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DEMAND ASSESSMENT AND PRICE-ELASTICITY ESTIMATION OF QUALITY-IMPROVED PRIMARY HEALTH CARE IN PALESTINE: A CONTRIBUTION FROM THE CONTINGENT VALUATION METHOD

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SUMMARY

This paper proposes a new methodology to assess demand and price-elasticity for health care, based on patients' stated willingness to pay (WTP) values for certain aspects of health care quality improvements. A conceptual analysis of how respondents consider contingent valuation (CV) questions allowed us to specify a probability density function of stated WTP values, and consequently, to model a demand function for quality-improved health care, using a parametric survival approach. The model was empirically estimated using a CV study intended to assess patients' values for improving the quality of primary health care (PHC) services in Palestine. A random sample of 499 individuals was interviewed following medical consultation in four PHC centers. Quality was assessed using a multi-attribute approach; and respondents valued seven specific quality improvements using a decomposed valuation scenario and a payment card elicitation technique. Our results suggest an inelastic demand at low user fees levels, and when the price-increase is accompanied with substantial quality-improvements. Nevertheless, demand becomes more and more elastic if user fees continue to rise. On the other hand, patients' reactions to price-increase turn out to depend on their level of income. Our results can be used to design successful health care financing strategies that include a consideration of patients' preferences and financial capacities. Copyright © 2007 John Wiley & Sons, Ltd.

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INTRODUCTION

Predicting patients' reactions to changes in medical services' prices represents one of the most challenging tasks confronting developing countries' policymakers in the design and implementation of successful health care financing strategies. Following the so-called 'Bamako Initiative' that was launched at a meeting of African Ministers of Health in Bamako in 1987, cost-sharing policies have been introduced in many developing countries (Litvack and Bodart, 1993; McPake *et al*., 1993; Mariko, 2003). Such policies consist in attributing a user fee (price) to medical services, to be paid by the users at the point of consumption (Griffin, 1992). In theory, cost-sharing policies are intended to raise funds to be used in improving the quality of delivered care (Dumoulin, 1993). Pricing decisions, however, are

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often difficult for health care providers because they raise complex trade-offs between accessibility and sustainability goals (Foreit and Foreit, 2003). The solution to this dilemma should start with a proper assessment of health care demand, and an accurate estimation of demand price- and income-elasticities.

Most previous studies which have attempted to assess health care demand, and to estimate price-elasticity, relied on observations about individuals' behavior during recent or current health problems (Gertler and Hammer, 1997). Different econometric models were used to specify the quantity demanded, or the probability of demanding a certain type of care, as a function of services' prices and quality levels – while adjusting for users' individual characteristics including income (Cissé *et al.*, 2004). Most of these studies used cross-sectional household surveys to model the relationship between price and demand (Mwabu *et al.*, 1993). Some studies considered demand fluctuations in response to variations in prices charged by health care providers (Waddington and Enyimayew, 1990); others used experimental design techniques to randomly attribute special pricing strategies to different health facilities (Gertler and Molyneaux, 1997; Bratt *et al.*, 2002), or to randomly assign individuals to different health plans with different payment structures (Newhouse, 1995). The common feature in all these studies is that they all relied on comparisons of patients' reactions to different economic environments, using patients' real behaviors.

On the other hand, a limited number of studies used stated preference techniques to elicit patients' behavior vis-à-vis different pricing strategies (Abel-Smith and Rawal, 1992; Weaver *et al.*, 1996; Gyldmark and Morrison, 2001; Onwujekwe *et al.*, 2001, 2002; Whittington *et al.*, 2002; Foreit and Foreit, 2003). These studies were designed to assess patients' willingness to pay (WTP) for certain types of health care or for certain aspects of quality improvements, using the contingent valuation (CV) method. The implicit objective in these studies is to assess the underlying health care demand function. As defined by Klose (1999), CV is a direct hypothetical survey technique used to assess the maximum amount of money a respondent would be willing to pay for the commodity in question; i.e. its value. From a microeconomic perspective, this represents the height of the inverse demand curve (Varian, 2000). The authors in these studies had either analyzed the determinants of stated WTP values (Weaver *et al.*, 1996; Gyldmark and Morrison, 2001; Onwujekwe *et al.*, 2001, 2002), or used simple descriptive analysis, based on the percentage of respondents stating a WTP value higher than a certain hypothetical user fee (UF) to sketch the demand curve for quality-improved care (Whittington *et al.*, 2002; Foreit and Foreit, 2003).

Several elicitation techniques have been proposed to help identify reliable WTP values using the CV method (Klose, 1999) – including the payment card. The payment card technique has been proposed (Mitchell and Carson, 1989), and used (Ryan *et al.*, 2004), as a *valid* and *efficient* elicitation technique – compared to open-ended and dichotomous choice alternatives – to reveal the value, for the users, of non-marketed health amenities. The use of payment card results in a continuous distribution of WTP values, as opposed to discrete distributions obtained from dichotomous elicitation techniques. However, given that 'price' is not amongst the independent variables usually used to explain variations in elicited continuous WTP values, it is not directly possible to specify a demand function based on WTP values obtained through the payment card elicitation technique.

