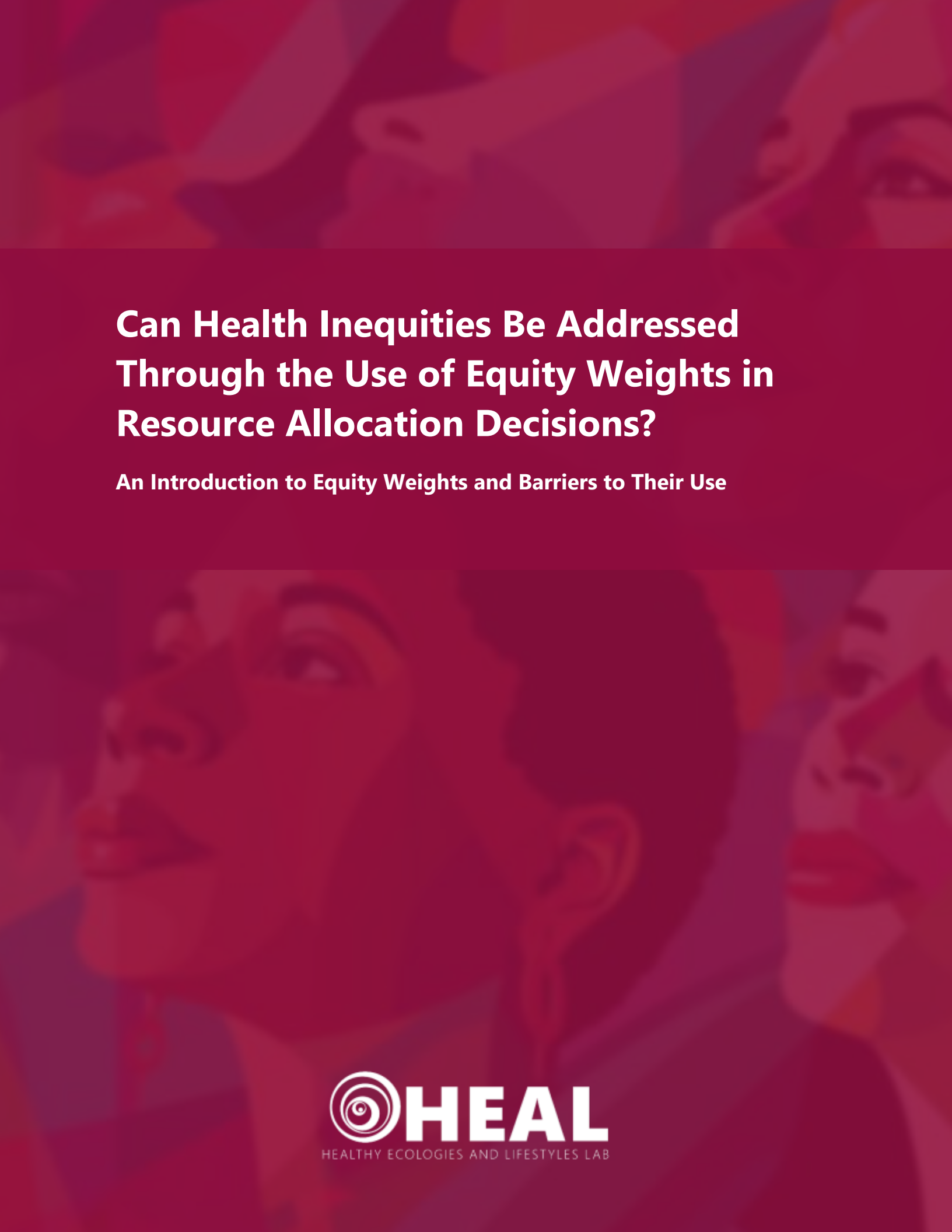


Can Health Inequities Be Addressed Through the Use of Equity Weights in Resource Allocation Decisions?

An Introduction to Equity Weights and Barriers to Their Use

HEAL

HEALTHY ECOLOGIES AND LIFESTYLES LAB

Executive Summary

Addressing health inequities through health resource allocation decisions requires a systematic, quantifiable approach. In the context of cost-benefit and cost-effectiveness analyses, equity-weighting provides a potentially suitable solution for balancing equity and efficiency considerations. An equity weight is a mathematical adjustment that can be applied to a Quality Adjusted Life Year (QALY) or Cost-Effectiveness Threshold (CET). These weights are used to systematically (a) increase the valuation of health gains among disadvantaged groups or (b) reduce the threshold value for considering whether an intervention within these populations is deemed cost-effective. The present guide serves as a resource for supporting the uptake and implementation of equity weights in resource allocation decisions, with specific attention paid to some of the difficult decisions and barriers associated with using equity weights. In doing so, we conclude that valuing QALYs differently for different populations can and should be done, if doing so supports decisions that lessen inequities without creating large losses to efficiency. This is the case even if such weights are not perfectly calibrated to match epidemiological severity. For example, weights between 1.5 and 3.5 appear both acceptable to the general public and reasonable to apply in cost-benefit decision making.

Authors

Kiffer G. Card
Anthony T. Amato
Marina Adshade
Robert S. Hogg
Nathan J. Lachowsky

Funding

Funding for this report was from the Canadian Foundation for AIDS Research (CANFAR) and Dr. Card received funding from a Michael Smith Scholar Award. Dr. Card is also supported by the Pacific Institute on Pathogens, Pandemics, and Society.

Table of Contents

Part 1.
Equity, Equality, and Efficiency in Healthcare

Equity and Equality

Canada has one of the healthiest populations in the world.[1] However, not everyone in Canada experiences the same level of health. Some people are healthier and will live longer lives; others are less healthy and will die early.[2]

Differences in health are known as ***health inequalities***. When a health inequality is systemic, avoidable, and unfair we call it a ***health inequity***.[3]

What is the difference between equity and equality?

Equality and ***equity*** have emerged as related, but distinct concepts in public health theory. When considering health outcomes, both terms imply a sense of sameness and equivalence. For example, if all individuals in a population have the same life expectancy, you would satisfy the demands of equality and equity on this measure. The difference between these terms is clearer when considering the *processes* by which health outcomes are achieved. Providing *equal* access to healthcare, for example, involves providing the same services to all people. Meanwhile, providing *equitable* access to healthcare involves providing the level of service that each person needs in order to overcome the barriers to health that they face as individuals and communities.

Health inequities, *not just inequalities*, exist in Canada.[4] They persist despite commitments from governments and health organizations to remedy them. In some cases, health inequities are worsening. For example, the disproportionate burden of COVID-19 on racial and ethnic minorities – which is driven predominately by differences in housing and working conditions – has resulted in a widening chasm of life expectancy.[5]

The Social Determinants of Health

Multiple factors contribute to health inequalities and inequities. Biological, psychological, cultural, social, environmental, and behavioural factors all contribute to differences in health status.[6,7] Each of these domains contributes differing amounts to the health of a population. Many contributing factors are modifiable through intervention, others are not. According to common estimates, only 10-20% of avoidable mortality can be addressed through medical approaches – the remaining must be addressed through broader systemic changes that prevent the emergence of poor health.[6,7]

The ***social determinants of health*** are recognized as key drivers of health inequities. The World Health Organization describes social determinants of health as "*the conditions in which people are born, grow, live, work and age*" and "*the fundamental drivers of these conditions*."[8] Major social determinants of health include (a) housing, food, and water security, (b) socioeconomic status and working conditions, (c) educational attainment and health literacy, (d) stigma and discrimination, and (e) social capital and support.[8] Without addressing these factors, advances toward reducing health inequities are unlikely.[6,7]

Equity and Efficiency

Reducing or eliminating health inequities often requires decision-makers to balance equity with efficiency. ***Efficiency***, in this case, refers to achieving the greatest health benefit for the least cost.[9] In theory, efficient health systems produce the greatest benefit for the system as a whole, but do not necessarily address inequities.[10] In practice, perusing equity often means making trade-offs with efficiency.[10] In a purely efficient health system, resources are allocated such that the average level of health in a population is maximized. The variation of health within the population is not considered and it is not important to whom health benefits accrue. On the other hand, in a purely equitable health system, the focus is on bringing all people to the same standard of health, even if that standard is sub-optimal (meaning it is not as good as it could be in a purely efficient system). In fact, a reduction in the standard of health within an equitable system is sometimes required due to the increasing marginal costs for health gains.

