SIVAC

Supporting Independent Immunization and Vaccine Advisory Committees

Desk Review of Decision Making Tools in Economics of Immunization and Immunization Financing

Anaïs Colombini / 2010

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List of acronyms

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ACIP: Advisory Committee on Immunization Practice

AMP: Agence de Médecine Préventive

CHOICE: Choosing Interventions that are Cost-Effective

cMYP: comprehensive Multi Year Plan

DALY: Disability Adjusted Life Years

EPI: Expanded Program of Immunization

GAVI: Global Alliance for Vaccine and Immunization

GSP: Global Serotype Project

GSK: Glaxo SmithKline

Hib: Haemophilus Influenzae type B

HPV: Human Papilloma Virus

ITAG: Immunization Technical Advisory Group

IVB: Immunization, Vaccines and Biological

IVR: Initiative for Vaccine Research

LSHTM: London School of Hygiene & Tropical Medicine

LY(G): Life Years (Gained)

NGO: Non Governmental Organization

NPI: National Program of Immunization

PAHO: Pan American Health Organization

PATH: Program for Appropriate Technology and Health

PCV: Pneumococcal Conjugate Vaccine

PHR+: Partnership for Health Reform Project

QALY: Quality Adjusted Life Years

SIVAC: Supporting Independent Immunization And Vaccine Advisory Committees

TB: Tuberculosis

UNICEF: United Nations Children's Fund

VIC: Vaccine Introduction Costing

WHO: World Health Organization

1. Introduction

SIVAC Initiative

The SIVAC Initiative aims to contribute to the enhancement of the use of evidence-based decision-making processes for the establishment of national immunization policies and programs in GAVI-eligible and Middle Income Countries.

In coordination with other health and immunization players, the SIVAC Initiative will assist in the establishment or strengthening of functional, sustainable National Independent Immunization Technical Advisory Committees (NITAG[1]) in making recommendations for program improvements and vaccine introductions through technical assistance, training, development of tools and information sharing.

The SIVAC initiative is funded by a generous grant from the Bill & Melinda Gates Foundation and implemented by AMP in partnership with IVI.

One of the activities of the SIVAC Initiative is to provide information, tools, and training through a technical resource & training center (TechTrain Center) to NITAGs members and scientific secretariat and the immunization community, so as to improve evidence-based decision making processes for immunization.

The desk review of existing decision-making information, tools and trainings aims to draw a descriptive picture of all the material which already exists or which is under development potentially supporting decision making processes. Together with the "needs assessment of NITAGs" work it will facilitate the definition of service specifications that the technical resource and training centre (TechTrain Center) should provide to NITAGs and to the immunization community.

According to the generic Terms of Reference, the objectives, scope and expected results of the Desk Review are the following.

1.1. Objective of the desk review of tools in economics of immunization

The main objective for the Desk Review is to draw a picture of the existing decision-making material in economics of immunization.

Specific Objectives are:

- To gather information on the tools that already exist and that are under development
- To identify areas to be addressed in the needs assessment process.

A secondary objective is to identify experts who would be interested to work with SIVAC on the development and maintenance of the technical resource & training center (TechTrain Center).

[1] For information on NITAG, refer to http://www.who.int/immunization/sage/national_advisory_committees/en/index.html

1.2. Scope of the Desk Review of tools in economics of immunization

The topic of this specific desk review is economics of immunization. Other topics such as logistic, programmatic and epidemiological issues will be taken into account in other desk reviews.

The decision-making materials are:

- Guidelines, papers, and templates to conduct analysis
- Specific tools to carry out analysis (models, assessment tools, templates, check lists….)

These materials have been developed by international organizations (such as UNICEF, WHO and GAVI), universities, scientific NGO, Ministries of Health, or others.
In this first step, articles are not taken into account, nor a database.

This desk review does not aim to be exhaustive. It is a continuing process; the desk review will be completed by partners and by the SIVAC team as we advance with the initiative implementation.
Moreover this desk review does not intend to be a critical review of the tools, guidelines and training. This will be done with partners in a second phase and will be presented in another report.

1.3. Expected results of the Desk Review

The expected results are:

1. A catalog of existing materials, with basic information, and if possible further information.
    - basic information will include
        - a short summary of what the tool does
        - the author(s) and the institution(s)
        - the year of creation
        - the status of development (developed and tested / developed / under development)
    - if available, further information will include :
        - some information about the f development context
        - how accessible the tool is (on the internet…), how often it is accessed and by whom
        - intellectual property
        - more technical information
        - feedback information from users about the tool (ease of use, quality…)
        - contact details of authors
        - any other useful information
2. An analysis on the findings of the desk review :
    - a summary of existing tools and tools under development
    - a list of potential partners (author and institution) where tools can be found
    - tools which seem interesting to use within SIVAC (with or without adaptation) and to put on the platform
    - tools which seem to be missing
3. Some specific elements to submit to the “needs assessment” process, based on the analysis (result 3). These can be specific questions or areas which need to be addressed during the needs assessment process (survey with questionnaire + workshop).

One complementary result would be a list of contacts who would be interested to work for SIVAC on specific topics according to requirements (tools development , information collection …).

2. Methodology

The Desk review of tools in economics of immunization is based on a research on internet. Below is an indicative list of the main websites consulted:

- Pubmed : www.ncbi.nlm.nih.gov
- WHO/IVB: www.who.int/vaccines
- WHO/AFRO: www.afro.who.int/index.html
- WHO/EMRO: www.emro.who.int/index.asp
- PAHO /ProVac: www.paho.org/english/ad/fch/im/Provac.htm
- World Bank: www.worldbank.org/
- UNICEF: www.unicef.org
- PATH: www.path.org/
- AIM: http://aim.path.org/
- Sabin vaccine Institute : www.Sabin.org
- GSK: www.gsk.fr/
- Rotavirus vaccine Program: www.rotavirus.org
- PneumoAdip: www.pneumoadip.com/
- HibInitiative: www.hibaction.org/
- Gavi Alliance: www.vacinealliance.org
- Partnership for Health Peform Plus Project: www.phrplus.org
- Australie / Australian Technical Advisory Group on Immunisation: www.health.gov.au/internet/immunise/publishing.nsf/Content/advisory-bodies
- Canada / Public Health Agency: www.phac-aspc.gc.ca/index-fra.php
- USA / Centers for Diseases Control and Prevention (CDC): www.cdc.gov/nip
- UK / Joint Committee on Vaccination and Immunisation (JCVI) : www.dh.gov.uk/ab/jcvi/index.htm
- Suisse / Commission Fédérale pour les vaccinations (CFV): www.bag.admin.ch/ekif/index.html?lang=fr
- France/ Haute Autorité en Santé (HAS): www.has-sante.fr/portail/jcms/j_5/accueil
- Immunization Action Coalition: www.Immunize.org
- Allied Vaccine Group: www.Vaccine.org

The “Final Reports of Technical Review of Costing Tools”, Commissioned by an Inter-agency Steering Committee and the Partnership for Maternal, Newborn and Child Health (September 2008), has also been consulted.

PAHO ProVac team has also been contacted to provide the tools and guidelines developed or underdeveloped by the Initiative.

At the end of the internet research, a catalogue of the existing and underdeveloped tools in economics of immunization has been elaborated in Excel format, giving a brief summary of the tools and guidelines. This catalogue has been kindly reviewed by Miloud Kaddar (WHO/IVB).

3. Analysis of the findings of the Desk Review

In this desk review we distinguish three types of documents:

- Guidelines
  Guideline is used here for documents that provide technical information to design an economic evaluation.
- Excel tools
  Excel tools is used here for documents in Excel format designed to calculate cost and/or cost effectiveness ratio of a specific intervention
- User guides
  User guides is used here for documents that explain how to use a specific Excel Tool.

Documents are also distinguished according to their scope. We distinguish 5 areas:

- Tools and guidelines on EPI costs and cost-effectiveness
- Tools and guidelines on costs of a new vaccine introduction, which are not designed for a specific vaccine
- Tools and guidelines on costs of the introduction of a specific vaccine, as they happen:
  - Pneumococcal
  - Diarrhoeal (mostly rotavirus)
  - Influenza
  - *Haemophilus Influenzae* type B (Hib)
  - Human Papilloma Virus (HPV)
- Tools and guidelines on the costs or economic burden of a specific disease (preventable by vaccination)
- Tools and guidelines on the presentation of the economic evaluation at National Immunization Advisory Committees

3.1. Summary of existing tools and tools under development

The table below provides an overview of existing tools and tools under development, according to the classifications mentioned above.

