who received DPT3 vaccine last quarter}}{\text{Total number of children aged 0-11 months in the catchment population last quarter}} \times 100
\]

Key Indicators for Child Immunization Services

- Coverage of DPT3
- Coverage of OPV3
- Drop out rate between DPT1 and DPT3
- Vaccine usage per immunized child

REMEMBER! The numerator and the denominator can cover any period of time (quarter, year, etc.). However, the time period related to the numerator and the denominator in a single indicator must always be the same.
STEP 2: Analyze the Data (Calculate—Interpret—Present)

Calculate the Indicator

The Numerator

The numerator is calculated with information recorded in the quarterly report.

Example: 65 children received DPT3 last quarter.

The Denominator

The denominator is calculated using the total catchment population measured in the last census multiplied by .04 (equals 4%, or the percent of children 0-11 months). These figures should be provided by the district health office or local government.

Example: Total catchment population of 10,000 multiplied by .04 (10,000 x .04) = 400 children aged 0-11 months in the catchment population.

This means that there are an estimated 400 children aged 0-11 months each year for a population of 10,000. Since the numerator relates only to one quarter, the denominator should be divided by four. 400/4 = 100 children aged 0-11 months who were eligible for DPT3 last quarter.

Coverage

Using examples from above, divide the numerator by the denominator and multiply by 100: (65/100) x 100 = 65%.

Interpret the Indicator: What Does this Indicator Tell You?

You can use this indicator to:

♦ Describe the problem: Is it big or small?
   — 65% of all children have received DPT3 last quarter.
   — 35% of eligible children did not receive DPT3 last quarter.

♦ Compare the indicator with the target. Describe the relationship of coverage compared to the objective. Did you reach the target? Is coverage improving?
  There is probably an annual target for immunization.
coverage in your country. There may even be a target set for your district or your catchment area. While DPT3 coverage does not tell you if a child is fully immunized, it is a sound indicator of immunization program performance. If the target for last quarter is higher than 40%, interventions may be needed to raise coverage. How does cumulative coverage for your area compare to your target? Are you on track? (Refer to the help section.)

♦ Determine who is affected most by this problem?
The data can also tell you where immunization coverage is the lowest and where it is the highest. Look at coverage in each village and make a list of the ten villages with the lowest coverage. Then mark these villages on a map of the catchment area. Are all the low coverage villages in the same location? What do these villages have in common that might cause coverage to be especially low?

Presenting the Data

In addition to mapping the villages where coverage is low, it is useful to present the data in different ways to understand the situation. Three different types of pictures can be used to explain immunization coverage: line graphs, bar graphs, and tables.

Making a Graph or Table

You can make a line graph to show changes in immunization coverage over time. To depict cumulative coverage for the year, record a marker or dot across from the total number of DPT3 immunizations given in the first quarter. For the next quarter, add the total number of immunizations to that of the first quarter, and so on for the rest of the year. You can then compare one quarter with the next to see if your total coverage is improving. Each point is connected with a line until the year is complete.

You can also place markers or dots on the graph relating to the coverage target set for your area. Then you can compare your coverage with the target. Using the example above, if the annual coverage target for DPT3 is 70%, then each year you should aim to immunize 280 children. Dividing that annual target by four quarters gives you a quarterly target of 70 children. In Graph 1 (pg. 79), cumulative coverage has fallen below the target each quarter, even though coverage in the third exceeded the target. You can also make a bar graph to compare actual coverage and targets each quarter. For each quarter, you make a bar at the same height as the total number of children immunized with DPT3 that quarter. You should then make a bar the same height as the target for that quarter. You can then compare one quarter with the next to see if the total number of children with DPT3 is below, the same, or higher than the target. In Graph 2 (pg. 79), immunization coverage exceeded the target in the third quarter, but fell below the target in the three other quarters.
**Graph 1: Cumulative Coverage of DPT3**

- **Number of children 0-11 months with DPT3**
- **Quarter 2002**

**Graph 2: Coverage of DTP3 - Realized vs. Objective**

- **Number of children 0-11 months with DPT3**
- **Quarter 2002**
A third way of presenting the data is to make a table to show the actual number of children immunized with DPT3 per village and compare it to the target.

Using the tally sheet below, take information from the register and count the number of children immunized in each village. The tally sheet might look like Table 1 below.