Prioritizing Equity

Neither a purely equitable nor efficient system is desirable. Studies assessing the resource allocation preferences of individuals suggest that we have a general aversion to inequity, even though we want an efficient health system. For example, research from Ateemaa et al. (2015) suggests that while people are averse to losses in health among their own groups, they are willing to sacrifice marginal gains to resolve inequities faced by others.[11] In other words, it is generally found that people tend to value equity above and beyond efficiency.[12–14]

From a practical standpoint, such an approach to health resource allocation is consistent with contemporary ethics, even if our own within-group favouritism stands as a barrier.[15] As such a simple utilitarian approach to maximizing benefits to the population as a whole is not consistent with our basic sense of decency. This effect is particularly strong when it is small minority groups that experience extreme levels of disadvantage.[16]

Why does equity often come at the expense of efficiency?

A key reason that equity comes at the expense of efficiency is that individuals who experience health inequities are frequently minorities who have been marginalized by mainstream cultures and intuitions. Marginalization makes these individuals harder to identify, more difficult to engage, and less healthy to start with. It's important to note that these conditions are not the fault of individuals, but of social systems.

Therefore, addressing inequities in marginalized communities requires us to address not only the fundamental biological drivers of poor health, but also the upstream, underlying, and mutually reinforcing social determinants of health. As such, equitable interventions must be specifically tailored and targeted if they are to achieve the same health outcomes as more general approaches. This process makes equity-oriented interventions more expensive to develop, implement, and sustain. In resource-constrained settings, the increased cost of these programs must come at the expense of other opportunities to improve health – thus giving rise to the equity-efficiency trade-off.

Part 2.
Integrating Health Equity into Decision Making Processes Using Equity Weights

There are a variety of ways that equity can be incorporated into healthcare decisions.[17–20] Among available approaches,[21,22] it has been argued that healthcare planners should explicitly adjust for equity when conducting cost-benefit analyses.[23,24] However, despite a general endorsement of equitable resource allocations in health, some institutions have been hesitant to formally implement equity considerations into their valuation of health gains to different communities.[25,26] This is because doing so requires us to value health gains among some as worth more than health gains among others. These decisions can sometimes feel arbitrary and punitive. Given the value that democratic societies place on equality, it is not surprising that some are hesitant to abandon utilitarian values, even in pursuit of equity.

Equity Weights

Equity weights provide a systematic and quantitative approach for the equitable distribution of health gains, which may help overcome some of the resistance that policymakers feel when trying to implement equity considerations into resource allocation decisions. For decades, various policymakers have used some form of equity weighting or

advocated doing so.[27] For example, since the 1990s, Australian authorities in some jurisdictions have valued health gains among Indigenous communities at 2 to 3 times the "value" of health gains in other populations – reflecting the "health need" of the Indigenous communities in Australia.[25] In effect, this and similar approaches increase the value of interventions supporting demographic groups who have greater health needs.[28] We call the multiplier applied to a health gain an "equity weight."

Equity weights are simply mathematical adjustments applied in cost-benefit analyses in order to account for the distribution of benefits to key individuals and groups.[22,29] In effect, this "correction" gives interventions that include priority populations an edge in resource allocations by reducing their cost or increasing their value. This helps to adjust for the relatively higher cost of a QALY in these communities.

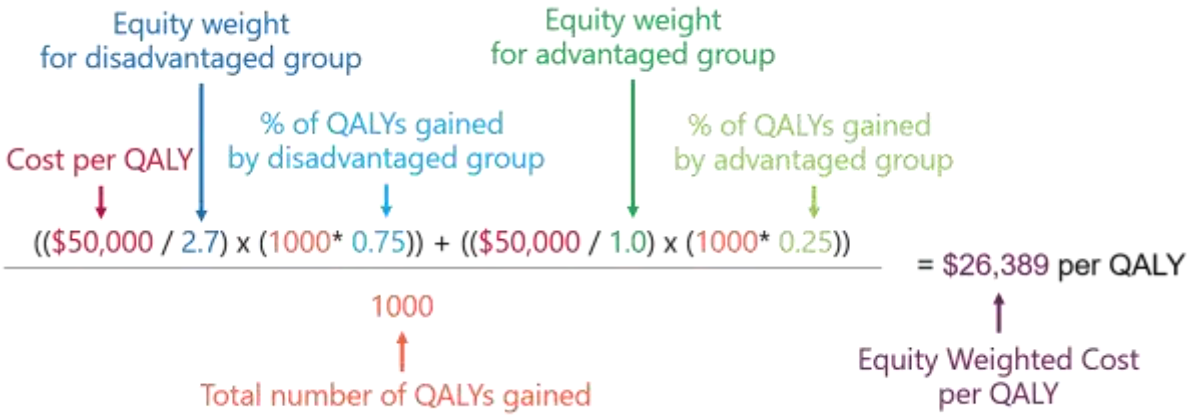
Life Years and Quality Adjusted Life Years

In traditional cost-benefit analyses, ***Life Years (LY)***[30] are used to represent the benefits gained from an intervention. It has become standard practice to use ***Quality Adjusted Life Years (QALYs)*** capture both the number of years of life gained as well as the quality of those years.[30] The QALY is therefore a good way to maximize the efficiency of resource allocation decisions.[31] However, an implicit assumption of the QALY is that all QALYs are the same, irrespective of who accrues them.[32] In other words, QALYs ignore the fact that the cost to buy a QALY in a marginalized population is higher than in the general population (which, in effect, would incentives policymakers to disproportionately fund programs in the general population, which in turn would worsen inequalities). Therefore, a QALY is an insufficient unit of individual benefit[33] because it does not appropriately value programs with explicit equity considerations or goals.[22]

Equity-Weighted Quality Adjusted Life Years

Several solutions have been proposed to address the equity limitations of the QALY.[34–36] Among these, several experts have advocated for the application of an equity weight to QALY calculations. Nord et al. (1999) and Bleichrodt et al. (2004) have made convincing arguments for the use of ***Equity-Weighted Quality Adjusted Life Years (EQALYs)***.[37–39] Doing so provides a straightforward way of integrating equity considerations in cost-benefit analyses.

For example, if a program producing 1,000 QALYs costs $50,000 CAD per QALY but 75% of QALYs are gained among Indigenous persons and an equity weight assigned for Indigenous people is 2.7, the program would be evaluated as if it only cost $26,389 CAD per EQALY. The decision to fund this program would be a no-brainer!



As you can see, the use of equity weights allows for the systematic and quantifiable incorporation of equity considerations into resource allocation decisions.[9,40,41] Ideally, the equity weight adjusts for the additional cost of buying a QALY in a marginalized population compared to the general population. Further, it reduces the gaps between those advantaged by our health and social systems and those disadvantaged by them.

Barriers to Equity Weighting

Determining what inequities to address.

There are several barriers to applying equity weights.[19,41,42] First, know what factors you should consider. For example, you could use equity weights to address health inequities across geographic regions, income groups, ethnic groups, or some other factor. The choice of which factors to weight for may be controversial.[43] Social and political priorities likely will play a role in shaping what factors should be considered. Of course, this introduces grave potential for bias and misapplication of equity weights.

Calculating equity weights.

Regardless, once you decide what factors you want to weight, decide how to calculate the weight that will be applied.[44,45] In particular, you will need to determine how "strong" the weights should be.[19] Multiple methods have been proposed to inform the calculation of equity weights.[18,21,29,45] Among these, two dominant strategies have emerged. These are: (1) preference-based weights and (2) epidemiologically-derived weights.[46]

Preference-based Weights. The historically favoured strategy for developing equity weights is to utilize the stated preferences of the public.[47–50] The preference for this method comes from the economic origins of equity weights, where discrete choice and stated preference studies are common ways to elicit information about "rational choices."[51] To derive an equity weight from a stated preference study, you might explain to participants that individuals from high-income groups live 6 years longer than those

from low-income groups and then let them choose between programs that serve high and low-income groups in order to assess the rate at which they prioritize the low-income group. These choices reveal information that tells you how many life years people might be willing to trade off in high-income groups to meet the needs of low-income groups. This is called an average marginal rate of social substation and can be applied as an equity weight.[29]

Epidemiologically-derived Weights. When trying to estimate the marginal rate of social substitution for many health conditions, social stigma could likely and significantly impact the perceived benefit of equity-oriented approaches.[51,52] Indeed, for decades, stigma has worked against creating an equitable healthcare system, not for it.[53] People are more likely to support health gains for people like themselves, and less likely to support equitable trade-offs for other groups.[14] Given this, a second method to develop equity weights is to calculate the burden of disease using epidemiological data (e.g., $\frac{Mortality\ Rate\ in\ Disadvantaged\ Population}{Mortality\ Rate\ in\ total\ Population}$), and then use this value as an equity weight.[29] These estimates are typically identified through a literature review of surveillance reports, academic studies, or primary epidemiological research. While this may be difficult, the benefit of this approach is that it is based on empirical disease estimates.