Summary Table of existing tools and tools under development

Scope of the document	Guidelines	Tools	User's Guide
Tools and guidelines on EPI costs and cost-effectiveness	• WHO Guide for standardisation of economic evaluation of immunization programmes • WHO-UNICEF Guidelines for developing a comprehensive multi year plan (cMYP) • Financing assessment tool for immunization service: guidelines for performing a country assessment	CMYP Costing and Financing Tool	Immunization Costing and Financing: a tool and user guide for comprehensive multi Year Planning (cMYP)
Tools and guidelines on costs of a new vaccine introduction, which are not designed for a specific vaccine	• Guidelines for estimating costs of introducing new vaccines into the national health system	Vaccine Introduction Costing (VIC) Tool	Guidelines for using the VIC Tool
Tools and guidelines on costs of the introduction of a specific vaccine - Pneumococcal		• Preliminary ProVac Initiative Pneumococcal Economic Model • Interactive Pneumococcal Vaccination Policy Model • SUPREMES	User's Guide to ProVac Initiative Pneumococcal Economic Model v1.1
- Diarrhoeal (mostly rotavirus)		• ProVac Rotavirus Model • European Model CEA of Rotavirus vaccines -POLYMOD • Rotarix analysis of Economics - Roxanne, GSK	Guidelines for using the Rotavirus Model

Scope of the document	Guidelines	Tools	User's Guide
		• A Markov Model to assess the impact of Rotavirus vaccination - Merck • Model and CEA of Rotavirus vaccines –SPMSD • Global CEA of Rotavirus vaccines - PATH	
- Influenza		FluvacEcon (Tool)	FluvacEcon (Guidelines)
- Haemophilus Influenzae type B (Hib)	Estimating the potential cost-effectiveness of using Haemophilus Influenzae type B (Hib) vaccine		
- Human Papilloma Virus (HPV)		HPV Costing Tool *(under development)*	
Tools and guidelines on the costs or economic burden of a specific disease (preventable by vaccination)	• Who Guide to identifying the economic consequences of disease and injury • Guidelines for estimating the economic burden of diarrhoeal disease with focus on assessing the costs of rotavirus diarrhoea • Estimating costs for cost effectiveness analysis: Guidelines for managers of diarrhoeal diseases control programmes • Generic protocols for cost and cost effectiveness analysis of TB diagnosis and treatment services		
Tools and guidelines on the presentation of the economic evaluation at National Immunization Advisory	Guidance for health economic studies presented to the Advisory Committee on Immunization Practice	Economic study slides templates	

Scope of the document	Guidelines	Tools	User's Guide
Committees	(ACIP)		

3.1.1. Existing Tools

The topics covered by the existing toosl and their users' manuals are listed below - names of the tools are indicated in brackets.

- EPI cost, cost effectiveness and funding gap (cMYP costing tool)
- Incremental cost of introducing new vaccines –Rotavirus, Pneumococcal, HPV and Influenza- (VIC Tool)
- Cost savings and cost effectiveness of introducing Influenza Vaccine (FluvacEcon)
- Cost savings and Cost effectiveness of introducing Pneumococcal vaccine (ProVac Economic Model, Interactive Pneumococcal Vaccination Policy Model, SUPREMES)
- Cost savings and Cost effectiveness of Rotavirus vaccine (ProVac Rotavirus Model, European Model CEA of Rotavirus vaccines –POLYMOD, Rotarix analysis of Economics -Roxannel, GSK, A Markov Model to assess the impact of Rotavirus vaccination –Merck, Model and CEA of Rotavirus vaccines –SPMSD, Global CEA of Rotavirus vaccines – PATH)

3.1.2. Existing guidelines

The topics covered by the existing guidelines are listed below – the names of the institution which published the guidelines are indicated in brackets.

- EPI cost and funding gap (WHO/IVB, PHR+)
- EPI cost effectiveness (WHO/IVR)
- Incremental cost of introducing new vaccines (WHO)
- Economic impact of diseases and injury (WHO)
- Cost of diarrhoeal disease (WHO)
- Cost and cost effectiveness of Tuberculosis diagnosis and treatment services (WHO)
- Cost savings and cost effectiveness of Hib Vaccine (WHO)

3.1.3. Tools under development

The topics covered by the toosl under development are listed below - names of the tools are indicated in brackets.

- Incremental cost of HPV vaccination (ProVac)

3.1.4. Others

- Templates and guidelines on how to present results of economic studies to ITAG (CDC)

3.2. List of potential partners

The institutions, authors and authors' contacts (when available) appeared in the description card of each individual document quoted in this desk review, as well as in the Excel document presented in the annex of this desk review.

Below is a list of potential partners, where the tools can be found,, guidelines and training mentioned in this desk review. It includes public organization, NGO, the private sector as well as specific projects or working groups.

- AMP
- CDC
- GSK
- PAHO

- PATH
- PHR+
- PneumoAdip
- WHO/IVB
- WHO/AFRO

The institutions which have been involved so far in the elaboration of the training, tools and guidelines quoted in this desk review should be contacted to discuss about their potential interest in adapting or developing guidelines, tools, training and information material needed for ITAG in the context of SIVAC.
The partnership could also be extended to:

- Paris Dauphine University
- The London School of Tropical Medicine
- WHO/IVR

3.3. Documents which appear interesting to use within SIVAC

Tools, guidelines and training of interest for SIVAC are here defined as those which can help ITAG members to make decisions regarding immunization strategies from an economic and financi point of view and documents that can be used by NITAG scientific secretariat to prepare background documents of NITAG members.
They include:

(i) documents which make health economics evaluations and issues of EPI funding understandable to a non expert of the topic, and
(ii) documents that could be used by the NITAG scientific secretariat to make an economic evaluation recommended by ITAG members.

3.3.1. General documents on the economics of immunization and EPI financing for ITAG

Documents listed below 2 are the ones which could be helpful for ITAG members who are not experts in health economic evaluation and EPI financing to understand the principles of health economics evaluation and what they can expect from them, as well as NIP financing issues.

- Web based Training on “Economic Evaluation of Public Health Preparedness and Response Efforts” (CDC)
- EPIVAC course on “Financial Sustainability of EPI” (AMP)
- “Guidance for Health Economic Studies Presented to the Advisory Committee on Immunization Practices”; and the “Economic study slides templates” associated (ACIP)

3.3.2. Documents to make an economic evaluation and/or a financing assessment for an ITAG

Three major economic criteria have to be taken into account for decision making on vaccine introduction: the budget impact, the financing affordability and the cost effectiveness of the intervention. Cost effectiveness ratios allowing ranking immunization strategies/policy among them to choose the more cost effective.?? (this sentence doesn’t make sense)

[2] Among the documents quoted in this desk review.

Below is a list of tools and guidelines that could be used to make an economic evaluation needed by an ITAG. Potential needs for adaptation of the tools and guidelines mentioned below will be analyzed in the in- depth review that will follow this desk review.

3.3.2.1. Economic evaluation

- "WHO Guide for standardization of economic evaluation of immunization programmes" (WHO)
- "Guidelines for estimating costs of introducing new vaccines into the national health system" (WHO)
- "Vaccine Introduction Costing (VIC) Tool" and the user's guide of the VIC Tool (PAHO)
- TRIVAC (PneumoAdip) or "Preliminary ProVac initiative Pneumococcal Economic Model" (PAHO / ProVac).
  The final recommendation of which one of these tools to put on the SIVAC platform will be made after a further evaluation of both tools (which will be done in the indepth review)
- ProVac Rotavirus Model (PAHO / ProVac)
- FluvacEcon (CDC)
- Estimating the potential cost-effectiveness of using Haemophilus influenzae type b (Hib) vaccine (WHO)
- HPV Costing Tool (PAHO / ProVac). To be confirmed when available.

3.3.2.2. Financing assessment

To make decisions and/or recommendations, ITAG should have the information (i) on the budget impact on the EPI of a new vaccine introduction and (ii) its financial affordability. This information can be found in national EPI cMYP, when available. Otherwise, tools and guidelines which can be used for a financing assessment of the impact of introducing a new vaccine or of other new immunization activities/strategies are the following.

- cMYP costing and financing tool; and the guidelines associated "Immunization costing and financing: a tool and users guide for comprehensive multi- year planning" (WHO)

3.4. Documents which appear to be missing or which require adaptation

This desk review gives a first glance on which available documents need adaption and which documents seem to be missing in order to fulfil ITAG needs. An in- depth review with partners will follow this first desk review. It will go further into the analysis of each document and will provide further recommendations on adaptation requirements, tools development , guidelines and training.

3.4.1. Documents requiring adaptation

At first glance those available documents which require an adaptation to be relevant for ITAG needs are the following:

- CDC training on "Economic evaluation of Public Health Preparedness and Response Efforts". In particular there is a need to explain the differences in the information provided by different outcome measures that can be used for immunization programs (intermediate and final outcomes).