In this paper, we demonstrate how one could however extract information about health care demand through WTP values stated using a payment card elicitation technique. We implement a survival analysis approach to model patients' demand for quality-improved health care, and estimate price-elasticity, based on stated continuous WTP values. The proposed approach enables a transformation of continuous WTP values into a large number of dichotomous data that are suitable to model a demand function, while maintaining the efficiency advantage of continuous distributions. Similar parametric and non-parametric analytical approaches have been proposed to assess demand using dichotomous WTP data (Mitchell and Carson, 1989; Kriström, 1990; Johannesson and Jonsson, 1991). The spirit of our proposition emerges from an analysis of the decision making process whereby respondents state their WTP values following a payment card elicitation technique. The empirical part of the paper concerns a

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CV study carried out to assess patients' WTP values for improving the quality of primary health care (PHC) services in Palestine (Mataria *et al.*, 2004). The following section illustrates the policy problem behind the study and describes the CV survey design. The next section describes the theoretical and econometric models used in the analysis. The next following two sections present the collected data and discuss the main findings of the study. The paper concludes with some remarks and recommendations for future research work.

POLICY PROBLEM AND SURVEY DESIGN

Established in 1993 following the 'Oslo Peace Agreements' between Israel and the Palestinian Liberation Organization (PLO), the Palestinian Ministry of Health (PMOH) was assigned the primary role of providing comprehensive, efficient and equitable health care services to the entire Palestinian population living in the West Bank and Gaza Strip (NSHP, 1999). However, three other main health care providers continue to assist the PMOH in providing the spectrum of needed services and promote the health of the Palestinian population: a group of Palestinian non-governmental organizations (PNGOs), which play an essential role in primary health care (PHC) provision; United Nations Works and Relief Agency (UNRWA), which serve the Palestinian refugees of the 1948 war; and a private sector, which is almost only accessible to the most wealthy groups of the population. International donations, which were the main sources of funding for most PNGOs, became centrally managed by the PMOH, with restricted accessibility to other health care providers. Consequently, many PNGOs started to partly rely on mobilizing private resources to ascertain their own financial sustainability. Similar fiscal policies were also envisaged by the PMOH as a way to guarantee future self-sufficiency (NSHP, 1999, p. 28). PHC services, in the local context, comprise public health activities, reproductive health and front-line diagnosis and treatment (MOH-MHIS, 2002). Our study was designed to provide managers of PNGOs and PMOH PHC providers with complementary information about the level and structure of user fees that could be implemented. The analysis is based on an assessment of the demand function for quality-improved health care services using stated WTP values.

A CV questionnaire was prepared, tested and administered by pre-trained interviewers on a random sample of patients seeking care in four PHC centers situated in Ramallah district (Palestine). Questionnaire administration took place during a one-month period (from 14/07/01 to 13/08/01). Two of the selected centers are governmental and the other two are private not-for-profit PNGO PHC centers. On the other hand, two of the centers are located in urban zones and the other two are rural PHC centers. Any patient leaving a medical consultation was eligible to take part in the study. Following some introductory information on CV and its specific use in the study, respondents were requested to value specified enhancements in the quality of provided care using seven pre-selected quality-attributes (see Appendix A for the selected attributes and their measurement scales). For this purpose, respondents were first asked to characterize the current status of each of attributes, as they perceive them, and then, to assess a transition from that *status quo* to the 'best' state of each attribute, i.e. to state their WTP value for the specified quality improvements. Respondents perceive the *status quo* level of each attribute differently; however, the 'best' state was proposed to be identical for all respondents; e.g. a 'Very Close' PHC center, a 'Not Long at All' waiting time, etc. (see Appendix A). This implied that different respondents valued different degrees of quality improvements, depending on their own current situations. Consequently, a lower *status quo* level indicates that a higher degree of quality improvement is being proposed, and hence, valued by the respondent. Improvements over each of the attributes were assessed separately using a decomposed valuation scenario (O'Brien and Gajni, 1996); and WTP values were revealed using a payment card elicitation technique (Mitchell and Carson, 1989; Donaldson *et al.*, 1997) (see Appendix B for a summary of the valuation process including the WTP questions). Individuals' demographic and socioeconomic characteristics were collected in the last

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section of the questionnaire. For more details on questionnaire design see (Mataria *et al.*, 2004); the questionnaire instrument is available at: http://www.geocities.com/awadmataria/CVquestionnaire.pdf.

MODEL

Respondents' preferences depend on expected health status following medical consultation (H_i) and a composite commodity (C_i). The purchased medical care is invested in health, and the expected health improvement depends on the quality of care Q_i and on some individual characteristics X_i (e.g. health status and education).[1] Utility is maximized when

$$U_i(H_i(Q_i), Y_i - UF_i) = \text{Max } U_i(H_i, C_i) \tag{1}$$

where Y_i and UF_i are individual i's income and paid user fees. Consider two quality levels, each associated with a different UF: Q_{iA} and Q_{iB} are the status quo and improved quality levels, as perceived by individual i. UF_{iA} and UF_{iB} are the current and new proposed user fees following quality-improvement. The demand function for the quality-improved service D_i (.) is specified as a discrete demand function. Individual i demands the quality-improved service if, and only if, the difference in individual's utility level following quality improvement is greater than or equal to zero. This implies that $D_i = 1$ if and only if:

$$U_m Q_i(Q_{Ai}) * \text{d}Q_i + U_m C_i(C_{Ai}) * \text{d}C_i \geq 0 \tag{2}$$

$$\text{i.e.,} [U_m Q_i(Q_{Ai}) / U_m C_i(C_{Ai})] * \text{d}Q_i \geq -\text{d}C_i \tag{3}$$

where U_m is the marginal utility function. The consumer continues to purchase improvements in health care quality as long as her/his WTP value for the quality-improved care exceeds the opportunity cost of the extra payment. That is,

$$\text{MRS}_{C/Q} * \text{d}Q_i \geq -\text{d}C_i \Rightarrow \text{WTP}_i \geq -\text{d}C_i \Rightarrow \text{WTP}_i \geq \text{UFI}_i \tag{4}$$

where $\text{d}C_i$ represents the difference in consumption following a user fee increment of UFI. Equation (4) serves as the bases for an empirically tractable model. We assume that WTP_i is a continuous random variable with a probability density function (f) and a cumulative distribution function (F).

$$F(\text{WTP}) = Pr(\text{WTP} \leq \text{WTP*}) = \int_0^{\text{WTP*}} f(\text{WTP})\, \text{dWTP} \tag{5}$$

Equation (5) refers to the cumulative distribution of WTP up to WTP*, where WTP* is a realization of WTP which correspond to the UFI.[2] Given that some observations on WTP may be right censored, the probability that individual i's WTP value is at least WTP* is given by the survival function in Equation (6). The survival function is defined as the complement of the CDF – also called the de-cumulative distribution function – and shall represent in our case the demand function for quality improved health care. Sketching the demand curve as (1–F(WTP)) has been alluded to by (Mitchell *et al.*, 1989, p. 48).

$$S(\text{WTP}) = Pr(\text{WTP} > \text{WTP*}) = 1 - F(\text{WTP*}) = \int_{\text{WTP*}}^{\infty} f(\text{WTP})\, \text{dWTP} \tag{6}$$

The survival function in (6) gives the probability that the service continues to be demanded following a user fee increment of UFI = WTP*. Survival functions are usually specified to correspond to a

[1] Since we are interested in individual's price/quality tradeoffs, a separability condition between Q_i and X_i is assumed to simplify the analysis. This shall reduce the health production function into H_i (Q_i).

[2] WTP* is the increment beyond which the consumer quits the pool of the demanders for the quality-improved service; i.e. it is the maximum tolerated UFI.

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conceptually valid underlying hazard function (λ). The hazard function is a conditional density function that corresponds to the probability that individual *i* exit the pool of demanders (i.e. having a WTP value less than WTP*), following a small increment in WTP* (here, UF). Our *a priori* expectation – to be tested from the data – is that the hazard function decreases as the prevailing UF increases. Indeed, if the individual is already accepting to pay a high UF, the probability that she/he ceases to demand the service following a small UFI is relatively small. This is because the negative effect of a small UFI on individual *i*'s budget constraint decreases as the prevailing price increases. Hence, the hazard function, which is the probability of not demanding the service following the UFI, is expected to be a decreasing function with respect to UFI. A popular PDF that leads to a non-constant hazard is the Weibull distribution (Kiefer, 1988; Greene, 2000). The Weibull distribution gives rise to a monotonically increasing, decreasing or constant hazard depending upon the estimated value of its parameter (α); thus, it permits to test our *a priori* hypothesis of a decreasing hazard. Equations (7–9) present the resulting Weibull density distribution and its underlying hazard function. Explanatory variables are introduced in the model using proportional hazard specification; i.e. by multiplying the basic hazard by $\gamma = e^{\sum \beta X}$, where X includes all other explanatory variables. In this case, the effect of explanatory variables consists of shifting up or down the basic hazard, and the exponential of the resulting regression coefficients gives an estimation of the corresponding relative hazard.

$$\text{Weibull PDF} : f(\text{UFI})|_X = \gamma\alpha(\text{UFI})^{\alpha-1}\exp\{-\gamma(\text{UFI})^{\alpha}\} \text{with } \gamma, \alpha > 0; \gamma = e^{\sum \beta X} \tag{7}$$

$$\text{Hazard function} : \lambda(\text{UFI})|_X = \alpha(\text{UFI})^{\alpha-1}\exp\{\gamma\} \text{with } \gamma, \alpha > 0; \gamma = e^{\sum \beta X} \tag{8}$$

$$\text{Survival (Demand) function} : \text{D}(\text{UFI}) = \exp\{-\gamma(\text{UFI})^{\alpha}\} \text{with } \gamma, \alpha > 0; \gamma = e^{\sum \beta X} \tag{9}$$

The model can be estimated – to get the values of α and β_i – using the maximum likelihood estimator. The econometric analysis was carried out using Stata release 7.0 for Windows (StataCorp, 2001). Given that survival model packages (including STATA) only support positive dependent variables, and that a relatively high percentage of respondents in our sample stated zero WTP values for at least one quality attribute (vary from 21.5 to 58.7%), we added 0.01 NIS (<0.005 US$) to the zero WTP values to incorporate them into the analysis. Quality variables are firstly introduced into the model as specified in Table I; following, a series of likelihood ratio (LR) tests were conducted to test equality between regression coefficients of different quality levels.