The disadvantage of empirical weights is they can lack public support – meaning that policymakers might be hesitant to utilize them. While previous comparisons of these two approaches in the creation of income-based equity weights suggest that they produce similar estimates,[29] caution should be taken. Nevertheless, at the end of the day, it is important to choose a weight that represents the true inequities experienced by a population, but is also acceptable to decision makers who will rely on cost estimates.

"There is no one size that fits all. We must work country by country, region by region, community by community, to ensure the diversity of needs are addressed to support each reality."

Amina J. Mohammed, Deputy Secretary General, UN

Applying equity weights.

Once you know what inequities you will address and the strength of the equity weights you will apply, you must decide how to use them. Indeed, equity weights can be applied using a variety of approaches.[42] One approach would be to apply the equity weight to the benefit-side of a cost-benefit equation, by multiplying a group-specific equity weight by the QALYs gained among each group. Under this approach, a larger weight above 1.0 is applied to disadvantaged groups. This results in a higher estimated benefit for a program that better addresses inequities.[54] Alternatively, you might apply equity weights to the cost-side of the cost-benefit equation by multiplying a weight of less than 1.0 by the dollars spent on disadvantaged groups. This results in a lower estimated cost of programs serving disadvantaged groups. While the former approach is generally preferred (because it might be less likely to confuse an accountant), the latter might be beneficial if your organization uses a "cost-effectiveness threshold" (i.e., a dollar value used to estimate whether an intervention is cost-effective).[55] For example, in Canada, a cost-effectiveness threshold of $50,000 CAD per QALY is often used. Applying an equity weight to this cost-effectiveness threshold would allow for relatively more expensive programs to still pass this criterion by discounting the cost of the QALYs gained among disadvantaged groups – thereby helping such programs to clear this hurdle.

Part 3.
The Do's and Don'ts of Applying Equity Weights

Now that you have a basic idea about what equity weights are and how they can be used, this section reviews a few scenarios that can help to further flesh out in your mind some of the "Do's and Don'ts" of applying equity weights.

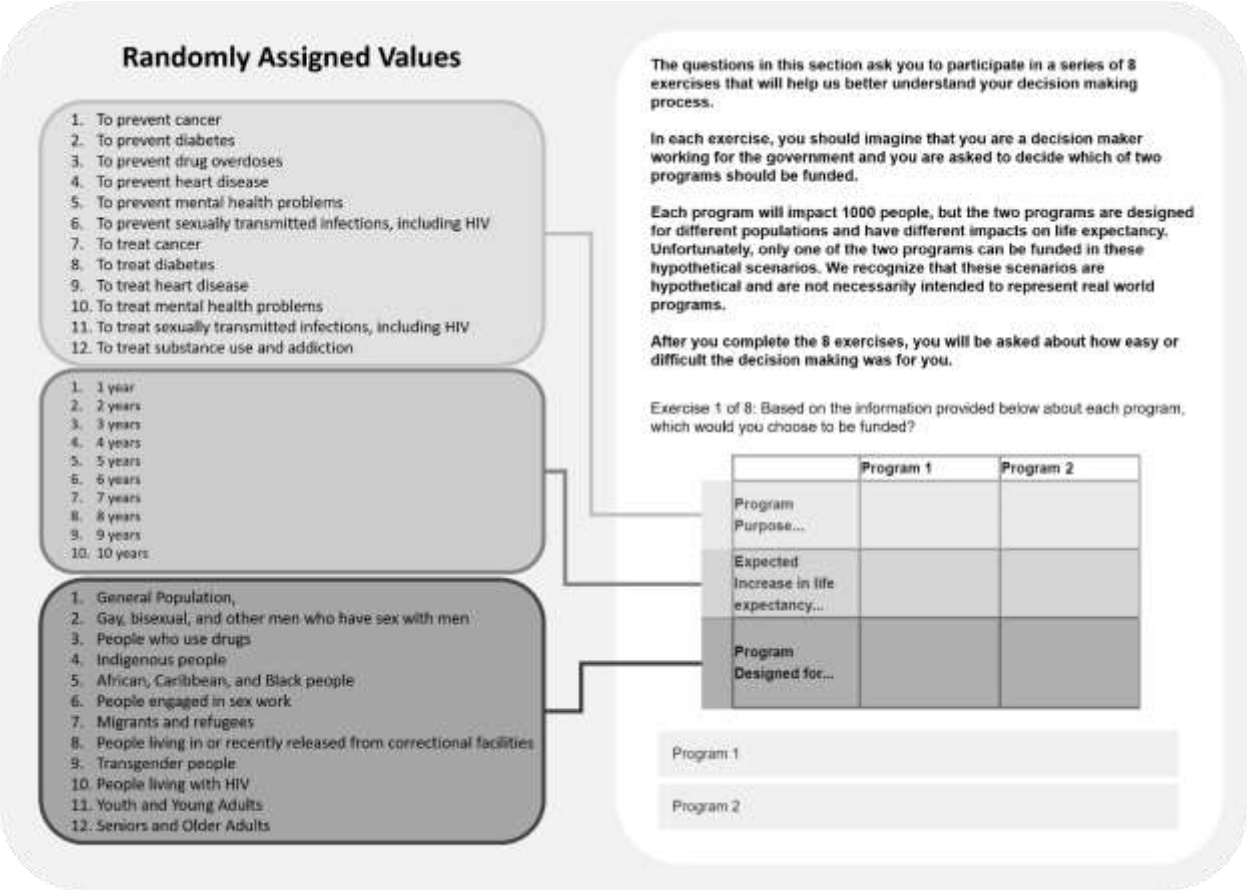
Scenario #1: Preference-based Equity Weights.

As we discussed earlier, equity weights have been calculated using estimates from stated preference data and epidemiological data. In this case study, we examine stated-preference equity weights generated through a discrete choice experiment.

A **discrete choice experiment** is a quantitative method that asks participants to make choices over multiple rounds of data collection. Their choices are then analyzed to understand what factors influenced how they made decisions.

For the present scenario, we asked participants to choose between two potential public health programs. Each program was defined by (1) the program's primary aim (e.g., to treat or prevent a given health condition), (2) which health condition the program addressed, (3) the number of years of life gained to by program participants (i.e., 1-10

years), and (4) the target population of the intervention. The figure below shows the response options that were randomly assigned to each of the two hypothetical programs.



Across eight head-to-head comparisons, participants then selected one of two programs that they would choose to be funded. We then modelled what factors were associated with whether a participant chose a given program. Full details of this study are published in Card et al. (2022).[56]

Our analyses of these data reveal several important findings:

First, participants preferred interventions that added more years to participants' life expectancy. In fact, for one year of marginal life gained, there was a 15 percent increase in the odds that participants chose that program. This suggests that participants are, to some extent, prioritizing efficiency by selecting programs that accrue more health gains for their respective beneficiaries.

