

Framing an Economic Evaluation

Online Workshop On Health Economics

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 - Objective
 - Audience
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 - Specifying intervention and comparator
 - Target population

Objective of Analysis

- 'What is' versus 'What if' analysis
- Is it for generating evidence or influencing policy?
- What use are you going to put your findings to?

Example: 'What is'

- Cost-effectiveness of m-health Intervention by Community Health Workers for Reducing Maternal and Newborn Mortality in Rural Uttar Pradesh, India. (2015-16)



Example: 'What if'

- Cost-effectiveness of Safety Engineered Syringes for therapeutic use in India and Punjab State. (2017-18)



Audience for Evaluation

- Government
- Financing intermediaries, eg. Insurance
- International organizations
- Bilateral aid agencies
- NGOs
- Pharmaceutical companies
- Hospitals

Perspective

- Patient
- Health system/ hospital/ insurer
- Societal

Perspective: Health System

Cost effectiveness of targeted HIV prevention interventions for female sex workers in India

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ABSTRACT

Objective To ascertain the cost effectiveness of targeted interventions for female sex workers (FSW) under the National AIDS Control Programme in India.

Methods A compartmental mathematical Markov state model was used over a 20-year time horizon (1995–2015) to estimate the cost effectiveness of FSW targeted interventions, with a health system perspective. The

after self-disclosure of HIV-positive status by the FSW to an outreach peer worker. Currently, there are more than 1500 targeted intervention projects, of which more than 1200 are funded by the National AIDS Control Organization (NACO).²

Case studies from India have shown the effectiveness of targeted interventions for FSW in reducing risky sexual behaviour.^{3–5} Other studies

Perspective: Societal

Cost-Effectiveness of Autologous Stem Cell Treatment as Compared to Conventional Chemotherapy for Treatment of Multiple Myeloma in India

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Abstract Recent innovations in treatment of multiple myeloma include autologous stem cell transplantation (ASCT) along with high dose chemotherapy (HDC). We undertook this study to estimate incremental cost per quality adjusted life year gained (QALY) with use of ASCT along with HDC as compared to conventional chemotherapy (CC) alone in treatment of multiple myeloma. A combination of decision tree and markov model

From a societal perspective, ASCT was found to incur an incremental cost of INR 334,433 per QALY gained. If the ASCT is initiated early to patients, the incremental cost for ASCT was found to be INR 180,434 per QALY gained. With current mix of patients, stem cell treatment for multiple myeloma is not cost effective at a threshold of GDP per capita. It becomes marginally cost-effective at 3-times the GDP per capita threshold. However, accounting for the

Perspective: Societal

Cost-effectiveness of *Haemophilus influenzae* type b (Hib) vaccine introduction in the universal immunization schedule in Haryana State, India

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Objective In India, *Haemophilus influenzae* type b (Hib) vaccine introduction in the universal immunization programme requires evidence of its potential health impact and cost-effectiveness, as it is a costly vaccine. Since childhood mortality, vaccination coverage and health service utilization vary across states, the



Analytic Horizon

- Period of time covered by the analysis
- Criteria:
 - Cover all main costs and benefits
 - Allow for seasonal or other cyclical variation
 - Cover the period over which intervention is set up, implemented and run

Time Horizon: Lifetime

Cost-Effectiveness of Human Papillomavirus Vaccination for Adolescent Girls in Punjab State: Implications for India's Universal Immunization Program

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BACKGROUND: Introduction of human papillomavirus (HPV) vaccination for adolescent girls is being considered in the Punjab state of India. However, evidence regarding cost-effectiveness is sought by policy makers when making this decision. The current study was undertaken to evaluate the incremental cost per quality-adjusted life-years (QALYs) gained with introduction of the HPV vaccine compared with a no-vaccination scenario. **METHODS:** A static progression model, using a combination of decision tree and Markov models, was populated using epidemiological, cost, coverage, and effectiveness data to determine the cost-effectiveness of HPV vaccination. Using a societal perspective, lifetime costs and consequences (in terms of QALYs) among a cohort of 11-year-old adolescent girls in Punjab state were modeled in 2 alternate scenarios with and without vaccination. All costs and consequences were discounted at a rate of 3%. **RESULTS:** Although immunizing 1 year's cohort of 11-year-old girls in Punjab state costs Indian National Rupees (INR) 135 million (US dollars [USD] 2.08 million and International dollars [Int\$] 6.25 million) on an absolute basis, its net cost after accounting for treatment savings is INR 38 million (USD 0.58 million and Int\$ 1.76 million). Incremental cost per QALY gained for HPV vaccination was found to be INR 73 (USD 1.12 and Int\$ 3.38). Given all the data uncertainties, there is a 90% probability for the vaccination strategy to be cost-effective in Punjab state at a willingness-to-pay threshold of INR 10,000, which is less than one-tenth of the per capita gross domestic product. **CONCLUSIONS:** HPV vaccination appears to be a very cost-effective strategy for Punjab state, and is likely to be cost-effective for other Indian states. *Cancer* 2017;000:000-000. © 2017 American Cancer Society.

