

**EXTENDED COST-EFFECTIVENESS ANALYSIS OF
HEALTH POLICY INTERVENTIONS IN LOWER-MIDDLE-
INCOME COUNTRIES: A SCOPING REVIEW**

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Abstract

Background: Public health interventions in Lower-Middle-Income Countries (LMICs) generate both health and non-health consequences which may impact population sub-groups differently.

Objective: To synthesize Health Policy Assessment (HPA) studies that stratify policy intervention outcomes by equity-relevant variables such as income quintile or sex or region and identify knowledge that could potentially be applied in policy formulation and decision-making in LMICs.

Methods: Using a scoping review approach, I searched five databases (i.e., MEDLINE, EMBASE, APA PsycInfo, Google scholar and ScienceDirect) for studies that assessed the health and non-health benefits of health policy interventions in LMICs and reported study features, and intervention characteristics and outcomes.

Results: I included 20 articles that focused on the impact of taxes on sugar-sweetened beverages (10%) and tobacco (25%) and the vaccination and treatment of different diseases and other national health strategies or programs. Most articles (85%) reported on all the four domains of Health Policy Assessment relevant to the study: Health Benefit Gains (HBG), Financial Risk Protection (FRP), Financial Consequences (FC) and the distributional consequences of the policy interventions. Health and non-health impacts were unevenly distributed among the poor and the rich or females and males based on the prevalence of disease or level of consumption of a product (especially tobacco or sugar-sweetened beverages). Taxes on tobacco (pro-poor) and sugar-sweetened beverages (pro-rich) generated contrasting health and non-health social distributions of consequences.

Conclusions: Findings revealed that consequences of health policy interventions are not evenly distributed as implicitly assumed in (traditional) cost-effectiveness analysis (CEA). Considering the social distributions of health and non-health impacts of health policy interventions may be the gateway in achieving Universal Health Coverage (UHC) in LMICs. It helps policymakers to undertake and strategize policy interventions towards a target population. Ongoing research should explore how to model and estimate equity and total health trade-off, particularly in the context of policy formulation and decision-making.

1. Introduction

The traditional economic assessments of health interventions in LMICs such as CEA have focused on the cost of intervention per health gains (such as Quality-Adjusted Life Year) or deaths averted or disability-adjusted life-year (DALY) averted, of one policy option compared with others, based on the assumption that consequences of policies are equally distributed. CEA also ignores the evaluation of non-health benefits such as FC and FRP, which are crucial issues in LMICs. Household health expenditure can be too high or ‘catastrophic’ and lead to (medical) impoverishment of some sub-groups in LMICs and related adverse outcomes such as inadequate demand for healthcare, morbidity, and mortality. Most poor people in LMICs are burdened with medical impoverishment or are experiencing financial risk of catastrophic health expenditure (CHE), defined as expenditures exceeding a particular fraction of total household expenditures (Verguet et al., 2015c). Kruk et al. (2009) surveyed households in 40 LMICs and found that about 25% of those households borrowed money or sold assets to pay for medical care. Averting the number of CHE cases or poverty cases resulting from medical expenditure is termed as FRP (Verguet et al., 2015c). According to Verguet et al. (2015c), FRP is emerging as a relevant component of national health strategies in LMICs. Eliminating financial barriers to access would position universal public finance (UPF)¹ as a crucial policy device for attaining UHC² (Verguet et al., 2015c), which is necessary for reducing morbidity and mortality across populations and countries, especially in LMICs. Thus, evaluating health policy interventions based on health and non-health (i.e., FC and FRP) impacts and distributional consequences is relevant in attaining UHC

¹ government financing of an intervention irrespective of who is receiving it.

² ensuring that people have access to the health care they need without suffering financial hardship

in LMICs and in guiding policy formulation and decision-making. The World Bank's Flagship course in health finance included provision for FRP as one criterion of good performance for health systems (Verguet et al., 2015c) because it leads to increase in the demand for healthcare and many positive outcomes for the population.

Driven by the importance of equity and non-health benefits of policy interventions, economists have developed strategies to measure them categorized into Equity trade-off analysis (ETA) and Equity impact analysis (EIA). ETA employs the health equity trade-off technique, which highlights the trade-off between potential cost-effectiveness and an alternative health equity objective such as reducing inequality in lifetime health or prioritizing those who are currently severely ill (Cookson et al., 2017). It is sub-divided into Equity constraint analysis (ECA) and Equity-weighting analysis (EWA). EIA, on the other hand, employs the net equity impacts techniques, which highlight the importance of the distribution of benefits and opportunity costs. It is also sub-divided into Extended cost-effectiveness analysis (ECEA) and Distributional cost-effectiveness analysis (DCEA). DCEA is an economic assessment tool used to model, analyze, and estimate the expected social distributions of costs and health benefits and the plausible trade-offs between total health and reduction in health inequality. ECEA, which is typically employed by HPA studies in LMICs, assesses both the (aggregate) health and non-health outcomes (i.e., FRP and FC) of public interventions and the distributional consequences of the impacts stratified by income quintile, sex, or region. DCEA does not estimate FRP which is a central focus of the study hence the review will focus on ECEA.

To the best of my knowledge, there is no current or thorough synthesis of HPA studies based on non-health benefits and distributional consequences of health policy interventions in LMICs, emerging and relevant healthcare issues and untapped source of knowledge to address this gap.

This study attempts to synthesize published Health Policy Assessment (HPA) studies that stratify policy intervention outcomes by equity-relevant variables such as income quintile or sex or region and identify knowledge that could potentially be applied in policy formulation and decision-making in LMICs.

2. Methods

Using a scoping review approach, I searched five databases (i.e., MEDLINE, EMBASE, APA PsycInfo, Google scholar and ScienceDirect) for studies that assessed the health and non-health benefits of health policy interventions in LMICs and reported study features, and intervention characteristics and outcomes.

2.1 Approach

The study followed Arksey and O'Malley (2005) framework and presented the scoping review in five stages: (1) Identifying the research question; (2) Identifying relevant articles (3) Study selection (3) Data charting; and (5) Collating, summarizing, and reporting the results. A scoping review is chosen because, though it is similar in rigour to a systematic review, it comprises of a range of study designs and outcomes that reveals existing knowledge and identify issues requiring further primary study (Gagliardi et al., 2021). Due to limited time or deadline for this work, a rapid review approach was adopted encompassing single language (English), exclusion of grey literature, review of 20 articles and elimination of duplicate articles. A short timeframe (last 11 years) was used because the ECEA tool has only recently been applied in the health literature. A protocol was not registered, and the study did not require research ethics board approval as data were publicly accessible. I did the establishment of eligibility criteria, review of a preliminary summary of extracted data, draft, and final report alone.

2.1.1 Identifying the research questions

Many articles were identified in the literature that evaluated health policy interventions including UPF programs. However, the study intended to review articles and answer the question: Why is stratification of health and non-health benefits across equity-relevant variables important in an economic evaluation of health policy interventions in LMICs?

The research question is chosen against the backdrop that about a fourth of households in LMICs are at financial risk of CHE (Kruk et al., 2009), which may also vary by sex or region or any other equity-relevant variables.

