

# Distributional dilemmas in health policy: large benefits for a few or smaller benefits for many?

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**Objectives:** To examine funding priorities assigned by health ministry officials when choosing between clinical programs that offer similar overall benefits distributed in different ways (e.g. large gains for a few versus small gains for many), and to compare the relative magnitude of any distributional bias to age biases.

**Methods:** A survey consisting of paired hypothetical health care programs was mailed to the 135 most senior officials of the Health Ministry in Ontario, Canada (population 11.5 million). Respondents were asked to assume they were members of a panel allocating a fixed sum of money to one of two programs in each pair. All program descriptions included the number of persons affected each year by a given disease and the average survival gains from the hypothetical programs. Some scenarios also mentioned the side-effects associated with programs and/or the average age of the beneficiaries.

**Results:** Four respondents had retired/died. Of 131 eligible respondents, 80/131 (61%) provided usable responses. Asked to choose between providing large benefits to a few citizens and small benefits to a great many, 23% (95% CI: 14%, 33%) of respondents were unable to decide, but 55.8% (95% CI: 47%, 70%) favored providing large benefits to fewer patients. Eliminating the 23% unable to decide, 47/62 or 76% (CI: 63%, 86%) expressed a distributional preference. With a smaller distributional discrepancy, indecision increased, with 35% of respondents having no preference and the remainder split almost evenly between the two programs. Other scenarios showed that health officials' pro-youth biases were only slightly larger than their distributional preferences and that distributional preferences were magnified when combined with minor differences in average ages of beneficiaries.

**Conclusions:** A substantial minority of health care decision-makers had difficulty choosing between programs with similar overall gains and distributional differences – a result consistent with the utilitarian assumptions of cost-effectiveness analysis. However, when distributional differences were large, decision-makers clearly favored large gains for a few beneficiaries rather than small gains for many. Policy analysts should explicitly weigh distributional issues along with aggregate health gains when addressing resource allocation problems.

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## Introduction

In the last decade, much debate in health care has focused on how limited resources should be allocated.<sup>1</sup> Resource allocation decisions, like clinical decisions, usually reflect three factors: evidence, circumstances and values. For example, a given treatment's benefits may dramatically outweigh its risks; but if financial circumstances or logistical constraints preclude offering the treatment to all those who would derive net benefit from it, values will come into play in priority-setting. One value-laden and little-explored aspect of priority-

setting arises with distributional dilemmas, i.e. choosing between programs that offer big gains to a few individuals and those that offer a small gain for many. To understand how decision-makers respond to these dilemmas, we presented several hypothetical priority-setting scenarios to senior officials in the Ministry of Health (MOH) of Ontario who manage an annual budget of CAD\$17.4 billion.

We aimed first to determine if public sector officials could choose between programs with obviously unequal benefits or harms ('control scenarios'). Since there is a widely recognized<sup>2,3</sup> cultural bias towards younger beneficiaries when resources are scarce, we then explored how age affected decisions about programs with similar benefits and harms ('age effects scenarios'), anticipating that these age effects could be compared in magnitude to the distributional effects that were our main interest. Last, in the key 'distributional effects scenarios', we asked MOH officials to choose between programs with different distributions of benefit but the same total gain in life-years.

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## Methods

### Respondents

A four-page questionnaire was mailed to all senior officials in the Ontario MOH ( $n = 135$ ). Participants were asked to provide anonymous responses to both the scenarios and demographic questions (age, gender, education).

### Survey design

The questionnaire consisted of eight paired hypothetical health care programs (see sample questions in the Appendix). Participants were asked to assume that they had been asked to sit on a panel which was to prioritize the allocation of a fixed sum of money to only one of Program 'A' or Program 'B'. (The instructions are also shown in the Appendix.) These programs were described in terms of:

- The number of people affected each year by a given disease,
- The average survival benefit from receiving a hypothetical treatment for the disease.

Additional scenarios included:

- The side-effects or harms associated with treatment, and/or
- The average age of the patients.

Participants could give funding priority to Program A or B, or indicate that they were unable to decide or had no preference.

The 'distribution of benefits' scenarios, in particular, asked participants to choose between programs yielding an equal total of life-years gained and similar harms, but with either major or minor distributional differences. An additional scenario combined minor distributional differences with minor differences in the average ages of the affected patients. One scenario in the set varied several factors simultaneously; after mailing, we recognized that it was unreasonably complex, and set its responses aside.

### Analysis

For the seven scenarios, the results are summarized as the proportion of respondents making each particular choice. The 95% confidence intervals (CI) for the key proportions are included. McNemar's test was used to compare responses to related questions. A binomial test of proportions was used to test the assumption of equal frequencies of responses within a given question. Statistical analysis was performed using Stata 4.0 (Stata Corporation, College Station, Texas, 1995).