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**TABLE 1: Tally Sheet for First Immunization Coverage**

<table>
<thead>
<tr>
<th>Village</th>
<th>Quarter 1 DPT3 immunizations under 12 months</th>
<th>Quarter 2 DPT3 immunizations under 12 months</th>
<th>Quarter 3 DPT3 immunizations under 12 months</th>
<th>Quarter 4 DPT3 immunizations under 12 months</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>DPT3 Immunizations by period</td>
<td>DPT3 Immunizations by period</td>
<td>DPT3 Immunizations by period</td>
<td>DPT3 Immunizations by period</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Quarter 1</td>
<td>Quarter 2</td>
<td>Quarter 3</td>
<td>Quarter 4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>under 12 months</td>
<td>under 12 months</td>
<td>under 12 months</td>
<td>under 12 months</td>
<td></td>
</tr>
<tr>
<td></td>
<td>under 5 km</td>
<td>under 5 km</td>
<td>under 5 km</td>
<td>under 5 km</td>
<td></td>
</tr>
<tr>
<td></td>
<td>IIII</td>
<td>III</td>
<td>### I</td>
<td>I</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. Mtta</td>
<td>II</td>
<td>### I</td>
<td>III</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>### I</td>
<td>II</td>
<td>### I</td>
<td>I</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. Mwabilla</td>
<td>I</td>
<td>III</td>
<td>I</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>### I</td>
<td>I</td>
<td>### I</td>
<td>I</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4. Mwatete</td>
<td>I</td>
<td>### I</td>
<td>III</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>### I</td>
<td>I</td>
<td>### I</td>
<td>I</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5. Kalalani</td>
<td>III</td>
<td>### I</td>
<td>I</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>III</td>
<td>I</td>
<td>### I</td>
<td>I</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6. Mwamududu</td>
<td>III</td>
<td>### I</td>
<td>II</td>
<td>21</td>
</tr>
<tr>
<td></td>
<td>### I</td>
<td>III</td>
<td>### I</td>
<td>I</td>
<td></td>
</tr>
<tr>
<td></td>
<td>7. Bofu</td>
<td>II</td>
<td>### I</td>
<td>III</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>### I</td>
<td>I</td>
<td>### I</td>
<td>I</td>
<td></td>
</tr>
<tr>
<td></td>
<td>8. Msambweni</td>
<td>I</td>
<td>### I</td>
<td>I</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>### I</td>
<td>I</td>
<td>### I</td>
<td>I</td>
<td></td>
</tr>
<tr>
<td>Total &lt;5 km</td>
<td>46</td>
<td>21</td>
<td>55</td>
<td>15</td>
<td>137</td>
</tr>
<tr>
<td>Villages 5 km or more</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1. Kenango</td>
<td>II</td>
<td>### I</td>
<td>I</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>###</td>
<td>II</td>
<td>### I</td>
<td>I</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. Kafundi</td>
<td>III</td>
<td>### I</td>
<td>### I</td>
<td>29</td>
</tr>
<tr>
<td></td>
<td>### I</td>
<td>III</td>
<td>### I</td>
<td>I</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. Mwashanga</td>
<td>I</td>
<td>### I</td>
<td>I</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>III</td>
<td>II</td>
<td>III</td>
<td>I</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4. Mgandini</td>
<td>I</td>
<td>II</td>
<td>I</td>
<td>9</td>
</tr>
<tr>
<td>Total &gt; 5 km</td>
<td>19</td>
<td>9</td>
<td>22</td>
<td>8</td>
<td>58</td>
</tr>
<tr>
<td>Total by period</td>
<td>65</td>
<td>30</td>
<td>77</td>
<td>23</td>
<td>195</td>
</tr>
</tbody>
</table>

**Table:** Immunization

**Health center:** Kasemeni  
**Indicator:** Immunization coverage  
**Year:** 2002
When you finish the tallies, you can fill in the numbers in Table 2 (page 82) and calculate DPT3 coverage by village and total catchment population in the same way you calculated the coverage indicator above. When this is done, look at the information carefully to see what it tells you. You can see that by the end of the year, coverages in Msambweni and Kalalani are lower than in any other villages located less than 5 km from the health center. Based on this data, the health worker may want to speak to the health committees in Msambweni and Kalalani and ask for their assistance in encouraging women to take their children to the health center to complete their immunization before the children are 12 months old.

**STEP 3: Assess the Situation**

Now use the indicator, the graphs, and the table to assess the situation and decide what to do.

**The indicator** tells you the overall size of the problem at a specific time. DPT3 coverage last quarter was 65%, and the annual target is 70%.

**Graph 1** tells you whether there have been improvements over time and how actual coverage compares to the target.

**Graph 2** tells you how close to the target you have come each quarter.

**Table 2** tells you where coverage is the lowest.

**WHAT IF...**

- If the level of coverage is acceptable (getting closer, equal to, or exceeding the target), then you may decide that no extra effort is needed.