2.1.2 Identifying relevant studies

Table 2 (see Appendix) specifies inclusion criteria. The study included peer-reviewed journal articles that evaluated the health and non-health impact of any health policy interventions (e.g., UPF programs and public interventions) stratified across equity-relevant variables (e.g., income quintile, sex, region, district, county, province, severity of disease etc.). Study design encompassed qualitative, quantitative, or mixed methods. I excluded studies that evaluated only the health benefits of policy interventions so that the findings will reflect the relevance and impact of FRP in HPA in LMICs. Studies that focused only on CEA, DCEA or any forms of ETA were excluded. Publications in the form of commentaries, abstracts, editorials, letters, and studies written in French and other languages were excluded from the review.

2.1.3 Defining the search strategy and study selection

I contacted a librarian, with the name Vincci Lui, at the Gerstein Science Information Centre by email for help and she sent me some videos and links that served as a guide for me to develop the search strategy (see Table 1) for this review. A search was done in five databases from 2010 to

2021, including MEDLINE, EMBASE, APA PsycInfo, Google Scholar, and ScienceDirect. I used the three-step search strategy as recommended in all Joanna Briggs Institute (JBI) types of reviews. I initially did a search using OVID MEDLINE followed by a simultaneous search with EMBASE and APA PsycInfo. All MeSH terms that were identified in all databases were kept. Newer or unique terms were added. I used all identified keywords and index terms to do a second search in all the three databases using OVID on the Gerstein Science Information Centre website platform. Based on the reference lists of the identified articles, I did a third search in Google Scholar and ScienceDirect.

2.1.4 Data extraction, analysis, and charting

After accounting for duplicates and placing the limits on the search, 3794 eligible studies were included. After title/abstract screening, quality assessment was done based on the ten (10) key appraisal checklists provided by JBI to select 20 articles. Articles scored ‘one point’ for each key requirement checked and ‘zero’ if otherwise. Their scores are summed and divided by 10. The first 20 articles in higher scores were selected for review based on the Preferred Reporting Items for Systematic and Meta-Analysis Extension for Scoping Reviews (PRISMA-ScR).

I extracted and tabulated data by reporting study characteristics (author, year of publication, country/origin, aims/purpose, and methodology) and findings in Table 3 (see Appendix). Health interventions were described for each study. All 20 articles employed the ECEA analytic tool, and I did not assess methodological quality of reviewed articles as this work is a scoping review. Further statistical analyses combining outcomes across studies was not feasible as the policy interventions reported by the studies varied widely by disease, strategy, study perspectives and outcomes. A visual chart of the process of data extraction is in Figure 1 (See Appendix).

3. Results

3.1 Summarizing and reporting the Search results

A narrative synthesis was employed to analyze and report the results of the study. About 4452 studies were identified from the three databases and 10 studies from Google Scholar and ScienceDirect. About 3794 studies were void of duplications, 3750 studies were excluded based on title/abstract screening and 24 were excluded after quality assessment. I included only 20 studies in this review (Figure 1). Extracted data are reviewed in Table 3 (see Appendix).

3.2 Study characteristics

A total of 20 articles on LMICs published from 2013 to 2021 were included in the analysis: Five in Ethiopia, four in India, one in Ethiopia and India in the same article, three in China, and two in South Africa. There was one article each in Vietnam, Armenia, Philippines, Malaysia, and Lebanon. In this review, different health policy interventions were identified within LMICs. About 65% (13 out of 20) were UPF programs and the remaining were public interventions (i.e., taxation). They used data from empirical literature, World Development Indicators (WDI) and other surveys and primary data sources.

As presented in Table 3, Assebe et al. (2020) and Verguet et al. (2015c) assessed the impact of malaria interventions. Raykar et al. (2016), Megidido et al. (2016), Loganathan et al. (2016), Johansson et al. (2016), and Essue et al. (2020) evaluated the impact of a schizophrenia treatment program, national epilepsy programs, rotavirus gastroenteritis vaccination intervention, national mental health strategy, cataract surgery intervention, respectively. Watkins et al. (2016) assessed the effect of a salt reduction policy. Verguet et al. (2015a), Pecenka et al. (2015), Levin et al. (2015), and Johansson et al. (2015) evaluated tuberculosis treatment, diarrhea treatment with

rotavirus vaccination, HPV vaccination for cervical cancer, and pneumonia treatment and pneumococcal vaccination, respectively. Verguet et al. (2015c) examined nine interventions (measles vaccination, rotavirus vaccination, pneumococcal conjugate vaccination, diarrhea treatment, malaria treatment, pneumonia treatment, cesarean section surgery, hypertension treatment, and tuberculosis treatment). Verguet et al. (2013) assessed a hypothetical rotavirus vaccination program. Verguet et al. (2015b), Salti et al. (2016), Verguet et al. (2017), Postolovska et al. (2018), and Wu et al. (2020) assessed the health and non-health consequences of an excise tax intervention (25%) on tobacco/cigarette. Saxena et al. (2019a), and Saxena et al. (2019b), assessed the impact of a tax intervention on sugar-sweetened beverages (10%).

3.3 Outcomes of HPA in LMICs

The reviewed articles assessed health policy interventions based on four domains: 1) Health Benefits Gained (HBG), 2) FC 3) FRP and 4) Equity. Non-health impacts of health policies comprise FC and FRP.

3.3.1 Health Benefits gained (HBG):

Most articles (75%) assessed the HBG of interventions based on deaths and DALYs averted, and a few measured HBG in terms of HALYs gained or lives saved. Watkins et al. (2016) found that implementing a salt reduction policy could avert 403 cardiovascular disease-related (CVD) deaths in South Africa. Johansson et al. (2015) revealed that a 40% pneumonia treatment coverage would avert 2610 under-five deaths annually.

3.3.2 Financial Consequences (FC):

About 95% (19 out of 20) of the articles reported on the FC of interventions such as direct medical and non-medical out-of-pocket (OOP) expenditure averted, indirect costs averted, government

savings/costs, and productivity losses. Johansson et al. (2016) found that the expected annual cost of implementing a Mental health care strategy to the Ethiopian government would be about US\$ 177 million. The expected productivity gain from a scaled-up depression treatment would be US\$ 51 million annually. The OOP that would be averted would include US\$544,000 for epilepsy, US\$162,000 for depression, US\$241,000 for bipolar disorder, and US\$81,000 for Schizophrenia.

3.3.3 Financial Risk Protection (FRP):

About 95% of the article reported FRP of the interventions such as CHE and poverty cases averted, the money-metric value of insurance provided. Essue et al. (2020) found that when both medical and non-medical costs associated with small incision surgery are eliminated for patients, it will avert 5,473 cases of CHE and 493 poverty cases in Vietnam.

3.3.4 Equity:

Mostly, interventions unequally benefited certain income groups (poor or rich) or gender (male or female). Only Essue et al. (2020) stratified the distributional benefits of interventions by sex and income quintiles. The remaining articles only focused on income quintile stratification. Assebe et al. (2020) found that an increase in malaria intervention coverage in Ethiopia would avert more deaths and generate FRP among the poor compared to the rich.

3.4 Why is stratification of health and non-health benefits across equity-relevant variables important?

3.4.1 Tax policies

Verguet et al. (2015b), Salti et al. (2016), Verguet et al. (2017), Postolovska et al. (2018), and Wu et al. (2020) found a pro-poor distribution of an excise tax increase on tobacco for both the health

(years of life gained or premature deaths averted) and the non-health benefits (FRP or FC). Saxena et al. (2019a) and Saxena et al. (2019b) assessed the impact of a tax intervention on sugar-sweetened beverages (SSB), and they found a pro-rich distribution of health and non-health benefits as the rich consumed more SSBs relative to the poor. Instead of a tax on the price of salt, Watkins et al. (2016) assessed the impact of reducing the quantity of salt consumption from 8 g per day to 5 g per day. They found a pro-rich distribution of non-health benefits, but health gains were (fairly) evenly distributed among income quintiles

3.4.2 Cost-effective Policies

Essue et al. (2020) found that more CHE cases, poverty cases, and DALYs were averted among females relative to males as cataract was found mainly among the females. They also found a pro-rich health distribution and a pro-poor non-health distribution associated with eliminating the OOP of cataract surgery in Vietnam. Pecenka et al. (2015) revealed that the health benefits of diarrhea treatment and rotavirus vaccination favored the poor, but its financial or non-health benefits favored the better-off people in Ethiopia.