### Results

Of the 135 senior officials initially surveyed, 4 were excluded as they had either retired or died. Among the 131 remaining, 80 (61%), provided usable responses; 42 (32%) did not respond at all; 7 (5%) explained that

they did not make the type of decisions called for in the questionnaire and declined participation; and 2 (2%) returned blank forms without explanation. Over 90% of respondents (75/80) had a university degree or other post-secondary training. There were 45 men (56%) and 35 women (44%). The majority (79%) of participants (63/80) were between the ages of 41 and 60 years; none were under 30 years of age.

### Control scenarios (Table 1)

Respondents generally chose correctly for two scenarios with obviously unequal benefits (93%) or harms (78%). However, of all 80 respondents, only 59 (74%) answered both questions as expected. Considering unequal harms with similar benefits led to more indecision than unequal benefits alone (McNemar's test:  $P = 0.005$ ).

### Age effects scenarios (Table 2)

When benefits and harms were similar and the difference in the age of patients was small (i.e. 30-year-old vs 50-year-old patients), a majority of respondents (56% [95% CI: 45%, 67%]) could not decide between treatment programs or had no preference. However, among those that did decide, 34/35 (97% [95% CI: 85%, 100%]) favored funding for the younger beneficiaries. When the difference in age was increased (i.e. 5-year-old vs 65-year-old patients), the proportions of undecided respondents decreased (McNemar's test:  $P = 0.002$ ); but a sizable minority (34% [95% CI: 24%, 45%]) did remain undecided. Again, among those that did decide, most (46/53 participants or 87% [95% CI: 75%, 95%]) favored the program aimed at younger patients. When the analysis was restricted to those 59 respondents who answered both of the control scenarios 'correctly', the results were very similar (Table 3).

### Distribution of benefit scenarios (Table 4)

When the differences in distribution were large, 23% [95% CI: 14%, 33%] of respondents were unable to decide or had no preference, but 55.8% [95% CI: 47%,

Table 1 Decision-makers' responses to programs with obviously unequal benefits or harms

Participants (% , n)			Comments <sup>a</sup>
Favoring Program A	Favoring Program B	Unable to decide/ no preference	
92.5 (74)	1.3 (1)	6.3 (5)	Program A: 25 years of increased life-expectancy Program B: 5 years of increased life-expectancy
2.5 (2)	77.5 (62)	20.0 (16)	Program A: associated with severe side-effects Program B: associated with few side-effects

<sup>a</sup> The programs were described as similar in all respects except those outlined in the table; increases in life-expectancy are expressed as averages.



Table 2 Decision-makers' responses to programs where beneficiaries differ in average ages — all respondents

	Participants (% , n)			Comments <sup>a</sup>
	Favoring Program A	Favoring Program B	Unable to decide/ no preference	
All respondents	42.5 (34)	1.3 (1)	56.3 (45)	Program A: 30-year-old patients Program B: 50-year-old patients
Respondents able to decide	97.1 (34)	2.9 (1)	N/A	
All respondents	57.5 (46)	8.8 (7)	33.8 (27)	Program A: 5-year-old patients Program B: 65-year-old patients
Respondents able to decide	76.8 (46)	13.2 (7)	N/A	

<sup>a</sup>The programs were described as equal in all respects except those outlined in the table; increases in life-expectancy and ages of patients affected by a given disease are expressed as averages.

Table 3 Decision-makers' responses to programs where beneficiaries differ in average ages — respondents able to answer control scenarios 'correctly'

	Participants (% , n)			Comments <sup>a</sup>
	Favoring Program A	Favoring Program B	Unable to decide/ no preference	
Correct respondents	45.8 (27)	1.7 (1)	52.3 (31)	Program A: 30-year-old patients Program B: 50-year-old patients
Correct respondents able to decide	96.4 (27)	3.6 (1)	N/A	
Correct respondents	55.9 (33)	8.5 (5)	35.6 (21)	Program A: 5-year-old patients Program B: 65-year-old patients
Correct respondents able to decide	86.8 (33)	13.2 (5)	N/A	

<sup>a</sup>The programs were described as equal in all respects except those outlined in the table; increases in life-expectancy and ages of patients affected by a given disease are expressed as averages.