EMPIRICAL FINDINGS

Sample and quality assessment

A total of 785 patients were approached and asked to answer the questionnaire – 499 (63.6%) gave their consent to participate in the study. Respondents' characteristics are summarized in Table II. Most of the respondents (91.8%) declared they were willing to pay higher UF to benefit from a better quality care. This confirms previous results suggesting that patients are willing to pay at least a share of the cost of improvements in access and quality of health care, especially for drugs (Alderman and Lavy, 1996; Weaver *et al.*, 1996). More than half of the respondents perceived the distance to the PHC center as 'Far' or 'Very far'; 70% of them were willing to pay an extra UF to have a 'Very Close' PHC center. Respondents' mean stated WTP values to benefit from such improvement amounted to 7.8 ($\pm$ 15.0) NIS. On average, respondents waited 35 min (max = 270 min) prior to the medical consultation; this was perceived as 'Very long' or 'Long' by 37.8% of the sample. Sixty percent of the sample was willing to pay an extra UF to benefit from a 'Not Long at All' waiting time; the mean WTP value for

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Table I. Explanatory variables specification

GPVFAR	= *Geographical proximity*; 1 for '*Very far*', 0 for otherwise
GPFAR	= *Geographical proximity*; 1 for '*Far*', 0 for otherwise
GPAVGE	= *Geographical proximity*; 1 for '*Average*', 0 for otherwise
GPCLOSE	= *Geographical proximity*; 1 for '*Close*', 0 for otherwise[a]
WTVLONG	= *Waiting time*; 1 for '*Very long*', 0 for otherwise
WTLONG	= *Waiting time*; 1 for '*Long*', 0 for otherwise
WTAVGE	= *Waiting time*; 1 for '*Average*', 0 for otherwise
WTNLONG	= *Waiting time*; 1 for '*Not long*', 0 for otherwise[b]
ATTDVBAD	= *Attitude*; 1 for '*Very bad*', 0 for otherwise
ATTDBAD	= *Attitude*; 1 for '*Bad*', 0 for otherwise
ATTDGOOD	= *Attitude*; 1 for '*Good*', 0 for otherwise[c]
SAMNEVER	= *Seeing the same doctor*; 1 for '*Never*', 0 for otherwise
SAMRARE	= *Seeing the same doctor*; 1 for '*Rarely*', 0 for otherwise
SAMEOFTN	= *Seeing the same doctor*; 1 for '*Often*', 0 for otherwise[d]
DPRSC	= *Doctor-patient relationship*; average of five items' scores multiplied by 20, range [20, 100]
DRUGNONE	= *Drug availability*; 1 for '*None of them*', 0 for otherwise
DRUGSOME	= *Drug availability*; 1 for '*Some of them*', 0 for otherwise[e]
RECOVSC	= *Chance of recovery*; average of five items' scores multiplied by 20, range [20, 100]
INCOME	= income in New Israel Shekel (NIS), using intervals of 500 NIS
SEX	= sex; 1 for female, 0 for male
AGE	= age, in years
EDUCATION	= education, number of schooling years
REASON	= reason of medical visit; 1 for acute reason, 0 for chronic condition
PAYMENT	= payment; 1 for charged service, 0 for free service
NATURE	= nature; 1 for NGO, 0 for governmental
LOCATION	= location; 1 for rural, 0 for urban

[a] *Geographical proximity* = '*Very close*' is included in the constant.
[b] *Waiting time* = '*Not long at all*' is included in the constant.
[c] *Attitude* = '*Excellent*' is included in the constant.
[d] *Seeing the same doctor* = '*Always*' is included in the constant.
[e] *Drug availability* = '*All*' is included in the constant'.

improvements over this attribute amounted to 4.1 ($\pm$ 8.9) NIS. In general, respondents did not complain from the attitude of the personnel of the centers. Nevertheless, 41.3% of them were ready to pay more to benefit from an 'Excellent' attitude; the mean WTP value was 4.2 ($\pm$ 11.2) NIS.

Only half of the respondents were examined by the same doctor every time they come to the center; and about 47% of the sample was willing to pay an extra UF to be able to 'Always' meet the same doctor. The stated mean WTP value for this attribute amounted to 4.2 ($\pm$ 8.9) NIS. Patients spent, on average, 7.6 ($\pm$ 7.0) min with the consulting doctor; this was estimated insufficient by one third of the sample. Two-thirds of the sample was prepared to pay an extra UF to be able to stay sufficient time with the doctor, to discuss with her/him the health problem and to receive sufficient and clear information about their disease and the prescribed treatment(s). The mean stated WTP value for improvements over this attribute was 6.4 ($\pm$ 13.9) NIS. Three quarters of the patients who received a prescription (most of them did) were able to find their medications in the center; 15.8% could find 'some'; and 8% could not find any. Three-quarters of the patients receiving prescriptions were willing to pay an extra UF in order to be 'Always' able to get their prescribed medications in the center; the mean WTP value for this improvement amounted to 6.3 ($\pm$ 10.4) NIS. With regard to the chance of recovery quality attribute, 78.5% of the respondents stated willing to pay an extra UF in order to be examined by more competent doctors and have a higher chance of recovery; the mean maximum WTP value was 8.0 ($\pm$ 13.0) NIS.

