Inclusion of equity in economic analyses of public health policies: systematic review and future directions

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Abstract

Objectives: To assess current approaches to inclusion of equity in economic analysis of public health interventions and to recommend best approaches and future directions.

Methods: We conducted a systematic review of studies that have used socioeconomic position (SEP) in cost-effectiveness analyses. Studies were identified using MedLine, EconLit and HEED and were evaluated based on their SEP specific inputs and methods of quantification of the health and financial inequalities.

Results: Twenty-nine relevant studies were identified. The majority of studies comparing two or more interventions left interpretation of the size of the health and financial inequality differences to the reader. Newer approaches include: i) use of health inequality measures to quantify health inequalities; ii) inclusion of financial impacts, such as out-of-pocket expenditures; and iii) use of equity weights. The challenge with these approaches is presenting results that policy makers can easily interpret.

Conclusions: Using CEA techniques to generate new information about the health equity implications of alternative policy options has not been widely used, but should be considered to inform future decision making.

Implications for public health: Inclusion of equity in economic analysis would facilitate a more nuanced comparison of interventions in relation to efficiency, equity and financial impact.

Key words: economic evaluation, equity, health inequalities

Given health budget constraints, priority setting for new programs is unavoidable, whether done explicitly or implicitly. Policy makers may use cost-effectiveness analysis (CEA) to help inform resource allocation decisions. It is usual practice in CEA to focus on 'efficiency' with the aim of maximizing health benefits for the lowest cost or minimising cost for a specified outcome. Efficiency is important, but only one of several policy objectives. Government statements about health usually include important notions of equity – reducing disadvantage, access to health services, and/or affordability.[1] Further, when the community in developed countries is asked what they want from their health care system, a 'fair' distribution of health gains is often seen as an important objective.[2-10]

Cost-effectiveness analysis (CEA) compares the relative costs and outcomes of a policy or program. The results of CEAs are usually summarised as incremental cost-effectiveness ratios (ICERs) that represent the additional costs and benefits of an intervention measured against a comparator. To present a helpful metric across different types of interventions, results are often presented as the 'net cost per quality adjusted life year' (QALY). To help determine value-for-money, an ICER threshold is often applied (e.g. <AUD$50,000 per QALY), below which an intervention is presumed 'efficient'. When a policy is being analysed for its cost-effectiveness, information regarding the equity in the distribution of health outcomes is rarely provided.[11,12]

Most CEAs either ignore health inequality impacts or limit themselves to a description of their nature without any quantification or consideration of intervention design changes to address inequality. While this applies across clinical medicine and public health, approaches to incorporate equity are likely to differ between these settings. The individualised nature of health care, for instance, is different to the population focus of public health, where confronting inequality may require discrimination between groups of relatively healthy people, for example, in the number and quality of preventative programs. In clinical care settings, this would be problematic. Equity is important in both settings, but here we focus on public health. In any country, differences in health status can be observed across the population.

Explicit health equity assessment is not always necessary. However, it can become important when, for example, a public health intervention is not cost-effective, and the question then arises of how much it reduces health inequality to not exclude this potential source of value.[11]

The health equity impact plane in Figure 1 illustrates the trade-offs between cost

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effectiveness and an alternative health equity objective.[11] Cost-effectiveness of the health program is shown on the vertical axis and the health equity impact on the horizontal axis. The latter represents the net impact after allowing for program opportunity costs and benefits. A policy that falls in Quadrant I improves both total health and equity ("win-win"); in Quadrant III, the policy harms both ("lose-lose"). In these two cases, the impacts on health maximisation and health equity are in the same direction, so there are no trade-offs. In Quadrant II, the policy has a positive impact total health but a negative impact on equity ("win-lose"), and in Quadrant IV, the policy has a negative impact on total health but a positive impact on equity ("lose-win").

