Preface

This guide and tool was developed by Ann Levin and Winthrop Morgan under the supervision of Raymond Hutubessy and Susan Wang of the Immunization, Vaccines and Biologicals department, World Health Organization (WHO), Geneva, Switzerland. It also benefited from comments from participants of a workshop held in December 2011 for review of the tool: Carol Levin (PATH), Stephen Resch (HDHPM), Jean-Bernard Le Gargasson (AMP), Mark Jit (HPA), Anthony Newall (University of South Wales), Wilm Quentin (Berlin University of Technology, Valesca Retèl (University of Geneva). John Odago (Uganda), Irtaza Chaudhri (WHO/EMRO), Shiva Raj Adhikari, Associate Professor of Economics Health, Tribhuvan University, Arthorn Riewpaiboon (Mahidol University), Phuong Thi Thanh Tran, Oxford University Research Unit, Ho Chi Minh City, Kuki Torimo (MOHSW Tanzania), Miloud Kaddar (EPI/WHO), and Nathalie Broutet (RHR/WHO).

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1. HPV Vaccine introduction Component of the C4P Costing Tool

1.1. Introduction

Cervical cancer is the second most common cancer in women worldwide by age-standardized incidence rate (ASR) with over a half million new cases and 275,000 deaths occurring annually\(^1\). More than 85% of these cases occurred in low and middle income countries (LMICs) with the highest incidence rates in Sub-Saharan Africa, South-Central Asia, Latin America, and Melanesia\(^2\).

The WHO Comprehensive Cervical Cancer Control Guide (2006) distinguishes four basic components of cervical cancer control: primary prevention; early detection through awareness and organized screening programmes; diagnosis and treatment; and palliative care for advanced disease. Two types of strategies currently available in LMICs which are considered for introduction are: 1) human papilloma virus (HPV) vaccine to girls aged 9-13 according to WHO guidelines; and 2) cervical cancer screening and treatment for women. In order to facilitate decision-making on these interventions, program managers and policymakers need information on the projected costs of introducing cervical cancer interventions. The C4P tool has been developed to assist governments to estimate the costs of cervical cancer interventions and is described in detail in this user guide. Part 1 of the user guide focuses on the costing tool for HPV vaccine introduction. Part 2 (still under development) will focus on cervical cancer screening and treatment.

1.2. What the C4P Costing Tool is Costing Out for HPV Vaccine Introduction

The costing tool enables the user to estimate the value of incremental (additional) resources required to add the HPV vaccine to an existing immunization program. That is, it only estimates the value of new resources needed and does not include the cost of other goods and services (e.g. transport) already being used for other vaccines (shared costs). For example, it does not estimate the cost of transporting HPV vaccine if this is part of the same transport used to deliver other vaccines from the central warehouse to the periphery in the country.

The quantity of resources required to introduce HPV vaccine for national immunization programs (NIPs) will differ from other vaccines since it has a target population not previously routinely served by most national immunization programmes, 9-13 year old. Reaching a target group of 9-13 year old girls with 3 doses is requires new delivery strategies, more transport, and

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\(^1\) GLOBOCAN 2008, IARC

more intensive information, education and communication activities, leading to new delivery costs for the immunization programme which are greater than the costs incurred when a new infant vaccine is added to the existing infant immunization schedule. That is, since the vaccine may be administered at venues such as schools or places in the community in addition to health centers, additional costs may be incurred for outreach. More resources are also needed to explain the benefits of the vaccine to the population. The C4P tool enables the user to estimate the additional resource requirements based on the specific strategy that will be used for the country and allows the user to examine different strategies and their associated costs.

The C4P tool provides estimates of several cost measures: 1) total costs of adding the HPV vaccine to specific regions/provinces or at the national level; 2) cost per dose; and 3) cost per fully immunized girl (FIG) defined as the cost per dose multiplied by the total number of doses delivered over three vaccination rounds divided by the total number of girls who received three doses as a function of coverage and dropout rates over three vaccination rounds. It differentiates recurrent (operational) and capital costs as well as financial and economic costs. It also present expenditures required for initial investments required for the HPV intervention.

Cost Components of C4P Vaccination

The C4P tool allows the user to estimate the costs of activities that take place during the introduction of HPV vaccination into a national immunization program. These activities include the following: procurement of vaccines and injection supplies, micro-planning, training, social mobilization and information, education and communication (IEC), purchase of cold chain equipment, service delivery of vaccines to target population, monitoring and evaluation, supervision, and waste management.

In the following section, the differences between types of costs are discussed.

Recurrent Costs

Recurrent costs are the value of resources that last less than one year. These include program costs such as the value of personnel time, transport, maintenance, monitoring and evaluation, and supervision as well as costs of short-term training activities that last less than a year (i.e. do not include material development and initial training) are also included.