Using the approach used in previous CV surveys for health care (Olsen and Donaldson, 1998; Stewart *et al*., 2002), reasons for not being willing to pay for the improvements were used to distinguish between 'true-zero' and 'protest-zero' answers. Answers that were considered 'true-zeros' comprised: '*I am not concerned with the improvement*'; '*I am not interested in the improvement*' or '*I cannot afford paying more*'. Answers that were considered 'protest-zeros' were: ' *I already* pay *enough*'; '*I am insured and it is the role*

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Table II. Sample characteristics

Variable		*N* (%) or Mean (± SD)
Sample size (response rate)		785 (63.6%)
Sample size (net)		*499*
PHC center	Ramallah Governmental PHC center	175 (35.1%)
	Al-Zaka PHC center	177 (35.5%)
	Beet-Liqya Governmental PHC center	83 (16.6%)
	Bido-UPMRC PHC center	64 (12.8%)
Gender (female)		383 (76.8%)
Age (years)		35.9 (± 13.7)
Education (formal schooling years)		8.5 (± 4.6)
Marital status	Married	405 (81.2%)
	Widowed/widower	24 (4.8%)
	Divorced	6 (1.2%)
	Single	58 (11.6%)
Occupancy (housewife)[a]		63.8%
Living zone	City	60 (12.2)
	Village	415 (84.2%)
	Refugee-camp	18 (3.7%)
Reason for the medical visit	Chronic disease & condition	109 (21.8%)
	Acute inf. &common illnesses	327 (65.5%)
	Pregnancy	21 (4.2%)
	Emergency	12 (2.4%)
	Others	30 (6.0%)
Insurance status (insured)		373 (75.4%)
User Fee co-payment (free)[b]		271 (54.7%)
No. of person per household		7.4 (± 3.6)
No. of person < 14 years old		3.1 (± 2.2)
No. of person in charge		7.5 (± 3.7)
Came more than once during last year		*89.2%*
Examined by a generalist[c]		*67.5%*
Household monthly income (NIS)	≤ 1000 NIS	128 (26.8%)
	[1000–2000]	182 (38.1%)
	[2000–3000]	97 (20.3%)
	[3000–4000]	38 (8.0%)
	[4000–5000]	19 (4.0%)
	> 5000	14 (2.9%)

[a]Other occupancies included: 11.2% employed, 7.5% workers, 6.9% independent, 4.7% unemployed, 4.1% students and 1.4% others.
[b]Mean user fees = 6.3 (± 8.1) NIS.
[c]Amongst the 161 patients examined by specialists, 150 patients were recruited from the two NGO PHC centers.

of insurance to finance quality improvements'; '*It is the role/duty of the government/the health care system/ the doctors to provide good quality care*'; and '*It is my right to benefit from good quality care*'. Respondents' answers indicate that most zero answers were indeed 'true-zeros'. On the other hand, the number of respondents stating that they were not willing to pay for all the seven attributes was very limited ($n = 20$). Therefore, all zero answers were included in the analysis.

Econometric analysis

In comparison with other parametric survival models (e.g., exponential, lognormal and loglogistic), the Weibull distribution resulted in the lowest Akaike Information Criterion (AIC) (Akaike, 1981) for five of the seven quality attributes, suggesting that it was the most appropriate model to specify the basic hazard function. It was ranked second and third for the 'attitude of PHC center's staff' and 'being able to meet the same doctor' attributes, respectively. Moreover, model estimation resulted in α-parameter estimates that are less than one for the seven quality attributes (0.348 to 0.582). This supports our *a priori* assumption about the decreasing hazard ($p < 0.010$), and adds evidence to the appropriateness of

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the Weibull distribution. The proportional hazard assumption was also fulfilled based on the Kaplan Meier curves (Kennedy, 1998) in the price range of interest [0–20 NIS] – indeed, a UFI of 20 NIS makes prices go beyond those exercised by private doctors.

Weibull regression results for the seven quality attributes are presented in Table III. A smaller coefficient signifies a lower risk of not demanding the quality-improved service following the UFI. This can be quantified by taking the exponential of the regression coefficient, which results in an estimation of the relative hazard between the category of the independent variable of interest and the category of reference. In order to have a simpler and more illustrative interpretation of the role played by the amplitude of quality improvement on demand, several demand curves, stratified by quality *status quo* levels, can be sketched. Again, a lower quality status quo level indicates that a higher magnitude of quality improvement is being proposed and assessed by the individual in exchange for a similar price-increase.

Key demand curves for a quality-improved service at the level of the geographical proximity attribute are presented in Figure 1(a) – the curves were simulated using the data generated Weibull's α parameter and the mean values for other independent variables in the model (as depicted in Equation (9)). Figure 1(a) concerns respondents' demand for a 'Very Close' PHC center, as stratified by the *status quo* level of the geographical proximity attribute. Results suggest that the demand curves for respondents living at 'Close' or 'Average' distances from the PHC center – as perceived by them – decline more steeply than the demand curve of respondents currently living at a 'Very Far' or 'Far' distances from the PHC center. Indeed, the latter would benefit more from improving the geographical proximity attribute, and thus they would be less penalized than those living at 'Close' or 'Average' distances by any UFI. For instance, a UFI of 2 NIS – accompanied with the provision of a 'Very Close' PHC center – would reduce the demand of patients living at 'Very Far' and 'Average' distances by 43.6% and 53.2%, respectively. In other words, the more important the quality improvement proposed to the individual in exchange for UFI is, the less the demand would be penalized by the price-increase. The same argument can be applied to all the seven quality-attributes, as suggested by the Weibull regression results.