Time Horizon: 15 years

Cost Effectiveness of Implementing Integrated Management of Neonatal and Childhood Illnesses Program in District Faridabad, India

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Abstract

Introduction

Despite the evidence for preventing childhood morbidity and mortality, financial resources are cited as a constraint for Governments to scale up the key health interventions in some countries. We evaluate the cost effectiveness of implementing IMNCI program in India from a health system and societal perspective.

Specifying the Intervention

- Who?
- Does what?
- To whom?
- Where?
- How often?
- Outcomes?

Example: Who Does What

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Who:

- ❖ Persons who did trainings
- ❖ ANMs, ASHAs and AWWs
- ❖ Supervisors of frontline workers

What:

- ❖ Trainings
- ❖ Improved management of childhood illnesses
- ❖ Behaviour change communication (BCC)
- ❖ Health system strengthening

remained the respondent in these surveys conducted at different time points. The intervention included training the frontline workers (auxiliary nurse midwife (ANM), child care workers or *anganwadi* workers (AWW) and accredited social health activists (ASHA)) on clinical algorithms for management of sick children. This enhanced their skills to assess, diagnose and treat a sick child. Besides the health workers, orientation sessions were conducted for traditional birth attendants and registered medical practitioners. AWW also performed home visits for newborn care. Newborn and child care practices at household level were improved through a behaviour change communication campaign involving women group meetings, installation of wall paintings and banners.

Example: Whom and Where

A cluster randomized trial to assess the impact of IMNCI was conducted from January 2007 to April 2010 in district Faridabad of Haryana state in India [12]. Impact was assessed in terms of reduction in infant mortality, infant morbidity (i.e. pneumonia and diarrhoea) and neonatal severe illness (Table 1). IMNCI program was implemented in 9 primary health centres (PHCs), with a total population of 537915. Remaining 9 PHCs, which catered to 587,213 population of Faridabad district, implemented routine child health services without IMNCI. A pregnancy surveillance was done in which 77587 pregnant women were identified and registered in the population under 18 PHCs (intervention and control arm) of district Faridabad. Outcome of the pregnancy was captured during the period from 2008–2010 through multiple contacts. A newborn cohort was identified based on the baseline pregnancy surveillance. This newborn cohort was followed up at 2 time points i.e. 6 months and 1 year from 2008 to 2010. Mothers

Where and Whom: Community based program for improved management of newborn and child illnesses

Example: How often

A cluster randomized trial to assess the impact of IMNCI was conducted from January 2007 to April 2010 in district Faridabad of Haryana state in India [12]. Impact was assessed in terms of reduction in infant mortality, infant morbidity (i.e. pneumonia and diarrhoea) and neonatal severe illness (Table 1). IMNCI program was implemented in 9 primary health centres (PHCs), with a total population of 537915. Remaining 9 PHCs, which catered to 587,213 population of Faridabad district, implemented routine child health services without IMNCI. A pregnancy surveillance was done in which 77587 pregnant women were identified and registered in the population under 18 PHCs (intervention and control arm) of district Faridabad. Outcome of the pregnancy was captured during the period from 2008–2010 through multiple contacts. A newborn cohort was identified based on the baseline pregnancy surveillance. This newborn cohort was followed up at 2 time points i.e. 6 months and 1 year from 2008 to 2010. Mothers remained the respondent in these surveys conducted at different time points. The intervention included training the frontline workers (auxiliary nurse midwife (ANM), child care workers or *anganwadi* workers (AWW) and accredited social health activists (ASHA)) on clinical algorithms for management of sick children. This enhanced their skills to assess, diagnose and treat a sick child. Besides the health workers, orientation sessions were conducted for traditional birth attendants and registered medical practitioners. AWW also performed home visits for newborn care. Newborn and child care practices at household level were improved through a

Contacts: Multiple contacts

What Comparator?

- Potential options
 - Current practice: single or mix of interventions
 - Best available evidence
 - Doing nothing: No intervention or no care at all
 - Alternate levels of intensity for new intervention

Example: Comparator

Intervention	Comparator	Comparator Type
Safety Engineered Syringes (SES)	Disposable syringe	Current practice
HIV Targeted Interventions (FSW)	Mass media	Current practice
Integrated Management of Neonatal and Childhood Illnesses (IMNCI)	Routine care	Current practice
Autologous Stem Cell Transplantation (ASCT)	Conventional Chemotherapy (CC)	Current practice
HPV Vaccination	No Vaccination	Do nothing
M-health program	Routine care	Current practice

Target Population

- Population group for whom intervention is intended (Vary by age, gender, disease and geography and this variation has an effect on cost-effectiveness)

Heterogeneity

Why considering heterogeneity in CEA is important?

Heterogeneity is important because:

- Varying levels of out-of-pocket expenditures and its impact in population subgroups
- Equity concerns
- Varying health gains in subgroups and hence policy decisions may vary.

✓ **Solution: Subgroup analysis**

Example: Subgroup Analysis