<table>
<thead>
<tr>
<th>Table 1. Vaccination Activities and associated Recurrent Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vaccination Activity</td>
</tr>
<tr>
<td>-----------------------</td>
</tr>
<tr>
<td>Vaccine Procurement and Storage</td>
</tr>
<tr>
<td>Information, Education and</td>
</tr>
</tbody>
</table>
**Capital Costs: Introduction Costs, Supplemental Cold Chain and Other Equipment**

Capital costs are the value of resources that last longer than one year such as cold chain equipment and vehicles. The capital goods and services used in HPV vaccination include initial investments such as introduction costs (micro-planning, initial training and social mobilization/IEC material development) as well as additional cold chain equipment, vehicle requirements, and incinerators (see Table 2). Capital costs in the C4P tool are found under the worksheets: 1) Introduction Costs, 2) Supplemental Cold Chain, and 3) Other.

<table>
<thead>
<tr>
<th>Vaccination Activity</th>
<th>Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vaccine Procurement</td>
<td>Additional Cold chain Equipment Requirements</td>
</tr>
<tr>
<td>Storage</td>
<td></td>
</tr>
<tr>
<td>Introduction</td>
<td>Micro-planning, Initial Training, Curriculum Development, IEC Material Development/ Sensitization Meetings</td>
</tr>
<tr>
<td>Waste Management</td>
<td>Additional incinerators</td>
</tr>
<tr>
<td>Other Transport</td>
<td>Additional Vehicles, Motorcycles, Boats, Bicycles, etc.</td>
</tr>
</tbody>
</table>

Calculation of capital costs differs from recurrent ones since these are annualized and/or discounted depending on the purpose of the analysis and whether financial or economic costs are preferred.

**Financial and Economic Costs**

Both financial and economic costs are calculated in the C4P tool. The user can choose which one is most appropriate depending on the objective of the analysis. If they want to know the additional costs incurred by the Ministry of Health, for example, they should focus on the financial cost calculation. **Financial costs** (also referred to “bookkeeping costs”) are the value of resources to the Ministry of Health and include the value of actual resources purchased for
the HPV vaccine introduction such as injection supplies, outreach allowances and per diem, resources used in training and developing new communication materials. Financial costs involve actual monetary payments (or expenditures) by the Ministry of Health.

**Economic** costs comprise the value of all outlays for the vaccine introduction as well as those already paid for or owned by the Ministry of Health and other sources of financing, e.g. the salaries of health personnel, vaccines paid for by partners, and time of volunteers. This analysis is useful if the user is interested in evaluating the share of different sources of finance for the vaccine introduction. For example, they may want to know the share of total costs financed by the MoH, external partners, clients and the community.

Furthermore this analysis gives a more complete and true picture of resources that are tied up in the provision of the new vaccine and their opportunity costs and should be used if a cost-effectiveness or cost-benefit analysis is to be conducted. In the case where the financial cost is low, then, ignoring economic costs may produce the illusion that introducing the new vaccine would cost nothing at all. The unseen opportunity costs then become the implicit hidden costs of introducing the new vaccine. Financial cost includes only costs that have been explicitly incurred, whereas, economic cost includes opportunity costs.

**Capital costs** are calculated differently depending on whether financial or economic costs are being estimated. When calculating financial costs, straight-line depreciation is used in the calculation of capital costs. That is, the cost of the item is annualized through dividing it by the useful life years of the good. For example, cold chain equipment could be expected to last for ten years and the total cost would be divided through by ten. Straight-line depreciation assumes that capital goods are used up equally over the useful time period of the item. For economic costs, capital goods are discounted as well as annualized. This type of depreciation assumes that people have time preference and prefer to use goods and services now rather than in the future.