- If overall coverage is too low, or coverage is not improving fast enough to meet your annual target, you may want to consider possible causes and solutions.

**The causes of low immunization coverage** may be found in the community, the health center, or in both.

**In the community**, you might consider:
- The distance a woman lives from the health center that offers immunization services;
- The mothers’ fear of side effects;
- The lack of knowledge about the importance of completing the immunization schedule or the number of times the
# TABLE 2: Immunization Coverage by Village

**Health center:** Kasemeni  
**Indicator:** Immunization coverage

**Target:** 70%  
**Year:** 2002

<table>
<thead>
<tr>
<th>Village</th>
<th>DPT3 Coverage 1/4</th>
<th>Children 0-11 months Coverage</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Quarter 1</td>
<td>Quarter 2</td>
<td>Quarter 3</td>
</tr>
<tr>
<td>Mwavumbe</td>
<td>4</td>
<td>7</td>
<td>57</td>
</tr>
<tr>
<td>Mtaa</td>
<td>9</td>
<td>12</td>
<td>75</td>
</tr>
<tr>
<td>Mwabilla</td>
<td>6</td>
<td>8</td>
<td>75</td>
</tr>
<tr>
<td>Mwatete</td>
<td>6</td>
<td>9</td>
<td>67</td>
</tr>
<tr>
<td>Kalalani</td>
<td>4</td>
<td>7</td>
<td>57</td>
</tr>
<tr>
<td>Mwashanga</td>
<td>6</td>
<td>11</td>
<td>55</td>
</tr>
<tr>
<td>Bofu</td>
<td>6</td>
<td>8</td>
<td>75</td>
</tr>
<tr>
<td>Msambweni</td>
<td>5</td>
<td>6</td>
<td>83</td>
</tr>
<tr>
<td><strong>Total &lt;5 km</strong></td>
<td><strong>46</strong></td>
<td><strong>68</strong></td>
<td><strong>68</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kenango</td>
<td>5</td>
<td>8</td>
<td>63</td>
</tr>
<tr>
<td>Kafudni</td>
<td>10</td>
<td>16</td>
<td>63</td>
</tr>
<tr>
<td>Mwashanga</td>
<td>1</td>
<td>3</td>
<td>33</td>
</tr>
<tr>
<td>Mgandini</td>
<td>3</td>
<td>5</td>
<td>60</td>
</tr>
<tr>
<td><strong>Total 5+ km</strong></td>
<td><strong>19</strong></td>
<td><strong>32</strong></td>
<td><strong>59</strong></td>
</tr>
<tr>
<td><strong>Total per period</strong></td>
<td><strong>65</strong></td>
<td><strong>100</strong></td>
<td><strong>65</strong></td>
</tr>
</tbody>
</table>

* Blank tables are located in Annex 2 at the end of the document.
Immunization

— Ensuring that mothers understand the information given to them about when to return, how many times to return, and side effects.

— Improving technical quality by:
  — Ensuring that there are no stockouts of vaccines;
  — Ensuring that the cold chain is functioning properly; and
  — Using a sterile needle and syringe for each injection.

— Making it as easy as possible for mothers to have their children immunized by:
  — Offering immunization every day; and
  — Asking about all children’s immunization status at antenatal visits.

— Conducting outreach services in remote areas and during market days.

— Increasing the use of information, education, and communication (IEC) activities in low-coverage areas to encourage use of the immunization services.

— Engaging village leaders, traditional healers, local midwives, and women’s groups in increasing awareness of immunization and encouraging mothers to bring their children for immunization.

In addition, a special, one-time intervention might be used each year to reach those children missed in routine services and raise coverage to as close to 100% as possible. Reports from these special interventions should be reported with routine service data when conducting self-evaluation.
STEP 4: Finding a Solution

Hold a Meeting

To begin to address the problem, you may want to hold a meeting with other health workers or community members. These meetings should follow the steps indicated below.

Set Priorities

First, decide what is the most important and easiest step to take. Start with something that relates to your direct responsibilities in the health facility. Then move on to the community. For example:

1. If you have run out of essential supplies, such as DPT vaccine:
   - Order supplies immediately and, in the future, order them on a regular basis to ensure that they arrive before you need them.

2. If you have learned from your discussions in the community or in the health center that more women are likely to come for childhood immunization if it were combined with curative clinic sessions:
   - Change the way you provide immunization services and let people know about it!

3. If women do not accept the importance of completing the immunization schedule or fear side effects:
   - Find out why and learn more about local customs and beliefs;
   - Speak to women who use the service and ask them why other women may not want to attend; and
   - Reassure women that the benefits of immunization outweigh the discomfort of side effects.

