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Methodological Article

Sharing and the Provision of "Cost-Ineffective" Life-Extending Services to Less Severely Ill Patients

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ABSTRACT

Background: Cost-utility analysis prioritizes services using cost, life-years, and the health state utility of the life-years. Nevertheless, a significant body of evidence suggests that the public would prefer more variables to be considered in decision making and at least some sharing of the budget with services for severe conditions that are not cost-effective because of their high cost. **Objectives:** To examine whether this preference for sharing persists for less severe conditions when both cost effectiveness and illness severity would indicate that resources should be allocated to other services. **Methods:** Survey respondents were asked to divide a budget between two patients facing life-threatening illnesses. The severity of the illnesses differed and the price of treatment was varied. **Results:** Sharing occurred in all scenarios including scenarios in which the illness was less severe and services were not cost-effective. Results are consistent with behavior commonly observed in other contexts. **Conclusions:** Results suggest that sharing per se is important and that the public would support some funding of cost-ineffective services for less severe health problems.

Keywords: cost-utility analysis, orphan services, reciprocity, sharing, social preferences.

Introduction

Cost-utility analysis prioritizes health services according to their cost per additional quality-adjusted life-year (QALY), where QALYs are defined as life-years multiplied by the utility of the life-years. Priority, therefore, depends on only three variables: cost, life-years, and the personal utility obtained by beneficiaries. Nevertheless, a significant body of empirical research has found that people would like additional variables to be considered in decisions affecting other people; that is, there is a "social preference" for the inclusion of these variables in decisions.

The relevant literature and the methods used in this literature have been reviewed by a number of authors [1–7]. Some variables are included in all of these surveys, for example, the severity of untreated illness defined in terms of either the quality of life (QOL) or future life expectancy (LE) [5] and the age of the patient. Other candidates for consideration include, inter alia, the realization of a person's health potential, achieving the length of life, which represents a "fair innings" [8], and the patient's socioeconomic status [9]. A common feature of these variables is that they affect the benefit side of the cost per QALY ratio.

Nevertheless, a limited number of studies have observed a social preference for allocating some part of a limited budget to services that are effective but not "cost-effective" because of their high cost [10–16]. In each of these studies, survey respondents allocated resources or some part of a limited notional budget to individuals who could receive fewer QALYs from them than a clearly identified alternative group with equally severe ill health. In two studies, results were attributed to the desire to preserve hope [10,14]. This, however, requires only the provision of sufficient services to create a credible chance of being the lucky recipient of care but with predictable dis-satisfaction after the event by nonrecipients. In other studies, the apparent anomaly has been explained primarily by a desire for "fairness" or equity, which, in turn, may be attributable to altruism or "sympathy" [17]. The latter is an emotional response that is commonly defined as a willingness to reduce personal well-being to confer benefits on others [18,19]. Altruism, in contrast, may be a more dispassionate response. As argued by Sen [20], people may be motivated by "commitment," which arises from a sense of duty.

The present study extends this literature by asking whether the social preference for sharing includes patients whose health problem is less severe than that of other identified patients and, in addition, when their treatment is less cost-effective. Although

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Conflicts of interest: The authors report no conflicts of interest.

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altruism and sympathy cannot be discounted as motivating such an outcome, both would be expected to focus concern upon those in the greatest need. Nevertheless, an additional motivation exists that has been largely ignored in the health economics literature that offers a potentially more plausible explanation.

Recent evidence, including results from experimental economics, indicates that social relationships are strongly influenced by norms that define and circumscribe appropriate behavior. Experimental games indicate a willingness of people to hurt others who are perceived as behaving inappropriately even when the utility of the decision maker is reduced [18,19]. A significant literature indicates that an important determinant of this behavior is the expectation of reciprocity. This does not exclude other motivations but it shifts the nature of the explanation from virtuous to normal behavior: from a concern for those who are most unlucky and have the greatest claim for care to a more inclusive response to events. In the Discussion section, it is argued that this motivation provides a satisfactory explanation for the type of sharing investigated in this article and in the survey reported.