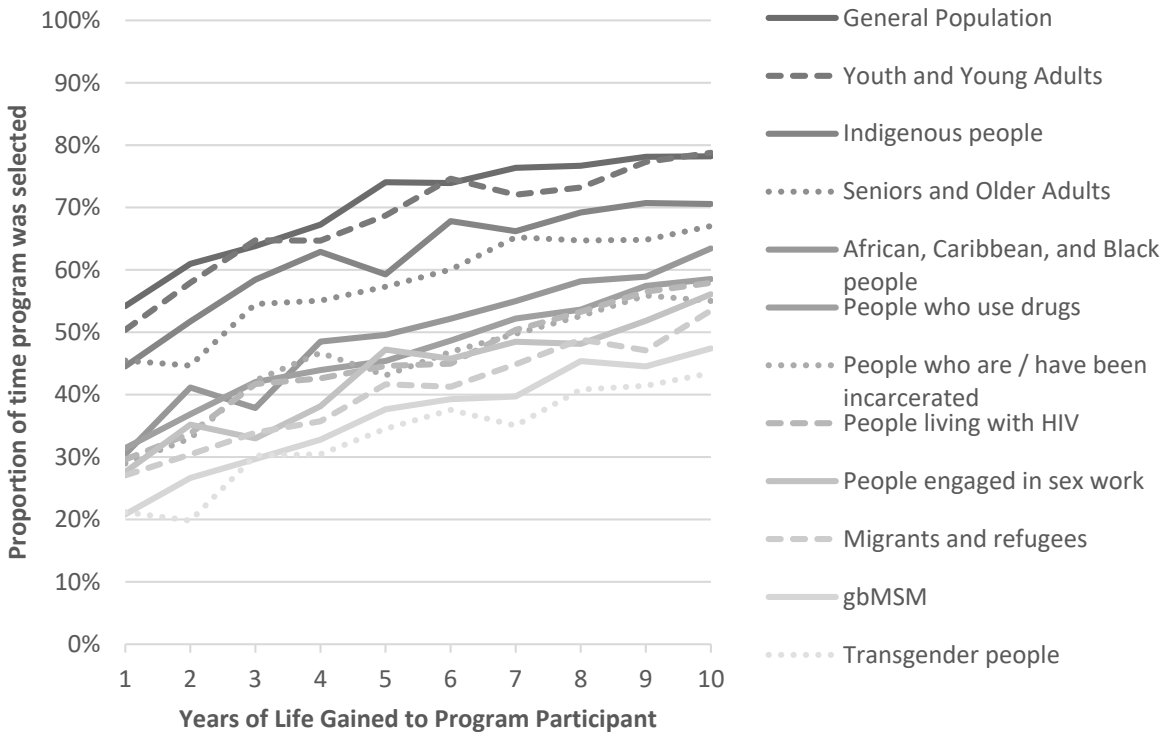
Second, we found that participants tended to favour interventions that focused on treatment rather than prevention. While this approach is emotionally intuitive, large

bodies of evidence suggest that it is more cost-effective to prevent disease than to treat it. As the old saying goes: An ounce of prevention is worth a pound of cure.

Third, people generally preferred interventions for common chronic diseases — such as heart disease, diabetes, and cancer — and were less likely to favour interventions for behaviour-related conditions, such as sexually transmitted infections. The table below shows the percent of time an intervention addressing each health condition was selected:

Health Condition	% of time it was selected
Mental Health	56.0
Cancer	53.4
Diabetes	53.2
Heart Disease	51.6
Substance Use	47.7
HIV & STIs	43.5

Fourth, people generally preferred programs focused on the general population as opposed to those tailored for key marginalized populations.



Given this trend, if we were to use the odds of a participant selecting an intervention as a stated preferences equity weight, you'd find that you'd be doing a huge disservice to the

cause of equity. In fact, as you can see in the table below, all the odds ratios, except for those targeting seniors and young adults, are less than 1.0. This means that applying these odds ratios as an equity weight would devalue QALYs gained among these groups.

	Odds of a program serving this population being selected, relative to an intervention tailored to the general population.
Client Population *(Ref: General Population)*	
Youth and Young Adults	1.22
Seniors and Older Adults	1.10
Indigenous people	0.91
African, Caribbean, and Black people	**0.56**
People living with HIV	**0.52**
People who use drugs	**0.34**
Transgender people	**0.26**
Migrants and refugees	**0.26**
gbMSM	**0.24**
People engaged in sex work	**0.24**
People who are incarcerated	**0.19**

BOLD indicates $p < 0.05$

Clearly, the lower value that the public places on programs tailored to these populations reflect a huge source of bias that limits the feasibility of using stated-preference equity weights to solve inequities.

However, we did find that the bias against behavioural interventions and those tailored for key populations was overcome when the programs addressed a health condition that was widely understood to be linked to the population the program was tailored to. For example, people were more likely to support interventions for sexually transmitted infections when these interventions were tailored for people engaged in sex work or for gay and bisexual men.

The table below shows the odds of a program targeting specific populations for each of the conditions:

	aOR	aOR	aOR	aOR	aOR	aOR
Client*Condition *(Ref: General Population)*	**Cancer**	**Diabetes**	**Heart Disease**	**HIV/STIs**	**Mental Health**	**Substance Use**
African, Caribbean, and Black people	1	**0.48**	**0.53**	0.76	0.69	**0.6**
gbMSM	1	**0.47**	**0.55**	**1.73**	0.89	1
Indigenous people	1	**0.55**	**0.32**	0.83	**0.62**	0.75
Migrants and refugees	1	**0.5**	**0.61**	**1.91**	1.15	0.76
People engaged in sex work	1	**0.56**	**0.52**	**1.78**	1.07	1.18
People who are incarcerated	1	0.86	0.72	**2.20**	**2.41**	**1.92**
People living with HIV	1	**0.39**	**0.45**	0.99	**0.61**	**0.58**
People who use drugs	1	**0.57**	**0.37**	1.13	**1.53**	**1.45**
Seniors and Older Adults	1	**0.4**	**0.36**	**0.35**	**0.61**	**0.44**
Transgender people	1	**0.55**	**0.48**	0.98	1.11	0.7
Youth and Young Adults	1	**0.55**	**0.31**	0.79	0.98	0.93

While the odds ratios above continue to demonstrate a general devaluation of QALYs gained to equity-deserving groups, the few categories where people were more likely to prioritize tailored and targeted programs suggest that people are willing to accept trade-offs between efficiency and equity.

Yet, we see that the public's support for interventions is patchwork. As such, to some extent the effect size values are arbitrary. Why would we weight a QALY differently for a gay man if it was in the context of a heart disease intervention compared to an HIV/STI intervention? If gay men experience inequities in life expectancy, shouldn't we prioritize health gains for gay men regardless of what the program is designed to achieve? Furthermore, the weights derived from these odds ratios are solely informed by gut feelings – not hard empirical facts about the disproportionate health burden these individuals face for these conditions. For these reasons, epidemiological weights have been advanced as a superior approach to the construction of equity weights.

Scenario #2: Epidemiological Weights: Selecting A Referent Group

Equity weights based on epidemiological data have considerable potential. In the next several scenarios, we review some of the issues that must be considered when using epidemiologically-derived equity weights. In the present example, we explore the issue of selecting a referent group.

In the previous example, we calculated odds ratios for the selection of a program relative to a program tailored to address cancer in the general population. The same sorts of

decisions must be made when considering the referent population for an epidemiologically-derived equity weight. To illustrate this, let's consider the case of HIV funding.

The Public Health Agency of Canada's Community Action Fund has identified nine priority communities for HIV prevention:

(1) Gay, bisexual, and other men who have sex with men (gbMSM);
(2) people who use drugs;
(3) Indigenous people;
(4) ethno-cultural communities, migrants, and refugees;
(5) people engaged in sex work;
(6) people living in or recently released from correctional facilities;
(7) transgender people;
(8) people living with common STBBI coinfections (e.g., Hepatitis C), and
(9) women.[57]

Each of these groups experience a disproportionate burden of HIV infection and individuals with multiple of these characteristics experience a multiplicative level of disproportionate harm.[58–60] However, if we are going to estimate the relative burden of disease experienced by these communities, we must select a referent population. For the purposes of this scenario, we propose three candidate referent groups:

(1) white heterosexual men, who experience an HIV incidence rate of 0.8 per 100,000;[62]
(2) the general population, who experiences an HIV incidence rate of 5.6 per 100,000;[61] and
(3) gbMSM, who we estimate experience an HIV incidence rate of 210.8 per 100,000.

Clearly, the referent group selected matters because the impact of HIV varies considerably by group. This is because there are huge inequities in HIV morbidity and mortality. Yet, there are logical reasons to choose each of these referent groups: white heterosexual men are more privileged than our nine equity-deserving communities; the general population includes all individuals without reference to a specific disease or condition; and gbMSM are the most over-represented group in the HIV epidemic and could be viewed as the default recipient for HIV programming funds.