- The suitability (availability of data, others) and the usefulness of the tools quoted in this desk review for the ITAGs sustained by the SIVAC program will be assessed in a second phase.
  What can already be said is that in most of the tools quoted in this desk review, some of the data that needs to be entered in the tools is not likely to be available in countries. If the situation had been anticipated by the authors of the tools by providing international data to use instead of national ones, this could have arisen though the question of the interpretation of the results and their suitability regarding local contexts.? (WHAT? The end of the sentence doesn't make sense - verb missing?)

3.4.2. Documents which appear to be missing

The guidelines and tools available cover mainly (i) new vaccine introductions and (ii) cost effectiveness analysis. There are no specific tools to conduct other types of economic analysis (such as economic impact of diseases); only guidelines exist. In addition, the existing guidelines and /or tools are not specific to other EPI "upgrades"other than the introduction of new vaccines.

Considerations of the economic consequences of other EPI improvements could only be taken into consideration through the guidelines entitled "WHO Guide for standardization of economic evaluation of immunization programmes" (WHO). The "cMYP costing and financing tool" (WHO) might also be used, but only sparingly because it's not specifically designed for this kind of evaluation.

Furthermore, tools on cost effectiveness of specific diseases/vaccines3 need to be used along with another tool (VIC tool) to calculate the costs of the introduction of the new vaccine. This could seem complicated to a person unfamiliar with these tools. It might be interesting to integrate VIC tools with the tools on cost effectiveness.

Moreover, it might be necessary to provide NITAG with systematic information on financial affordability and funding gap issues related to immunization. This could for example be made on the basis of GAVI alliance publication on financial sustainability of immunization program and of EPIVAC training on EPI financial sustainability.

4. Specific elements to submit to the need assessment process

Need assessment process

One of the SIVAC goals is to provide NITAG members with a technical resource and training Center, (so called NITAGs TECHTRAIN Center) in which they could easily find the information, tools, guidelines and training useful for their decision making.

The development of such a technical resource and training Center, relies on:

- A desk review of existing materials, tools and trainings for Burden of Diseases, Economics of Immunization, Logistics and Programmatic to identify what is already available,

[3] These tools are the one on Influenza (FluvacEcon), Rotavirus (ProVac Rotavirus Model) and the one on Pneumococcal (Preliminary ProVac Initiative Pneumococcal Economic Model).

- A needs assessment survey identifying the specific needs of NITAG members and NITAG scientific secretariat.

Following these two first steps, SIVAC will hold a workshop to finalize the identification of the needs (with NITAGs representatives and WHO ROs staff) and then, also using the desk reviews, agree with partners on the content and format of the future NITAGs TECHTRAIN Center.

The workshop related to the needs assessment and the specification of the NITAGs TECHTRAIN Center would be a good opportunity to check with NITAG's and future NITAGs members if:

- The available guidelines or tools on economic evaluation of new vaccine introduction[4] covers countries up to date needs ;
- Other considerations other than new vaccine introduction, and that have an economic impact, are likely to be taken into account by NITAG

Moreover, the workshop could also be an opportunity to discuss with the partners identified in chapter 5.2 about their willingness to collaborate on the adaption and/or elaboration of specific guidelines, tools, training and information material in the context of SIVAC.

[4] As quoted in this desk review.

5. Catalogue of existing and under development guidelines and tools in economics of immunization

The summaries provided for the different documents mentioned in this chapter are based on a brief analysis of them and on the descriptions provided by the authors of each of these documents.

5.1. Tools and guidelines on EPI Cost, Cost Effectiveness and Funding

5.1.1. WHO Guide for standardisation of economic evaluation of immunization programmes

Title of the document	**WHO Guide for standardisation of economic evaluation of immunization programmes**
Authors	D Walker, P Beutels, R Hutubessy
Institution	WHO
Type of document	Guidelines
Year of issue	2008
Status of development	Developed
Summary	Guidelines on what should be done regarding Cost Effectiveness Analysis (does not include budget impact analysis). The guidelines: - describes the different types of economic evaluation and summarizes the role of economic evaluation - considers the various ways of framing an evaluation - provides guidance on how to identify, measure and value resources in order to estimate the costs associated with an immunization programme - gives guidance on vaccine efficacy, vaccine effectiveness, vaccine delivery and uptake, including possible adverse events of vaccines and lastly the strengths and weaknesses of different outcome measures - provides guidance to help analysts decide when a dynamic or static model is to be preferred (includes flow charts) - discusses the choice of discount rate - considers the summary measures used to report economic evaluations and how they can be used to inform decision-making - describes some of the methods available for presenting uncertainty inherent to economic analysis - takes a broader view of the decision-making process - provides a summary of the recommendations and presents (checklist)
Accessibility of the	Internet: http://whqlibdoc.who.int/hq/2008/WHO_IVB_08.14_eng.pdf

Title of the document	**WHO Guide for standardisation of economic evaluation of immunization programmes**
document	
Contact details of authors	--
Elements of Context	WHO elaborate this guide was developed to help meet the need of decision-makers for relevant, reliable and consistent economic information; it aims to provide clear and concise, practical, high-quality guidance to those who conduct economic evaluations. The traditional Expanded Programme on Immunization (EPI) vaccines are considered to be among the most efficient uses of scarce health care resources. Today, there are many under-used and new vaccines available and many more in the pipeline that in the short- to medium-term will not cost the few cents per dose that the traditional vaccines do, but will be 'multi-dollar' vaccines. Decision-makers will require information on, among other things, their relative cost-effectiveness. A number of reviews have indicated that there is scope for improving the transparency, completeness and comparability of economic evaluations of immunization programmes. Adherence to general guidelines on economic evaluations would increase the quality, interpretability and transferability of future analyses; however, there is reason to believe that more specific advice might be needed in relation to vaccination programmes.

5.1.2. *WHO-UNICEF Guidelines for developing a comprehensive multy year plan (cMYP)*

Title of the document	**WHO-UNICEF guidelines for developing a comprehensive mutli year plan (cMYP)**
Authors	Immunization, Vaccines & Biologicals (WHO/IVB)
Institution	WHO, UNICEF
Type of document	Guidelines
Year of issue	2006 (March)
Status of development	Developed and tested
Summary	This Guide presents a series of steps to develop a multi year plan of immunization programs (cMYP), including analyzing the costs, financing, and financial gaps to implement the activities planed in the cMYP.
Accessibility of the document	Internet: www.who.int/vaccines-documents/ Hard copy: WHO, IVB, CH-1211 Geneva 27, Switzerland Fax: +41 22 791 4227; Email: vaccines@who.int
Contact details of authors	--
Elements of Context	In 2005, WHO-UNICEF, in collaboration with many GAVI Alliance partners, prepared Guidelines for Developing a Comprehensive Multi-Year Plan for Immunization (cMYP). The motivation was to improve and streamline various planning processes for immunization at country level. These new guidelines build on existing multi-year planning experience, while adding the critical elements of costing and financing based upon the methods developed for the immunization Financial Sustainability Plans (FSP).

5.1.3. cMYP Costing and Financing Tool

Title of the document	cMYP Costing and Financing Tool
Authors	Patrick Lydon
Institution	WHO
Type of document	Excel Tool
Year of issue	2005 (Version 1.3)
Status of development	Developed and tested
Summary	The aim of this Excel tool is to help undertake the costing and financing of cMYP of National Immunization Program (NPI). It has been developed to: - Estimate the past costs and financing of a National Immunization Programme - Make projections of its future costs - Make projections of its future resources requirements - make projections of its future financing needs to achieve programme objectives - Make projections of and analyse the corresponding financing gaps
Accessibility of the document	Internet: www.who.int/immunization_financing/tools
Contact details of authors	--
Elements of Context	*See WHO-UNICEF guidelines for developing a comprehensive mutli year plan (cMYP)*

5.1.4. *Immunization Costing and Financing: a tool and user guide for comprehensive multi Year Planning (cMYP)*

Title of the document	**Immunization Costing and Financing: a tool and user guide for comprehensive multi Year Planning (cMYP)**
Authors	Immunization, Vaccines & Biologicals (WHO/IVB)
Institution	WHO, GAVI
Type of document	User's Guide
Year of issue	2006 (December)
Status of development	Developed and tested
Summary	These guidelines accompanied the cMYP costing and financing tool. They provide : - an overview of important concepts, methodologies and definitions used in the excel costing and financing tool of the cMYP - step-by-step instructions on how to use the tool - guidance on where to find information needed - guidance on how to analyse data and results
Accessibility of the document	Internet: www.who.int/vaccines-documents/ Hard copy: WHO, IVB, CH-1211 Geneva 27, Switzerland Fax: +41 22 791 4227; Email: vaccines@who.int
Contact details of authors	--
Elements of Context	*See WHO-UNICEF guidelines for developing a comprehensive mutli year plan (cMYP)*

5.1.5. *Financing assessment tool for immunization service: guidelines for performing a country assessment*

Title of the document	**Financing assessment tool for immunization service: guidelines for performing a country assessment**
Authors	Kaddar M, Makinen M, Khan M
Institution	Partnerships for Health Reform Project, Abt Associates
Type of document	Guidelines
Year of issue	2000
Status of development	Developed and tested
Summary	The immunization financing "tool" aims at in-depth assessments of developing countries' national immunization programme costing, financing, and planning issues at the regional and national levels. Following a narrative overview of the assessment process, the immunization financing assessment tool offers a checklist and tables that guide the user through: - information gathering - estimating the current costs and financing - and developing a five-year plan Findings are intended to help a country's health officials and international donors understand the costs and financing of an immunization, so that they can develop policies to ensure financial sustainability of the existing programme and plan improvements in terms of expanding coverage and adding new vaccines and technologies.
Accessibility of the document	Internet: http://www.healthsystems2020.org/content/resource/detail/734/
Contact details of authors	--
Elements of Context	Assessments of immunization programs have traditionally focused on epidemiological and logistical aspects of the programs. This immunization financing assessment tool (IF tool), developed by the U.S. Agency for International Development's Partnerships for Health Reform as a partner in the Global Alliance for Vaccines and Immunization, is intended for in-depth, systematic evaluations of the costs and financing of immunization programs.

