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ISPOR Task Force Report

Economic Analysis of Vaccination Programs



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ABSTRACT

This report provides recommendations for budget holders and decision makers in high-, middle, and low-income countries requiring economic analyses of new vaccination programs to allocate scarce resources given budget constraints. ISPOR's Economic Evaluation of Vaccines Designed to Prevent Infectious Disease: Good Practices Task Force wrote guidelines for three analytic methods and solicited comments on them from external reviewers. Cost-effectiveness analyses use decision-analytic models to estimate cumulative changes in resource use, costs, and changes in quality- or disability-adjusted life-years attributable to changes in disease outcomes. Constrained optimization modeling uses a mathematical objective function to be optimized (e.g. disease cases avoided) for a target population for a set of interventions including vaccination programs within established constraints. Fiscal health modeling estimates changes in net present value of government revenues and expenditures attributable to changes in disease outcomes. The task force recommends that those

designing economic analyses for new vaccination programs take into account the decision maker's policy objectives and country-specific decision context when estimating: uptake rate in the target population; vaccination program's impact on disease cases in the population over time using a dynamic transmission epidemiologic model; vaccination program implementation and operating costs; and the changes in costs and health outcomes of the target disease(s). The three approaches to economic analysis are complementary and can be used alone or together to estimate a vaccination program's economic value for national, regional, or subregional decision makers in high-, middle-, and low-income countries.

Keywords: constrained optimization modeling, cost-effectiveness analysis, fiscal health modeling, vaccination program.

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Introduction

Many new vaccines for a wide range of infectious diseases are being introduced around the world. Their introduction requires increasing amounts of public health funds at a time of increasing pressure on health care budgets globally. Low-income countries have been supported in their vaccination programs by organizations such as Gavi, the Vaccine Alliance (www.gavi.org). Nevertheless, the support might decline when a low-income country makes the transition to middle-income status [1].

Budget holders and decision makers responsible for adding or changing vaccination programs in high-, middle-, and low-

income countries are requesting economic analyses of new vaccination programs to help allocate scarce resources in the context of budget constraints. These economic analyses should include not only cost impacts but also direct health benefits and broader health system consequences [2,3].

Vaccines can prevent infectious diseases by stimulating an individual's immune system, thereby reducing morbidity and possibly increasing life expectancy [4]. The populations eligible for a new vaccine may be very large and although individual benefits are uncertain and may occur many years in the future, population-level direct and indirect health system benefits may be substantial.

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1098-3015/\$36.00 – see front matter Copyright © 2018, ISPOR—The Professional Society for Health Economics and Outcomes Research.

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<https://doi.org/10.1016/j.jval.2018.08.005>

Background to the Task Force

The proposal to initiate the ISPOR Economic Evaluation of Vaccines Designed to Prevent Infectious Disease: Good Practices Task Force was evaluated by the ISPOR Health Science Policy Council and was then recommended to the ISPOR Board of Directors for approval in November 2015.

The task force comprised international subject matter experts representing a diverse range of stakeholder perspectives (academia, research organizations, government, regulatory agencies, and commercial entities). Considerable effort was made to ensure international representation of health care systems and knowledge of cost-effectiveness analysis, constrained optimization, and fiscal health modeling. The task force met approximately every 5

weeks by teleconference and in person at ISPOR conferences. All task force members reviewed many drafts of the report and provided frequent feedback in the form of both oral and written comments.

To ensure that ISPOR Good Practices Task Force Reports are consensus reports, findings and recommendations were presented and discussed at the ISPOR Congress meetings in Vienna, Austria, and the international meetings in Washington, DC, and Boston, MA. In addition, the draft reports were circulated to the task force’s review group at three separate times. All reviewer comments were considered and addressed as appropriate in subsequent versions of the report. Most were substantive and constructive comments, which helped in improving the report.

Globally, changes in vaccination programs are made in very different public health environments, and governmental involvement in regulating and financing these programs varies. Decision makers everywhere need to base their decisions about changes in vaccination programs on their policy objectives as well as on their perceived interests (e.g., values and preferences) and obligations (e.g., policies, regulations, and constraints), which we call their “decision contexts” [5]. Table 1 presents examples of decision makers and their policy objectives for vaccination programs.

vaccination, but some unique issues regarding vaccines that prevent infectious diseases must be taken into account in the economic assessments. In particular, vaccination programs can generate substantial “externalities” (indirect effects on third parties) that are not necessarily observed with other types of medical interventions, such as for treatment or prevention of noninfectious diseases (Table 2). These indirect effects should normally be considered in a full economic assessment of the vaccination program. Epidemiologic models designed to estimate the full health outcomes of a vaccination program are required to assess the indirect health effects on third parties [6].

Purpose of This Guidance

We present guidance for economic analyses of new vaccination programs using methods that are relevant to decision makers with different policy objectives within different decision contexts. These objectives and contexts are not exclusive to

Proposed Economic Analysis Methods

This report presents guidelines for conducting three types of economic analyses for vaccination programs in high-, middle-,

Table 1 – Decision makers and their policy objectives.

Decision makers	Policy objectives
<ul style="list-style-type: none"> • Those responsible for developing new vaccines (commercial or public enterprises) • Those responsible for allocating funds available for vaccination programs within a country • Medical specialists (e.g., in infectious diseases and pediatrics) • Those responsible for health planning, budget development, and management of community-based programs • Ministries of health, health technology assessment agencies, national immunization technical advisory groups (in the public sector), and leaders of public and private insurance plans • Senior officers of industrial federations, trade unions, or local workers’ compensation boards • Senior administrators of public service organizations • Leaders of international funding agencies (donors) or nongovernmental organizations • Ministers of finance with broad social objectives • General population 	<ul style="list-style-type: none"> • Allocate funding to vaccine research for different diseases on the basis of potential outcomes and return on investment • Allocate limited funds to vaccination programs by investing in the direct purchase and delivery of vaccines as well as surveillance, information gathering, and other activities to support successful vaccine implementation and use • Provide counsel to policymakers and other decision makers by serving on advisory councils • Choose the amount of health care resources to commit to vaccination programs while taking into consideration claims on budgets for health promotion and other prevention and treatment interventions • Choose vaccination or other prevention or treatment programs for public or private insured bundles • Decide whether to introduce a new workplace vaccination program to reduce employee productivity losses • Decide whether to require employees to be vaccinated to protect employees and others who are in contact with them, such as patients or family members • Determine whether to fund vaccine development and delivery programs through domestic institutions or vertically (e.g., in their own facilities or through other nongovernmental providers) or other priorities • Appraise the claims for funding vaccination programs and the health sector more generally and compare those claims with those for funding other needed infrastructure • Decide on vaccination preferences for themselves and their family

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