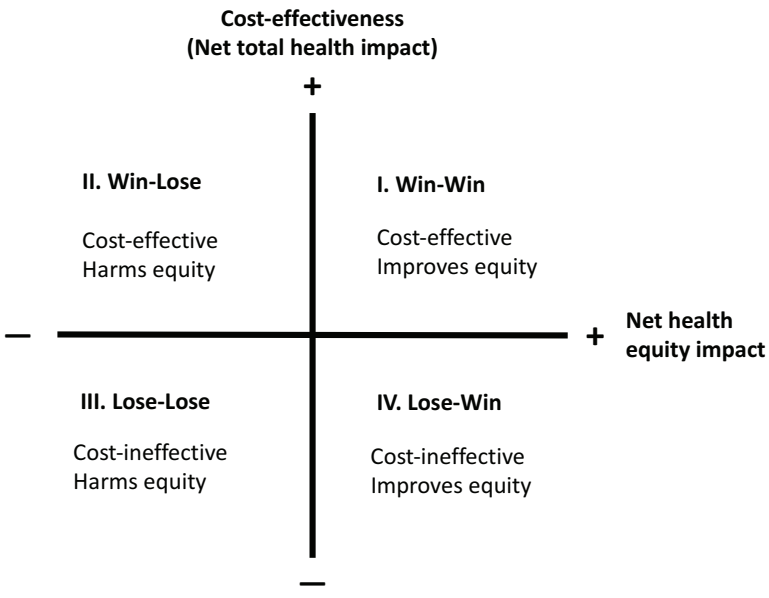
The main method of quantifying the health impact among different population groups within a CEA is to conduct subgroup CEAs, which entails a separate CEA for each socioeconomic position (SEP) subgroup to determine the costs and health gains in each group. Where interventions only require a whole of population CEA and are not set up for subgroup CEAs (e.g. population-wide strategies that are not targeted at certain groups), the subgroup health gains can be modelled. Despite measurement challenges, estimating the health gains of subgroups in population health strategies has the potential to allow policy makers to assess interventions not only for their cost-effectiveness, but also for their potential impact on health inequality. The objectives of this type of analysis are transparency and policy relevance, particularly where there is potential to increase inequalities in health status in already disadvantaged groups.

If interventions result in financial costs (or expenditure avoided) to individuals, it is also important to include this as part of the equity analysis. When a fiscal policy is being analysed it is necessary to consider whether it is regressive (taking a proportionally higher amount from those on lower incomes), or progressive (taking a proportionally higher amount from those on higher incomes). If the analysis shows that a higher proportion of expenditure comes from disadvantaged groups, it can then be determined whether and how the financial impact could be reduced.

There is an important distinction to be made between 'health inequality' and 'health inequity'. Health inequities are differences in health status between population groups that are the result of economic and social conditions.[14,15] They are considered avoidable and unfair. Inequity is a normative term linked to notions of social justice. Health inequality on the other hand, is a descriptive term that reports the distribution of a chosen metric.

When conducting a subgroup CEA to measure the health equity impact, the choice of the relevant population subgroup depends on which characteristic – SEP, ethnicity, geographical location, or gender – is important in the decision context. In the developed world, the single strongest predictor of an individual's health is his/her position on the socioeconomic spectrum.[16]

Figure 1: Health Equity Impact Plane.[11]



SEP can be measured by income, education, place of residence or occupation. On average, those at the lower end of the spectrum, irrespective of how SEP is measured, are more likely to suffer from diseases, have higher mortality rates and lower life expectancies.[16-20] This social gradient of health is also important for many racial and ethnic health differences because SEP can differ substantially by race and ethnicity.[21-24] In an analysis of government policies in thirteen countries, Crombie found that inequalities in health were most commonly presented as the difference in health status between SEP and that all countries had set an overarching goal to reduce such inequalities.[25] Our study is focused on socioeconomic health inequalities of public health interventions.

In response to growing policy concerns about health equity, economic evaluation techniques are being enhanced to provide useful evidence about health equity impacts and trade-offs. However, there has been no systematic evaluation of the advantages and disadvantages of the different published works that have incorporated equity for SEP into CEA. The aim of the present work was to review the studies that used SEP subgroup economic analyses to investigate socioeconomic health inequalities in the context of public health interventions. Subgroup CEA is a basis on which other methods of equity, such as measures of health inequality, equity weighting and opportunity cost analysis could be incorporated.[13] We aimed to assess the application, challenges and suitability of methods utilised in different contexts. Recommendations for future studies to improve the information available to policy makers are discussed.

Methods

Search strategy

Studies were identified using the following academic databases: Medline Complete, Health Economic Evaluations Database (HEED) and EconLit. All original research articles published in English were open for inclusion, with no restrictions on years of publication. Additional snowballing searches of reference lists were undertaken.