5.2. Tools and guidelines on Costs of Introduction of New Vaccines

5.2.1. Guidelines for estimating costs of introducing new vaccines into the national health system

Title of the document	Guidelines for estimating costs of introducing new vaccines into the national health system
Authors	Kou U.K.
Institution	WHO
Type of document	Guidelines
Year of issue	2002
Status of development	Developed
Summary	These guidelines take a stepped approach for estimating the incremental costs of introducing new vaccines into routine immunization services. The overall objective is to assist public health officials who are considering whether to introduce new vaccines to plan and budget for such introductions. The perspective is thus that of the health sector: the costs that fall on parents and others are not taken into account. The guidelines presents: - Basic concepts of costing (Incremental versus full costs, Financial versus economic costs, Capital versus recurrent costs) - How to identify and estimate costs - Methodology to estimate total vaccine & injection material needs and annual costs for a new vaccine, waste management costs , costs of expanding distribution system (transportation and storage), additional personnel costs, surveillance and monitoring costs - a very short brief on how to present results The guideline goes with templates of excel forms to calculate the costs.
Accessibility of the document	Internet: http://www.who.int/vaccines-documents/DocsPDF02/www665.pdf
Contact details of authors	--
Elements of Context	Various new vaccines have entered the market during the last few years and more are expected to be developed in the future. Governments have to decide whether to include new vaccines in the routine immunization schedule, which is publicly funded in most countries. They may decide not to do so and to leave uptake to the private sector. The rationale for introducing a new vaccine into government-funded national immunization services should firstly be based on whether the disease in question is a public health problem and, if it is, whether immunization is the best way to control it. Secondly, the overall costs of introducing the vaccine and maintaining sufficient

	coverage should be assessed.

5.2.2. Vaccine Introduction Costing (VIC) Tool

Title of the document	Vaccine Introduction Costing (VIC) Tool
Authors	--
Institution	PAHO
Type of document	Excel Tool
Year of issue	2006
Status of development	Developed
Summary	The VIC tool is a simplified costing tool for determining the incremental financial and economic "Cost of Program(s)" associated with the introduction of four new vaccine, that are the ones against Rotavirus, Pneumococcal, HPV and Influenza. The tools also calculate a cost per individual vaccinated. N.B.: For some recurrent and capital costs, you can even enter the own costs for the country (discretionary costs) or use the prefilled costs of the excel tool.
Accessibility of the document	Internet: http://www.paho.org/English/AD/FCH/IM/ProVAc_Models.htm
Contact details of authors	Michael Dávila (PAHO) at davilami@paho.org and phone 202-974-3121; and Manuel Rocha Fontes (PAHO) at: rochaman@paho.org and phone 202-974-3732
Elements of Context	New life-saving vaccines being introduced have significantly higher prices than previous vaccines. As health sector budgets grow slowly, resources have to be allocated more prudently and consider competing options. Decision makers in Latin America and the Caribbean (LAC) increasingly require economic analysis to support decision-making for new vaccines, in addition to demographic, epidemiologic, and management data. The ProVac Initiative provides technical cooperation and strengthens national capacity to make evidence-based, informed decisions in the context of the introduction of new and underutilized vaccines, in particular regarding economic evaluations. The ProVac Initiative has collaborated with leading academic researchers to develop simplified models in Excel for estimating the health and economic Burdens of Disease, the incremental Cost of Programs of new vaccine introduction, and the Cost-Effectiveness of new vaccines.

5.2.3. Guidelines for using the VIC Tool

Title of the document	Guidelines for using the VIC Tool
Authors	--
Institution	PAHO
Type of document	User's Guide
Year of issue	2006
Status of development	Developed
Summary	The guidelines: - Describes the VIC tool - Gives detailed instructions ▪ for data input in the VIC tool ▪ on classification by types of cost - Provides others explanation on economic terminologies and methods
Accessibility of the document	Internet: http://www.paho.org/English/AD/FCH/IM/ProVAc_Models.htm
Contact details of authors	--
Elements of Context	*See Vaccine Introduction Costing (VIC) Tool*

5.3. Tools and guidelines on the cost of introducing Influenza vaccine

5.3.1. FluvacEcon (Tool)

Title of the document	**FluvacEcon**
Authors	Meltzer M.I.
Institution	CDC / ProVac
Type of document	Excel Tool
Year of issue	2006
Status of development	Developed
Summary	Fluvacecon is a software to estimate the cost effectiveness of annual influenza vaccination from the perspective of the health care system. It's a programmed workbook to provide public health officials a means of evaluating the economics of influenza vaccination. The data to be entered concerned: - Population being considered for vaccination - Rates of non-death influenza-related health outcomes - Rates of deaths due to influenza - Cost per person treated: In and outpatients - Effectiveness of influenza vaccine - Cost per person vaccinated The Excel tool provides: - a Summary of the health outcome data entered into the model - the Net $/ case or death averted - the Sensitivity analyses results Results are also represented on graphs. N.B.: FluvacEcon does not provide any calculation of vaccination costs in itself (neither per year, nor per activities and so on). This data are instead entered to run the model.
Accessibility of the document	Internet: http://www.paho.org/English/AD/FCH/IM/ProVAc_Models.htm
Contact details of authors	Martin I Meltzer M.S., Ph.D: MMeltzer@cdc.gov
Elements of Context	New life-saving vaccines being introduced have significantly higher prices than previous vaccines. As health sector budgets grow slowly, resources have to be allocated more prudently and consider competing options. Decision makers in Latin America and the Caribbean (LAC) increasingly require economic analysis to support decision-making for new vaccines, in addition to demographic, epidemiologic, and management data. The ProVac Initiative provides technical cooperation and strengthens national capacity to make evidence-based, informed decisions in the context of the introduction of new and underutilized vaccines, in particular regarding economic evaluations. The ProVac Initiative has collaborated with leading academic researchers to develop simplified

	models in Excel for estimating the health and economic Burdens of Disease, the incremental Cost of Programs of new vaccine introduction, and the Cost-Effectiveness of new vaccines.

5.3.2. FluvacEcon (Guidelines)

Title of the document	FluvacEcon
Authors	Meltzer M.I.
Institution	CDC / ProVac
Type of document	User's Guide
Year of issue	2006 (1.0 Beta Test Version)
Status of development	Developed
Summary	The user's manual of Fluvacecon explains: - the main methods used in the software - what data has to be entered - the results provided by the software (summary of health data; cost effectiveness ratio, sensitivity analysis results)
Accessibility of the document	Internet: http://www.paho.org/English/AD/FCH/IM/ProVAc_Models.htm
Contact details of authors	Martin I Meltzer M.S., Ph.D: MMeltzer@cdc.gov
Elements of Context	*See FluvacEcon Tool*

5.4. Tools and guidelines on the cost of introducing Pneumococcal vaccine

5.4.1. Preliminary ProVac Initiative Pneumococcal Economic Model

The Preliminary ProVac Initiative Pneumococcal Economic Model is part of TRIVAC. TRIVAC is a tool that integrates cost-effectiveness models for 3 vaccines: conjugate pneumococcal, rotavirus, and *Haemophillus influenza B*.