**Table 3. Resources by Vaccination Activity for Financial and Economic Costs**

<table>
<thead>
<tr>
<th>Vaccination Activity</th>
<th>Financial Costs</th>
<th>Economic Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Procurement of Vaccines and injection supplies</td>
<td>Cost of vaccines and injection supplies to government</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cost of freight, clearance, insurance and taxes</td>
<td><strong>Cost of vaccines and injection supplies regardless of source of financing</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cost of freight, clearance, insurance and taxes</td>
</tr>
<tr>
<td>Micro-planning</td>
<td>Per diems and travel allowances</td>
<td><strong>Personnel time spent in meetings</strong></td>
</tr>
<tr>
<td></td>
<td>Venue rental</td>
<td>Per diems and travel allowances</td>
</tr>
<tr>
<td></td>
<td>Transport</td>
<td>Venue rental</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Transport</td>
</tr>
<tr>
<td>Training</td>
<td>Development of training materials</td>
<td><strong>Value of personnel time spent on training</strong></td>
</tr>
<tr>
<td></td>
<td>Per diems and travel allowances</td>
<td>Development of training materials</td>
</tr>
<tr>
<td></td>
<td>Venue rental</td>
<td>Per diems and travel allowances</td>
</tr>
<tr>
<td></td>
<td>Transport</td>
<td>Venue rental</td>
</tr>
<tr>
<td></td>
<td>Training Materials</td>
<td>Transport</td>
</tr>
<tr>
<td></td>
<td>Stationery</td>
<td>Training Materials</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Stationery</td>
</tr>
<tr>
<td>IEC/Social Mobilization</td>
<td>Facilitator time in meetings</td>
<td><strong>Value of personnel, school teacher, and volunteer time spent on material</strong></td>
</tr>
<tr>
<td></td>
<td>Per diems and travel allowances</td>
<td>development and other activities</td>
</tr>
<tr>
<td></td>
<td>Stationery</td>
<td>Facilitator time in meetings</td>
</tr>
<tr>
<td></td>
<td>Printing of materials</td>
<td>Per diems and travel allowances</td>
</tr>
</tbody>
</table>
|                                      | Production of TV and/or radio spots                     | }
<table>
<thead>
<tr>
<th>Section</th>
<th>Items</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Service Delivery</td>
<td>Transport fuel, Personnel per diems to travel to vaccination sites, Supplies – e.g. cotton</td>
<td>Value of personnel time spent on vaccination, Transport fuel, Personnel per diems to travel to vaccination sites, Supplies – e.g. cotton</td>
</tr>
<tr>
<td>Monitoring and Evaluation</td>
<td>Tally sheets or registers, Pens and pencils, Vaccination cards, Materials for surveillance</td>
<td>Tally sheets or registers, Pens and pencils, Vaccination cards, Materials for surveillance</td>
</tr>
<tr>
<td>Supervision</td>
<td>Travel allowances, Transport fuel and maintenance, Stationery</td>
<td>Value of personnel time spent on supervision, Travel allowances, Transport fuel and maintenance, Stationery</td>
</tr>
<tr>
<td>Waste Management</td>
<td>Purchase of incinerators (annualized), Fuel, Transport</td>
<td>Purchase of incinerators (annualized/discounted), Fuel, Transport</td>
</tr>
<tr>
<td>Cold chain equipment</td>
<td>Cold chain equipment (annualized)</td>
<td>Cold chain equipment (annualized and discounted)</td>
</tr>
</tbody>
</table>

Table 3 presents a comparison of resources included in cost estimation based on whether financial or economic costs are being calculated. For micro-planning, for example, the value of personnel time spent in meetings is included in economic costs but not in financial costs.

The main differences between financial and economic costing are threefold: 1) The time spent by health personnel, school teachers, and volunteers is valued in economic costing since there is an opportunity cost to this time – i.e. the workers are unable to spend time on other activities when they are occupied with HPV vaccination - but are not included in financial costs since these are already paid for with government salaries; 2) The value of donated goods and services is included in economic costs but not in financial costs since there is an opportunity cost to their use; and 3) Capital costs are calculated differently for financial and economist costs.

A glossary of terms used in the cost analyses in the C4P tool is found in Appendix 1.

1.3. The C4P Tool Structure

The C4P tool has seven sections: 1) HOME, 2) SETUP, 3) WORKSHEETS, 4) REPORTS, 5) CHARTS, 6) PLUG-INS, and 7) INDEX. Buttons at the top of each page allow the user to go to each section easily. Each page has a button that links to the DASHBOARD. The Dashboard provides findings on total costs, cost per dose and cost per fully immunized girl (FIG) for the data and assumptions entered into the workbook.

The following is a description of the seven sections:
1. The initial worksheet is HOME (Figure 1). This sheet summarizes the tasks included in the tool, steps to a customized cost estimate, and reports and charts. It also shows the total financial and economic costs and cost per fully immunization girl (FIG) at the left.

**Figure 1. Screenshot of HOME Worksheet**

2. Five worksheets are included under SETUP – OWNER, LABELS, SUBNATIONAL INFO, ECONOMIC INPUTS, and STRATEGY. These Worksheets will be described in detail in the section on Data Entry.

3. The third set of worksheets is included within WORKSHEETS. The Worksheets include MICROPLANNING, VACCINES, TRAINING, SOCIAL MOB & IEC, SERVICE DELIVERY, SUPERVISION & MONITORING, SUPPLEMENTAL COLD CHAIN, and OTHER.

4. The fourth set of worksheets is for REPORTS – OUTPUTS REPORT, RECURRENT COSTS, INTRODUCTION COSTS, and TOTAL COSTS.

5. The fifth category of worksheets is for CHARTS.

6. The sixth set of worksheets is for PLUG-INS. The worksheets are entitled TRAINING, VACCINE ARRIVAL and MEETINGS.

7. The seventh category is for the INDEX.

**Color Coding in C4P Tool**

In the C4P tool, cells are color coded and shaded to indicate their purpose. That is, the color, shading, or border indicates whether these are for 1) inputting data, 2) linked to another cell in the workbook, 3) calculated, 4) not filled, or 5) for labels, as can be seen in Table 3.