The specific search terms were: ("cost-effectiveness" OR "cost-utility" OR "cost-benefit" OR "cost-consequence" OR "economic evaluation" OR "economic analysis") AND

(socioeconomic* OR "social class" OR "social hierarchy" OR "social inequality" OR depriv* OR disadvantage* OR income OR educational OR occupation OR residence) NOT "low-income countr*".

To estimate a percentage of the total number of economic evaluations of public health programs or policies that have used SEP subgroup analysis, the Econlit database was used. Econlit classifies studies under the subheading "Health government policy regulation; public health". The specific search terms used were: ("cost-effectiveness" OR "cost-utility" OR "cost-benefit").

Study selection and inclusion criteria

Included studies were assessed for their relevance by one reviewer (AL). Studies that assessed public health interventions using economic evaluation techniques that compare alternative courses of action in terms of both costs (resource use) and consequences (outcomes, effects) and stratified SEP group/s were included. Cost-utility analysis (CUA) is a form of CEA whereby the health outcomes are measured in terms of both the length of life and the quality of that life (usually QALYs). Cost-effectiveness analysis measures outcomes in physical units meaningful to clinicians and patients, such as a 'cost per death averted'. Our aim was to include interventions that address a whole population across a socioeconomic gradient, as well as interventions targeted only at lower SEP groups. Accordingly, included studies were those that were aimed at a whole population, a community, or were targeted at specific individuals and groups of people within a country, community or organisation.

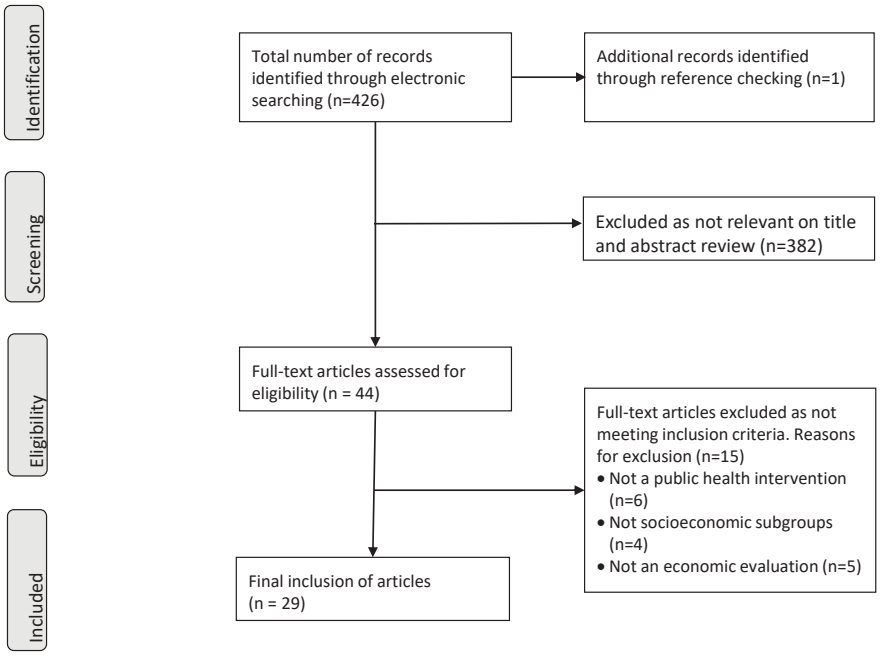
Studies were excluded by one reviewer (AL) if they: 1) were not public health interventions or policies; 2) examined groups that were not SEP-based, such as ethnic group or age differences; or 3) analysed a low-income country as one population.

Study appraisal

Data on the following variables were extracted: country, aims, perspective, study type, intervention and comparator, population subgroups, SEP specific modelling inputs, health outcomes and financial outcomes.

The studies were appraised based on: i) the number and type of SEP specific inputs in the model; ii) level of complexity of quantification of the health inequality; iii) methods of incorporating the equity analysis into the CEA; and iv) inclusion of financial costs.

Figure 2: Literature search strategy.



Results

The literature search yielded a total of 426 papers. The reading of titles and abstracts indicated that 44 of the articles were potentially eligible. After examination of the full text of these articles, the final number of studies included was 31. Reasons for excluding full-text articles are shown in Figure 2. Of the 576 economics evaluations of public health interventions identified in Econlit database, 5% were studies that used SEP subgroup CEA.

Overview of included studies

Date of publication ranged from 2010 to 2015. Of the 31 included studies, 15 examined two or more SEP subgroups and 16 studies analysed a low SEP group only. A summary of each of these studies including the SEP specific inputs and outcomes and policy relevance of each study is provided in the supplementary files.