4. Discussion

The synthesis revealed that tax could favor the poor or the rich depending on the product. For instance, since the poor has low income, they will be more responsive to a tax on tobacco and quit it and experience increased health and non-health benefits relative to the rich. Meanwhile, a tax on SSB will favor the rich (both health and non-health benefits) relative to the poor because the poor has lower income and hence, consumes less SSB.

The synthesis also revealed that interventions may be cost-effective but exert different distributions of health and non-health consequences on the poor and the rich or female and male

depending on the severity or prevalence of disease in a particular sub-group in that country or other equity-relevant variables. As cataract is prevalent among females in Vietnam, hence they benefited more from the cataract intervention relative to men. Thus, stratifying health and non-health benefits of policy interventions by equity-relevant variables is very crucial for policy formulation.

5. Conclusion and Recommendations

Findings revealed that consequences of health policy interventions are not evenly distributed as implicitly assumed in (traditional) cost-effectiveness analysis (CEA). Considering the social distributions of health and non-health impacts of health policy interventions may be the gateway in achieving Universal Health Coverage (UHC) in LMICs. It helps policymakers to undertake and strategize policy interventions towards a target population. Ongoing research should explore how to model and estimate equity and total health trade-off, particularly in the context of policy formulation and decision-making.

6. Limitations

Only one author screened the articles. The analyses were limited by the different or heterogeneity of health policy interventions evaluated by the various articles. Only 20 articles were reviewed, and they employed ECEA, making the review less informative regarding the complexity surrounding HPA. The study did not include unpublished (grey literature) articles.

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APPENDIX

(1) Abbreviations

CHE Catastrophic Health Expenditure

DCEA Distributional cost-effectiveness analysis

DHS Demographic Health Survey

ECEA Extended cost-effectiveness analysis

EIA Equity Impact Analysis

ETA Equity Trade-off Analysis

FRP Financial Risk Protection

FC Financial Consequence

HBG Health Benefits Gained

HPA Health Policy Assessment

JB I Joanna Briggs Institute

LMIC Lower-middle-income country

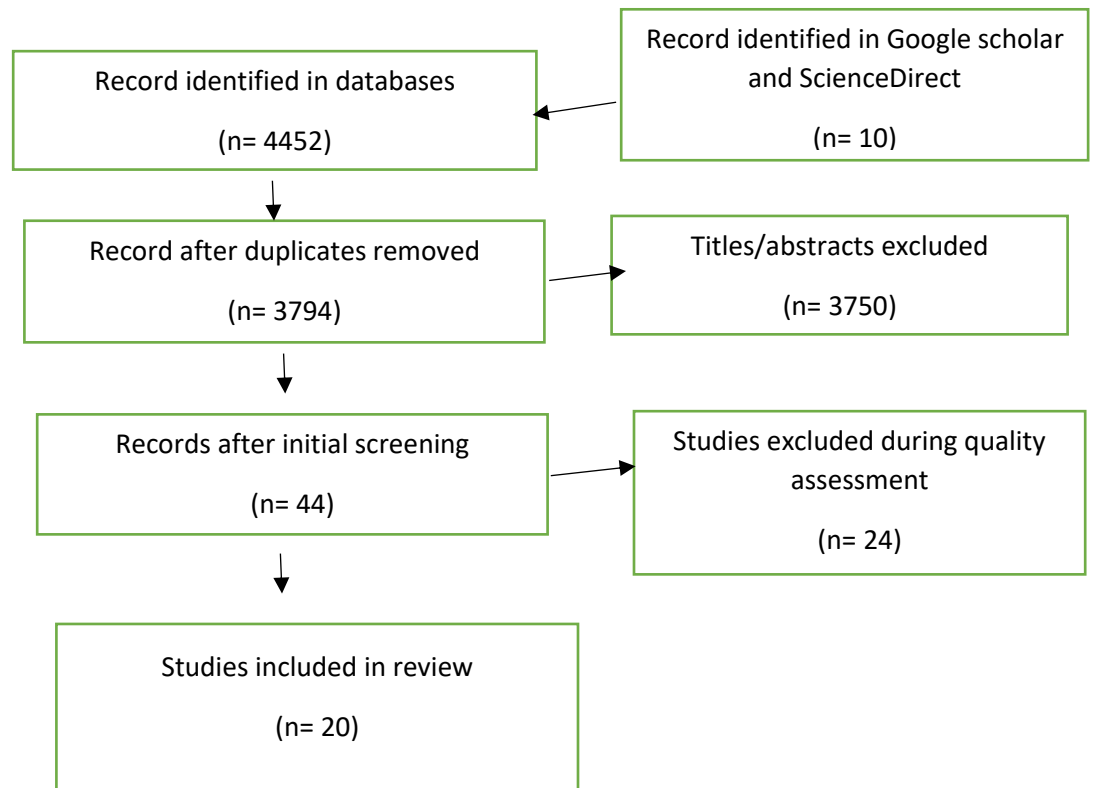
MeSH Medical Subject Heading

SSB Sugar-sweetened beverage

UHC Universal Health Coverage

UPF Universal Public Financing

(2) **Figure 1: Preferred Reporting Items for Systematic and Meta-Analysis Extension for Scoping Reviews (PRISMA-ScR) diagram. Flow chart of studies screened and included.**



(3) **Table 1. Search Strategy**

	MeSH and search items
1	exp Developing Countries/
2	exp Cost-Benefit Analysis/ec [Economics]
3	extended cost-effectiveness*.tw,kf.
4	distributional cost-effectiveness*.tw,kf.
5	3 or 4
6	1 and 2
7	5 or 6
8	limit 7 to (english language and yr="2010 - 2021")
9	exp "Costs and Cost Analysis"/
10	exp Treatment Effectiveness Evaluation/
11	exp developing country/
12	exp "cost benefit analysis"/
13	9 or 10 or 12
14	11 and 13
15	limit 14 to (english language and yr="2010 - 2021")
16	8 or 15
17	remove duplicates from 16

(4) **Table 2. Study inclusion criteria**

Category	Criteria
Participants	Any recipients or population affected by any health policy intervention (UPF or public intervention) of any socio-economic and demographic characteristics in any LMIC.
Issue	Health and non-health impacts of any policy intervention stratified by any equity-relevant variables including but not limited to sex, income quintiles, region (district or county or municipality or state or province), or severity of disease, etc.
Comparisons	Exploring and comparing the status quo (existing situation) and any (new or current) policy interventions under review, consideration or implemented.
Study Design	<ul style="list-style-type: none">• Qualitative, quantitative, or mixed methods.• Reviews were not eligible, but their references were screened for eligible studies.
Outcomes	HBG, FRP, FC and Equity and any other that may be considered in a study.

(5) Table 3. List of studies and their general characteristics included in the review.