Before we select a referent group, we must also gather incidence rates for each of the nine communities we'd like to compare. It is important to demonstrate this process, so we show our work in the table below:

Key populations	Incidence rates (per 100,000)
Gay, bisexual, and other men who have sex with men	
BC Centre for Disease Control, 2017	249.5
BC Centre for Disease Control, 2017	282.9
Centre for Communicable Diseases and Infection Control, 2017	146.7
Centre for Communicable Diseases and Infection Control, 2018	113.2
Centre for Communicable Diseases and Infection Control, 2019	81.5
Centre for Communicable Diseases and Infection Control, 2021	102.3
Public Health Agency of Canada, 2013	347.9
Public Health Agency of Canada, 2014	317.6
Public Health Agency of Canada, 2018	263.2
Public Health Agency of Canada, 2020	172.1
People who use injection drugs	
BC Centre for Disease Control, 2017	32.2
BC Centre for Disease Control, 2017	27.3
Blouin et al., 2016	800.0
Centre for Communicable Diseases and Infection Control, 2017	125.7
Centre for Communicable Diseases and Infection Control, 2018	129.8
Public Health Agency of Canada, 2018	141.9
Public Health Agency of Canada, 2019	9.7
Public Health Agency of Canada, 2020	134.3
People living in correctional facilities	
Public Health Agency of Canada, 2020	36.8
Women	
BC Centre for Disease Control, 2017	
Centre for Communicable Diseases and Infection Control, 2017	3.1
Centre for Communicable Diseases and Infection Control, 2018	3.2
Centre for Communicable Diseases and Infection Control, 2019	4.0
Centre for Communicable Diseases and Infection Control, 2021	3.4

Public Health Agency of Canada, 2014	3.3
Public Health Agency of Canada, 2018	2.8
Youth	
BC Centre for Disease Control, 2017	1.4
BC Centre for Disease Control, 2017	0.8
Centre for Communicable Diseases and Infection Control, 2017	2.3
Centre for Communicable Diseases and Infection Control, 2018	2.0
Centre for Communicable Diseases and Infection Control, 2019	2.0
Centre for Communicable Diseases and Infection Control, 2021	1.6
Indigenous people	
BC Centre for Disease Control, 2017	7.6
BC Centre for Disease Control, 2017	10.2
Centre for Communicable Diseases and Infection Control, 2017	14.5
Centre for Communicable Diseases and Infection Control, 2018	12.9
Centre for Communicable Diseases and Infection Control, 2021	11.5
Public Health Agency of Canada, 2014	3.3
Public Health Agency of Canada, 2018	14.6
Public Health Agency of Canada, 2020	18.8
East Asian/South Asian/West Asian/Arab people	
Centre for Communicable Diseases and Infection Control, 2017	1.5
Centre for Communicable Diseases and Infection Control, 2018	1.6
Centre for Communicable Diseases and Infection Control, 2017	2.1
Centre for Communicable Diseases and Infection Control, 2018	2.6
BC Centre for Disease Control, 2017	2.8
Latinx people	
Centre for Communicable Diseases and Infection Control, 2017	8.0
Centre for Communicable Diseases and Infection Control, 2018	10.8

African/Caribbean/Black	
BC Centre for Disease Control, 2017	13.2
Centre for Communicable Diseases and Infection Control, 2017	13.9
Centre for Communicable Diseases and Infection Control, 2018	24.4

To collect these estimates, we conducted a search within the grey literature and governmental reports. PubMed and Google Scholar were searched for peer-reviewed journal articles. To identify grey literature estimates, we searched CATIE, the Public Health Agency of Canada, the Centre for Communicable Diseases and Infection Control, Provincial Public Health Agencies, the Ontario HIV Treatment Network, and the Ontario Advisory Committee on HIV/AIDS. Included estimates were from studies published after 2010 to ensure that the estimates were relevant to the current epidemiological situation in Canada. Where incidence rates were not available, we used census data and other population size estimates to calculate the incidence rate. For some populations (e.g., transgender people, people engaged in sex work) we did not identify any reliable estimates and therefore have excluded these groups from further analysis. While all of the estimates we provide are imperfect, they are nevertheless sufficient for the present scenario. It is likely you will also need to go to considerable lengths to find epidemiological studies relevant to your research area.

Based on the rates in the table above, estimated HIV incidence rates vary within and between populations, depending on the data source. Be careful in selecting the estimates you rely on given that these values are used to calculate your equity weights. If you can find multiple estimates, we suggest taking a median incidence ratio to reduce the effect of outliers. From the estimates identified through our review, we thus calculated a median estimate of the incidence rate for each population and provide these estimates in the table below:

	Median Incidence Rate (per 100,000)
gbMSM	**210.8**
People who use injection drugs	**127.75**
People in correctional facilities	**36.8**
Women	**3.25**
Youth	**1.8**
Indigenous people	**12.2**
Asian	**2.1**
Black/Latino	**13.2**

Based on the median incidence rate estimates above, we can derive equity weights by dividing the incidence rate in each community by that of a referent population. The table below compares our equity weights calculated using each of our referent groups:

	(Ref = White Hetero. Men)	(Ref = gbMSM) *Inverted Value in Gray*	(Ref = Overall Population)
gbMSM	**263.50**	**-**	**37.64**
People who use injection drugs	**159.69**	**0.61** *(1.65)*	**22.81**
People in correctional facilities	**46.00**	**0.17** *(5.73)*	**6.57**
Women	**4.06**	**0.02** *(64.86)*	**0.58**
Youth	**2.25**	**0.01** *(117.11)*	**0.32**
Indigenous people	**15.25**	**0.06** *(17.28)*	**2.18**
Asian	**2.63**	**0.01** *(100.38)*	**0.38**
Black/Latino	**16.50**	**0.06** *(15.97)*	**2.36**

*Light grey values are inverse values calculated by dividing 1 over the equity weight.

As you can see, the group selected as a referent population is critical to understanding the inequities experience across communities. Compared to white heterosexual men, all other groups have an equity premium (values greater than 1.0). Similarly, compared to gbMSM, all other groups have an equity penalty (values less than 1.0). In the scenario where the overall population is the referent group, some groups have a premium, others have a penalty. As such, you must pay close attention to the selection of your referent group, and you should choose a referent group that meaningfully captures the dimension of inequity you wish to address.

In selecting a referent group, it is helpful to consider the equity-efficiency trade-offs inherent in equity weights. For example, in the first scenario, in which white heterosexual men are the referent group, our equity weight for gbMSM is 263.50! This means that gaining a single QALY among gbMSM is equal to 263.5 QALYs among white heterosexual men once you factor in equity considerations. In effect, this means it is much easier to justify funding HIV prevention among gbMSM compared to white heterosexual men. Meanwhile, if we use the overall population as a referent group, a single QALY gained among gbMSM is equal to only 37.64 QALYs gained from the general population. While the trade-off is not quite as severe, it is still much more equitable and cost-effective to fund an intervention targeting gbMSM compared to one targeting the general population. Finally, in the scenario in which gbMSM were treated as the referent group, you can see that all the equity weights are less than 1.0, meaning that they are valued at a fraction of the value of a QALY gained among gbMSM. If you calculate the inverse of these values by dividing 1 over the equity weight, the values indicate the number of QALYs you'd need to gain in a key population to make it worthwhile to forgo a single QALY among gbMSM. For example, to forgo one QALY among gbMSM, you'd need to gain at

least 1.65 QALYs among people who inject drugs or 5.73 QALYS among people in correctional facilities, or 15.97 QALYs among Black and Latino communities. These trade-offs reflect the fundamental reality that gbMSM remain the top priority population for HIV interventions.

Scenario #3: Choosing which characteristics to weight for.

In the previous scenario, we calculated equity weights for a variety of communities, based on HIV incidence rates. However, it's important to realize that in reality individuals have more than just one identity and there are few, if any, interventions that cater to just one homogenous group.[19] People and programs are complicated and messy. Contemporary epidemiological surveillance programs are not advanced enough to provide statistics that capture the complex and intersecting characteristics that make up real human beings. For example, no surveillance program on earth provides the incidence rate of HIV among young Asian gbMSM who inject drugs. For these reasons, equity weights have not yet been widely applied to address intersectional concerns and it is unclear whether our public health surveillance systems will ever allow us to do so. Nevertheless, we know that tailored and targeted public health programming is important and often necessary to achieving QALYs and addressing health inequities. For example, HIV prevention among Black gbMSM may very well deliver more EQALYs than one tailored to gbMSM more generally. As such, it might be a mistake to fund a gbMSM intervention over one targeting African, Caribbean, and Black communities even with much higher equity weights for gbMSM-specific interventions. Clearly, choosing which characteristics to weight on can be important. In the present scenario, we demonstrate the calculation of weights addressing inequities related to both ethnicity and gbMSM identity. In doing so, we use the weights from above and arbitrarily choose heterosexual men as the referent group of choice. Further, we assume an arbitrary cost of $13,000 per participant (among 7 participants) and assume 3 QALYs gained for each participant:

Ethno-cultural	gbMSM	QALYS	Actual Cost	Actual Cost / QALY	Cost / EQALY	
					Ethnicity	gbMSM
Black	Yes	3	$ 13,000.00	$ 4,333.33	$ 262.63	$ 115.13
White	Yes	3	$ 13,000.00	$ 4,333.33	$ 4,333.33	$ 115.13
Asian	No	3	$ 13,000.00	$ 4,333.33	$ 1,647.66	$ 4,333.33
White	Yes	3	$ 13,000.00	$ 4,333.33	$ 1,647.66	$ 115.13
Black	No	3	$ 13,000.00	$ 4,333.33	$ 262.63	$ 4,333.33
Indigenous	Yes	3	$ 13,000.00	$ 4,333.33	$ 284.15	$ 115.13
Black	No	3	$ 13,000.00	$ 4,333.33	$ 262.63	$ 4,333.33
Average			***$ 13,000.00***	***$ 4,333.33***	***$ 1,242.95***	***$ 1,922.93***
Total			***$ 91,000.00***	***$ 30,333.33***	***$ 8,700.68***	***$ 13,460.50***

As you can see, weighting for inequities by ethnicity results in an average cost per EQALY of $1,242.95 dollars and weighting for inequities associated with gbMSM identity results in an average cost/EQALY of $1,922.93. One solution to this problem would be to average across the two estimates, resulting in an average Cost/QALY of $1,582.94 for this sample of participants. While this is imperfect, it might be a suitable assumption when accounting for multiple intersectional characterises is required.