*Table 3. Color Coding in C4P Tool*

<table>
<thead>
<tr>
<th>Cell</th>
<th>Font Color</th>
<th>Cell Background Shading</th>
<th>Cell Background Pattern</th>
<th>Cell Border</th>
<th>Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input Number</td>
<td>Black</td>
<td>Yellow</td>
<td>None</td>
<td>Dotted</td>
<td>None</td>
</tr>
<tr>
<td>Cell</td>
<td>Font Color</td>
<td>Cell Background Shading</td>
<td>Cell Background Pattern</td>
<td>Cell Border</td>
<td>Symbol</td>
</tr>
<tr>
<td>--------------------------</td>
<td>------------</td>
<td>-------------------------</td>
<td>-------------------------</td>
<td>-------------</td>
<td>--------</td>
</tr>
<tr>
<td>Input Percent</td>
<td>Black</td>
<td>Yellow</td>
<td>None</td>
<td>Dotted</td>
<td>%</td>
</tr>
<tr>
<td>Input Dollars</td>
<td>Black</td>
<td>Yellow</td>
<td>None</td>
<td>Dotted</td>
<td>$</td>
</tr>
<tr>
<td>Linked Name</td>
<td>Blue</td>
<td>White</td>
<td>None</td>
<td>Double blue line</td>
<td>None</td>
</tr>
<tr>
<td>Linked Number</td>
<td>Black</td>
<td>Blue</td>
<td>None</td>
<td>Double blue line</td>
<td>None</td>
</tr>
<tr>
<td>Linked Percent</td>
<td>Blue</td>
<td>Blue</td>
<td>None</td>
<td>Double blue line</td>
<td>%</td>
</tr>
<tr>
<td>Linked Dollars</td>
<td>Blue</td>
<td>Blue</td>
<td>None</td>
<td>Double blue line</td>
<td>$</td>
</tr>
<tr>
<td>Calculated Number</td>
<td>Black</td>
<td>Blue</td>
<td>Small Dots</td>
<td>Double blue line</td>
<td>None</td>
</tr>
<tr>
<td>Calculated Dollars (not totals)</td>
<td>Black</td>
<td>White</td>
<td>Small Dots</td>
<td>Solid Line</td>
<td>$</td>
</tr>
<tr>
<td>Calculated Dollars (totals)</td>
<td>Blue</td>
<td>Blue</td>
<td>Small Dots</td>
<td>Solid Line</td>
<td>$</td>
</tr>
<tr>
<td>Locked (No user access)</td>
<td>Black</td>
<td>Grey</td>
<td>None</td>
<td>Solid Line</td>
<td>Solid Line</td>
</tr>
<tr>
<td>Label</td>
<td>Black</td>
<td>White</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
</tbody>
</table>

Figure 2 shows an example of color coding in the pricing worksheet for vaccination.

- The yellow cells are for inputting data on names of regions, and districts.
- The white cell with blue letters and a double blue border indicates that the cell is linked to another cell.
- The blue dotted cells indicate that the number in the cell is calculated.
- The grey cells with black borders are for locked cells.

Figure 2. Example of Color Coding used in the SUBNATIONAL INFO Worksheet
Software Requirements for C4P Tool

The C4P tool is designed to be used with Microsoft Excel 2010 so that it can make use of the dropdown menu feature. However, it can also be used with Microsoft Excel 2007 but the user must fill in some information manually in a few places where there are dropdown menus.

INDEX

The last worksheet (see Figure 3) is the INDEX. This sheet shows the different worksheets by category.

Figure 3. Screenshot of INDEX Worksheet
1.4. Gathering and Entering Data for C4P tool

Before entering data, the user should examine the worksheets under SETUP and WORKSHEETS and determine whether there is consensus on the service delivery strategy to be used - i.e. will the vaccination take place at schools, health facilities, campaigns, or other venue, what will the age group of the girls be?; What is the plan for training?; What other assumptions are required for the HPV vaccination in their country?; and Will the vaccine be phased-in or delivered nationwide? Having information on the possible service delivery strategy or strategies is a necessary input into the tool.

The tool may be used to estimate/project the costs of implementing one strategy or to compare the costs of implementing two or more strategies. For example, the government may want to compare the costs of delivering HPV vaccine at schools vs. at health facilities. In that case, the user should make a copy of the C4P tool and in order to maintain separate workbooks for each of the strategies and fill in the costs for each of the strategies so that the workbooks and the costs can be compared.

After the user has identified the strategies to be costed in the C4P tool, s/he should gather together the data required for the analysis. A list of data that needs to be collected for the tool is given in Appendix 2. Once the user has gathered the data needed for the C4P tool, he or she can begin the data entry.

To enter data into the workbook, the user must turn off the worksheet protection. To do this, the user should do the following: go to ‘FILE,’ press on ‘INFO,’ and then put in the password to unprotect the worksheet. The password is HPVVACCINE.
SETUP Worksheets

As mentioned above, the data entry Worksheets are entitled OWNER, LABELS, SUBNATIONAL INFO, ECONOMIC INPUTS, and STRATEGY.

OWNER INFORMATION

The Worksheet entitled “OWNER” (see Figure 4) is for identification of the owner of the tool, their affiliation, country information, and the date that the worksheet was last changed. The user should go to that page and fill in their name and contact information. This should be the name for which questions about the data or strategies can be addressed. This worksheet also stamps a date of last use and can be used to ensure version control over the C4P tool.

