

WHO/IVB/19.10
ORIGINAL: ENGLISH

WHO guide for standardization of economic evaluations of immunization programmes

EDITION II
October 2019

Immunization, Vaccines and Biologicals



**World Health
Organization**

**This document was produced by the Initiative for Vaccine Research (IVR)
of the Department of Immunization, Vaccines and Biologicals**

WHO guide for standardization of economic evaluations
of immunization programmes, 2nd edition
Ordering code: WHO/IVB/xx.xx
Published: October 2019

This publication is available on the Internet at: <https://apps.who.int/iris/>

Copies of this document as well as additional materials on
immunization, vaccines and biologicals may be requested from:
World Health Organization
Department of Immunization, Vaccines and Biologicals
CH-1211 Geneva 27, Switzerland
Fax: + 41 22 791 4227 • Email: vaccines@who.int

© World Health Organization 2019

Some rights reserved. This work is available under the Creative Commons Attribution-NonCommercial-ShareAlike 3.0 IGO licence (CC BY-NC-SA 3.0 IGO; <https://creativecommons.org/licenses/by-nc-sa/3.0/igo>).

Under the terms of this licence, you may copy, redistribute and adapt the work for non-commercial purposes, provided the work is appropriately cited, as indicated below. In any use of this work, there should be no suggestion that WHO endorses any specific organization, products or services. The use of the WHO logo is not permitted. If you adapt the work, then you must license your work under the same or equivalent Creative Commons licence. If you create a translation of this work, you should add the following disclaimer along with the suggested citation: "This translation was not created by the World Health Organization (WHO). WHO is not responsible for the content or accuracy of this translation. The original English edition shall be the binding and authentic edition".

Any mediation relating to disputes arising under the licence shall be conducted in accordance with the mediation rules of the World Intellectual Property Organization.

Suggested citation. WHO guide for standardization of economic evaluations of immunization programmes, 2nd edition. Geneva: World Health Organization; 2019. Licence: CC BY-NC-SA 3.0 IGO.

Cataloguing-in-Publication (CIP) data. CIP data are available at <http://apps.who.int/iris>.

Sales, rights and licensing. To purchase WHO publications, see <http://apps.who.int/bookorders>. To submit requests for commercial use and queries on rights and licensing, see <https://www.who.int/publishing/copyright/>.

Third-party materials. If you wish to reuse material from this work that is attributed to a third party, such as tables, figures or images, it is your responsibility to determine whether permission is needed for that reuse and to obtain permission from the copyright holder. The risk of claims resulting from infringement of any third-party-owned component in the work rests solely with the user.

General disclaimers. The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of WHO concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted and dashed lines on maps represent approximate border lines for which there may not yet be full agreement.

The mention of specific companies or of certain manufacturers' products does not imply that they are endorsed or recommended by WHO in preference to others of a similar nature that are not mentioned. Errors and omissions excepted, the names of proprietary products are distinguished by initial capital letters.

All reasonable precautions have been taken by WHO to verify the information contained in this publication. However, the published material is being distributed without warranty of any kind, either expressed or implied. The responsibility for the interpretation and use of the material lies with the reader. In no event shall WHO be liable for damages arising from its use.

WHO/IVB/19.10
ORIGINAL: ENGLISH

WHO guide for standardization of economic evaluations of immunization programmes

**EDITION II
October 2019**

Immunization, Vaccines and Biologicals



**World Health
Organization**

Contents

<i>1.1 Preface</i>	<i>xi</i>
<i>1.2 Acknowledgements</i>	<i>xii</i>
<i>1.3 Abbreviations and acronyms</i>	<i>xiii</i>
<i>1.4 Glossary of terms</i>	<i>xv</i>
Chapter 1: Introduction	1
1.1 Evidence-based decision-making.....	1
1.2 Existing guidance and recent changes in economic evaluation.....	2
1.3 Overall aim and target audience.....	2
1.4 Structure of the guide.....	3
Chapter 2: Economic evaluation of health care	4
2.1 Different types of economic evaluation.....	4
2.2 The role of economic evaluation.....	5
2.3 Budget impact analysis/financing of programme implementation.....	6
Chapter 3: Framing the analysis	8
3.1 Target audience.....	8
3.2 Study question.....	8
3.3 Type of evaluation.....	9
3.4 Target population.....	12
3.5 Comparator.....	12
3.6 Perspective.....	15
3.7 Time frame and analytic horizon.....	15
3.8 Scope of benefits.....	16
3.9 Recommendations.....	17
Chapter 4: Estimating costs	18
4.1 Approaches to costing.....	18
4.1.1 Bottom-up and top-down costing.....	18
4.1.2 Full and incremental costing.....	18
4.1.3 Choosing the price level and currency.....	19