It also matters which participants accrue QALYs and how many they accrue. In the example below, we simply allow for the number of QALYs to differ across participants to call attention to this fact.

Ethnicity	gbMSM	QALYS	Actual Cost	Actual Cost / QALY	Cost / EQALY	
					Ethnicity	gbMSM
Black	Yes	1	$ 13,000.00	$ 13,000.00	$ 787.88	$ 345.38
White	Yes	3	$ 13,000.00	$ 4,333.33	$ 4,333.33	$ 115.13
Asian	No	4	$ 13,000.00	$ 3,250.00	$ 1,235.74	$ 3,250.00
White	Yes	5	$ 13,000.00	$ 2,600.00	$ 988.59	$ 69.08
Black	No	3	$ 13,000.00	$ 4,333.33	$ 262.63	$ 4,333.33
Indigenous	Yes	2	$ 13,000.00	$ 6,500.00	$ 426.23	$ 172.69
Black	No	1	$ 13,000.00	$ 13,000.00	$ 787.88	$ 13,000.00
		Average	***$ 13,000.00***	***$ 6,716.67***	***$ 1,260.33***	***$ 3,040.80***
		Total	***$ 91,000.00***	***$ 47,016.67***	***$ 8,822.28***	***$ 21,285.60***

As you can see, the weights are sensitive to how many QALYs are gained and by which individuals. Indeed, weighting for inequities by ethnicity results in an average cost per EQALY of $1,260.33 dollars and weighting for inequities associated with gbMSM identity results in an average cost/EQALY of $3,040.80. The average of the two cost estimates is now $2,150.56 per EQALY (compared to $1,582.94 in the scenario where all participants accrued the same number of QALYs).

At some point, deciding which factors to weight for and how strong the weight should be may begin to feel arbitrary. After all, should a program that costs $91,000 dollars really be evaluated as costing less than one-tenth that amount? Or should a program be treated to cost three times as much as the same program depending on which dimension of equity you choose to concern yourself with?

One of the reasons we run into these sorts of challenges, is because decision making is frequently siloed. Rarely do policy analysts have opportunities to develop a master plan

that can address the totality of circumstances. However, analysts can try to control for this by thinking more carefully about how they are constructing the weights they use. In practice, this means that the factors being weighted align with real-world needs, political priorities, and programming opportunities. Equity weights are just one part of the evaluation process and should not be given more priority than they deserve.

Scenario #4: Weighting for Morbidity vs. Mortality

Thus far in exploring epidemiologically-derived equity weights, we have been using HIV incidence as a proxy for burden of disease. While this was helpful to illustrate some of the lessons delivered from the scenarios above, incidence is not necessarily the best factor to weight on. Indeed, if you think about what we're trying to do when developing equity weights, we're trying to re-evaluate the value of QALYs gained to equity-deserving communities and prioritize these over QALYs of those who already enjoy relatively long and healthy lives. As such, we should consider both morbidity and mortality when constructing our weights. The present scenario aims to demonstrate the impact of weighting for mortality compared to incidence.

To begin, imagine you are a policy maker with the Ministry of Health and you are deciding between funding two programs: one focused on women living with HIV and another focused on men living with HIV. For simplicities sake, let's assume each program costs the same amount of money.

The first step to evaluating these programs is determining which inequities you would like to address. You might initially consider the disproportionate burden of HIV among men. In fact, in 2019, only 30.2% of people diagnosed with HIV were females and 69.8% were males. Using these estimates, we would assume that men are about 2.31 times more likely to acquire HIV than women. We could use this value as an equity weight alongside the weight used to adjust for higher mortality among women. In doing so, 5,000 QALYs among women would be valued as 6,100-6,650 EQALYS and 5,000 QALYS among men would be valued as 11,550 EQALYS.

However, what happens when we consider the impact of mortality instead of incidence? In Canada, women are less likely to be aware of their HIV infection and to achieve viral suppression and generally have worse health outcomes compared to men living with HIV.[63,64] This suggests a need to apply an equity weight that favours programming among women. To calculate an equity weight based on mortality, we will use the adjusted death rates among men (30.0 per 1,000 person-years) and women (36.5 per 1,000 person-years), as reported by Hogg et al. (2017).[64] To calculate this weight, we simply divide the death rate among women by the death rate among men which gives us an equity weight of 1.22. We would apply this weight to QALYs gained among women to increase their value.

We could alternatively use life expectancy estimates for men and women with and without HIV to calculate the total years of life lost due to HIV for each gender.

Life Expectancy of people with and without HIV, 1996-2012

	With HIV	Without HIV
Men	51	78
Women	47	83

Based on such estimates from Hogg et. al. (2017), HIV acquisition is associated with a loss of 27 years among men and 36 years among women. Dividing the years lost among women by the years lost among men, we get a similar, albeit slightly higher equity weight of 1.33.

Assuming that each program benefits 1,000 participants by adding a projected average of 5 QALY's to their life expectancy, we would evaluate the program serving men as producing 5,000 EQALY's and the program serving women as producing 6,100-6,650 EQALYs (depending on our selected weight). Clearly, in this scenario, funding the program among women is better because it addresses inequalities in life expectancy among men and women living with HIV.

As you can see from these two examples, the relative strength of an equity weight hugely varies by whether you are considering incidence versus mortality. You could combine the two equity weights (i.e., 1.33 for mortality favouring women and 2.31 for incidence, favouring men) into a single weight by taking the inverse of one of the weights so that they both apply to the same gender. This would result in an equity weight of 1.74 applied to the QALYs among men. As a note of interest, this value is similar to the equity weight of 1.73 derived from the stated preferences for HIV and STI services among gbMSM. However, this probably is more coincidence than anything.

(1/1.33)*2.31 = 1.74

Applying this equity weight to the programs tailored for preventing HIV, the program serving women would be valued as producing 5,000 EQALYs and the program serving men would be valued as producing 8,700 EQALYs. These values are not so different that it would never make sense to fund HIV programs serving women. Indeed, it is important to consider the entire funding landscape – much of which, as noted, is already focused on men who have sex with men. Therefore, it might very well be the case that funding the program that is valued with fewer QALYs is the right decision to make.

It's also important to note that programs serving different populations will typically not produce the same QALYs. We've made assumptions in this scenario that will make it easy to understand – but these assumptions are not reflective of the real world. For example, often, the cost of a marginal QALY increases – meaning it may be easier to gain more QALY's through an intervention tailored to women than one tailored to gbMSM. These program-specific nuances can easily alter the balance of your decision making. Equity weights can serve as a guide, but as with all cost-benefit analyses they should not be the sole criterion on which decisions are made.

Part 4.
Concluding Thoughts

In the scenarios described above, we attempted to highlight many important complexities inherent in calculating and applying equity-weights. To summarize, we highlight a few key issues identified with equities through the scenarios above:

(1) Preference-based equity weights are somewhat arbitrary and vulnerable to bias and stigma that may undervalue equity gains;
(2) Calculating epidemiologically-derived equity weights requires you to reliably and precisely quantify the inequalities experienced in different communities;
(3) The epidemiological measures must capture the totality of the inequity you are aiming to remedy;
(4) Even when you have good epidemiological estimates, you must decide how to frame the inequities by deciding which groups will be weighted in comparison to what referent levels;
(5) You must make critical decisions about what inequities you are interested in weighting for and how to apply these weights to individuals with complex identities; and
(6) The strength and direction of your equity weights are to varying degrees' sensitive to each of the choices and data quality issues you encounter along the way.