	Author(s), Year of publication and Origin/Country	Aims/purpose	Methodology/methods (including study population and sample size)	Key findings
1	Assebe et al. (2020), Ethiopia	<p>Estimated the health gains and FRP of malaria interventions.</p> <p>Status quo: The baseline coverage before the UPF was 40% for LLIN, 29% for IRS, 35% for ACT.</p> <p>Intervention: They increased coverage in artemisinin-based combination therapy (ACT), long-lasting insecticide-treated bed nets (LLIN), indoor residual spraying (IRS) and malaria vaccine (hypothetical) by 10% in Ethiopia. It was a UPF program.</p>	<p>Used Extended cost-effectiveness analysis to estimate the health gains and FRP and their distributions across socio-economic groups. The cost of each intervention was estimated from the health system perspective. They employed data from the literature, their own calculations, and assumptions.</p>	<p>HBG: The ACT, LLIN, IRS and the vaccine would respectively avert 358, 188, 107 and 38 deaths each year.</p> <p>FC: The four interventions would avert about \$4,627,800 of out-of-pocket expenditures (OOP). The net government cost would be \$5.7, 16.5, 32.6, and 5.1 million per year for the ACT, LLIN, IRS and the vaccine interventions, respectively.</p> <p>FRP: ACT, LLIN, IRS and the Malaria vaccine averted 440, 220, 125 and 18 cases of CHE annually.</p> <p>Equity: The averted deaths and FRP benefits would accrue mainly to the poorest income quintiles as they face higher malaria prevalence and associated risk factors. About 50% of deaths averted by ACT, LLIN, and IRS and 52% by the vaccine accrued to the poorest and poorer quintile.</p>
2	Essue et al. (2020), Vietnam	<p>Evaluated the health and non-health impact of cataract surgery in Vietnam, across sex and income quintiles.</p> <p>Status quo: Patients paid all medical and non-medical OOP costs associated with cataract surgery.</p> <p>Interventions: Program A: comprises eliminating medical OOP costs for small incision cataract surgery.</p> <p>Program B: encompasses program A plus a voucher covering non-medical OOP costs.</p>	<p>Conducted ECEA to estimate HBG, FC, FRP and equity. Cost was estimated from the societal perspective. Created an incident cohort comprising of all females and males in Vietnam aged 50 years and older with visual impairment due to cataracts. Used data from empirical literature, General Statistics Office of Vietnam, Ministry of Health and Medical Service Administration and WDI.</p>	<p>HBG: 45 DALYs were averted for males and 207 DALYs were averted for females for programs A and B. Thus, both programs avoided same DALYs.</p> <p>FC: The elimination of out-of-pocket costs were estimated to result in more individuals having surgery. Thus, from 1668 to 2326 males and from 8728 to 12,185 females. Incremental cost of policy to the government was assessed.</p> <p>FRP: There would be a net of 1,732 cases of CHE averted from program A and 5,473 cases of CHE averted from program B. There would be 115 poverty cases averted from program A and 493 poverty cases avoided from program B.</p> <p>Equity: <i>By Sex:</i> There were more DALYs averted among females compared to males for both program A and B. There were more CHE cases averted among females (1,438) compared to males (294) for program A. There were more cases of CHE averted among females (4,606) relative to males for program B. No poverty cases were averted among men by program A, but 155 cases were averted among females. More poverty cases were also averted by program B among females (405) compared to males (88).</p>

				<p><i>By income quintile:</i></p> <p>For both Programs A and B, most DALYs would be averted in the richest income quintiles. Thus, 109 and 32 DALYs would be averted for the richest quintile and poorest quintile, respectively for both programs A and B.</p> <p>Most cases of CHE would be averted in individuals in the lowest income quintiles (1,897) compared to no case in the richest income group, for both programs A and B. No poverty cases were averted among the richest income group for both programs A and B. Meanwhile, 115 and 493 cases of poverty were averted in the poorest income group for program A and B respectively.</p>
3	Wu et al. (2020), India	<p>Examined the health and non-health impact of an increased excise tax on tobacco in four Indian states.</p> <p><u>Intervention:</u> A cigarette price increase to Indian Rupees (INR) 10 plus 10% <i>ad valorem</i> tax.</p>	<p>Employed the ECEA to estimate HBG, FC, FRP, and equity. They used data from WDI and Market price A. C. Nielson.</p>	<p><i>HBG:</i> The tax would cause about 1.5 million men to quit smoking and hence, about 664,700 deaths due to COPD, stroke, heart disease and cancer would be averted in the four states.</p> <p><i>FC:</i> Additional tax revenue was generated totaling INR \$4,385 crore.</p> <p><i>FRP:</i> About 453,600 men would avoid CHE and 75,100 men would avoid falling into extreme poverty in the four states.</p> <p><i>Equity:</i> The bottom income group gain more than the top income group. The poor would benefit the most from the large tax increases. About 210,300 deaths will be averted among the bottom 20% (or the poor) and only 28,600 deaths will be averted among the top 20% (or the rich) in the four states.</p>
4	Saxena et al. (2019a), Philippines	<p>Examined the impact of a tax on sweetened beverages on premature deaths associated with noncommunicable diseases such as type 2 diabetes mellitus, ischemic heart disease and stroke, across income quintiles over the period 2018-2037 (20 years) in the Philippines.</p> <p>Status quo: The mean price of sugar-sweetened beverages such as a regular cola/soft drinks was 45 Philippine pesos per liter.</p> <p><u>Intervention:</u> A tax increase of 6 Philippine pesos per liter (about 13%) on sweetened beverages to curb the obesity burden.</p>	<p>Employed the ECEA to estimate HBG, FC, FRP and Equity. Obtained data from the Philippine Statistics Authority, the 2013 Philippines Demographic and Health Survey (PDHS), PhilHealth database and the Philippines National Survey 2013.</p>	<p><i>HBG:</i> Found that an estimated 10, 339 deaths from ischemic heart disease, 5913 deaths related to diabetes mellitus, and 7950 stroke-related deaths could be averted by the tax from 2018 to 2037.</p> <p><i>FC:</i> Over the 20 years period, the tax could generate 627 million US Dollars health-care costs, and total OOP cost savings of US\$ 369 million.</p> <p>The tax raised US\$ 813 million in revenue per annum.</p> <p><i>FRP:</i> About 13,890 CHE cases could be averted.</p> <p><i>Equity:</i> The largest number of averted deaths was among the highest or fourth- and fifth-income quintiles.</p> <p>The poorest quintile could have the lowest savings in out-of-pocket (OOP) payments and bear the smallest tax burden (14%).</p> <p>The highest income quintile could save the most and bear the highest tax burden (26%). Thus, about 35% of total OOP savings accrued to the highest income quintile and only 3% accrued to the lowest income quintile.</p> <p>About half of the deaths averted accrued to the top two income quintiles and only 10% is accrued to the bottom two income quintiles, who had lower consumption of sugar-sweetened beverages.</p>