Except for the drug availability attribute, this compensatory effect of quality-improvements was highly significant (Table III). The non-significant association for the drug availability attribute might be due to a problem with the framing of the WTP question. Indeed, respondents were asked about their WTP values to be 'Always' able to find their prescribed medications in the center. Therefore, even those who were able to find their medications in the center for this time were willing to pay substantial amounts to be 'Always' able to find them in the future. The positive coefficients for the DPR- and chance of recovery-scores indicate that the better the DPR and the higher the chance of recovery are, the higher the risk that the patient stops to demand the service following the UFI if improvements should concern these two attributes.

Elasticity and revenue estimations

Our results can be used to assess demand price-elasticity and to estimate expected extra revenues following the UFI. This was calculated at the mean values of all independent variables in the model, other than price, and presented in Figure 1(b) for the geographical proximity attribute. Results suggest that, price-elasticity is an increasing function of UFI.

If UF are increased, PHC center's managers can increasingly expect higher revenues, as long as, the price-elasticity is less than 1; and this in spite of the monotonically decreasing demand curve. Indeed, when price-elasticity equals one, the negative effect of price increase on demand – and consequently, on revenues – is totally compensated by the positive effect of price-increase on revenues. As a result, if a 'Very Close' PHC center is being provided to all the respondents, and UF have been increased to fund such quality-improvement, the highest extra revenue per user that the PHC center can expect amounts to 1.59 NIS – at this level price-elasticity equals one. This occurs at a UFI of 10.92 NIS. One should

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Table III. Weibull regression results

Independent variable	Dependent variables in the seven Weibull regressions						
	WTP for geographical proximity	WTP for waiting time	WTP for attitude of staff	WTP for same doctor	WTP for DPR♣	WTP for drug availability	WTP for chance of recovery♣
	B (*B* SE)	*B* (*B* SE)	*B* (*B* SE)	*B* (*B* SE)	*B* (*B* SE)	*B* (*B* SE)	*B* (*B* SE)
Constant	1.833***	−0.121	−0.160	0.641	−0.462	−0.653*	−1.815***
	(0.547)	(0.411)	(0.395)	(0.419)	(0.381)	(0.391)	(0.443)
GPVFAR_FAR	−3.048***	—	—	—	—	—	—
	(0.346)	—	—	—	—	—	—
GPAVGE	−2.765***	—	—	—	—	—	—
	(0.350)	—	—	—	—	—	—
GPCLOSE	−2.031***	—	—	—	—	—	—
	(0.361)	—	—	—	—	—	—
WTVLONG_-LONG	—	−0.636***	—	—	—	—	—
	—	(0.153)	—	—	—	—	—
WTAVGE_N-LONG	—	−0.088	—	—	—	—	—
	—	(0.148)	—	—	—	—	—
ATTDVBAD_BAD	—	—	−0.899***	—	—	—	—
	—	—	(0.249)	—	—	—	—
ATTDGOOD	—	—	−0.338***	—	—	—	—
	—	—	(0.116)	—	—	—	—
SAMNE-VER_OFTEN	—	—	—	−0.535***	—	—	—
	—	—	—	(0.152)	—	—	—
SAMRARE	—	—	—	−0.880***	—	—	—
	—	—	—	(0.188)	—	—	—
DPRSC	—	—	—	—	0.009***	—	—
	—	—	—	—	(0.003)	—	—
DRUGNONE	—	—	—	—	—	−0.293	—
	—	—	—	—	—	(0.205)	—
DRUGSOME	—	—	—	—	—	−0.082	—
	—	—	—	—	—	(0.150)	—
RECOVSC	—	—	—	—	—	—	0.012***
	—	—	—	—	—	—	(0.003)
INCOME	−0.058**	−0.062**	−0.022	−0.039	−0.056**	−0.022	−0.078***
	(0.026)	(0.025)	(0.023)	(0.025)	(0.024)	(0.024)	(0.024)
SEX	0.244*	−0.028	0.275**	−0.154	−0.072	−0.042	0.171
	(0.138)	(0.131)	(0.136)	(0.152)	(0.140)	(0.137)	(0.137)
AGE	0.005	0.015***	0.007	0.004	0.0004	0.004	0.007
	(0.006)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
EDUCATION	−0.010	−0.017	−0.003	−0.009	−0.017	−0.030**	−0.004
	(0.015)	(0.014)	(0.015)	(0.016)	(0.015)	(0.015)	(0.015)
REASON	0.402***	0.143	−0.033	0.059	−0.255*	0.105	0.039
	(0.150)	(0.143)	(0.148)	(0.146)	(0.140)	(0.145)	(0.143)
PAYMENT	−0.166	−0.020	−0.007	0.158	−0.186	0.613**	0.291
	(0.232)	(0.260)	(0.249)	(0.234)	(0.249)	(0.287)	(0.249)
NATURE	−0.204	−0.045	−0.008	−0.422*	0.159	−0.309	−0.210
	(0.234)	(0.262)	(0.252)	(0.246)	(0.258)	(0.286)	(0.254)
LOCATION	0.457***	0.168	0.569***	0.114	0.347***	−0.002	0.185
	(0.121)	(0.115)	(0.121)	(0.145)	(0.124)	(0.123)	(0.122)
Alpha	0.520***	0.427***	0.348***	0.348***	0.433***	0.529***	0.582***
	(0.021)	(0.017)	(0.013)	(0.014)	(0.018)	(0.023)	(0.043)
No. of observations	400	401	401	348	400	375	399
Log likelihood	−899.30	−975.31	−1037.60	−899.88	−973.60	−850.74	−874.75
Probability > χ^2	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0.0046	<0.00005

Notes: *B* = coefficient, SE *B* = standard error of the coefficient.
* = $P<0.10$; ** = $P<0.05$; *** = $P<0.01$.
♣: DPR score and chance of recovery score; range [20, 100].