Of critical importance to the advancement of equity weights, epidemiological data must be improved so that estimates of intersecting burden can be accurately and precisely produced. For example, the collection of race-based data is critical to understanding and reporting inequalities associated with race. Further, reporting life expectancy and mortality estimates across intersections of race, gender, income, and other salient characteristics is needed to understand the totality of inequities experienced by different individuals. In the current epidemiological environment, fundamental estimates of morbidity and mortality are missing.

Furthermore, in the present report we have largely ignored one of the most critical challenges to applying equity weights: Namely, that the impact of many public health programs goes unmeasured. Without knowing the potential impact of an intervention on a population, it is pointless to try evaluating the program in terms of QALYs or EQALYs. If the government wants to undertake evidence-based policy decisions, it must prioritize evaluations and research. Of course, even when an intervention is effective, there is little guarantee that it will have the same effect across populations. It is very plausible that QALYs gained by an intervention in one population would be easily gained in another population.

For these reasons, we strongly encourage decision makers to include cost-benefit analyses as only one, but not the sole, criteria that they consider in determining resource allocations and the role equity should play. It is our opinion that the existing literature on implementing equity into public health decision making overstates the potential to do so in a purely quantitative, systematic way. Working with communities and people with lived experience likely provides a more accurate and accessible picture of inequity and need. Further, it is unclear whether extreme inequities are appropriately addressed through cost-benefit analyses. Indeed, as is the case with HIV, most of the groups who experience huge inequities are already prioritized – without the need for cost-benefit analyses to justify these decisions.

This is not, of course, to say that equity weights cannot be part of the solution to inequities facing communities. Indeed, as noted above, equity weights have been used as a decision tool in several jurisdictions. Valuing QALYs differently for different populations can and should be done, if doing so supports decisions that lessen inequities without creating catastrophic losses to efficiency. This is the case even if such weights are not perfectly attuned. For example, weights between 1.5 and 3.5 seem to be both acceptable to the general public and reasonable to apply in cost-benefit decision making.[25,43,46,56]

References

1. McAlister FA, Cram P, Bell CM. Comparing Canadian health care to that in other countries: looking beyond the headlines. CMAJ Can Med Assoc J. 2018 Feb 26;190(8):E207–8.

2. Canada PHA of. A New Perspective on the Health of Canadians [Internet]. 2001 [cited 2022 Aug 16]. Available from: https://www.canada.ca/en/public-health/services/health-promotion/population-health/a-new-perspective-on-health-canadians.html

3. Canada PHA of. Social determinants of health and health inequalities [Internet]. 2001 [cited 2022 Aug 16]. Available from: https://www.canada.ca/en/public-health/services/health-

promotion/population-health/what-determines-health.html

4. Canada PHA of. Understanding the report on Key Health Inequalities in Canada [Internet]. 2018 [cited 2022 Aug 16]. Available from: https://www.canada.ca/en/public-health/services/publications/science-research-data/understanding-report-key-health-inequalities-canada.html

5. Andrasfay T, Goldman N. Reductions in US life expectancy during the COVID-19 pandemic by race and ethnicity: Is 2021 a repetition of 2020? MedRxiv Prepr Serv Health Sci. 2022 Jul 19;2021.10.17.21265117.

6. McGinnis JM, Williams-Russo P, Knickman JR. The Case For More Active Policy Attention To Health Promotion. Health Aff (Millwood). 2002 Mar;21(2):78–93.

7. Mackenbach JP. The contribution of medical care to mortality decline: McKeown revisited. J Clin Epidemiol. 1996 Nov;49(11):1207–13.

8. Braveman P, Gottlieb L. The Social Determinants of Health: It's Time to Consider the Causes of the Causes. Public Health Rep. 2014;129(Suppl 2):19–31.

9. Bobinac A, van Exel NJA, Rutten FFH, Brouwer WBF. Inquiry into the relationship between equity weights and the value of the QALY. Value Health J Int Soc Pharmacoeconomics Outcomes Res. 2012 Dec;15(8):1119–26.

10. Klonschinski A, Lübbe W. [QALYs and fairness: health economic approaches to the fairness issue and their problems]. Gesundheitswesen Bundesverb Arzte Offentlichen Gesundheitsdienstes Ger. 2011 Oct;73(10):688–95.

11. Attema AE, Brouwer WBF, l'Haridon O, Pinto JL. Estimating sign-dependent societal preferences for quality of life. J Health Econ. 2015 Sep;43:229–43.

12. McNamara S, Holmes J, Stevely AK, Tsuchiya A. How averse are the UK general public to inequalities in health between socioeconomic groups? A systematic review. Eur J Health Econ HEPAC Health Econ Prev Care. 2020 Mar;21(2):275–85.

13. Skedgel C, Wailoo A, Akehurst R. Societal preferences for distributive justice in the allocation of health care resources: a latent class discrete choice experiment. Med Decis Mak Int J Soc Med Decis Mak. 2015 Jan;35(1):94–105.

14. Norman R, Hall J, Street D, Viney R. Efficiency and equity: a stated preference approach. Health Econ. 2013 May;22(5):568–81.

15. Goto R, Mori T. Comparison of Equity Weights of Life Year Gains: A Discrete Choice Experiment for Japanese and Korean General Public. Value Health. 2014 Nov 1;17(7):A516.

16. Bleichrodt H, Doctor J, Stolk E. A nonparametric elicitation of the equity-efficiency trade-off in cost-utility analysis. J Health Econ. 2005 Jul;24(4):655–78.

17. Avanceña ALV, Prosser LA. Examining Equity Effects of Health Interventions in Cost-Effectiveness Analysis: A Systematic Review. Value Health J Int Soc Pharmacoeconomics Outcomes Res. 2021 Jan;24(1):136–43.

18. Johri M, Norheim OF. Can cost-effectiveness analysis integrate concerns for equity? Systematic review. Int J Technol Assess Health Care. 2012 Apr;28(2):125–32.

19. Round J, Paulden M. Incorporating equity in economic evaluations: a multi-attribute equity state approach. Eur J Health Econ. 2018;19(4):489–98.

20. Carlson JJ, Brouwer ED, Kim E, Wright P, McQueen RB. Alternative Approaches to Quality-Adjusted Life-Year Estimation Within Standard Cost-Effectiveness Models: Literature Review, Feasibility Assessment, and Impact Evaluation. Value Health J Int Soc Pharmacoeconomics Outcomes Res. 2020 Dec;23(12):1523–33.

21. Dukhanin V, Searle A, Zwerling A, Dowdy DW, Taylor HA, Merritt MW. Integrating social justice concerns into economic evaluation for healthcare and public health: A systematic review. Soc Sci Med 1982. 2018;198:27–35.

22. Herlitz A. Income-based equity weights in healthcare planning and policy. J Med Ethics. 2017 Aug 1;43(8):510–4.

23. Phelps C, Madhavan G. Resource allocation in decision support frameworks. Cost Eff Resour Alloc. 2018 Nov 9;16(1):48.

24. MacKillop E, Sheard S. Quantifying life: Understanding the history of Quality-Adjusted Life-Years (QALYs). Soc Sci Med. 2018 Aug 1;211:359–66.

25. Mooney G, Jan S. Vertical equity: weighting outcomes? or establishing procedures? Health Policy. 1997 Jan 1;39(1):79–87.

26. Courbage C, Rey B. Priority setting in health care and higher order degree change in risk. J Health Econ. 2012 May;31(3):484–9.

27. Reidpath DD, Morel CM, Mecaskey JW, Allotey P. The Millennium Development Goals Fail Poor Children: The Case for Equity-Adjusted Measures. PLoS Med. 2009 Apr 28;6(4):e1000062.

28. Paulden M, McCabe C. Modifying NICE's Approach to Equity Weighting. PharmacoEconomics. 2021 Feb;39(2):147–60.

29. Lal A, Mohebi M, Sweeney R, Moodie M, Peeters A, Carter R. Equity Weights for Socioeconomic Position: Two Methods—Survey of Stated Preferences and Epidemiological Data. Value Health. 2019 Feb 1;22(2):247–53.

30. Whitehead SJ, Ali S. Health outcomes in economic evaluation: the QALY and utilities. Br Med Bull. 2010 Dec 1;96(1):5–21.