Title of the document	**Preliminary ProVac Initiative Pneumococcal Economic Model**
Authors	Anushua Sinha, edited by Michael Davila and Manuel Rocha Fontes
Institution	PAHO / ProVac; TheTRIVAC model was developed in collaboration with the London School of Hygiene and Tropical Medicine and the Hib Initiative.
Type of document	Excel Tool
Year of issue	2006 (?)
Status of development	Developed and tested
Summary	It is a burden of disease model, in which the effects of vaccination on the following childhood disease syndromes are captured (acute otitis media, pneumonia, and meningitis). Vaccination's effects are captured by the model in terms of: - Health burden (cases, deaths, life years, disability-adjusted life years) - Economic burden (health systems costs –curative-, family costs (Incremental) costs of vaccination are calculated elsewhere (VIC tool) The model currently captures vaccine's direct effects on immunized children, but does not capture indirect effects such as herd immunity or serotype replacement. The analysis can be performed from: - The health systems perspective, incorporating vaccine, vaccine program, and direct medical treatment costs. - A societal perspective, including family out-of-pocket costs and family productivity losses. Both costs and health consequences are discounted by the model. The tool allows performing sensitivity analysis. The tools allow to view the: - Annual health and economic consequences of introducing pneumococcal conjugate vaccination or not introducing pneumococcal conjugate vaccination - Cost effectiveness ratios, including intermediate calculation (Birth cohort being vaccinated, Discounted and cumulative discounted vaccination program costs, Discounted and cumulative discounted direct medical costs, DALYs averted, Life years gained, Deaths averted)
Accessibility of the	Internet: http://www.paho.org/English/AD/FCH/IM/ProVAc_Models.htm

Title of the document	**Preliminary ProVac Initiative Pneumococcal Economic Model**
document	
Contact details of authors	Dr. Sinha, phone number: +1-973-972-6538 e-mail: sinhaan1@umdnj.edu
Elements of Context	New life-saving vaccines being introduced have significantly higher prices than previous vaccines. As health sector budgets grow slowly, resources have to be allocated more prudently and consider competing options. Decision makers in Latin America and the Caribbean (LAC) increasingly require economic analysis to support decision-making for new vaccines, in addition to demographic, epidemiologic, and management data. The ProVac Initiative provides technical cooperation and strengthens national capacity to make evidence-based, informed decisions in the context of the introduction of new and underutilized vaccines, in particular regarding economic evaluations. The ProVac Initiative has collaborated with leading academic researchers to develop simplified models in Excel for estimating the health and economic Burdens of Disease, the incremental Cost of Programs of new vaccine introduction, and the Cost-Effectiveness of new vaccines.

5.4.2. User's Guide to ProVac Initiative Pneumococcal Economic Model v1.1

Title of the document	User's Guide to ProVac Initiative Pneumococcal Economic Model v1.1
Authors	--
Institution	ProVac
Type of document	User's Guide
Year of issue	--
Status of development	Developed *(or still underdevelopment?)*
Summary	The user's manual gives an overview of how the model works and the kind of results it provides. *N.B.: this user's guide is less developed and pedagogical the one on Flue. It seems to have been elaborated for the workshop in itself more than for a wide use.*
Accessibility of the document	Internet: http://www.paho.org/English/AD/FCH/IM/ProVAc_Models.htm
Contact details of authors	--
Elements of Context	*See Preliminary ProVac Initiative Pneumococcal Economic Model*

5.4.3. Interactive Pneumococcal Vaccination Policy Model

Title of the document	**Interactive Pneumococcal Vaccination Policy Model**
Authors	--
Institution	PneumoAdip
Type of document	Excel Tool
Year of issue	--
Status of development	Developed and tested
Summary	This Interactive Pneumococcal Vaccination Model allows the health benefits, costs, and cost-effectiveness of pneumococcal vaccine to be projected according to an evidence-based approach. It is designed for users with familiarity using personal computers but with limited experience conducting health economic analyses. Wherever possible, the model is pre-populated with inputs drawn "from the highest quality data sources". The model combines the results from three recent international efforts to assess the burden of pneumococcal disease and to develop standards for assessing the cost-effectiveness of health prevention: - WHO - Choosing Interventions that are Cost-Effective (WHO-CHOICE): WHO-CHOICE has assembled country-level data on the direct medical costs associated with hospital and outpatient management of diseases. - Global Serotype Project (GSP): Collecting unpublished and published sources of pneumococcal serotype data from across the globe, the GSP investigators have developed contemporary estimates of the regional proportions of disease-causing pneumococcal isolates covered by pneumococcal conjugate vaccines in children under age five. - WHO- Hib and Pneumococcal Global Disease Burden Project: The project investigators modelled credible country-level estimates of *Haemophilus influenzae* type B and pneumococcal disease burden in children under five, in order to understand the importance of disease due to these bacterial pathogens and the potential for control through vaccination. Category of costs taken into account are (some are optional): - Curative care ▪ Direct Medical costs (hospital and outpatient and sequelae related costs) ▪ Direct Non medical costs ▪ Indirect costs (work lost) - Vaccination ▪ Cost per dose of vaccine ▪ Program cost per dose ▪ Program start up costs

Title of the document	Interactive Pneumococcal Vaccination Policy Model
Accessibility of the document	Internet: http://www.preventpneumo.org/data-tools/Cost_Effectiveness_Model.cfm
Contact details of authors	C. Greg Hagerty, PhD, Clinical Assistant Professor, Department of Medicine, UMDNJ – Robert Wood Johnson Medical School, New Brunswick, NJ USA, cgreg@cgreg.com
Elements of Context	The pneumococcus (Streptococcus pneumoniae) is the leading bacterial cause of acute lower respiratory infections, which in turn, are a major cause of child mortality. It also causes meningitis, other forms of invasive bacterial disease, and ear infections (acute otitis media). The GAVI Alliance decision to invest an initial $200 million to help a group of countries introduce pneumococcal conjugate and rotaviral vaccines was announced in November 2006. The announcement of an Advanced Market Commitment (AMC) of $1.5 billion for advancement of pneumococcal vaccines was made in February 2007. As pneumococcal conjugate vaccine becomes financially accessible, policymakers need information about the projected health benefits, costs, and cost-effectiveness of vaccination when considering how to spend healthcare dollars. Routine vaccination of infants against pneumococcus needs substantial investment by governments, non-governmental organizations, and donors. The Interactive Pneumococcal Vaccination Model addresses the need for streamlined cost-effectiveness analysis tools to assist decision makers in understanding the economic and health benefits associated with vaccine introductions.

5.4.4. SUPREMES

Title of the document	SUPREMES
Authors	B. Standaert
Institution	GSK
Type of document	Excel Tool
Year of issue	--
Status of development	Developed *(or still underdevelopment?)*
Summary	The objective of the model is to assess the public health impact by number of cases/events avoided and the economic value (as per cost and QALY/LY impact) of PCV-vaccines such as SynflorixTM (PHiD-CV) on the following disease areas: I(P)D, pneumoniae, AOM caused by S pneumoniae & NTHi, when compared with no vaccination while including the herd effect at country level. Model structure and hypothesis - Time cycle and time horizon: one year - Comparison of the 1-year condition of two age-groups (<10y old and total population), unvaccinated and vaccinated with Synflorix™ at vaccine steady state situation. - Perspective of the health care payer. The societal perspective can be added by including indirect cost estimates. - Discount: no discount on cost and effect is applied - Herd protection: at vaccination steady state level the model start from a condition where the net herd protection is already installed across the whole population induced by the previous vaccine already in the market. The effect of the net herd protection results in a reduction in incidence of vaccine type pneumococcal-related outcomes in all age groups. - Serotype and pathogen replacement: Both are defined as the substitution of vaccine-sensitive serotypes/pathogens by non-vaccine-sensitive serotypes/pathogens in a vacant nasopharyngeal niche at the individual and collective level. In the model presented here, the individual component of replacement is included in the direct vaccine effectiveness estimate, while the collective component is combined with herd protection to estimate the indirect vaccine net herd effect estimate. - Disease burden: AOM sequelae has been introduced as an option. - Safety: vaccination does not cause any serious adverse - Multiple infections have not been considered in the model - Vaccine dosing: 3+ 1>> 2+1. - Sensitivity analysis: Included in the analysis is a 20% range change under and above the base-line values for most of the variables in the model.

Title of the document	SUPREMES
	The data to be entered includes: - Demographic data, such as population size, life expectancy - Epidemiology data, such as cases of IPD, pneumonia and AOM; proportion of sequelae, of hospitalization and GP visits - Direct medical costs and indirect cost - Disutility scores The model provides the following outcomes: - Specific deaths - Number of cases - Costs - QALYs - LYs
Accessibility of the document	None known *Has been presented at the Global Meeting on Implementing New and Under-utilized Vaccines, Work Group Session "Pneumococcal conjugate vaccine cost-effectiveness assessments", Hotel Royal Plaza, Montreux, Switzerland, 16-18 June 2009*
Contact details of authors	Baudouin Standaert, Health Economics _ GCRD, GlaxoSmithKline Biologicals, Tel : +3226565696, Mobile : +32472501501, Email : baudouin.a.standaert@gskbio.com
Elements of Context	--

5.5. Tools and guidelines on the cost of introducing Diarrhoeal vaccine

Several Cost Effectiveness Analysis (CEA) tools have been developed (POLYMOD, GSK Roxanne Model, others), but only the ProVac one was available at the time of doing this desk review.
The descriptive cards of these models are *de facto* based on the description of the models made by the developers themselves.