Table 4 Decision-makers' responses to programs where beneficiaries differ in distributions of benefits — all respondents

	Participants (% , n)			Comments <sup>a</sup>
	Favoring Program A	Favoring Program B	Unable to decide/ no preference	
All respondents	55.8 (47)	18.8 (15)	22.5 (18)	Program A: 500 people gain 20 years of life-expectancy Program B: 10 000 people gain 1 year of life-expectancy
Respondents able to decide	75.8 (47)	25.2 (15)	N/A	
All respondents	30.0 (24)	25.0 (28)	35.0 (28)	Program A: 1000 people gain 20 years of life-expectancy Program B: 4000 people gain 5 years of life-expectancy
Respondents able to decide	46.2 (24)	53.8 (28)	N/A	
All respondents	53.8 (43)	21.3 (17)	25.0 (2)	Program A: 500 30-year-olds gain 20 years of life-expectancy Program B: 2000 50-year-olds gain 5 years of life-expectancy
Respondents able to decide	71.7 (43)	28.3 (17)	N/A	

<sup>a</sup>The programs are equal in all respects except those outlined in the table; increases in life-expectancy and ages of patients affected by a given disease are expressed as averages.

70%] favored providing large benefits to fewer patients. Eliminating those unable to decide, 47/62 or 76% [95% CI: 63%, 86%] expressed a distributional preference. This strength of preference was only slightly less than that seen for funding younger beneficiaries (see above).

When the distributional difference was decreased, not only were more respondents undecided (35%) but also the proportions favoring one or other program were similar (24/52 and 28/52, both  $P = 0.678$ ). However, when this same distributional difference was combined with a minor age difference, the proportion of undecided responses dropped back from 35% to 25%, and among 60 respondents making a choice, 43 (72% [95% CI: 59%, 83%]) favored the program that provided more benefit to fewer patients when these patients were younger. Restricting the analysis only to those 59 respondents who answered the control scenarios 'correctly', the results again were very similar (Table 5).

## Discussion

Public policy-makers in all countries are increasingly involved with health care resource allocation. Our survey of top officials in a health ministry with a CAD\$17.4

billion budget suggests that, when net benefits are the same, a substantial minority of health care decision-makers have difficulty making choices between a program that offers larger benefits to fewer individuals and one offering smaller benefits to larger numbers. This indecision is in keeping with the utilitarian assumptions inherent in cost-effectiveness analysis or decision analysis as applied to health care.<sup>4</sup> However, the amount of indecision was reduced by widening the distributional disparities, or adding minor age differences to distributional differences so that larger benefits were concentrated in fewer younger individuals. In these latter instances, policy-makers who made distributional choices clearly favored bigger gains for smaller numbers. For example, 76% favored a program providing 500 patients with an average of 20 years of life-expectancy over one providing 10 000 people with an average 1 year survival gain.

We acknowledge that we surveyed decision-makers individually, whereas allocation decisions may be made through group consensus. That said, it is not clear why group discussion would change the preferences expressed here. Another limitation is that participants were asked to choose between two clearly hypothetical



**Table 5** Decision-makers' responses to programs where beneficiaries differ in distributions of benefits – respondents able to answer control scenarios 'correctly'

	Participants (% , n)			Comments <sup>a</sup>
	Favoring Program A	Favoring Program B	Unable to decide/ no preference	
Correct respondents	62.7 (37)	15.3 (9)	22.0 (13)	Program A: 500 people gain 20 years of life-expectancy Program B: 10 000 people gain 1 year of life-expectancy
Correct respondents able to decide	80.4 (37)	19.6 (9)	N/A	
Correct respondents	30.5 (18)	33.9 (20)	35.6 (21)	Program A: 1000 people gain 20 years of life-expectancy Program B: 4000 people gain 5 years of life-expectancy
Correct respondents able to decide	47.4 (18)	52.6 (20)	N/A	
Correct respondents	52.5 (31)	22.0 (13)	25.4 (15)	Program A: 500 30-year-olds gain 20 years of life-expectancy Program B: 2000 50-year-olds gain 5 years of life-expectancy
Correct respondents able to decide	70.5 (31)	29.5 (13)	N/A	

<sup>a</sup>The programs are equal in all respects except those outlined in the table; increases in life-expectancy and ages of patients affected by a given disease are expressed as averages.

programs in each scenario. Such an abstract exercise may be difficult for health policy-makers. However, the descriptions presented to participants were much more straightforward than would be the norm for many policy decisions, and responses were similar when we limited the analysis to the respondents who answered the 'control scenarios' rationally. Furthermore, the choices of bureaucrats in this study were in keeping with our earlier work showing that doctors and patients favor programs with a small probability of a large gain over programs that appear to offer a small gain for all receiving treatment.<sup>5,6</sup> We accordingly do not believe that the findings reflect confusion or misunderstanding on the part of respondents. If discussions about priority-setting for publicly-insured health benefits involve processes of community and professional consultation (as has occurred in Oregon and New Zealand), we expect that the distributional preferences of health professionals and the general citizenry would be similar to those shown here for senior policy-makers.

From a methodological standpoint, it would be ideal to repeat this study with a survey that offered far more detail about the programs, and with scenarios arrayed in a factorial matrix that allowed us to tease out the relative impact of different covariables. However, given the time pressures on senior bureaucrats and the 60% response to even this simple survey, such a study could face major feasibility challenges.