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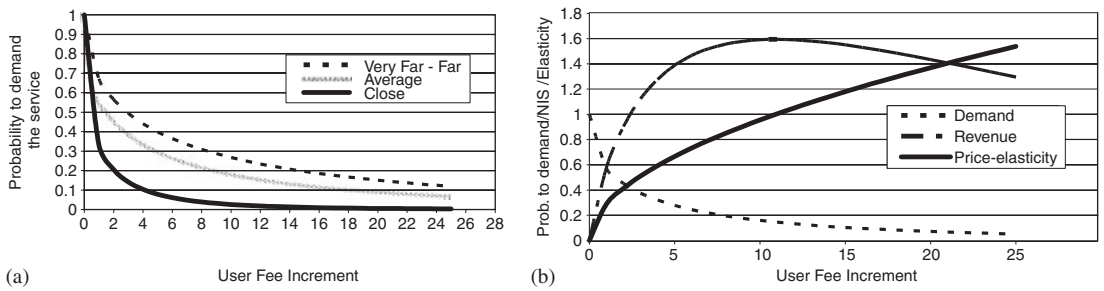

Figure 1. (a) Demand curves for a 'Very Close' PHC center, stratified by geographical proximity *status quo* level; (b) demand curve, demand price-elasticity and extra revenues as a function of user fee-increase, when accompanied with providing a 'Very Close' PHC center

however not neglect that at such UF level demand is reduced by 85.4%. Similar analyses were conducted for the different quality-attributes in the model and comparable results concerning the negative association between the degree of quality improvement and the UF effect on demand was obtained. Table IV presents key figures about how demand and center's revenues vary with UFI, when the latter is being accompanied with improvements over each of the seven quality-attributes. Results are presented for the whole sample and for situations where the UFI concerns only specific groups of the population.

Socioeconomic determinants of the demand

The effects of other explanatory variables on demand were assessed by calculating the relative hazard (e^{β}). Results suggest that respondent's income had a significant effect on the way she/he would react in response to a price-increase. The risk that the patient ceases to demand the service following a UFI reduces as the patient's income increases. This association was significant at 5 and 1% levels for four quality attributes; namely, geographical proximity, waiting time, doctor–patient relationship and chance of recovery. This could be interpreted as a positive income-elasticity, implying that health care is a 'normal' good, as has been suggested in previous studies (Chernichovsky and Meesook, 1986; Ellis *et al.*, 1994; Barlow and Diop, 1995; Mariko, 2003).

In general, a price-increase accompanied by quality improvement would have similar impact on the demand of both males and females. However, significant differences were detected when improvements concern the geographical proximity and the attitude of PHC center's staff. Here, females appear to be more negatively affected by a price-increase than males, everything else being equal. On the other hand, the age of the patient seems not to influence her/his demand following a price-increase, except if quality improvement concerns the waiting time attribute. In this case, elderly patients would be more negatively affected by the price increment. The demand of the more educated patients seems to be less elastic than that of patients with lower education levels; however, the results were only significant for the drug availability attribute. Considering the reason behind the medical visit, whether it was for a chronic or an acute problem, the results were mixed. On one hand, the demand of chronic patients seems to be less affected ($p<0.01$) by a UFI than that of acute patients if the distance to the center is to be reduced. On the other hand, improving doctor–patient relationship would have a more persuasive effect on acute patients, in order not to reduce demand, than on chronic patients ($p<0.10$). A UFI would have a similar effect on the demand of patients who are used to be 'charged' for the service and those who currently receive the service 'free of charge'. An exception concerns the drug availability attribute. Here, the former seems not to be willing to pay more than what they are already paying to have all their prescribed treatments available in the center. UFI seem to have similar effects whether exercised by governmental or NGO PHC centers; however, the NGO-clientele would be less affected by the price

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Table IV. Demand and revenue variations following user fee-increase accompanied with improving quality