Figure 4. Screenshot of OWNER Worksheet

LABELS

The Labels worksheet (see Figure 5) is used to enter information on country characteristics. Once this information is entered, then the names are automatically entered into other worksheets in the workbook. The user can also enter default labels through pushing the button “Autofill with Default Labels for Selected Country.”

1. In the first table, the user should fill in the country name and the start year for the HPV introduction.

Figure 5. Screenshot on Labels Worksheet
2. In the second table, fill in the names of **administrative levels** such as national or central, second level areas such as regions or provinces, and other levels in the yellow cells.

3. In the third table, fill in **facility levels** such as referral hospitals, district hospitals, health centers, and dispensaries in the yellow cells.

4. In the fourth table, fill in the names of **school types** into the yellow cells in the worksheet. For example, two types of schools are public and private.

5. In the fifth table, fill in the names of health and education **personnel types** involved in the HPV vaccination. These should be filled in at the national, second level, third level, and health facility level.

**SUBNATIONAL INFO**

1. This worksheet is used to enter information from the subnational levels.

   1. In the second column, the user should fill in the names of the second level areas, e.g. regions or provinces. The user can fill up to fifty names of second level areas. If s/he wants to fill in more than fifty names, then they should contact by email for technical assistance of the C4P tool. (Cells are locked)
   2. In the third column, the user should fill in the number of third level areas such as districts. For example, since there are three districts in the Kigali province of Rwanda, the user would fill in three in this cell.
   3. In the fourth column, the user should list the number of vaccination facilities by second level area in their country. This number will depend on the type of facilities that will be involved in the vaccination – e.g. health centers and dispensaries without hospitals.
4. In the fifth column, the user should fill in the average number of vaccinators per facility. Then the number of vaccinators will be automatically calculated based on the number of facilities.

5. In the sixth column, the user should fill in the number of schools where the vaccine will be given. This number will depend on the country strategy about types of schools where vaccination will take place. For example, if vaccination only takes place at public schools and does not include private, then the number entered should only include the number of public schools.

**ECONOMIC INPUTS**

In this worksheet (see Figure 6), the user should enter various economic data (exchange rates with the US$, annual inflation rate, annual discount rate, and useful life years for the introduction costs) and their projected values over the next five years. This information can be found on the Ministry of Finance website or at other economic websites.

![Figure 6. Screenshot of the Economic Inputs Worksheet](image)

In the second table, the user can enter historical data on the exchange rate and annual inflation rate if this information is available. This information is helpful when predicting exchange rates.

**STRATEGY**

The STRATEGY worksheet (see Figure 7) is used to enter assumptions about the service delivery strategy.

1. In Table 1, fill in the coverage and drop-out rate assumptions for each year. These assumptions are linked to the VACCINES worksheet.
1. In Table 2, the user should enter the percentage of vaccine expected to be delivered at various venues – i.e. schools, health facilities, and other.
2. The table entitled ‘PLAN INTRODUCTION STRATEGY’ is used to specify the second level areas that will introduce HPV vaccination each year. To do so, the user should click on ‘START’ for each area introducing the vaccine. For areas that have already introduced the vaccine, the user should click on ‘CONTINUE’ and on ‘WAIT’ for areas that have not yet introduced the vaccine.

**WORKSHEETS**

The third set of worksheets is for WORKSHEETS. In these worksheets, users should enter assumptions for estimating costs of each activity. Then the estimated number of outputs and costs are shown.

**MICRO-PLANNING**

In this worksheet (see Figure 8), the user should enter assumptions for estimating the cost of micro-planning: 1) the number of activities needed to develop a detailed operational plan at each level for introduction of the HPV vaccine; and 2) estimated costs per activity at each level.

The third table in the worksheet entitled ‘EXPECTED OUTPUTS AND COSTS’ shows the number of micro-plans that are produced each year and their costs of producing these plans.
VACCINES

In this worksheet (see Figure 9), the user should enter or review assumptions for estimating the cost of vaccines: A) the projected vaccine coverage for each dose; and B) estimated vaccine wastage and buffer stock rates; C) number of doses per girl; D) safety box capacity; E) unit cost per item; and F) adjustment for subsidies – i.e. cost per dose less amount per dose paid by government. It should be noted that coverage levels using school vaccination will be affected by school enrollment levels in a country and the user should try to take this into account when projecting coverage levels.

The last table in the worksheet entitled EXPECTED OUTPUTS AND COSTS’ shows the number of Vaccines, Injection Syringes, and Safety Boxes that are produced each year and their costs of producing these plans.

Figure 9. Screenshot of Vaccines Worksheet
TRAINING

In this worksheet (see Figure 10), the user should enter assumptions for estimating the cost of training activities: A) the number of participants and size of each workshop type; and B) estimated costs per training workshop at each level.

The third table in the worksheet entitled ‘EXPECTED OUTPUTS AND COSTS’ shows the number of trainings that are produced each year and their costs.

A red button on the side of the third table allows the user to go to the plug-in for calculating training costs.