Studies examining two or more SEP subgroups

Intervention types

The main type of intervention analysed (n=8) was vaccination programs for the prevention of a range of conditions, including rotavirus,[26,27] pneumonia,[28] human papillomavirus,[29,30] measles[31] and tuberculosis.[32] Three studies looked at fiscal policies, including an increase in tobacco taxes[33,34] and a subsidy and tax decrease for fresh fruit and vegetables.[35] There were also studies that examined bowel screening programs,[36] a ban on trans fats,[37] promotion of physical activity in adults,[38] promotion of physical activity and nutrition in children[39] and coronary heart disease management.[40]

Seven studies were CUAs[30,34,36-40] and eight studies were CEAs.[26-29,31-33,35] Seven studies compared two or more interventions to current practice,[28,30,31,34-37] while the remainder compared a single intervention to current practice. Studies originated from a range of low, middle and high-income countries.[41] There were three interventions each from the United Kingdom,[36-38] India[26,27,32] and Ethiopia,[26,28,31] two from China[29,33] and New Zealand,[30,39] and one each from the Netherlands,[34] Australia[40] and France.[35]

Measures of socioeconomic position

The most commonly used measure of SEP was household income or wealth quintiles, utilised in eight of the 15 studies.[26-29,31-33,35] Five studies used area level deprivation or disadvantage that took into account multiple factors such as employment, income, education and housing.[30,36,38-40] One study used education level as the indicator of SEP.[34]

Assessment of the studies

Aims of the studies: For 14 of the 15 studies,[26-38,40] the main aims included the evaluation of the health outcomes across SEP groups. The remaining study did not explicitly mention an aim to analyse the health benefits by SEP groups.[39]

SEP specific inputs in modelling: A comprehensive SEP specific model, using rates of effectiveness, disease specific incidence, morbidity and mortality rates, specific to the subgroups was found in 10 studies.[26-28,30,31,34,36-38,40] Two studies used a simplistic model where the intervention effect size was the only SEP-specific input in the model.[35,39]

Studies examining one SEP subgroup

Intervention types

Of the 14 studies examining a targeted SEP group, six were CUAs,[42-47] and eight were CEAs.[48-55] The majority of the studies originated from the USA (n=9);[42,45-47,49,50,52,54,55] three came from the UK;[43,44,53] and one each from Australia[51] and Iran.[48]

Measures of socioeconomic position

Eight studies used low income as a measure of SEP[42,45,46,48,50,52,55,56] and six studies used an area-based level of disadvantage.[43,44,49,51,53,54]

Assessment of the studies

Aims of the studies: The aims of all the studies analysing one SEP group were to examine the cost-effectiveness of the intervention targeting a low SEP group.

SEP specific inputs in modelling: For the modeling of morbidity and mortality in the CUAs, one study used SEP specific mortality inputs,[44] while the other four studies used general population inputs.[42,45-47] In the CEA studies, all studies used SEP-specific effectiveness/efficacy rates either from the trial on which the study was based or from published sources.

Interpretation and quantification of the health inequality

In 12 of the 14 studies that aimed to evaluate the differences in health benefit between SEP groups, the health outcomes of each SEP group were presented, such as QALY gain per person.[30,34,38,40] While it was left to the reader to interpret the size of the differences, the studies did state which SEP group had the highest or lowest gains. Two of the studies confined their attention to the highest and lowest groups, and did not include the health gains of the middle groups in their results.[30,38]

Three studies presented the results as the total QALYs in each SEP group. Two of the studies[36,37] used population quintiles. However, one study used different-sized groups and stated that the highest health gains occurred in the middle SEP groups.[34] This was true for the overall number of QALYs, however these absolute differences will vary depending on the size of the group. In this study, calculation of the ratio of QALYs gained per smoker would have changed the result to the highest gains being in the highest SEP group.

Health equity impact plane

One study used a diagram of a health equity impact plane to summarise the net costs and the reduction in absolute inequality of coronary heart disease mortality for each policy option.[37]

Health inequality measures

Measures of health inequality are single numbers that quantify the size of SEP inequalities in health and can be classified as simple or complex.[57] Simple measures make pairwise comparisons of health between two subgroups, such as a lower and a higher SEP group. Complex health inequality measurements produce a single number that considers all SEP groups separately and assess how the rate of health gains vary across the gradient of SEP.[57] Measures of inequality can be relative or absolute.