Our results underscore some limitations of decision analysis and cost-effectiveness analysis<sup>7</sup> in making distributional decisions. These methods define 'value' as the cross-product of utilities for health states and the related probabilities that a subject will end up in those health states with alternative programs or treatments. This summary measure is often presented as quality adjusted life-years ('QALYs').<sup>7,8</sup> If the utility associated with each year of life gained is equal, a cost-utility analysis would attribute the same number of QALYs to a program that provides 20 years of survival gain to 10 people and another that provides 1 year to 200 people. Indeed, with discounting for deferred benefits in the first scenario, a decision analysis or cost-utility analysis would

tend to favor the latter program – a result contrary to the preferences of senior decision-makers surveyed in this study.

The most plausible explanation is that health officials' responses were conditioned in part by the so-called 'Rule of Rescue', whereby dramatically beneficial treatments will generally not be withheld because victims are readily identifiable.<sup>9</sup> The corollary for public officials is that large gains are more visible even if restricted to fewer people, and may therefore attract both greater media attention when announced, and more positive responses from voters and interest groups. The preferences demonstrated here – and their application by policy-makers in 'Rule-of-Rescue' resource allocation – suggest that dramatic programs helping a few patients (e.g. organ transplantation) may well be favored over broadly-based community programs (e.g. education campaigns to promote awareness of cardiovascular risk factors), even if the two programs have similar health yields and cost-effectiveness ratios. More generally, for those who argue that greater aggregate health gains can be achieved by policies that address the broad social determinants of health or by programs of community health promotion, these observations may help explain why investments in the sickness care system have enduring appeal.

Our findings complement those of Ubel et al<sup>10</sup> who have also used survey methods to address the limits of cost-effectiveness analysis in resource allocation decision-making. Ubel et al asked citizens, ethicists, and researchers to choose between two screening programs in a setting of budget constraints: one that had a lower cost-effectiveness ratio and would lead to larger societal health gains, but could not be offered to all citizens; and another that was not as cost-effective but was cheap enough for universal application.<sup>10</sup> Equity concerns led many respondents in all groups of respondents to favor the latter program, including a subgroup of respondents who were chosen for expertise in cost-effectiveness analysis and decision analysis. Thus, in the study by Ubel et al, as in our study, decision-makers gave weight to factors other than principles of strict



cost-utility analysis in choosing between programs. Conversely, our respondents' concern for equity diminished as the distributional discrepancy widened between paired scenarios.

In sum, our results add to the growing body of research showing that policy-makers are unlikely to accept cost-effectiveness analysis and other utility-maximizing methods as the sole or even primary determinant of resource allocation decisions in health care. We suggest that health resource allocation must explicitly consider not only net and aggregate health gains and the incremental costs to achieve them, but also the distribution of benefits (and harms) and the implications of that distribution with respect to societal values such as equitable access to care.

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## Appendix

### Scenario examples

#### Control scenario

Assume that you have been asked to sit on a panel which is to prioritize the allocation of a fixed sum of money to one of two hypothetical health care programs. The

following are a series of pairs of programs between which you have been asked to choose. Each program is described in terms of the number of people affected each year in Ontario and the survival increase from receiving treatment for the disease. Assume that any gain in life-expectancy is associated with a good quality of life: i.e. all of the treatments have very few side-effects. Also assume that all of the scenarios below have similar costs, and that the groups described in each scenario have the same average age.

#### Program A

- A certain type of cancer affects 1000 adults per year in Ontario
- The treatment for this disease provides all of those who receive it with an expected average increase in life-expectancy of 25 years

#### Program B

- Another type of cancer also affects 1000 adults per year in Ontario
- The treatment for this cancer increases average life-expectancy by 5 years

#### Age scenario

Again assume that you have been asked to sit on a panel which is to prioritize the allocation of a fixed sum of money to one of two hypothetical health care programs. As above, each program is described in terms of the number of people affected each year in Ontario and the survival increase from receiving treatment for the disease. Additionally, information is included regarding the average age of the patients receiving treatment as well as the potential side-effects of the treatments. Assume that all the scenarios below have similar costs.

#### Program A

- A form of lung disease affects 200 children each year in Ontario.
- The average age of these children is 5 years.
- Treatment increases their life-expectancies on average by 5 years.
- Without treatment, the patients will die within a very short time.
- With or without treatment, there are no long-term survivors.
- The treatment for this disease has moderate side-effects.

#### Program B

- 200 older individuals (average age 65 years) are affected by another type of lung disease each year in Ontario.
- The treatment for this disease increases the life-expectancy of those who receive it by 5 years, on average.
- Without treatment, the patients will die in a very short period of time.
- There are no long-term survivors from this disease.
- This treatment is also associated with moderate side-effects.