5.5.1. ProVac Rotavirus Model

ProVac Rotavirus Model is part of TRIVAC. TRIVAC is a tool that integrates cost-effectiveness models for 3 vaccines: conjugate pneumococcal, rotavirus, and *Haemophillus influenza B*.

Title of the document	**ProVac Rotavirus Model**
Authors	Rick Rheingans (Emory) and Andy Clark (LSHTM)
Institution	PAHO; TheTRIVAC model was developed in collaboration with the London School of Hygiene and Tropical Medicine and the Hib Initiative.
Type of document	Excel Tool
Year of issue	2006
Status of development	Developed and tested
Summary	The model predicts the economic (cost saving and cost effectiveness ratios) and epidemiological burden attributable to Rotavirus disease. Vaccination program costs will be generated elsewhere and can then be linked. Some technical information on the model: - The model has been designed for country-level analysis. - The vaccination program runs over a 20 year period from the year of introduction in 2007. The model also includes a year for planning costs in 2006 - Costs and benefits are discounted back to 2006. - The core algorithms within the model predict the efficacy of vaccination on deaths, hospitalisations and outpatient visits. - The model also incorporates features of the more complex LSHTM model i.e. 'longer analytical time horizon / multiple cohorts', 'vaccination timing' and 'rurality', and a time dimension on parameters over time - The efficacy rate is applied to the expected numbers of events occurring in each age group, setting and rurality and the level of protection is adjusted for current age and coverage for current year/number of doses/timing - Results are presented over time by cohort/yr of investment, and year - Sheets labelled by cohort / year of investment contain the

Title of the document	ProVac Rotavirus Model
	calculations Model assumptions: - RV mortality age distribution follows the hospitalisation age distribution - Assume those hospitalised have had 1 outpatient visit previously - Assumes splits between treatment settings are independent of infection rate Some of the current Rotavirus model limitations: - It is designed for Rotavirus immunization programs that are based on current epidemiological trends; - It needs to link with immunization program costing models such as the VIC tool, for the calculation of Cost-Effectiveness outputs such as a C/E ratio; - It is not a comprehensive costing tool for the total EPI program, as it only calculates the disease burden and Cost-Effectiveness ratio of one vaccination at a time. To review combinations of several vaccines, or the whole EPI program, an aggregate disease burden model would have to be used; - In the current version, and due to the difficulty in carrying out these calculations reliably, productivity gains and losses are not taken into account for the cost (and potential benefit) calculations; - It does not automatically optimize the resources for the desired outcomes. This has to be done by trial and experience.
Accessibility of the document	Internet: http://www.paho.org/English/AD/FCH/IM/ProVAc_Models.htm
Contact details of authors	--
Elements of Context	New life-saving vaccines being introduced have significantly higher prices than previous vaccines. As health sector budgets grow slowly, resources have to be allocated more prudently and consider competing options. Decision makers in Latin America and the Caribbean (LAC) increasingly require economic analysis to support decision-making for new vaccines, in addition to demographic, epidemiologic, and management data. The ProVac Initiative provides technical cooperation and strengthens national capacity to make evidence-based, informed decisions in the context of the introduction of new and underutilized vaccines, in particular regarding economic evaluations. The ProVac Initiative has collaborated with leading academic researchers to develop simplified models in Excel for estimating the health and economic Burdens of Disease, the incremental Cost of Programs of new vaccine introduction, and the Cost-Effectiveness of new vaccines.

5.5.2. Guidelines for using the Rotavirus Model

Title of the document	**Guidelines for using the Rotavirus Model**
Authors	Rick Rheingans (Emory U.) and Andy Clark (LSHTM)
Institution	PAHO
Type of document	User's Guide
Year of issue	2006 (Rota Model 5)
Status of development	Developed and tested
Summary	The guidelines of the Rotavirus Excel Tool : - Provided information on how the Excel Tool looks like - Describes the variables used to run the model for a specific country (demographic, vaccination coverage, disease burden, DALY's, health care utilization, visit and bed day cost, medication and diagnostic costs, family direct and indirect costs, vaccination timing, efficacy) - Provides information on the model limitations - Suggests a list of some of the issues and steps that may be needed to be included to plan for an effective decision (Cost Effectiveness ratios, funding needed, efficiency, replacement possibility of new interventions, and so on) and provides an example of such a table/ matrix
Accessibility of the document	*ProVac team*
Contact details of authors	--
Elements of Context	This guideline of the Rotavirus tool has been specially designed for the PAHO Pro-Vac initiative to support the estimation of the incremental costs of new vaccine introductions in Latin America and the Caribbean

5.5.3. *European Model CEA of Rotavirus vaccines -POLYMOD*

The following summary is based only on the information provided by modellers.

Title of the document	**European Model CEA of Rotavirus vaccines** **POLYMOD**
Authors	Mark Jit & Co
Institution	Health Protection Agency & Co
Type of document	Tool
Year of issue	--
Status of development	Developed and tested
Summary	POLYMOD provides a Cost Effectiveness analysis, from the viewpoint either of the health care provider or societal. Model structure and hypothesis - Type of model used: Static cohort model - Model structure: ▪ Age structured cohort model following vaccinated and unvaccinated cohorts. Each age group experience a probability of a rotavirus-related outcome or non-rotavirus-related death ▪ Age group: 1 month for first year of life and 1 year thereafter - Population: single birth cohort - Time horizon: 5 years of age - Non compartmental model. Outcomes are flexible and can include: ▪ Home treated cases, Primary care consultations, Emergency attendances, Outpatient attendances, Inpatient hospitalisations, Nosocomial infections and deaths - Vaccination strategies: infant vaccination with either Rotarix® or Rota Teq® following the national immunization schedule, compared to no vaccination - Costs included: Direct Medical costs and indirect costs. *Authors mentioned also "out of pocket expenses".* - Discounting: three scenarios: 3% for both costs and benefits; 4% for costs, 1.5% for benefits; no discounting - Sensitivity analysis: on herd immunity, perspective, discount rate, choice of vaccine and assumption about mild cases - Outcomes: health care used, costs, LYG, QALY, costs/ QALY gained, cost/episode saved, cost/hospitalisation saved
Accessibility of the document	-- *Has been presented at an Ad Hoc consultation meeting, WHO HQ, Switzerland, October 2009*
Contact details of authors	--
Elements of Context	--

Rotarix analysis of Economics -Roxanne, GSK

The following summary is based only on the information provided by modellers.

Title of the document	Rotarix analysis of Economics Roxanne
Authors	--
Institution	GlaxoSmith Kline Biologicals
Type of document	Tool
Year of issue	--
Status of development	Developed and tested
Summary	- Objectives of the model: ▪ Primary: Cost effectiveness of Rotarix® with no vaccination & other rotavirus vaccines ▪ Secondary: Disease spread in function of age; Budget impact over 5 years; Cost effectiveness of different dose & time schedule - Model structure: Markov Cohort Model in Excel MS ▪ Population: Bith cohort ▪ Cycle length: 1 month & infection period (60 months) ▪ Time horizon: average life time ▪ Comparator: non vaccination; other rotavirus vaccine ▪ Cost perspective: Societal (direct and indirect costs); health care payer ▪ Discount: country specific on cost and effect ▪ Sensitivity analysis: probabilities of events, costs, disutility, Vaccine efficacy after each dose, vaccine compliance, level of fixed herd effect - Data input: cost estimates per health state; utility score per health state; event probability age and non age specific; vaccine efficacy per dose + compliance - Data outputs: Number of events, Costs, QALYs, Incremental Cost Effectiveness Ratio
Accessibility of the document	-- *Has been presented at an Ad Hoc consultation meeting, WHO HQ, Switzerland, October 2009*
Contact details of authors	--
Elements of Context	--

5.5.4. A Markov Model to assess the impact of Rotavirus vaccination -Merck

The following summary is based only on the information provided by modellers.

Title of the document	**A Markov Model to assess the impact of Rotavirus vaccination**
Authors	--
Institution	Merck
Type of document	Tools
Year of issue	--
Status of development	Developed and tested
Summary	The model compares two hypothetical birth cohorts over the first 5 years of life with and without vaccination for rotavirus.
Accessibility of the document	-- *Has been presented at an Ad Hoc consultation meeting, WHO HQ, Switzerland, October 2009*
Contact details of authors	--
Elements of Context	--

5.5.5. *Model and CEA of Rotavirus vaccines –SPMSD*

The following summary is based only on the information provided by modellers.