Simple health inequality measures were included in one study[35] – a health disparities index – defined as the variation in the odds ratio for the first vs. other income deciles for each policy. The opportunity to quantify and compare the inequality impact of interventions was missed by four[28,30,31,34] of the seven studies that analysed two or more interventions.[28,30,31,34-37]

Complex health inequality measures were used by two studies, both of which used a slope index of inequality.[36,37] The study by Asaria et al. provided a new methodological framework for undertaking distributional cost-effectiveness analysis (DCEA) to combine the objectives of maximising health and minimising unfair variation in health when evaluating population health interventions.[36] Their methods included complex health inequality indices alongside CUA. They analysed two redesign options for an existing screening program: i) a targeted reminder for disadvantaged groups; and ii) a universal reminder. A battery of both relative and absolute measures of inequality for each intervention were presented. Five decimal places are shown to differentiate the numbers, and the differences in the size of the inequality measures between strategies appear very small. The importance of these small differences is not explained.

Equity Weights

There is an implicit equity approach in CEA that assigns an equal value to each unit of health gain regardless of the intervention or its recipients. Equity weights are a way of formally incorporating alternative equity positions into economic evaluation.[58] The weights are numbers that represent the relative importance of equity for SEP.

Two studies used a form of equity weighting when quantifying the health inequality impact. Asaria et al.[36] report the Kolm and Atkinson indices to measure inequality (see Supplementary Table 1), allowing for different levels of aversion to inequality, a measure of the overall health gains that society is willing to give up in order to achieve a more equal distribution of health. They present a low, medium and high value of aversion to inequality. All of the inequality measures, calculated across a range of inequality aversion levels, show that no screening was the least unequal and the universal reminder as the most unequal of the strategies. Banham et al.[40] present a method for weighting resource allocation, in situations where distribution of the same level of resources per capita to each SEP group would increase the inequalities due to different intervention effect sizes. If the policy objective is to reduce inequalities, the approach suggests weighting resource allocation, using the highest quintile as a benchmark and based on the difference between highest and lowest quintile specific intervention effects. For example, the weight for Quintile 1 would be 1.65, based on the difference between the effect sizes of Quintiles 5 and 1 of 18.8% and 11.4% respectively, divided by 11.4%.

Financial impacts

Financial impacts are measured in terms of market place transactions, consisting of out-of-pocket expenses avoided or incurred because of the intervention.

The novel framework of extended cost-effectiveness analysis (ECEA) emerged

from this review and includes two financial aspects of inequality across wealth strata of a population: i) the out-of-pocket (OOP) expenditure avoided; and ii) the level of financial risk protection (FRP) provided by the value of insurance afforded. ECEA was used by six studies from low and middle income countries.[41,26,28,29,31-33] Four studies have used the ECEA framework fully with the health benefits measured in 'deaths averted' across income quintiles and financial impacts of out-of-pocket treatment expenditures avoided and the FRP afforded.[26,28,32,33] Two studies omitted the FRP and reported a percentage change in expected income.[29,31] For example, Verguet et al. provide an alternate scenario to Universal Public Financing (UPF) of tuberculosis treatment in India, by reducing the cost of borrowing for the poor. Instead of health gains and the insurance value of UPF accruing primarily to the poor, lowering costs of borrowing for the poor could potentially achieve some of the health gains of UPF, lower costs to the public sector and improvements in the net income position of the top two income quintiles, but at the cost of leaving the poor more deeply in debt.[32]

Of the 29 studies, three studies examined fiscal policies;[33-35] however, only one reported the financial impact. Comprehensive financial impacts were presented showing that increased tobacco taxation can be a pro-poor policy instrument in China, by substantially decreasing tobacco expenditure in the poorest quintile and by decreasing expenditure on tobacco-related diseases and providing financial risk protection mainly concentrated in the poorest households.[33]

Analysis of opportunity cost

The opportunity cost could be the QALYs forgone when there is an equity-efficiency trade-off, such as between improving overall population health and the equity goal of reducing the health inequality between SEP groups. The latter may require diversion of additional resources to these harder to reach groups. The net equity impact of an intervention includes the health benefits forgone as well as the health benefits gained. The forgone health gains or health opportunity costs that could have resulted from implementing the next best alternative program may be unequally distributed among SEP groups.