5	Saxena et al. (2019b), South Africa	<p>Estimated the health and non-health impact of an excise tax increase on sugar-sweetened beverages on type 2 diabetes mellitus incidence and mortality, across socioeconomic groups.</p> <p>Status quo: Price per liter of sugar-sweetened beverages was ZAR 11.45. The assumed sugar content for the study was 10.6g/100mL.</p> <p>Intervention: A 10% tax increase on sugar-sweetened beverages. Thus, a tax of US\$0.18 cents/g of sugar over 4g/100mL. A 100% pass-through effect was assumed.</p>	<p>Employed ECEA to assess HBG, FC, FRP and equity.</p> <p>They used data from WDI, Global burden of disease study, National Income Dynamics Study, General Household Survey, IHME, National Department of Health, empirical literature and authors' assumptions and calculations.</p>	<p>HBG: The tax would avert an estimated 7898 type 2 diabetes mellitus-related premature deaths (T2DM) over 20 years.</p> <p>FC: The government would save about US\$140 million in subsidized healthcare over 20 years and raise US\$450 million in tax revenues per annum.</p> <p>FRP: An estimated 32,377 cases of CHE for T2DM and 12,000 cases of poverty would be averted. Savings in indirect costs due to reduced absenteeism and presenteeism would amount to ZAR 11.1 million per annum.</p> <p>Equity: The bottom two quintiles would bear the smallest tax burden increase and have the lowest savings in OOP payments due to significant subsidization provided by government healthcare. The major share of the savings in indirect costs would accrue to the highest income quintile.</p> <p>About 63% of the savings in OOP payments accrued to the top two quintiles as they are required to pay about 56-82% of their healthcare costs and 8% in each of the bottom two quintiles as they would pay, on average, only 20% of their healthcare costs in OOP payments. About only 16% of deaths would be averted in the poorest income group due to the relatively lower levels of sugar-sweetened beverages consumption.</p>
6	Postolovska et al. (2018), Armenia	<p>Examined the health and non-health impacts of increasing excise tax on tobacco in Armenia.</p> <p>Status quo: Baseline excise tax rate was 17%.</p> <p>Intervention: About 75% tax rate on the retail price of cigarettes which would be fully passed on to consumers.</p>	<p>Used ECEA to estimate HBG, FC, FRP and equity.</p> <p>Used data from World Bank's Health, Nutrition, and Population Statistics database, and the 2014 Integrated Living Conditions Survey (ILCS). Only male population was used.</p>	<p>HBG: About 88,000 premature deaths are averted.</p> <p>FC: OOP expenditures and Government savings related to tobacco-related disease treatment averted was US\$ 63 million and US\$ 26 million, respectively.</p> <p>FRP: Poverty cases averted was 22, 000. Cases of CHE averted was 33,000.</p> <p>Equity: Half of tobacco-related premature deaths and 27% of associated poverty cases averted would be concentrated among the bottom 40% of the income distribution population.</p>

7	Verguet et al. (2017), China	<p>Evaluated the impacts of an excise tax on tobacco products and of an implementation of smoke-free workplace in China, across income quintiles.</p> <p>Status quo: Taxes contributed to about 56% (39% for excise taxes) of retail prices of cigarettes in China.</p> <p>Intervention:</p> <ul style="list-style-type: none"> i.) A 75% increase in cigarette prices ii.) Implementation of total smoking bans in workplace. 	<p>Used ECEA to estimate HBG, FC, FRP and equity. Used the Global Adult Tobacco Survey China Report 2010 for ages 15-69, empirical literature and authors' calculations and assumptions. Examined the Chinese male population only.</p>	<p>HBG: Averted about 24 million tobacco-related premature deaths among the male population in China. Implementation of smoking bans in workplaces would avert about 12 million premature deaths</p> <p>FC: Increased additional tax revenues by US\$47 billion annually, and US\$ 55 billion OOP expenditures averted. About four million poverty cases would be averted by the implementation of smoking bans in workplaces. Compared with the excise tax increase, a reduction in smoking from the ban would decrease tax revenues by US\$ 7 billion annually.</p> <p>FRP: Averted around 9 million poverty cases from the increased taxes. About 16 million CHE cases would be averted. The implementation of smoking bans in workplaces would prevent around 4 million poverty cases.</p> <p>Equity: Poorer individuals were more responsive to the relative change in cigarette prices (from the tax), quitting in large numbers and facing less tobacco-related disease OOP treatment costs. About 61% of the tobacco-related premature deaths accrued to the poorest and poorer income (bottom) quintiles relative to 18% of the top two income groups. About 57% and 21% of OOP averted accrued to the smokers of the bottom 40% and top 40% of the income group distribution, respectively. About 69% of the averted poverty cases accrued to the bottom two income group.</p> <p>With regards to the implementation of smoking bans in workplaces, pre-matured deaths averted was evenly distributed among income groups. Thus, equal responsiveness to the ban across income groups. About 52% of poverty cases averted accrued to the bottom two quintiles as poorer individuals had lower income.</p>
8	Johansson et al. (2016), Ethiopia	<p>Estimated the health gains and non-health impacts of National Mental Health Strategy in Ethiopia for depression, bipolar affective disorder, schizophrenia, and epilepsy.</p> <p>Status quo: Baseline coverage for all disorders was <5% in Ethiopia.</p> <p>Intervention:</p> <p><i>Depression:</i> 30% coverage comprising of fluoxetine, cognitive therapy, and proactive case management. Coverage of depression is relatively lower because of low detectability.</p> <p><i>Bipolar affective disorder:</i> 50% coverage encompassing valproate with psychosocial therapy.</p> <p><i>Schizophrenia:</i> 75% coverage comprising of first-line antipsychotic medication (haloperidol or chlorpromazine) plus psychosocial treatment.</p>	<p>Extended cost-effectiveness analysis was applied. The cost of the intervention was from the household and health provider perspective. Data was populated from the secondary data source (i. e. empirical literature, the regional WHO-CHOICE dataset, International Drug Price Indicator Guide, World Bank and World Development Indicators, and Ethiopia Ministry of Health) and primary cost data (i. e. data from Amanuel Psychiatric Hospital in Ethiopia). Total costs are counted over 10-year period that interventions are implemented and are discounted at 3%.</p>	<p>HBG: The National Mental Health Strategy package is expected to generate 155,000 Healthy-life-years (HALYs) gain annually. It comprises of 64,500 HALYs, 61,300 HALYs, 20,300 HALYs and 8,900 HALYs for epilepsy, depression, bipolar disorder, and schizophrenia.</p> <p>FC: The OOP averted include US\$544,000 for epilepsy, US\$162,000 for depression, US\$241,000 for bipolar disorder and US\$81,000 for Schizophrenia. The expected annual cost of implementing the Mental health care package described at the specified target coverage levels was about US\$ 177 million, equivalent to about US\$ 1.8 per capita. The expected productivity gain from scaled-up depression treatment were US\$ 51 million annually.</p> <p>FRP: The money-metric insurance value (FRP metric) was US\$1.6 for Schizophrenia, US\$67 for bipolar disorder, US\$206 for depression and US\$ 1,443 for epilepsy.</p> <p>Equity or Distributional health consequences:</p> <p>The health and non-health benefits favored the richest income quintile for all interventions owing to variation of disease prevalence and income levels.</p> <p>HBG: 17,680 HALYs, 16,390 HALYs, 5,480 HALYs, and 2,420 HALYs for the richest income quintile for Epilepsy, Depression, Bipolar disorder, and Schizophrenia, respectively. With regards to the poorest income quintile, it was respectively 7,270 HALYs, 8,090 HALYs, 2,640 HALYs, and 1,160 HALYs.</p> <p>FC (US\$ '000): With regards to the richest income quintile, OOP averted was US\$149 for Epilepsy, US\$ 44 for Depression, US\$ 65 for Bipolar disorder, and US\$ 22 for</p>

