

Cost-effectiveness evidence – a case study

This document is intended to support immunization programme managers and staff in their efforts to secure sustainable funding for immunization.

HOW TO USE THIS DOCUMENT

It is important that decision-makers and partners appreciate the importance of immunization, not just as a public health intervention but as a national investment that yields socioeconomic returns and health care savings.

This document presents summaries and key findings from a cost-effectiveness study. It is one of ten such studies drawn from evidence published in peer-reviewed journals and official documentation. The summaries can be drawn upon to support your

country's efforts to raise the profile of immunization and ensure continued investment in it within the context of health care prioritization.

Use the summaries as inspiration, to prepare for a meeting or to hand out to stakeholders.

The case studies will help most when they are used to help paint a national picture and a strong country-specific case for continued support in immunization. Present the studies alongside descriptions of the national issues and challenges. If available, supplement them with your own national data. If the same data is not available, consider using other national data that can serve as a proxy.



Cost-effectiveness evidence for sustaining a vaccine

Case study: United States – polio¹

KEY FINDINGS:

A retrospective cost-effectiveness analysis for polio vaccination was conducted in the United States (U.S). Key findings included the following.

In retrospect, the U.S. polio vaccination programme is a cost-saving intervention.

In the period 1955-2015, the U.S. polio vaccination programme is estimated to have:

- prevented over 160 000 deaths;
- averted about 1.1 million cases of paralytic polio.

Due to treatment cost savings, the net economic benefit is approximately \$180 billion (2002 US\$).

If the time horizon is extended to 2099, polio vaccination is predicted to prevent 2.3 million more cases.

Methods

Estimated economic and health outcomes were calculated from the societal perspective comparing each new polio intervention with the existing polio intervention during four major periods in U.S. polio vaccination history - 1955, 1961, 1980 (mid-point of transition period) and 1997.

The total vaccination costs for a given year were calculated from the cost of vaccine doses distributed (plus wastage) minus the net treatment costs saved from prevented polio cases.

Predicted health and economic outcomes for status quo options were calculated using a dynamic disease transmission model.

The history of polio vaccination in the USA

- 1955** Salk inactivated poliovirus vaccine (IPV) was introduced and paralytic polio incidence dropped significantly
- 1961** Monovalent oral poliovirus vaccine (OPV) was introduced
- 1963** Monovalent OPV switched to trivalent OPV
- 1971** More cases of vaccine-associated paralytic polio (VAPP) than paralysis from wild polioviruses begin to be reported
- 1979** Circulating wild polioviruses were eliminated and the last indigenous case occurred in 1979
- 1997** Transition started from almost exclusive trivalent OPV to enhanced-potency IPV (eIPV)
- 2000** eIPV used exclusively assumed until 2015

¹ Thompson KM and Duintjer Tebbens RJ. (2006). Retrospective Cost-Effectiveness Analyses for Polio Vaccination in the United States. Risk Analysis, 26, 6.

Results

Health impact 1955-2015

Polio cases prevented	1.1 million
Deaths averted	160 000

Economic impact 1955-2015

Discounted cost of vaccine (US\$ 2002)	US\$ 36.4 billion
Treatment costs saved (US\$ 2002)	US\$ 215 billion
Net costs saved (US\$ 2002)	US\$ 178 billion

Cost and effectiveness of the polio immunization programme in the United States 1955-2015

YEAR OF DECISION	1955	1955	1961	1980	1997
LAST YEAR IN MODEL	2015	2015	2015	2015	2015
INTERVENTION	ACTUAL PROGRAMME	IPV INDEFINITELY	OPV INDEFINITELY	IPV INDEFINITELY	IPV INDEFINITELY
COMPARATOR PROGRAM	NO PROGRAMME	NO PROGRAMME	IPV INDEFINITELY	OPV INDEFINITELY	OPV INDEFINITELY
CUMULATIVE DISCOUNTED BENEFITS					
COSTS (BILLIONS, US\$ 2002)	-180	-110	-76	3.5	1.9
PARALYTIC CASES (INCLUDING DEATHS) PREVENTED*	480,000	340,000	160,000	200	130
DEATHS PREVENTED*	73,000	52,000	23,000	30	20
CUMULATIVE NET BENEFIT (BILLIONS US\$ 2002)	840	580	290	-3.2	-1.7

*1955 NET PRESENT VALUE