Figure 10. Screenshot of Training Worksheet

SOCIAL MOBILIZATION/IEC

In this worksheet (see Figure 11), the user should enter assumptions for estimating the cost of sensitization: A) the number of sensitization events at the national level, second level area,
third level area, health facilities, and schools – i.e. meetings to inform the population about HPV vaccination activities; B) estimated costs per sensitization activity at each level; and C) communication support costs by phase and level.

The last table in the worksheet entitled ‘EXPECTED OUTPUTS AND COSTS’ show the number of sensitization activities and communication support that are produced each year and their costs of producing these activities.

**Figure 11. Screenshot of Social Mobilization and IEC Worksheet**

**SERVICE DELIVERY**

In this worksheet (see Figure 12), the user should enter assumptions for estimating the cost of service delivery: 1) number of vaccinators and teachers assisting with the vaccination in schools, outreach visits and health facilities; 2) average number of girls to be vaccinated per school or outreach visit; 3) average number of minutes per vaccination per health facility, outreach visit or school; 4) average length and frequency of vaccination session per school visit or outreach visit; 5) average salary, benefits, and per diem per vaccinator and school teacher; and 6) travel allowance for vaccinators for visits to school or outreach site.

**Figure 12. Screenshot of Service Delivery Worksheet**
The last table in the worksheet entitled ‘EXPECTED OUTPUTS AND COSTS’ shows the number that are produced each year and their costs.

**SUPERVISION/MONITORING AND EVALUATION**

In this worksheet (see Figure 13), the user should enter assumptions for estimating the cost of supervision/monitoring & evaluation: A) number of supervision trips per year; and B) number of monitoring supplies per year per level; C) unit costs per trip or supply; D) the proportion of supervision trips allocated to HPV; and E) cost of a post-introduction evaluation.

**Figure 13. Screenshot of Monitoring & Evaluation/Supervision Worksheet**

The last table in the worksheet entitled ‘EXPECTED OUTPUTS AND COSTS’ shows the number of supervisory trips and monitoring and evaluation supplies that are projected for each year and their costs.

**+ COLD CHAIN**

This worksheet (Figure 14) provides guidance on calculation of additional cold chain requirements and their costs. The following steps are followed:

A. Choose the vaccine that will be used – i.e. Gardasil or Cervarix.

B. Estimate the number of shipments of vaccines into the country each year as well as shipments to intermediate stores and other levels..

C. Find out from the cold chain logistician the current amount of cold chain storage and the amount of excess cold chain capacity at each level. Calculate the additional cold chain and its cost with the cold chain logistician that is required at the national, second level area and third level area.
D. Enter the additional cm$^3$ of cold chain storage needed at each level into the table EXPECTED SUPPLEMENTAL STORAGE AND COSTS BASED ON ASSUMPTIONS. Enter the cost of purchasing additional cold chain storage required at each level in Column L.

The last table in the worksheet entitled ‘ANNUALIZED COSTS BASED ON ESTIMATED COSTS’ shows the annualized financial and economic costs by year and for the total period.

Figure 14. Screenshot of Cold Chain Worksheet

OTHER

In the OTHER worksheet (see Figure 15), the user should enter assumptions for estimating the cost of other recurrent and capital goods not found in other worksheets. For example, waste management is included in this worksheet under other recurrent costs. For each recurrent cost item, fill in data on items needed and their unit costs: 1) number of items needed by year in Table A; and 2) unit cost per item in Table B.

For other capital goods required, e.g. supplemental forms of transport such as bicycles or motorcycles, fill in information about the goods: 1) number of capital goods needed and their useful life years in Table C; and 2) unit cost of each good in Table D.
The last table in the worksheet entitled ‘EXPECTED OUTPUTS AND COSTS’ shows the number of safe disposal of supplies that are projected for each year and the costs.

**PLUG-INS**

The section on PLUG-INS is used to assist in calculation of the projected costs of trainings, vaccine shipping and handling, and meetings. The first worksheet (Figure 16) is on TRAINING COST ESTIMATION. In this worksheet, the user can enter information on resources used for the training such as health personnel, travel and allowances, supplies, and room rental.
The second plug-in (see Figure 17) is for estimation of vaccine shipping and handling costs. In the worksheet, the user should enter the add-on charges for vaccines for shipping and handling.

**Figure 17. Screenshot of the Vaccine Shipping and Handling Plug-in**

The third plug-in (see Figure 18) is for estimation of meeting costs. In the worksheet, the user should enter information on the resources used for meetings or workshops.

**Figure 18. Screenshot of Meeting Cost Calculator Plug-in**

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### 1.5. Results C4P

**REPORTS**

Six worksheets present the results of the costing. The first worksheet shows the total **INTRODUCTION COSTS**. The second worksheet shows the **RECURRENT COSTS** – vaccines, continuing social mobilization and IEC, service delivery, supervision and monitoring and evaluation, and other (waste management – by year and by financial and economic costs. The third worksheet shows **TOTAL COSTS** by cost category, year and type of cost. The fourth
worksheet entitled OUTPUTS REPORT presents that number of activities that have been produced with resources for each cost category. The fifth worksheet has summary tables and the sixth shows INITIAL INVESTMENT (INTRODUCTION COSTS, SUPPLEMENTAL COLD CHAIN and OTHER CAPITAL GOODS).