		<i>Epilepsy</i> : 75% coverage encompassing phenobarbital. It was a UPF intervention.		Schizophrenia. With regards to the poorest income quintile, it was <i>US\$ 60</i> for Epilepsy, <i>US\$ 21</i> for Depression, <i>US\$ 31</i> for Bipolar disorder, and <i>US\$ 11</i> for Schizophrenia. <i>FRP</i> : With regards to the richest income quintile, the insurance value (FRP metric) was <i>US\$835</i> for Epilepsy, <i>US\$ 113</i> for Depression, <i>US\$ 38</i> for Bipolar disorder, and <i>US\$ 0.9</i> for Schizophrenia. With regards to the poorest income quintile, it was <i>US\$ 42</i> for Epilepsy, <i>US\$ 9</i> for Depression, <i>US\$ 3</i> for Bipolar disorder, and <i>US\$ 0.1</i> for Schizophrenia.
9	Loganathan et al. (2016), Malaysia	Evaluated the non-health benefits and health impacts of rotavirus gastroenteritis vaccination in Malaysia. Status quo : No vaccination Intervention : 97% coverage of the vaccination. It was a UPF program.	Conducted ECEA to estimate the HBG, FC, Equity and FRP. Data was collected from empirical literature. They took the household perspective in estimating costs.	HBG : The Rotavirus vaccination resulted in huge reduction in rotavirus gastroenteritis episodes. FC : About US\$ 6 million savings to households seeking care for rotavirus gastroenteritis episodes annually. FRP : All income groups experienced catastrophic expenditure from rotavirus-related expenditure with 16% and 7% of the poorest experiencing catastrophic payments and impoverishment respectively. About 43% of the richest quintile spent more than 10% of household income on illness-related expenditure but were not impoverished. Equity : Found that the richest spend more (US\$ 277) on rotavirus-related direct costs relative to all income groups especially the poorest (US\$ 24). Meanwhile, the poorest pay (8%) about as much as the richest (11%) as a proportion of monthly income. Rotavirus gastroenteritis episodes averted by the vaccination was 3,500 for both the poorest and richest income group. OOP direct costs averted by the vaccination was US\$60,000 to the poorest income group and US\$640,000 for the richest income group. CHE and impoverishment averted by the vaccination was 2.8% and 1.2% for the poorest income group and 7.1% and zero percent for the richest income group.
10	Megiddo et al. (2016), India	Analyzed the health and non-health impacts of national epilepsy programs: Status quo : No treatment Interventions : 1. First-line anti-epilepsy drugs (AED) 2. First and second-line AEDs 3. First- and second-line AEDs and surgery. It was a UPF program.	Used ECEA to estimate HBG, FC, and FRP. Used data from empirical literature, authors' assumptions and calculations and International Drug Price Indicator.	HBG : Scenarios 1 to 3 would avert 1.8-2.3 million DALYs per year and would represent a cost-effective use of resources. FC : In the first 10 years, the government spent \$145 090, \$107 590, and \$77 720 in scenarios 1, 2 and 3, respectively. The government spent the most money in the first 5 years of the UPF scenarios when surgery was available and performed to many new patients and drops afterwards when they no longer have active epilepsy and stop treatment. OOP expenditure averted, on average, was over \$80 million per year in both scenarios 2 and 3. OOP expenditures averted in UPF scenario 1 were countered by new patients' care-seeking costs and increase in second-line drug purchases not covered in scenario 1 when patients do not respond to scenario 1 treatment and choose to continue treatment. Hence, there were no OOP savings in scenario 1. FRP : The money-metric value of insurance (FRP metric) increases from scenarios 1 through 3. The scenario 1 does not offer FRP. Equity : Only the top 1% of the population has more OOP expenditure averted as others do not pay for surgeries. The money-metric value of insurance decreases with wealth. Thus, the

				poor had the highest FRP and the rich had the least FRP. Scenario 1 does not offer FRP but affects the poor the most because they increase their effective coverage and their travel frequency the most. In scenario 2 and 3, the poor have the highest FRP and the rich has the least protection.
11	Raykar et al. (2016), India	<p>Evaluated the health and non-health gains of schizophrenia treatment in India, across income quintiles. It was a UPF program.</p> <p>Status quo: 40% average treatment coverage rate (ranges from 30% to 50% across income quintiles) of a combination of first- and second-generation antipsychotic medication with basic psychosocial treatment.</p> <p>Intervention: 80% coverage of First-generation antipsychotic drugs as well as intensive-psychosocial treatment. First-generation antipsychotic drugs include either tablet doses of haloperidol-chlorpromazine or an injection of fluphenazine, with biperiden administered for side effects.</p>	<p>Conducted ECEA to estimate HBG, FC, FRP and equity. Data was from the WHO-CHOICE costing database and authors' assumptions. Assumed an evenly distributed cohort size of 200,000 individuals in a population of one million, across the income quintiles. Used the District Level Household and Facility Survey (DLHFS-3 in India).</p>	<p>HBG: 122 DALYs averted per one million population.</p> <p>FC: OOP expenses averted summed up to US\$276,623</p> <p>FRP: The annual money-metric value of insurance for the entire one million population is US\$24,582. The value is highest for the lowest income quintile and decreases as income rises.</p> <p>Equity: Health gains are concentrated among the poorest, whereas the non-health gains such as OOP private expenditures averted are concentrated among the richest income quintiles. OOP averted ranged from \$49,880 for the poorest quintile to \$63,906 for the richest income group. About 28 and 22 DALYs were averted for the poorest and richest income quintiles.</p>
12	Salti et al. (2016), Lebanon	<p>Examined the non-health and health effects, by socio-economic status, of increasing tobacco taxes in Lebanon.</p> <p>Intervention: 50% increase in the price of imported cigarettes.</p>	<p>Conducted ECEA to estimate HBG, FRP, FC and equity. They employed data from the 1999 National Household Health Expenditures and Use Survey (NHHEUS), WDI, Global Youth Tobacco Survey (GYTS) Country Factsheet for Lebanon (2011), data from Institute for Health Metrics and Evaluation (IHME), Household living conditions survey (2005) and Authors' calculation and assumptions.</p>	<p>HBG: About 65,000 premature deaths would be averted by the tax increase.</p> <p>FC: US\$300 million of additional tax revenues. US\$22 million of OOP spending on healthcare would be averted. Expenditure on tobacco-related disease treatment averted was US\$ 37 million.</p> <p>FRP: Around 26,800 poverty cases were averted.</p> <p>Equity: The tax increase would be pro-poor in health gains, savings on healthcare and poverty reduction. Premature deaths averted was 17,000 for the poorest income quintile and 9,000 for the richest income quintile. OOP expenditures averted was US\$ 8 million for the poorest income quintiles and US\$ 2 million for the richest income quintile. Poverty cases averted was 17,000 for the poorest income quintile and zero or no cases for the richest income quintile.</p>
13	Watkins et al. (2016), South Africa	<p>Estimated the health and non-health impacts of a salt reduction policy on cardiovascular diseases (CVD) in South Africa, across income quintiles. CVD included stroke, ischemic heart disease (IHD), hypertensive heart failure</p>	<p>Used ECEA to estimate HBG, and FC, FRP and equity. Costs were estimated from the societal perspective. Data was taken from National Income Dynamics Study (NiDS), IHME and empirical</p>	<p>HBG: 403 CVD deaths averted.</p> <p>FC: Total OOP savings and government savings were \$294,860 and \$2,523,850, respectively.</p> <p>FRP: CHE cases averted was 175. Poverty cases averted was 145.</p> <p>Equity: More CHE cases were averted in the upper income quintiles driven by more expensive care accesses by the wealthy. Thus, 6 and 80 cases were averted for the poorest</p>