Title of the document	**Model and CEA of Rotavirus vaccines**
Authors	--
Institution	Sanofi Pasteur MSD
Type of document	Tool
Year of issue	--
Status of development	Developed and tested
Summary	The model objectives are: ▪ To assess the medico-economic impact of rotavirus vaccination ▪ To assess the cost-effectiveness of rotavirus vaccination compared with no vaccination Model description: - Model type: Single cohort, Static model, incidence based decision model, developed in Excel - Population: birth cohort followed-up for 5 years - Constant annual Rotavirus gastroenteritis –related health care resources utilization incidence over 5 years, with a probability distributed by age group - Perspectives: societal - Costs taken into account: ▪ Direct medical costs (eventual vaccine-related adverse effects, health care resources utilization related costs) ▪ Indirect costs (workdays lost and associated costs) - Type of analysis: cost-effectiveness and cost-utility analysis - Discount rates: 4% for costs and 1.5% for benefits - Outcomes: incremental cost effectiveness ratios ▪ Cost per event avoided, cost per LYG, cost per QALY According to its modellers, the model strength and limitations are: - All patients possible medical pathway modelled (risk of re-infection or re-hospitalization due to nosocomial infections not evaluated) - Highly sensitive to inputs uncertainty (incidence data, cost data, utility data) - Indirect benefits of the vaccination not considered (herd immunity, impact on Health care system organization)
Accessibility of the document	-- *Has been presented at an Ad Hoc consultation meeting, WHO HQ, Switzerland, October 2009*
Contact details of authors	--

Elements of Context	--

5.5.6. *Global CEA of Rotavirus vaccines - PATH*

The following summary is based only on the information provided by modellers.

Title of the document	**Global CEA of Rotavirus vaccines**
Authors	--
Institution	PATH
Type of document	Tool
Year of issue	--
Status of development	Developed and tested
Summary	- Model structure: decision analytic model, static model, built in Excel - Population: annual birth cohort of GAVI-eligible countries, followed for 5 years - Perspective: ? - Discounting: 3% for both costs and benefits - Outcomes: impact on mortality over time cost per DALY and cost per death averted
Accessibility of the document	-- *Has been presented at an Ad Hoc consultation meeting, WHO HQ, Switzerland, October 2009*
Contact details of authors	--
Elements of Context	--

5.6. Tools and guidelines on the cost of introducing HPV vaccine

5.6.1. HPV Costing Tool

It can't be provided here information on HVP related costing tool as the latest will be provided by ProVAc team to AMP/SIVAC when finished.

Title of the document	**HPV Costing Tool (?)**
Authors	--
Institution	PROVAC / Harvard University (?)
Type of document	Excel Tool
Year of issue	--
Status of development	Under development + pre tested (workshop)
Summary	Estimate the incremental cost for an HPV vaccination program?
Accessibility of the document	None known
Contact details of authors	--
Elements of Context	ProVac Initiative

5.7. Tools and guidelines on the cost of introducing Hib vaccine

5.7.1. Estimating the potential cost-effectiveness of using Haemophilus Influenzae type B (Hib) vaccine

Title of the document	**Estimating the potential cost-effectiveness of using Haemophilus Influenzae type B (Hib) vaccine**
Authors	Kou U. and Nelson C.
Institution	WHO
Type of document	Guidelines
Year of issue	2001 (Field test version 1)
Status of development	Developed and Tested
Summary	The general recommendation of this guideline is that cost-effectiveness estimates of using conjugate Hib vaccine in a childhood immunization schedule can be generated by combining burden estimates with cost data. The cost data being, from the perspective of the health sector: - Costs of vaccine and its administration - Treatment costs averted as a result of immunization This short document provide some elements of methodology to: - Estimate the most important costs of vaccines and their administration - Estimate treatment costs averted as a result of immunization - Estimate net costs of introducing Hib vaccine - Estimate the cost-effectiveness of introducing the vaccine The perspective recommended is the one of the health sector.
Accessibility of the document	Internet: www.who.int/vaccines-documents/
Contact details of authors	--
Elements of Context	--

5.8. Tools and guidelines on the cost or economic burden of a disease (preventable by vaccination)

5.8.1. Who Guide to identifying the economic consequences of disease and injury

Title of the document	**Who Guide to identifying the economic consequences of disease and injury**
Authors	Department Of Health Systems Financing, Health System and services
Institution	WHO
Type of document	Guidelines
Year of issue	2009
Status of development	Developed
Summary	The guideline provides a review of methodological issues and current practice relating to economic impact studies in health. It also provides some general recommendation on the methodology of such analysis. In more details, the guideline provides: - conceptual foundations of study on economic consequences of disease and injury - At macroeconomic level: ▪ An evaluation of the channel through which disease and injury impact overall economic welfare ▪ General guidelines on what studies on macroeconomic impact should take into consideration and some methodological recommendation ▪ In Annex: a summary of the different types of approaches definition, empirical approach, data requirements, advantages and limitations) - At microeconomic level: ▪ Analytical principles that should guide the measurement and valuing process of this type of studies
Accessibility of the document	Internet: http://www.who.int/choice/publications/d_economic_impact_guide.pdf Hard copy: WHO Press, 20 Avenue Appia, 1211 Geneva 27, Switzerland Fax: +41 22 791 4857; Email: bookorders@who.int
Contact details of authors	--
Elements of Context	Although insufficient as a basis for setting priorities and allocating resources in health – for which data on effectiveness are also needed – economic burden studies may help to identify possible strategies for reducing the cost of disease or injury via appropriate preventive action or treatment strategies. In light with methodological shortcomings of existing literature on economic impact in health studies, as well as the strong continuing demand for economic impact studies in health, WHO is proposing a defined conceptual framework within which the economic impact of

	disease or injury can be considered and appropriately estimated, with a view to enhancing the consistency and coherence of economic impact studies in health.

5.8.2. *Guidelines for estimating the economic burden of diarrhoeal disease with focus on assessing the costs of rotavirus diarrhoea*

Title of the document	**Guidelines for estimating the economic burden of diarrhoeal disease with focus on assessing the costs of rotavirus diarrhoea**
Authors	Immunization, Vaccines & Biologicals Department (WHO/IVB)
Institution	WHO
Type of document	Guidelines
Year of issue	2005
Status of development	Developed
Summary	The guideline presents a method for determining the cost associated with diarrhoeal disease in children under five years of age. Methods for estimating the costs from the viewpoint of the health sector and for the society as a whole are explained. Costs associated with diarrhoea include: - Direct medical costs borne by providers, patients and caregivers - Non direct medical costs (e.g. travel costs) borne by patients/caregivers - Costs of time lost from productive work (indirect costs) borne by patients/caregivers and/or society
Accessibility of the document	Internet: www.who.int/vaccines-documents/ Hard copy: WHO, IVB, CH-1211 Geneva 27, Switzerland Fax: +41 22 791 4227; Email: vaccines@who.int
Contact details of authors	--
Elements of Context	Diarrhoea is one of the most common childhood illnesses, in both developing and developed countries. Rotavirus has been consistently reported to be the single most common cause of diarrhoea worldwide. A recently licensed rotavirus vaccine is therefore expected to have an important role in reducing diarrhoeal incidence and mortality. An estimate of the overall economic burden of diarrhoeal disease can be used for three major purposes and types of analysis: raising awareness and encourage to engage in prevention; planning and budgeting; cost effectiveness analysis of interventions for control of diarrhoea (direct and indirect cost of diarrhoeal could be avoided if effective intervention were introduced to prevent or reduce the severity of the disease).

5.8.3. *Estimating costs for cost effectiveness analysis: Guidelines for managers of diarrhoeal diseases control programmes*

Title of the document	**Estimating costs for cost effectiveness analysis: Guidelines for managers of diarrhoeal diseases control programmes**
Authors	M. Phillips, D.S. Shepard, S.J. Lerman, R.A. Cash
Institution	WHO
Type of document	Guidelines
Year of issue	1988
Status of development	Developed
Summary	The purpose of the manual is to give guidance on how to apply technique of cost effectiveness analysis to Diarrhoeal disease control (CDD) programmes, focusing primarily on case management activities. It goes step by step through the procedure to undertaking a cost effectiveness analysis (CEA): - Planning stages (define the study question, choosing alternatives to compare, describing costs and outcomes which will be measured, etc.) - Calculating costs and effectiveness - Analysis and presentation of the data
Accessibility of the document	WHO Library (ref: WHO/CDD/SER/88.3)
Contact details of authors	--
Elements of Context	Managers of Diarrhoeal disease control (CDD) programmes are never entirely free to organize their programmes as they think best (bureaucratic restrictions, medical conservatism, changing donor policies and limited budgets are some of the constraints they face. Nevertheless, there is considerable scope for decision making and the challenge is to do the best possible given the scarcity of financial and other resources. The economic technique of cost effectiveness analysis is one of the tools available to help choose wisely from a range of alternatives ant to design and implement efficient programmes.

