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Impact of Treatment Subsidies and Cash Payouts on Treatment Choices at the End of Life

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ABTRACT

Objectives: To examine the extent to which financial assistance, in the form of subsidies for life-extending treatments (LETs) or cash payouts, distorts the demand for end-of-life treatments. **Methods:** A discrete choice experiment was administered to 290 patients with cancer in Singapore to elicit preferences for LETs and only palliative care (PC). Responses were fitted to a latent class conditional logistic regression model. We also quantified patients' willingness to pay to avoid and willingness to accept a less effective LET or PC-only. We then simulated the effects of various LET subsidy and cash payout policies on treatment choices. **Results:** We identified three classes of patients according to their preferences. The first class (26.1% of the sample) had a strong preference for PC and were willing to give up life expectancy gains and even pay for receiving only PC. The second class (29.8% of the sample) had a strong preference for LETs and preferred to extend life regardless of cost or quality of life. The final class (44.1% of the sample) preferred LETs to PC, but actively traded off costs and length and quality of life when making end-of-life treatment choices. Policy simulations showed that LET subsidies increase demand for LETs at the expense of demand for PC, but an equivalent cash payout was not shown to distort demand. **Conclusions:** Patients with cancer have heterogeneous end-of-life preferences. LET subsidies and cash payouts have differing effects on the use of LETs. Policymakers should be mindful of these differences when designing health care financing schemes for patients with life-limiting illnesses.

Keywords: cash payout, palliative care, preference, subsidy.

Introduction

Life-extending treatments (LETs) for advanced cancers are expensive but often prolong life by only a few months and reduce patients' health-related quality of life. Alternatively, provision of palliative care (PC) to patients with advanced cancers improves their symptom control, thereby offering them greater quality of life [1], and reduces health care expenditures [1–5], but allows the disease to run its natural course. Extensive literature shows that patients trade off these factors when deciding whether or not to pursue LETs [6–14].

In efforts to keep access to health care for advanced cancers affordable, many governments provide subsidies for LETs. In Singapore, the focus of this study, up to 30 chemotherapy drugs are available to eligible patients at heavily subsidized rates [15]. In addition to these subsidies, Singapore's ElderShield program provides monthly cash payouts in the event of a disability, with a maximum payout of $28,800 [16]. Those eligible for the payments can use the money as they wish; there is no obligation to use it for medical services only. Many private insurers in Singapore also provide lump-sum payments if the insured is diagnosed with a life-threatening/critical illness such as an advanced cancer. As with ElderShield, these payments do not depend on hospital admissions or actual medical expenses, acting as a kind of early life insurance payout.

LET subsidies and cash payouts in the event of diagnosis with an advanced cancer, although aimed at helping patients cope with high medical costs, may have unintended consequences, including encouraging excess health care use. This study uses a stated-preference survey to examine the extent to which financial assistance, in the form of LET subsidies or cash payouts, distorts the demand for LET and only PC. We simulate the effect of various LET subsidy and cash payout policies on the choice between LET and PC-only. We hypothesize that LET subsidies increase the demand for LET over PC-only. However, universal cash payouts, such as ElderShield and critical illness insurance that effectively act to increase the disposable income of the patient, do not change relative prices of treatments and thus are not expected to influence the demand for LET or PC-only. This holds as long as PC is a normal, as opposed to an inferior, good, where the latter would suggest that demand decreases as income rises.

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We assume that patients do not have similar preferences, and therefore LET subsidies and cash payouts may have varying effects on demand. Earlier studies show that people have opposing preferences for life extension versus improving quality of life [9,17–19]. Some people place a high value on life extension at the end of life because of lower opportunity costs, the desire to preserve the hope of living, and the social value of life [19]. Others would rather forgo life extension and have financial resources spent elsewhere, such as improving quality of life [6] and/or leaving a bequest [19]. We hypothesize that there are at least two distinct sets of preferences among patients with cancer: those who have greater preference for LETs over PC-only and those who have greater preference for PC-only over LETs. Age [20,21], socioeconomic status [22], marital status [23,24], presence of social support [25], children living at home [25], and a high level of positive religious coping [26] are known to predict greater use of aggressive LETs such as chemotherapy and hospitalizations. We also hypothesize that patients who are younger, have higher incomes, are married, have children, and/or are nonreligious will have greater demand for LETs over PC-only because these individuals are likely to have a greater motivation to extend life and/or greater access to financial resources. Results of this study will inform policymakers on the expected changes in demand for LETs and PC-only, when LET subsidies and/or cash payouts are altered.