		<p>(HHF) and end-stage renal disease due to hypertension (ESRD).</p> <p>Status quo: The existing salt consumption was 8 g per person daily.</p> <p>Intervention: Government's target in salt consumption is 38% reduction to 5 g per day.</p>	<p>literature. A cohort of 1 million adults 40 years or older were used.</p>	<p>and richest income quintiles, respectively. Poverty cases averted was zero and 2 for the poorest and richest income quintiles, respectively.</p> <p>However, health gains were (fairly) evenly distributed, except for a slightly lower impact in the poorest quintile. CVD deaths averted were 69, 86, 79, 86 and 83 for the poorest, poorer, middle, richer, and richest income quintile, respectively.</p>
14	Johansson et al. (2015), Ethiopia	<p>Estimated the health and non-health impacts of pneumonia treatment for under-five children and pneumococcal vaccination (PCV-13) for newborns in Ethiopia.</p> <p>Status quo: Baseline average coverage was 27% for pneumonia treatment before the UPF. The pneumococcal vaccines coverage was 0%.</p> <p>Interventions Scaled-up pneumonia treatment by 10% to a 37% average coverage. The pneumococcal vaccines coverage or the PCV-13 base case is scaled up from 0% coverage to 38% coverage on average.</p> <p>They were UPF interventions.</p>	<p>Used ECEA to estimate the HBG, FRP and FC.</p> <p>Both interventions represent cost savings from the household perspective when assessing FRP and private household expenditures averted. However, when estimating the governmental cost of both interventions, they undertook a health system perspective.</p> <p>They used data from empirical literature and authors' assumptions.</p>	<p>HBG: A 38% PCV-13 coverage would avert about 2,960 newborns deaths annually. A 40% pneumonia treatment coverage would avert 2610 under-five deaths annually.</p> <p>FC: A total of \$2.4 million of private household expenditures would be averted by the two interventions annually.</p> <p>FRP: Using a money-metric value of insurance (or risk premium) provided by the program, they estimated that both interventions offer between 50% and 60% of the FRP to the poorest quintile.</p> <p>Equity: HBG: Both interventions save more lives among the poorest groups due to higher disease burden in that population. About 30 to 40% of all deaths averted by the two interventions would be expected to occur in the poorest quintile. 1004 and 886 lives were saved in the poorest income quintile through pneumococcal vaccine and pneumonia treatment, respectively. Meanwhile, only 152 and 134 lives were saved in the richest income quintile through pneumococcal vaccine and pneumonia treatment, respectively.</p> <p>FC (US\$' 000): US\$ 122 and US\$ 207 OOP payments were averted in the poorest income quintile through pneumococcal vaccine and pneumonia treatment, respectively. Meanwhile, US\$ 71 and US\$ 480 OOP payments were averted in the richest income quintile through pneumococcal vaccine and pneumonia treatment, respectively. The richest quintile benefits from about 30% of the total private expenditures averted.</p> <p>FRP: The poorest income benefited more from FRP than the richest income quintile.</p>
15	Levin et al. (2015), China	<p>Estimated the health and non-health impacts of HPV vaccination plus screening to prevent cervical cancer in China.</p> <p>Status quo: Screening alone</p> <p>Intervention: HPV vaccination plus screening.</p> <p>It was a UPF program.</p>	<p>Conducted ECEA to estimate the HBG, FC, FRP and equity.</p> <p>Costs were estimated from the governmental perspective.</p> <p>Used published data and authors' assumptions.</p>	<p>HBG: The vaccination policy would avert many deaths.</p> <p>FC: The policy will also hugely cost the government and avert treatment seeking cases of cancer.</p> <p>FRP: Treatment seeking cases of cancer averted (per million women) is 3540, 3511, 3312, 3256 and 2999 of the poorest, poor, middle, richer, and richest quintiles, respectively.</p> <p>Equity: The HBG and FRP favored women in the lowest quintile. The vaccination policy would avert 2877, 2854, 2667, 2604 and 2362 deaths (per million women) of the poorest, poor, middle, richer, and richest quintiles, respectively. Treatment seeking cases of cancer averted was 3540 and 2999 (per million women) for the poorest and richest income groups, respectively. The patient cost savings (per million women) from the vaccination policy would be US\$1,633,160 for the poorest, US\$2,240,688 for the poor, US\$2,785,626 for the middle, US\$4,417,303 for the richer and US\$ 7,041,335 for the richest quintiles.</p>

				The government cost per death averted from the vaccination policy would be US\$10,920 for the poorest, US\$11,009 for the poor, US\$11,789 for the middle, US\$12,076 for the richer and US\$ 13,277 for the richest quintiles.
16	Pecenka et al. (2015), Ethiopia	<p>Examined the health and non-health impacts of diarrhea treatment alone (baseline) compared to diarrheal treatment along with rotavirus vaccination (intervention).</p> <p>Status quo: A diarrheal treatment coverage of 32% and no rotavirus vaccination.</p> <p>Intervention: A 20 percentage points increase of coverage. Thus, an overall rate of 52% for the diarrheal treatment along with rotavirus vaccination.</p> <p>It was a UPF intervention.</p>	<p>Conducted ECEA to estimate HBG, FC and Equity. Data was used from the Ethiopian Demographic Health survey (EDHS), WHO-CHOICE, author's calculations and assumptions, World Development Indicators (WDI) and from empirical literature.</p> <p>They estimated costs from the health system perspective.</p>	<p>HBG: Diarrheal treatment averted 4400 deaths and rotavirus vaccination and diarrheal treatment together averted 5600 deaths.</p> <p>FC: Diarrheal treatment averted US\$ 12 million household OOP payments and rotavirus vaccination and diarrheal treatment together averted US\$ 13.5 million OOP payments. The net costs of the diarrheal treatment only and the rotavirus vaccination and diarrheal treatment together to the government are US\$100 million and US\$93 million, respectively. The gross cost of the rotavirus vaccination and diarrheal treatment together to the government was US\$ 102 million.</p> <p>Equity: The health benefits of the interventions tend to benefit the poor while the financial benefits favor the better-off people.</p> <p>HBG: With regards to the poorest income quintile, deaths averted was around 18 and 13 for diarrheal treatment and rotavirus vaccination and diarrheal treatment (only), respectively per each US\$ 1,000,000 spent by the government. Meanwhile, with regards to the richest income quintile, deaths averted was around 4 and 3 for diarrheal treatment and rotavirus vaccination and diarrheal treatment (only), respectively per each US\$ 1,000,000 spent by the government.</p> <p>FC: With regards to the poorest income quintile, OOP payments averted was around US\$20,000 and US\$17,000 for diarrheal treatment and rotavirus vaccination and diarrheal treatment (only), respectively per each US\$ 1,000,000 spent by the government. Meanwhile, with regards to the richest income quintile, OOP payments averted was around US\$34,000 and US\$29,000 for diarrheal treatment and rotavirus vaccination and diarrheal treatment (only), respectively per each US\$ 1,000,000 spent by the government.</p> <p>The study did not report on any of the FRP metrics such as poverty cases averted, or CHE averted or money-metric value of insurance.</p>
17	Verguet et al. (2015a), India	<p>Evaluated the health and non-health consequences of tuberculosis treatment in India in three scenarios.</p> <p>Status quo: The average DOTS coverage was 71%. Non-DOTS coverage was 13%.</p> <p>Interventions: Base case scenario: Public finance of tuberculosis treatment (DOTS) to 90% coverage (per 1 million population). Non-DOTS coverage after UPF was 5%.</p>	<p>Conducted extended cost-effectiveness analysis. Costs were estimated from the public sector perspective.</p> <p>Data was collected from the empirical literature, authors' assumptions, and calculations, and WDI.</p>	<p>HBG: 80, 29 and 119 tuberculosis deaths would be averted per year by base case, and variant 1 and 2, respectively.</p> <p>FC: Private expenditures averted by variant 1 and 2 and base case are US - \$25,000 and US\$34,000 and US\$29,000 respectively.</p> <p>FRP: The values of money-metric insurance for variant 1 and 2 and base case are US\$0 and US\$ 10,000 and US\$9,000, respectively.</p> <p>Equity: The two bottom income quintiles would benefit most from the tuberculosis deaths averted (80%) and the insurance value (80%) associated with the base case scenario. Same income quintiles benefit the most from tuberculosis death averted in both variant 1 and 2.</p>