The opportunity costs were analysed by one study.[36] The authors' method of estimating the distribution of opportunity cost was to assume that the additional costs come from a fixed health budget and the health opportunity cost of the disinvestment of these funds within the National Health Service was one QALY per £20,000. The base case assumed that the opportunity costs were distributed equally across all population subgroups. Subsequently, two sensitivity analyses were performed assuming the costs were borne entirely by the healthiest subgroup and secondly by the unhealthiest subgroup. The results are presented as social welfare indices with five decimal places to distinguish the differences in magnitude. These differences are not easily interpreted and an explanation of the implications of the small differences in magnitude would have been useful.

Discussion

The aim of this paper was to examine studies that have used SEP subgroup CEA analysis and to assess how they identify and measure health inequalities in public health interventions. The key methods from the studies included: i) the use of health inequality measures to show the inequality differences when two or more interventions are being compared; ii) the analysis of financial impacts such as out-of-pocket treatment expenditures avoided; iii) the use of SEP specific inputs for mortality and morbidity, especially in the studies that analysed effects across different SEP groups; and iv) the use of equity weights.

We found the main weakness to be that in most studies where two or more interventions were being compared, there was a reliance on disaggregated data and the interpretation of the size differences of the inequality was left to the reader. Also, some studies did not include financial impacts when they were a potentially important aspect of the intervention and some studies confined their attention to the highest and lowest SEP groups and potentially omitted important results from the middle groups.

The study by Asaria et al.[36] broke new ground in providing a DCEA framework by presenting complex inequality measures, including aversion to inequality values and equity weighting analysis. The framework demonstrated how alternative social judgments influence the assessment of which strategy is best. Social welfare analysis can be a useful way of ranking interventions to decide which one best minimises health inequalities and/or maximises health, taking into account people's aversion to inequality. The study demonstrated the use of equity weights to explore the implications of alternative value judgments. One of the features of Asaria et al.'s methodology[36] is the transparency about value judgments and the use of sensitivity analyses to reflect alternative value judgments. Lack of consensus on an equity weight algorithm has raised doubts about equity weight analysis.[11] However, this type of analysis is recommended to be used as an aid to analyse the implications of using alternative value judgments via sensitivity analysis and not necessarily as an algorithm for making decisions.[11]

ECEA has also emerged as a framework for incorporating health and financial inequality impacts into economic evaluation in low and middle-income countries. Examining the financial impacts across SEP groups is an important advance in analysing equity in CEA. Although the framework has only been used in low and middle-income countries, aspects of ECEA would be useful in analyses originating from high income countries also; the analysis of out-of-pocket costs incurred and averted across SEP groups is highly relevant in any country when the impacts differ.

When assessing the equity impact of an intervention, the distribution of both health gains and opportunity costs are important. The distribution of the latter will depend on how the intervention is funded. For example, if the funding comes from public health expenditure, health losses may be distributed unequally to those who are worse off, as they rely more on public services.[13] The study by Asaria et al.[36] is the only one to present preferred strategies for when health opportunity costs are borne by the least healthy, the healthiest or are equally distributed. An important area for future research is to deliver improved estimates of the distribution of opportunity costs, and to determine a realistic distribution that plausibly reflects the impact of likely disinvestment decisions.

The use of health inequality measures is a constructive way forward where the aim is to compare different intervention options for their health inequality impact to allow ease of comparison and ranking of the interventions. Simple health inequality measures are easy to calculate and interpret, however they only take two SEP subgroups into account. The advantage of using complex health inequality

measures is that they allow for a number of different interventions to be compared for their health inequality impact, taking into account each subgroup and its size. Whether one should consider measure of effect or the total impact depends on whether the size of the low SEP groups is considered a changeable aspect by policy-makers, (for example the income distribution), or whether to focus on the effect that is modifiable by public health policy.[57]

A limitation of the use of health inequality measures is that they are subject to misinterpretation. The slope index of inequality and the relative index of inequality, for example, are complex to interpret and can easily lead to misunderstandings.[57] The article by Asaria et al.[36] would have benefited from more explicit interpretations of some of the inequality measures, including the implication of the size of the differences, to improve ease of understanding. Future studies should include a clear interpretation of each measure. The use of figures to compare results of health inequality measures of various policies could be useful.