**INTRODUCTION COSTS**

In the INTRODUCTION COSTS worksheet (Figure 19), the results of cost calculations for each introduction activity is shown – i.e. micro-planning, training and sensitization/ initial IEC. As mentioned earlier, these costs are incurred at the time the vaccine is introduced at the national level and/or at second/third level areas and are not repeated. For example, micro-planning workshops/meetings are important for planning the operational roll-out of vaccination activities but are only needed one-time activity in each locale where the vaccination takes place. Introduction activities do not always occur during the first year and could take place during the second or third year if there is phasing-in of the vaccine over time.

**Figure 19. Screenshot of Introduction Costs Worksheet**

Introduction costs are treated as capital costs in the worksheets since these last more than one year. The depreciation of total introduction costs is shown at the bottom of the worksheet. See Section 2.1.2 for a discussion of capital costs.

**RECURRENT COSTS**

In the RECURRENT COSTS worksheet (Figure 20), the results of cost calculations for each recurrent cost are shown. As mentioned earlier, these costs last for less than one year. For example, vaccines, syringes and safety boxes need to be purchased each year.
Figure 20. Screenshot of Recurrent Costs

TOTAL COSTS

In the TOTAL COSTS worksheet (Figure 21), the total costs for each year are shown as well as costs for different cost categories. Costs are shown separately for INTRODUCTION COSTS, RECURRENT COSTS, SUPPLEMENTAL COLD CHAIN, and OTHER CAPITAL COSTS.

Figure 21. Screenshot of TOTAL COSTS Worksheet
OUTPUT REPORT

In the OUTPUT REPORT worksheet (see Figure 22), the various outputs produced for each cost categories are shown – e.g. number of micro-planning sessions and persons trained.

Figure 22. Screenshot of OUTPUT REPORT Worksheet

SUMMARY TABLES

In the SUMMARY TABLES worksheet (Figure 23), the financial and economic costs are shown by cost category. These data are used for the charts shown in the CHARTS worksheet.

Figure 23. Screenshot of SUMMARY TABLES Worksheet
**INITIAL INVESTMENT**

In the INITIAL INVESTMENT worksheet, the costs that comprise initial investment (introduction costs, cold chain supplement, and other capital costs) are totaled (see Figure 24).

Figure 24. Screenshot of INITIAL INVESTMENT COSTS REPORT

**CHARTS**

In the CHARTS worksheet, bar and pie charts are used to display the results for financial and economic costs. The bar chart shows the projected financial and economic costs by year, using color to indicate each cost component. The pie chart illustrates the share of total projected costs for each cost component.

Figure 23. Screenshot of CHARTS Worksheet
2. Appendices

2.1. Appendix 1: Glossary of Terms

**Annualization**: Division of total costs by life expectancy of the good, used to work out the cost of a capital good over its lifetime.

**Capital items**: Goods that last for longer than one year such as equipment.

**Cost-effectiveness analysis**: Comparison of the costs and effectiveness of alternative ways of achieving the same objective.

**Depreciation**: Amount of capital used during one year.

**Discounting**: Accounts for time preference through calculating the present value using the discount rate.

**Economic costs**: Estimates all costs of an intervention, regardless of the source of funding, so that the opportunity cost of all resources is accounted for in the analysis, includes in-kind and donor contributions. Takes into account resources are tied up for one activity and are not available for other purposes (opportunity cost). Also allows for the fact that people prefer receiving goods and services now rather than later in the future (time preference) and includes discounting for capital items.

**Financial costs**: Estimates the actual monetary flows of the buyer such as the Ministry of Health. Does not include the value of resources already paid for such as personnel time.

**Introduction Costs**: Introduction costs are initial one-time programmatic activities and include micro-planning, initial training activities, and initial sensitization/IEC. These are treated as capital costs in economic costing.

**Investment Costs**: Initial expenditures used in preparation for an intervention. These include introduction costs plus purchase of capital goods such as cold chain equipment and transport purchases.

**Opportunity costs**: The cost of an alternative that must be forgone in order to pursue a certain action.

**Present Value**: The current value of goods or services, usually applied to costs or outcomes expected in the future.

**Recurrent Items**: Goods or items used in the delivery of a service or intervention that last less than a year, e.g. personnel salaries.
**Straight-line Depreciation:** This type of depreciation assumes that all of the benefit from the capital good is worked out evenly throughout its lifetime; it involves annualizing the total costs but does not discounting.