		<p>Variant 1: improved capital markets allow individuals to borrow to finance tuberculosis treatment.</p> <p>Variant 2: Inclusion of the prevention of secondary tuberculosis cases.</p> <p>They were UPF programs.</p>		
18	Verguet et al. (2015b), China	<p>Examined the impact of a specific excise tax on cigarettes in China in terms of both non-health and health outcomes, across income quintiles.</p> <p>Status quo: A pre-increase tax rate and cigarette pack price were 41% (US\$ 0.30) and US\$ 0.74, respectively.</p> <p>Intervention: A 50% increase in tobacco price through excise tax fully passed onto tobacco consumers.</p>	<p>Used ECEA to estimate HBG, FC, FRP and equity.</p> <p>Costs were estimated from the consumer perspective.</p> <p>They employed data from empirical literature, authors' assumptions, Global burden of disease study, MPOWER 2011, and WDI.</p> <p>They considered only the male population.</p> <p>Employed the Asian Development Bank's framework that assesses the effect of taxation-created cigarette shocks.</p>	<p>HBG: 231 million years of life gained over 50 years of additional tax revenues from the excise tax.</p> <p>FC: The tax would increase overall household expenditures on tobacco by \$376 billion but decrease these expenditures by \$21 billion in the lowest income quintile, over the 50 years of additional tax revenues. Additional tax revenues raised from the excise tax would be US\$ 703 billion, over the 50 years of additional tax revenues. Expenditure on tobacco-related disease treatment (OOP) averted was US\$24 billion, over the 50 years of additional tax revenues.</p> <p>FRP: It would afford FRP worth US\$1.8 billion, over the 50 years of additional tax revenues.</p> <p>Equity: The FRP is mainly concentrated in the lowest income quintile. Thus, US\$ 1.3 billion for the poorest income group and less than US\$ 0.1 billion for the richest income quintile, over the 50 years of additional tax revenues. About 79 million and 11 million years of life gained by the poorest and richest income group, respectively, over the 50 years of additional tax revenues. About US\$ 6.6 billion and US\$ 1.5 billion expenditure on tobacco-related disease treatment (OOP) averted, respectively, over the 50 years of additional tax revenues.</p>
19	Verguet et al. (2015c), Ethiopia	<p>Examined the health gains and non-health impacts of nine interventions (measles vaccination, rotavirus vaccination, pneumococcal conjugate vaccination, diarrhea treatment, malaria treatment, pneumonia treatment, caesarean section surgery, hypertension treatment and tuberculosis treatment) that the Government of Ethiopia aims to make universally available.</p> <p>Status quo: Rotavirus vaccination (0%), pneumococcal conjugate vaccination (0%), measles vaccination (56%), diarrhea treatment (32%), pneumonia treatment (27%), malaria treatment (24%), tuberculosis treatment (50%), hypertension treatment (34%) and caesarean section surgery (83% and 15% for urban and rural areas)</p>	<p>Employed extended cost-effective analysis.</p> <p>The cost was estimated from the health system perspective. The study employed data from secondary sources and from published studies.</p> <p>Data was collected from the Ethiopia Central Statistical Agency and ICF international, international drug price indicator guide, Global health expenditure database and WDI.</p>	<p>HBG: Per Dollar spent by the Government, 510, 1700, 890, 3600, 4100, 410, 590, 2600, and 140 deaths would be averted from rotavirus vaccination, pneumococcal conjugate vaccination, measles vaccination, diarrhea treatment, pneumonia treatment, malaria treatment, cesarean section surgery, tuberculosis treatment, and hypertension treatment, respectively.</p> <p>FC: OOP payments averted were US\$ 180 000, US\$ 110 000, US\$ 9 000, US\$ 26 000 000, US\$15 000 000, US\$ 300 000, US\$ 270 000, US\$4 400 000, US\$ 730 000 from rotavirus vaccination, pneumococcal conjugate vaccination, measles vaccination, diarrhea treatment, pneumonia treatment, malaria treatment, cesarean section surgery, tuberculosis treatment, and hypertension treatment, respectively.</p> <p>Government intervention cost were US\$ 800 000, US\$ 1 200 000, US\$ 260 000, US\$ 50 000 000, US\$31 000 000, US\$ 670 000, US\$ 420 000, US\$6 900 000, US\$ 1 300 000 from rotavirus vaccination, pneumococcal conjugate vaccination, measles vaccination, diarrhea treatment, pneumonia treatment, malaria treatment, cesarean section surgery, tuberculosis treatment, and hypertension treatment, respectively.</p> <p>FRP: Per Dollar spent by the Government, 270, 170, 14, 40 000, 23 000, 460, 410, 6700, and 1100 cases of poverty would be averted from rotavirus vaccination, pneumococcal conjugate vaccination, measles vaccination, diarrhea treatment, pneumonia treatment, malaria treatment, cesarean section surgery, tuberculosis treatment, and hypertension treatment, respectively.</p>

		<p><u>Intervention:</u> A 10 percentage points increment in current coverage of all interventions except for the caesarean section surgery in the urban areas which remained at 83%.</p> <p>It was a UPF program.</p>		The study did not disaggregate results by income quintile. Thus, they did not directly address the issue of equity.
20	Verguet et al. (2013), India and Ethiopia	<p>Examined the health and non-health benefits of a hypothetical rotavirus vaccination in India and Ethiopia.</p> <p><u>Hypothetical Intervention:</u> About 76% and 52% vaccine coverage for India and Ethiopia, respectively.</p> <p>It was a public finance program.</p>	<p>Used ECEA to estimate the HBG, FC, FRP and Equity. Data from empirical literature were used.</p> <p>A societal perspective is adopted to estimate the cost. They used a hypothetical cohort of 1,000,000 births over the first five years of life.</p>	<p><i>HBG:</i> 32,000 (32% of all rotavirus deaths) and 3700 (26% of all rotavirus-related deaths) lives would be saved in India and Ethiopia respectively.</p> <p><i>FC:</i> Total household expenditures averted would be US\$1,900,000 and US\$ 800,000 for India and Ethiopia, respectively.</p> <p><i>FRP:</i> Total FRP (value of money-metric insurance) would be about \$15,000 and \$8000 for India and Ethiopia, respectively.</p> <p><i>Equity:</i> More lives would be saved among the bottom income quintile relative to the top income quintile in India and Ethiopia. The total household expenditure averted associated with the bottom two income quintiles (poorest and poorer) for India and Ethiopia would be 34% and 25%, respectively. The largest FRP value would be felt by the bottom income quintile (poor) in India and Ethiopia.</p>