Given that all the studies considering equity for SEP across population groups were published in the past five years, application of this type of analysis is still in its infancy. In the health economics literature, for example, there is a well-developed literature on the pros and cons of including equity weights in economic appraisal, but only a limited and emerging literature on how to construct those equity weights. The estimate of 5% of economic evaluations in public health using SEP subgroup analysis is likely to be an underestimate, as the search only included the Econlit database. Econlit includes economics and business journals, however, an estimated 2.5 times as many health economics authors publish in PubMed listed journals.[59] If this is the case, the percentage is likely to be closer to 1.5%. PubMed was not used for the estimation because it does not have a classification system by category.[36,13]

With regard to SEP specific mortality and morbidity in the modelling of health outcomes, it is important to note that the use of subgroup specific parameters, such as lower life expectancy and higher morbidity burden, may result in the evaluation of one subpopulation being less cost-effective than another. For example, lower SEP groups may have lower life expectancy and higher comorbidities resulting in lower health gains and higher ICERs. For this reason, an intervention that is cost-effective overall may not be cost-effective in lower SEP groups. Sensitivity analyses could include the use of general population life expectancy, quality of life estimates and treatment cost variations to compare the difference in results. Blakely et al.[30] used this technique, although not for SEP, by applying non-Maori morbidity rates to Maoris and presented both sets of results. This was done because higher background mortality and morbidity rates for Maoris meant that in the baseline analysis a life saved for Maori was weighted less than a life saved for non-Maori. By comparing the two analyses, it is possible to check whether disadvantaged groups are being further disadvantaged.

A recent article reviewed formal methods that consider equity in the context of CEA for health technology assessment (HTA), covering multiple concepts and values relating to equity.[12] It identified one of the major obstacles hindering the use of formal equity methods in decision making, as the variety of concepts and values discussed under the notion of equity. Focusing on one key aspect of equity, such as SEP, allows for clarity. The methods of incorporating equity common to both HTA – an aspect of clinical medicine – and public health were equity weights and opportunity cost analysis.

One of the advantages of subgroup CEA is that it is an existing modelling method that health economists are familiar with performing, particularly in health technology assessment for heterogeneous characteristics, such as treatment effects. However, data requirements are more demanding and social distributions of key parameters are required. Trials are usually not designed or powered to detect subgroup effects as this requires additional resources, both for the collection and analysis of subgroup data. When health inequality impacts are a desired output of an intervention, the collection of SEP subgroup effectiveness data needs to be factored into the study protocol and budget.

Given the extra data requirements and costs involved, choices need to be made about when to conduct explicit health inequality analysis. When priority-setting decisions are being made around a set of potential interventions, as well as full economic evaluation studies to inform which interventions are both effective and cost-effective, the technical results of such evaluations need to be considered within a decision-making framework that explicitly considers health inequalities.[60] Analysis of the health inequality impacts may also help with the restructuring of programs to encourage participation among lower SEP groups. The analysis can be done before they are implemented, but also retrospectively performed on existing programs.

The methods of DCEA and ECEA are not widely used, however, future studies should consider using these techniques to provide policy makers with more useful information about the equity implications of policy options. When two or more interventions are being considered the inclusion of health inequality measures facilitates comparisons across key efficiency/equity objectives and should be included in future studies to enhance the information available to decision-makers. If financial impacts such as expenditure incurred or avoided are an important aspect of the policy, these should be included as part of the analysis. Equity weighting analysis can be used to quantify how much concern for equity is required when a trade-off between equity and cost-effectiveness is needed. It has been demonstrated that various weights can be applied, allowing the appropriate weight to be considered by decision makers along with stakeholders.[11] Further research could gauge the usefulness of these methods for decision-makers and stakeholders. It is important that results and inequality measures presented are easy to interpret. Feedback will be helpful to identify which health inequality measures are most useful in practice.

Conclusions

As a reaction to growing policy concerns about health equity, there has been a move towards using CEA techniques to generate new information about the health equity implications of alternative policy options. The use of economic evaluation to investigate socioeconomic health inequality impacts of public health policies is relatively new and more work is required to allow ease of interpretation and comparison of measures being reported. The new techniques described have not been widely used to inform decision making, but it is hoped that these options are considered and used to provide policy makers with additional information about the health equity impacts of public health policies.

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Supporting Information

Additional supporting information may be found in the online version of this article:

Supplementary Table 1: Cost-utility and Cost-effectiveness Studies including SEP subgroup analyses.

Supplementary Table 2: Studies examining only a low SEP group.