**Time Preference:** Preference for receiving goods and services at one time over another, usually expressed as wanting goods and services now rather than later in the future.
2.2. Appendix 2: List of Data Requirements

COUNTRY CHARACTERISTICS

• Administrative levels
• Types of Health Personnel working in Immunization planning, training and vaccination
• Types of health facilities where vaccination will take place
• Names of second level areas in countries (e.g. regions, provinces or districts)

PROGRAM VARIABLES

• Immunization coverage goal (%)

ECONOMIC VARIABLES

• Exchange Rate (local currency to $US1)
• Annual Inflation Rate (%)
• Annual Discount Rate (%)

PROCUREMENT VARIABLES

• Vaccine Wastage Rate (%)
• Vaccine Buffer/Reserve Stock (%)
• Syringe Wastage Rate (%)
• Syringe Buffer/Reserve Stock (%)
• Safety Box Wastage Rate (%)
• Safety Box Buffer/Reserve Stock (%)
• Safety Box Capacity (#)
• Subsidized Cost per dose of Vaccine (unloaded)
• Unsubsidized 'Cost per dose of Vaccine (unloaded)
• Doses per fully immunized child (FIC) (#)

TRAINING VARIABLES

• Health workers trained per operational dispensary (#)

SOCIAL MOBILISATION AND IEC VARIABLES

• Sensitization Meetings per School (held in New Schools only) (#)
• Sensitization Meetings per Health Facility (held in new dispensaries only) (#)
• Personal IEC Materials printed per FIC (#) (e.g. brochure, handout)
• Collateral IEC Materials printed per Active Health Facility (# each year) (e.g. posters, hangers, wall charts)
• Cost to Broadcast 1 Radio Public Service Announcement
• Local Radio Public Service Announcements (PSAs) per Year per Active Region
• Cost to Broadcast 1 TV Public Service Announcement
• National TV Public Service Announcements (PSAs) per Year

SERVICE DELIVERY VARIABLES

IN-FACILITY:

• Average # Minutes per Visit for HPV Vaccine (#)
• Proportion of Vaccinations Administered in Health Facility (%)
• Average Visits to Health Facility Needed to Fully Immunize Girl (FIG) (#)

IN SCHOOL:

• Visits to each School (#)
• Proportion of Vaccinations Administered in Schools (%)
• Average # Vaccinations Administered per School Visit (#)
• Number of Vaccinators at school visit
• Number of School Teachers assisting with HPV Vaccination
• Outreach per diem and Travel allowance per Vaccinator
• Per Diem for School Teacher

MONITORING & EVALUATION VARIABLES

• Allocation of Supervision Costs to HPV Vaccine Programme (%)
• National supervisory trips per year (#)
• Days per national supervisory trip (#)
• Regional supervisory trips per year (#)
• Days per regional supervisory trip (#)
• District supervisory trips per year (#)
• Days per district supervisory trip (#)
• Average cost of fuel per litre (local currency)
• Fuel Allotment for a National Supervisory Tour (# litres)
• Fuel Allotment for a Regional Supervisory Tour (# litres)
• Fuel Allotment for a District Supervisory Tour (# litres)
• Tally Sheets per Operational Dispensary per year (#, includes wastage)
• Tally Sheets per School Visit (#, includes wastage)
• Vaccination Cards per Fully Immunized Child (#, includes wastage)
• Cost of Post Introduction Evaluation

DELIVERY VARIABLES AND ASSUMPTIONS BY REGION

• Target population defined as the number of girls in the target population by region by year (e.g. use UNDP data)
• Number of Schools
• Number of operational health facilities used for HPV vaccination

PRICE DATA FOR COSTS OF TRAINING AND SOCIAL MOBILIZATION AND IEC

Salaries and per diems

• Salaries by type of staff* (including benefits)
• Per diems by type of staff*
* (use Table 1 below)

Vehicle and Transport related prices

• Travel allowances
• Fuel price per liter per

Workshops and meeting prices

• Daily hall rental charges for workshops
• Daily meals and refreshments (breakfast, lunch and dinner)

Material Design, Production, and Printing Prices

• Printing costs per
  o Tally sheets
  o Vaccination cards
• IEC charges for
  o Print Material Development & Production
  o Radio Spot Development & Production (Develop one set of coordinated radio spots (:60)(:30)(:15))
  o TV Spot Development & Production (Develop one set of coordinated TV spots (:60)(:30)(:15))
  o Printing Leaflets (assumes print run of 10,000 or more)
  o Printing Posters (assumes print run of 10,000 or more)
  o Airing Radio Spots (assumes block purchase of one month of spots)
  o Airing TV Spots (assumes block purchase of one month of spots)
* Table 1 Local salaries and per diems in local currencies

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<th>Position</th>
<th>Salaries including benefits</th>
<th>Per diem</th>
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<td>National EPI Manager</td>
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<td>National Surveillance Officer</td>
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<td>National Cold Chain Officer</td>
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<td>Other (specify)</td>
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<td>National EPI Training and Communication Officer</td>
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<td>National Data Manager</td>
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<td>National Asst. Data Officer/Manager</td>
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<td>National Supplies Officer</td>
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<td>National Driver</td>
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<td>Second Level (Regional/Provincial) Medical Officer</td>
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<td>Second Level (Regional/Provincial) Health Officer</td>
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<td>Second Level (Regional/Provincial) Cold Chain/Logician</td>
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<td>Second Level (Regional/Provincial) Cold Chain Officer</td>
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<td>Second Level (Regional/Provincial) Driver</td>
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<td>Third-level (E.g. District) Health Officer</td>
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