The objective of the survey was to further test the preference for sharing and, in particular, whether people will share resources with patients in lesser need and when less health may be created than with an alternative use of the resources. The survey and its analyses are described below. Results are then presented and discussed.

Methods

The study design is presented in Table 1. Respondents to a Web-based survey were asked to complete a series of constant-sum paired comparison (CSPC) tasks. Each was asked to imagine that they were a representative of the public advising the government on how to divide a fixed budget between two patients, A and B, both aged 40 years and both with conditions that would reduce their LE. The condition was more severe for patient B whose LE was 2 years, that is, 8 years less than the 10-year LE of patient A. "Severity"—as in much of the literature—refers to urgency: the years before death without treatment. The longevity of both patients could be extended in direct proportion to expenditure from a budget that was insufficient to give both patients a normal LE. Five scenarios were presented that altered the relative cost effectiveness of services. In the first three scenarios, the relative price of the services, P_A/P_B, was varied and the budget adjusted to compensate for the varying cost. In the final two scenarios, the patient with the more severe condition (patient B) also had an incurable, permanent disability that reduced QOL and therefore the effectiveness of services. In each scenario, the initial budget was increased in five equal increments.

The primary hypothesis was that in all scenarios the budget would be shared irrespective of cost effectiveness and severity. The four subsidiary hypotheses were 1) *severity*, that all else equal, a patient in a more severe health state will receive more services; 2) *cost*, that a patient will receive fewer services when the price is higher; 3) *benefit*, that a permanent disability will reduce the budget allocation to a patient as the cost effectiveness of services will fall; and 4) *fair share*, that a disproportionate initial share to a patient will subsequently result in an adjustment to achieve a more balanced distribution of benefits. Counter-hypotheses were that the budget would be allocated exclusively to the patient whose need for care was more urgent (the "severity hypothesis") or to the more cost-effective treatment (health maximization). The hypotheses imply the following outcomes.

Case 1 ($P_A = P_B$; $LE_A = 10$, $LE_B = 2$): The severity hypothesis suggests that resources would be directed only to patient B until LEs were equalized. The sharing hypothesis implies that some of the budget will be allocated to patient A.

Case 2 ($P_A = 2P_B$): Both severity and cost effectiveness would favor an exclusive allocation of the budget to patient B. This is the strongest test of the sharing hypothesis, which implies that resources will also be allocated to patient A.

Case 3 ($P_A = \frac{1}{2}P_B$): Health maximization would result in the budget being allocated exclusively to patient A. A consideration of severity would direct some resources to patient B.

Case 4 ($P_A = P_B$): Patient B has moderate incurable problems with walking and self-care. Health maximization implies that all the budget would be allocated to patient A. Nevertheless, severity concerns would direct resources to patient B.

Case 5 ($P_A = P_B$): Patient B has severe incurable problems with walking and self-care. The cost effectiveness of services for patient B is further reduced from case 4, increasing the expected allocation to patient A.

Hypotheses were tested by direct observation of the amount allocated to the services in each scenario. The significance of the difference between the initial and final allocation was assessed using a t test.

Table 1 – Study design.

Parameter	Case				
	1	2	3	4	5
Life expectancy (from the present age of 40 y)					
Patient A	10	10	10	10	10
Patient B	2	2	2	2	2
Budget ($000)[*]	1.5	2.5	2.5	1.5	1.5
P_A:P_B[†]	1:1	2:1	1:2	1:1	1:1
Quality of life					
Patient A	1	1	1	1	1
Patient B	1	1	1	Moderate incurable problems[‡]	Severe incurable problems[‡]

[*] The budget increment was increased in cases 2 and 3 so a similar number of life-years could be purchased at each iteration of the exercise.

[†] P_A, P_B = price (cost to the budget) of one additional year of life expectancy for patient A and patient B.

[‡] Incurable moderate/severe problems with walking and self-care.