Methods

Sample

Between September 2013 and July 2014, a convenience sample of 290 patients with cancer were recruited by trained interviewers from waiting rooms in four outpatient cancer clinics (National Cancer Centre, Tan Tock Seng Hospital, Johns Hopkins Singapore International Medical Centre, and National University Hospital). These clinics see most of the patients with cancer in Singapore. The inclusion criteria are having been diagnosed with stage I to IV breast, lung, or colorectal cancer; age 21 years or older; presently undergoing or are about to undergo active, adjuvant, or palliative treatment; and attending one of the four clinics as outpatients. Patients who were deemed to be mentally incompetent or too sick to respond to the survey were excluded. Before beginning the survey, patients were asked whether they were aware of their diagnosis. The interview was discontinued if they were not. All participants provided written informed consent. The survey was approved by the NHG Domain Specific Review Board (2013/00087) and the Institutional Review Board at SingHealth (2014/193/A).

Survey

The survey elicited information on the patients' socioeconomic status and health status. The main section was the discrete choice experiment (DCE), which consisted of 10 choice tasks per respondent. For each task, patients were asked to assume they have stage IV cancer with no chance of cure and to choose their most and least preferred scenario from two LET choices and PC-only (i.e., with no LET). Patients were also asked to imagine a new insurance plan that provides a cash payout when they are diagnosed with stage IV cancer. The payout amount was not made explicit and may vary or even be zero. Instead, patients were told only the net cost of each scenario. If the payout was less than the cost of treatment, the patient would have to pay the balance from out of pocket. Otherwise, the patient would receive a net gain. This approach allows us to simulate the effects of LET subsidies or payouts of various magnitudes that are presented to patients as options with varying levels of net gains or losses (payments for LETs).

The attributes and levels for LETs and PC were validated through a series of cognitive interviews and pilot testing. The list of attributes, levels, and their descriptions are given in Appendix Table 1 in Supplemental Materials found at http://dx.doi.org/10.1016/j.jval.2016.02.015. PC was assumed to be completely covered by the insurance plan, and so it involved either no cost or a net gain that would result from a potential cash payout. All other PC attributes were fixed at the lowest median survival (6 months), lowest 5-year survival rate (1%), and highest quality of life (rating 6). The attributes for LETs could take on any level listed in Table 1, except for quality of life, which was a rating of either 2 or 4, both worse than the quality of life associated with PC. A sample choice task is shown in Appendix Figure 1 in Supplemental Materials found at http://dx.doi.org/10.1016/j.jval.2016.02.015. The Sawtooth Choice-Based Conjoint software (Oren, UT) was used to generate an experimental design that ensured efficient statistical estimates of the preference weights for each of the attribute levels [27]. To avoid potential design effects, 4 versions of the experimental design, each with 10 questions, were produced and survey participants were randomly assigned to one of them.

Analysis

For this study, we made use of only the "most preferred" response as recommended by Dyachenko et al. [28]. Analysis of the DCE data is based on the random utility model [29]. The model assumes that the utility U_{ij} of person i associated with treatment j has a deterministic component V_{ij} and an unobserved stochastic error component ε_{ij}:

$$U_{ij} = V_{ij} + \varepsilon_{ij}.$$

The deterministic part of the utility is approximated by a linear combination of treatment attributes,

$$V_{ij} = \boldsymbol{\beta}' + \mathbf{x}_{ij}.$$

where $\mathbf{x}_{ij}$ is the vector of treatment attributes and $\boldsymbol{\beta}'$ is the vector of preference weights (or taste parameters) of the respective attribute levels. To allow for differential effects for gains and losses, the net cost of treatment was specified as a piecewise linear function with separate slope parameters $\boldsymbol{\beta}_{\mathrm{GAIN}}$ and $\boldsymbol{\beta}_{\mathrm{PAY}}$ for net gain and net payment, respectively. The remaining treatment attributes were specified using effects coding. An alternative-specific constant was also included to capture preferences for PC. Note that because the quality-of-life rating of 6 is confounded with PC, the constant term also includes preferences for the highest available quality of life.

A latent class conditional logistic regression model was used to estimate relative preferences of treatment attributes, accounting for potential preference heterogeneity among subgroups of

Table 1 – Policies in scenario analysis.

Policy	Effect on net cost of treatment options
A. No financial assistance	No change
B. Targeted LET subsidy	Reduce net payment of less effective LET by $20,000
C. Blanket LET subsidy	Reduce net payment of all less effective LETs and more effective LETs by $20,000
D. Universal cash payout	Reduce net payment of all LETs by $20,000 and increase net gain of PC by $20,000
E. PC-only cash payout	Increase net gain of PC by $20,000

LET, life-extending treatment; PC, palliative care.