4.2	Identification: which costs to include?	21
4.2.1	Costs for the health sector	22
4.2.2	Costs for patients and their families, including lost productivity	23
4.2.3	Future unrelated costs	24
4.3	How to measure resource use?	25
4.3.1	Costs for the health sector	25
4.3.2	Costs for patients and their families, including lost productivity	26
4.4	Valuing resources	27
4.5	Valuing productivity losses/gains	28
4.6	Vaccination-specific costing issues	29
4.7	Recommendations	31
Chapter 5: Assessing the effects of the vaccination programme		32
5.1	Vaccine efficacy	32
5.2	Vaccine effectiveness	36
5.2.1	Vaccine delivery and uptake (coverage)	36
5.2.2	Adverse events following immunization (AEFI)	37
5.2.3	Duration of protection	39
5.3	Choosing and valuing outcomes	39
5.4	Recommendations	41
Chapter 6: Modelling		42
6.1	Specific parameters for infectious disease epidemiology	42
6.1.1	The reproduction number	42
6.1.2	Incidence and the force of infection	44
6.2	Impact of vaccination	45
6.3	Modelling infectious diseases	49
6.3.1	Basic types of infectious disease models	49
6.3.2	Choosing between different types of model	52
6.4	Practical implementation options of static and dynamic models	61
6.5	Model validation	63
6.5.1	Model verification and calibration	63
6.5.2	Convergent validity	64
6.5.3	Face validity	65
6.5.4	Predictive validity and post-implementation economic evaluation	65
6.6	Recommendations	65

Chapter 7: Discounting	66
7.1 Why vaccination programmes are sensitive to the choice of discount rates.....	66
7.2 Equal or differential discounting.....	66
7.3 Other discounting schemes.....	67
7.4 Recommendations.....	67
Chapter 8: Estimating, presenting and interpreting cost-effectiveness data under uncertainty	68
8.1 Why accounting for uncertainty?.....	68
8.2 How should costs and effects be linked?.....	68
8.3 Which uncertainties to account for?.....	70
8.3.1 Types and sources of uncertainty.....	70
8.3.2 Which uncertainties (not) to account for?.....	73
8.3.3 How (large) should the uncertainties be specified?.....	73
8.3.4 How to be transparent on the uncertainties (not) included?.....	75
8.4 Propagating the uncertainties into the results of the economic evaluation.....	76
8.4.1 Propagating uncertainty in a deterministic way.....	76
8.4.2 Propagating uncertainty in a probabilistic way.....	76
8.4.3 Deterministic and probabilistic sensitivity analysis combined.....	77
8.5 Determining the most optimal strategy.....	77
8.5.1 Deterministic cost-effectiveness analysis (DETCEA).....	77
8.5.2 Probabilistic cost-effectiveness analysis (PROBCEA).....	82
8.5.3 Deterministic and probabilistic cost-effectiveness analysis combined.....	88
8.6 Identifying what causes (decision) uncertainty.....	88
8.6.1 How does the outcome of interest change when using different input parameter value(s), and/or different model(s) and/or methodological choice(s)?.....	89
8.6.2 How much do the model choices impact the results?.....	90
8.6.3 Which uncertain aspects of the disease and interventions under study induce most uncertainty in incremental costs, incremental effects, cost-effectiveness ratios and/or net benefits?.....	91
8.6.4 Which uncertain aspects of the disease and interventions under study induce most decision uncertainty?.....	91
8.7 General approach and presenting results to decision makers.....	91
8.8 Recommendations.....	92

Chapter 9: Economic evaluation and the decision-making process	93
9.1 The use of economic evaluation in policy and practice.....	93
9.2 Decision-making bodies.....	94
9.3 Equity-related criteria.....	95
9.4 Potential “broader” benefits of vaccines.....	96
9.5 Budget-impact and multi-product analyses.....	99
9.6 Assessing models made by third parties.....	100
9.7 Recommendations.....	100
Chapter 10: Conclusions and summary of recommendations	101
References	111
Appendix 1: Sources of data	132
Appendix 2: List of useful websites	134

预览已结束，完整报告链接和二维码如下：

https://www.yunbaogao.cn/report/index/report?reportId=5_24999