31. Nosyk B, Min JE, Zang X, Feaster DJ, Metsch L, Marshall BDL, et al. Why Maximizing Quality-Adjusted Life Years, rather than Reducing HIV Incidence, Must Remain Our Objective in Addressing the HIV/AIDS Epidemic. J Int Assoc Provid AIDS Care [Internet]. 2019 Jan 22 [cited 2020 Jan 31];18. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6457342/

32. Weinstein MC. A QALY is a QALY--or is it? J Health Econ. 1988 Sep;7(3):289–90.

33. Pettitt DA, Raza S, Naughton B, Roscoe A, Ramakrishnan A, Ali A, et al. The limitations of QALY: a literature review. J Stem Cell Res Ther

[Internet]. 2016 [cited 2020 Jan 31];6(4). Available from: https://ora.ox.ac.uk/objects/uuid:d22a9b1b-c2f0-4f6c-83ee-fdc320e4af61

34. Stolk EA, van Donselaar G, Brouwer WBF, Busschbach JJV. Reconciliation of economic concerns and health policy: illustration of an equity adjustment procedure using proportional shortfall. PharmacoEconomics. 2004;22(17):1097–107.

35. Karnon J, Partington A. Cost-Value Analysis and the SAVE: A Work in Progress, But an Option for Localised Decision Making? PharmacoEconomics. 2015 Dec 1;33(12):1281–8.

36. Norheim OF, Ottersen T, Tolla MT, Memirie ST, Johansson KA. Incorporating Distributional Concerns into Practical Tools for Priority-Setting. 2019 Nov 2 [cited 2022 Aug 18]; Available from: https://academic.oup.com/book/38723/chapter/336942293

37. Bleichrodt H, Diecidue E, Quiggin J. Equity weights in the allocation of health care: the rank-dependent QALY model. J Health Econ. 2004 Jan 1;23(1):157–71.

38. Nord E, Pinto JL, Richardson J, Menzel P, Ubel P. Incorporating societal concerns for fairness in numerical valuations of health programmes. Health Econ. 1999 Feb;8(1):25–39.

39. Lindholm L, Henriksson R, Rosén M, Bergenheim T, Salander P. [Modified cost-benefit analysis takes equity into consideration. Treatment of brain tumors is more cost-effective than hip replacement]. Lakartidningen. 1999 Jun 2;96(22):2749–54.

40. Lal A, Moodie M, Peeters A, Carter R. Inclusion of equity in economic analyses of public health policies: systematic review and future directions. Aust N Z J Public Health. 2018 Apr;42(2):207–13.

41. Cookson R, Drummond M, Weatherly H. Explicit incorporation of equity considerations into economic evaluation of public health interventions. Health Econ Policy Law. 2009 Apr;4(Pt 2):231–45.

42. Ong KS, Kelaher M, Anderson I, Carter R. A cost-based equity weight for use in the economic evaluation of primary health care interventions: case study of the Australian Indigenous population. Int J Equity Health. 2009 Oct 7;8:34.

43. Reckers-Droog V, van Exel J, Brouwer W. Equity Weights for Priority Setting in Healthcare: Severity, Age, or Both? Value Health J Int Soc Pharmacoeconomics Outcomes Res. 2019 Dec;22(12):1441–9.

44. Besar Sa'aid H, Mathew S, Richardson M, Bielecki JM, Sander B. Mapping the evidence on health equity considerations in economic evaluations of health interventions: a scoping review protocol. Syst Rev [Internet]. 2020 Jan 8 [cited 2020 Jan 31];9. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6950907/

45. Wailoo A, Tsuchiya A, McCabe C. Weighting must wait: incorporating equity concerns into cost-effectiveness analysis may take longer than expected. PharmacoEconomics. 2009;27(12):983–9.

46. Lal A, Mohebi M, Sweeney R, Moodie M, Peeters A, Carter R. Equity Weights for Socioeconomic Position: Two Methods—Survey of Stated Preferences and Epidemiological Data. Value Health. 2019 Feb 1;22(2):247–53.

47. Lal A, Siahpush M, Moodie M, Peeters A, Carter R. Weighting Health Outcomes by Socioeconomic Position Using Stated Preferences. PharmacoEconomics Open. 2017 Jun 23;2(1):43–51.

48. Skedgel C, Wailoo A, Akehurst R. Societal preferences for distributive justice in the allocation of health care resources: a latent class discrete choice experiment. Med Decis Mak Int J Soc Med Decis Mak. 2015;35(1):94–105.

49. Ryan M, Scott DA, Reeves C, Bate A, van Teijlingen ER, Russell EM, et al. Eliciting public preferences for healthcare: a systematic review of techniques. Health Technol Assess Winch Engl. 2001;5(5):1–186.

50. Gu Y, Lancsar E, Ghijben P, Butler JRG, Donaldson C. Attributes and weights in health care priority setting: A systematic review of what counts and to what extent. Soc Sci Med 1982. 2015 Dec;146:41–52.

51. Whitty JA, Lancsar E, Rixon K, Golenko X, Ratcliffe J. A systematic review of stated preference studies reporting public preferences for healthcare priority setting. The Patient. 2014;7(4):365–86.

52. Valdiserri RO. HIV/AIDS Stigma: An Impediment to Public Health. Am J Public Health. 2002 Mar;92(3):341–2.

53. Stangl AL, Earnshaw VA, Logie CH, van Brakel W, C. Simbayi L, Barré I, et al. The Health Stigma and Discrimination Framework: a global, crosscutting framework to inform research, intervention development, and policy on health-related stigmas. BMC Med. 2019 Feb 15;17(1):31.

54. Paulden M, O'Mahony J, Round J. Direct equity weights. In 2020. p. 275–300.

55. McCabe C, Claxton K, Culyer AJ. The NICE cost-effectiveness threshold: what it is and what that means. PharmacoEconomics. 2008;26(9):733–44.

56. Card KG, Adshade M, Hogg RS, Jollimore J, Lachowsky NJ. What public health interventions do people in Canada prefer to fund? A discrete choice experiment. BMC Public Health. 2022 Jun 13;22(1):1178.

57. Public Health Agency of Canada. HIV and Hepatitis C Community Action Fund [Internet]. Ottawa: Government of Canada; 2016 Feb [cited 2020 Jan 30]. Available from: https://www.canada.ca/en/public-health/services/funding-opportunities/hiv-hepatitis-community-action-fund-next-steps.html#s3

58. Logie CH, James LI, Tharao W, Loutfy MR. HIV, Gender, Race, Sexual Orientation, and Sex Work: A Qualitative Study of Intersectional Stigma Experienced by HIV-Positive Women in Ontario, Canada. PLOS Med. 2011 Nov 22;8(11):e1001124.

59. Watkins-Hayes C. Intersectionality and the Sociology of HIV/AIDS: Past, Present, and Future Research Directions. Annu Rev Sociol. 2014;40(1):431–57.

60. Bauer GR. Incorporating intersectionality theory into population health research methodology: Challenges and the potential to advance health equity. Soc Sci Med. 2014 Jun 1;110:10–7.

61. Lansky A, Johnson C, Oraka E, Sionean C, Joyce MP, DiNenno E, et al. Estimating the Number of Heterosexual Persons in the United States to Calculate National Rates of HIV Infection. PLoS ONE. 2015 Jul 27;10(7):e0133543.

62. Haddad N, Weeks A, Robert A, Totten S. HIV in Canada-surveillance report, 2019. Can Commun Dis Rep Releve Mal Transm Au Can. 2021 Jan 29;47(1):77–86.

63. Canada PHA of. People living with HIV in Canada: infographic [Internet]. 2015 [cited 2022 Aug 30]. Available from: https://www.canada.ca/en/public-health/services/publications/diseases-conditions/hiv-canada.html

64. Hogg RS, Eyawo O, Collins AB, Zhang W, Jabbari S, Hull MW, et al. Health-adjusted life expectancy in HIV-positive and HIV-negative men and women in British Columbia, Canada: a population-based observational cohort study. Lancet HIV. 2017;4(6):e270–6.

Acknowledgements

The authors gratefully acknowledge the research participants who were involved in this study, as well as our funders and supporters.

Suggested Citation

Kiffer G. Card, Anthony T. Amato, Marina Adshade, Robert S. Hogg, Nathan J. Lachowsky (2023). "Can Health Inequities Be Addressed Through the Use of Equity Weights in Resource Allocation Decisions? An Introduction to Equity Weights and Barriers to Their Use." The Healthy Ecologies and Lifestyle Lab.