5.8.4. *Generic protocols for cost and cost effectiveness analysis of TB diagnosis and treatment services*

Title of the document	**Generic protocols for cost and cost-effectiveness analysis of TB diagnosis and treatment services**
Authors	Floyd K.
Institution	WHO
Type of document	Guidelines
Year of issue	1999
Status of development	Developed
Summary	The document provides: - Key economic concepts in costs and cost effectiveness analysis - Key issues to consider when designing a cost and cost effectiveness analysis - A protocol for assessing the health care services costs associated with individual components of tuberculosis diagnosis and treatment - Guidelines for the assessment of patients, family and community costs associated with use of tuberculosis services - A protocol for assessing the cost for managing a tuberculosis patient to treatment completion - A protocol for assessing the cost effectiveness of tuberculosis diagnosis and treatment - A protocol for assessing the total health services cost of tuberculosis diagnosis and treatment services at district, regional and national level Each protocol is associated with a specific template of questionnaires
Accessibility of the document	Internet: www.who.int/vaccines-documents/
Contact details of authors	--
Elements of Context	Developed through a WHO project entitled “Community care for TB in Africa”. It was made for policy makers and planners to know the cost and cost effectiveness of their services to justify continued allocation of resources to their programme.

5.9. Tools and guidelines on presentation of economic evaluation at National Advisory Committees

5.9.1. Guidance for health economic studies presented to the Advisory Committee on Immunization Practice (ACIP)

Title of the document	**Guidance for health economic studies presented to the Advisory Committee on Immunization Practice (ACIP)**
Authors	Lieu T. & al.
Institution	CDC / ACIP Ad Hoc Working Group on Economic Analyses
Type of document	Guidelines
Year of issue	2007
Status of development	Developed
Summary	Provide a framework for the description and presentation of methods to use to examine the economics of a vaccine-related issue.
Accessibility of the document	Internet: http://www.cdc.gov/vaccines/recs/acip/economic-studies.htm
Contact details of authors	Dr Jean Clare Smith, MD, MPH, Assistant to the Director for Immunization Policy, CDC/CCID/NCIRD/ISD, Jis6@cdc.gov
Elements of Context	In recent years, as the number and cost of vaccines have steadily increased, the importance of economic analyses in establishing policy for addition of new vaccines to routine immunization schedules has received increasing recognition. Cost-effectiveness and other types of economic analyses often are presented to ACIP members, who have requested that guidance be adopted to ensure that high quality economic data are presented in a standardized format. To ensure that economic data presented to the Committee and its Working Groups are uniform in presentation, understandable, and of the highest quality, lead economists and the Health Economics Research Group (HERG) at CDC have developed Guidance for Health Economics Studies Presented to the ACIP. The guidance specifically mandates technical review of any economic study that is presented to the ACIP. Materials to be included are a document or report that provides the methods and results of the study, a slide set and/or other presentation material.

5.9.2. *Economic study slides templates*

Title of the document	**Economic study slides templates**
Authors	--
Institution	CDC / ACIP Ad Hoc Working Group on Economic Analyses
Type of document	Templates
Year of issue	--
Status of development	Developed
Summary	Templates of power point presentation to present at ACIP Working Group results of economic studies on immunization.
Accessibility of the document	Internet: http://www.cdc.gov/vaccines/recs/acip/economic-studies.htm
Contact details of authors	--
Elements of Context	*See Guidance for health economic studies presented to the Advisory Committee on Immunization Practice (ACIP)*

6. Catalogue of existing training in health economics and economics of immunization

6.1. Training in health economics

Though training in health economics is beyond the scope of this desk review, one reference has been retained. This choice have been made because it's a very clear training witch would provide to the members of National ITAG who would not be familiar with this type of study a good picture on how an economic evaluation should be frame.

6.1.1. Economic evaluation of Public Health Preparedness and Response Efforts

Name of the Training	Economic evaluation of Public Health Preparedness and Response Efforts
Authors	Norbert Denil, OWCD (Webmaster), Kwame Owusu-Edusei, NIOSH (Content), Kakoli Roy, OWCD (Project Supervision), Amanda Schofield (Content), Ara Zohrabian, OWCD (Content)
Institution	CDC
Type of document	E - Learning
Year of issue	--
Status of development	Developed
Summary	Introductory course on applying economic evaluation techniques to public health preparedness and response strategies. This course is targeted to meet the needs of public health professionals at the local, state, or federal level. It explains why to do an economic evaluation, how to frame an economic evaluation, what are the different types of economic analyses. It also provides several case interactive studies (including on vaccination/ pneumococcal). A glossary is also available.
Accessibility of the document	http://www.cdc.gov/owcd/EET/Preface/Preface.html
Contact details of authors	Norbert Denil (Site design and production) 321-633-6150 ngd1@cdc.gov ; Ara Zohrabyan (Technical content) 404-498-6322 aqz0@cdc.gov
Elements of Context	--

6.2. Training in economics of immunization

6.2.1. EPIVAC

Name of the Training	EPIVAC
Authors	Lévy P. (University Paris Dauphine), Lafarge H. (University Paris Dauphine), M. Raffinot (University Paris Dauphine), Kaddar M. (WHO/IVB), Colombini A. (AMP), Guébo A. (Ministry of Health, Côte d'Ivoire), Gnato H. (Ministry of Economy and Finance, Côte d'Ivoire)
Institution	AMP
Type of document	E Learning (Web based and/or interactive CDROM)
Year of issue	2009 (last version; first version in 2002)
Status of development	Developed
Summary	Courses on EPI cost, economic evaluation of EPI, economic efficiency of EPI, financial sustainability of EPI, financing mechanism and sources of EPI, budget.
Accessibility of the document	On request (password for the E learning platform and/or CDROM) Web site dedicated: http://epivac.org/
Contact details of authors	epivac@aamp.org
Elements of Context	EPIVAC is a training program validated by the GAVI Board in 2001. EPIVAC goal is to strengthen vaccination programs by training program managers, usually district level officers, to improve the vaccine operations and performance within their own districts. The competence of these managers is critical for achieving quality performance and sustainability of immunization programs. EPIVAC programme combine two area of competency: vaccinologie and management. It is validated by a Inter University Diploma in Organization and Management of Public vaccine-Prevention programs in Developing countries. The Diploma is delivered by two universities engaged in a North South partnership: the University of Medicine Of Cocody Abidjan (Côte d'Ivoire), and the University of Economics and Management of Paris Dauphine (France).

6.2.2. Advanced Immunization Management (AIM)

Name of the Training	**Advanced Immunization Management (AIM)**
Authors	--
Institution	PATH,
Type of document	E learning (web based)
Year of issue	--
Status of development	Developed
Summary	Courses on cost, economic evaluation, financial sustainability, budget.
Accessibility of the document	Internet: http://aim.path.org/
Contact details of authors	PATH, AIM e-Learning Project, 13 Chemin du Levant, 01210 Ferney-Voltaire, France, Fax: +33 450 28 04 07, info@aim.path.org
Elements of Context	The AIM e-Learning tool is designed to provide comprehensive information to support immunization programme managers at all stages of country-level decision-making.

6.2.3. Mid-Level Management Course for EPI Managers (MLM)

Name of the Training	Mid-Level Management Course for EPI Managers (MLM)
Authors	--
Institution	WHO
Type of document	Printed document delivered to the trainees during the MLM workshop.
Year of issue	--
Status of development	Developed
Summary	Information / Training on EPI costs, Advocacy for EPI funding, Financial Sustainability
Accessibility of the document	Internet: http://www.afro.who.int/ddc/vpd/epi_mang_course/ *Unfortunately Modules on costing and financing are not available on internet*
Contact details of authors	--
Elements of Context	Given the increasing complexity of the working environment for staff involved in immunisation, WHO AFRO identified a need to review training requirements to respond to the evolution of the EPI environment and trends. The experience acquired during field tests and from training EPI staff from countries of the Region shows that: - EPI managers need to improve their technical skills in management, co-ordination, planning, communication, monitoring and evaluation - Newly recruited programme managers need training to increase their knowledge and confidence in the management of the programme - Experienced EPI staff also has specific training needs to update their knowledge in the problem-solving approach and in the modern theory of EPI. The aim of MLM training is to enable immunisation managers at all levels to acquire skills in planning, management, monitoring and evaluation. It will also give them the knowledge to supervise and support immunisation operations such as service delivery, the cold chain and logistics, purchase and quality control of vaccines, communication in support of the programme. The intermediate course also proposes a general framework for resolving problems encountered in EPI. Hence, the problem-solving approach is the basic teaching method used in all the modules of the intermediate course (a detailed description of problem solving is presented in Module 1: Problem Solving Approach to Immunisation Services and Management).

Annexe:
Table descriptive of overall guidelines, tools and training in economics of immunization

Please refer to the Excel files.