4. If the population does not have enough information about the importance of immunization, the correct number of visits, and the services that are offered at the health center:
   - Conduct IEC activities in the villages with women’s groups and associations, village representatives, and networks to increase local knowledge of the benefits of immunization.

5. If some women say they cannot come to the health center because they live too far away or cannot find appropriate transportation:
   - Form a network of local groups to provide services such as IEC and identification of children with incomplete immunization status;
   - Supervise and support the networks; and
   - Conduct outreach services regularly in the villages.
6. If cultural beliefs may be discouraging women from using immunization:

- Respect cultural differences, but find out more about them;
- Choose health messages that reflect local beliefs;
- Collaborate with local leaders to encourage them to accept the importance of immunization; and
- Involve women’s groups and associations and others to help promote immunization.

Only you and your community together can decide the best steps to take to address the problem in your community.

### Develop an Action Plan

Work with other health staff or community members to make a plan. A plan is an agreed set of activities that will be conducted to address a problem or achieve a result. This plan might include improving the health service, setting a coverage target for the next few quarters, or introducing new activities to encourage more women to come for early preventive infant care. The plan should list all the activities that will be done, when they should be completed, and who is responsible for completing them.

### Action Plan for Improving Immunization Coverage

<table>
<thead>
<tr>
<th>Activities to improve immunization coverage</th>
<th>Date to be completed?</th>
<th>Who is responsible?</th>
<th>Results achieved or not? Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Order vaccine regularly</td>
<td>9/2/02</td>
<td>Mary</td>
<td></td>
</tr>
<tr>
<td>Begin to provide immunization during curative clinics</td>
<td>Starting March 2002</td>
<td>Mary</td>
<td></td>
</tr>
<tr>
<td>Conduct IEC activities that explain: (1) the side effects to women; (2) the benefits of immunization; and (3) the number of visits to be completed before age one</td>
<td>21/3/02</td>
<td>Health workers, Management committee, Women’s groups, etc.</td>
<td></td>
</tr>
</tbody>
</table>

* Blank tables are located in Annex 2 at the end of the document.*

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Work with the Community

Next, continue to work with the community to implement the plan. While both the health workers and the community can take responsibility for implementing the action plan, the community may need your help to do their part.

Seek Support

If you need help, you could request support from the district, a local NGO, local government, or other community groups. Religious leaders can help spread health messages. A local traditional healer might understand the benefits of immunization or the necessity of completing the schedule. Engage him in spreading positive messages about immunization. Solving health problems in the community is everyone's responsibility.

STEP 5: Monitoring the Results of the Action Plan

It is important to monitor what happens as a result of your action plan. Did your activities lead to an improvement in immunization coverage?

Fill in the Action Plan and Note the Results That Were Achieved

- **Assess** the same indicator after a period of time to see if there has been any change. Be sure to share that information with all those involved in identifying and addressing the problem.

If you reach the target or make any improvement:

- **Inform** the management committee and the community of this success, congratulate them, and thank them;
- **Ask** them to make an effort to maintain or even improve on this good result; and
- **If necessary, work** with the community to reach a higher target for the next period and define activities that will help you reach it.

If you do not reach the target or your indicators remain low:

- **Identify** the villages in the area with the lowest participation; and
- **Hold** a meeting with the village leaders to help identify the causes for low coverage and find solutions.
The Results of Self-Evaluation

Mary mapped out coverage in each village in the health center catchment area. She noticed two patterns. The first was that coverage was lower in the villages located more than five kilometers away from the health center. This finding corresponded with coverage rates for many other services. She concluded that distance was clearly affecting use of the health facility. Mary decided to conduct additional outreach activities in these villages, including immunization and preventive infant care. The second pattern revealed that immunization coverage was also lower in a group of villages near the health center. Mary had no idea why this was happening, so she decided to contact the health center management committee to discuss this problem. She presented the graph and explained that overall immunization coverage was increasing. Then she showed them the map to indicate that there were still pockets of low coverage, mostly in remote villages, but also in a village closer to the health center.

The committee suggested that Mary contact the NGO working in the school that serves the villages with low coverage. They could provide support in conducting an information campaign on the benefits of immunization.

Later that week, Mary presented the same data to the staff of the education NGO, and they agreed to assist the health service in improving immunization coverage. First, however, they suggested conducting some focus group research to understand people’s views of immunization and their reasons for not immunizing their children. Mary was on the way to solving the problem of low immunization coverage using data and her relationship with the community.