User fee increase	Geographical proximity (*All*)		Geographical proximity (*Very Far* or *Far*)		Geographical proximity (*Average*)	
(NIS)	ΔDemand (%)	ΔRevenues (NIS/patient)	ΔDemand (%)	ΔRevenues (NIS/patient)	ΔDemand (%)	ΔRevenues (NIS/patient)
2	−54.9	0.90	−43.6	1.13	−53.2	0.94
5	−72.3	1.39	−60.2	1.99	−70.6	1.47
10	−84.1	1.59	−73.3	2.67	−82.7	1.73
20	−92.8	1.43	−85.0	3.01	−91.9	1.62
User fee increase	Waiting time (*All*)		Waiting time (*Very Long* or *Long*)		Waiting time (*Average* or *Not Long*)	
(NIS)	ΔDemand (%)	ΔRevenues (NIS/patient)	ΔDemand (%)	ΔRevenues (NIS/patient)	ΔDemand (%)	ΔRevenues (NIS/patient)
2	−68.3	0.63	−55.2	0.90	−75.1	0.50
5	−81.7	0.92	−69.5	1.53	−87.2	0.64
10	−89.8	1.02	−79.7	2.03	−93.7	0.63
20	−95.3	0.93	−88.3	2.34	−97.6	0.49
User fee increase	Attitude of PHC staff (*All*)		Attitude of PHC staff (*Very Bad or Bad*)		Attitude of PHC staff (*Good*)	
(NIS)	ΔDemand (%)	ΔRevenues (NIS/patient)	ΔDemand (%)	ΔRevenues (NIS/patient)	ΔDemand (%)	ΔRevenues (NIS/patient)
2	−76.7	0.47	−50.5	0.99	−70.9	0.58
5	−86.5	0.67	−62.0	1.90	−81.7	0.92
10	−92.2	0.78	−70.8	2.92	−88.5	1.15
20	−96.1	0.78	−79.2	4.17	−93.6	1.28
User fee increase	Meeting the same doctor (*All*)		Meeting the same doctor (*Never or often*)		Meeting the same doctor (*Rare*)	
(NIS)	ΔDemand (%)	ΔRevenues (NIS/patient)	ΔDemand (%)	ΔRevenues (NIS/patient)	ΔDemand (%)	ΔRevenues (NIS/patient)
2	−76.7	0.47	−66.3	0.67	−53.7	0.93
5	−86.5	0.67	−77.6	1.12	−65.3	1.74
10	−92.2	0.78	−85.1	1.49	−74.0	2.60
20	−96.1	0.78	−91.1	1.78	−82.0	3.61
User fee increase	Doctor-patient relationship (*All*)		Doctor-patient relationship (*Bad*: DPR Score = 20)		Doctor-patient relationship (*Excellent*: DPR Score = 100)	
(NIS)	ΔDemand (%)	ΔRevenues (NIS/patient)	ΔDemand (%)	ΔRevenues (NIS/patient)	ΔDemand (%)	ΔRevenues (NIS/patient)
2	−59.8	0.80	−45.8	1.08	−71.8	0.56
5	−74.2	1.29	−59.8	2.01	−84.8	0.76
10	−84.0	1.60	−70.8	2.92	−92.1	0.79
20	−91.5	1.69	−81.0	3.80	−96.8	0.65
User fee increase	Drug Availability (*All*)		Drug Availability (*None*)		Drug Availability (*Some*)	
(NIS)	ΔDemand (%)	ΔRevenues (NIS/patient)	ΔDemand (%)	ΔRevenues (NIS/patient)	ΔDemand (%)	ΔRevenues (NIS/patient)
2	−51.1	0.98	−42.5	1.15	−49.5	1.01
5	−68.7	1.56	−59.3	2.03	−67.1	1.65
10	−81.3	1.87	−72.7	2.73	−79.9	2.01
20	−91.1	1.78	−84.6	3.07	−90.1	1.98

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Table IV. (*continued*)

User fee increase	Chance of Recovery (*All*)		Chance of Recovery (*Bad*: DPR Score = 20)		Chance of Recovery (*Excellent*: DPR Score = 100)	
(NIS)	ΔDemand (%)	ΔRevenues (NIS/patient)	ΔDemand (%)	ΔRevenues (NIS/patient)	ΔDemand (%)	ΔRevenues (NIS/patient)
2	−44.5	1.11	−29.7	1.41	−59.5	0.81
5	−63.3	1.83	−45.2	2.74	−78.6	1.07
10	−77.7	2.23	−59.4	4.06	−90.1	0.99
20	−89.4	2.11	−74.0	5.19	−96.9	0.63

increase if the latter was intended to assure that the patients meet the same doctor at every visit. Finally, UFI would have a more negative effect on demand if they were implemented in rural PHC centers than if they were exercised by urban PHC centers. This effect appears to be highly significant if the mobilized revenues were used to improve one of the following attributes: geographical proximity, attitude of the staff or doctor–patient relationship.

DISCUSSION

The above analysis demonstrates how demand, price-elasticity and center's revenues vary following a UFI associated with improvements in the quality of delivered care. Results suggest that the negative effect of UFI on demand could be compensated, at least in part, by improving the quality of delivered care. This supports previous results on the compensatory effect of quality-improvements on demand for health care following a price-increase (Abel-Smith and Rawal, 1992; Leighton, 1995; Wouters, 1995; Weaver *et al.*, 1996; Akin and Hutchinson, 1999). Furthermore, the higher the quality improvement is, the lower the negative effect of UFI on demand would be. In addition, our model allowed us to estimate a price-elasticity that varies with the UF level; something which remains more consistent with the economic theory than the more restrictive assumption of constant price-elasticity, present in most previous studies that have tried to assess health care demand (Gertler and Hammer, 1997; Cissé *et al.*, 2004). Our results suggest that price-elasticity is positively associated with the level of UFI; this has been also suggested by Gertler *et al.* (1987).

The analogy presented in our paper between the demand function and the survival analysis, had already been suggested by Johannesson and Jonsson (1991). In their paper, the authors discussed the estimation of mean and median WTP values following the dichotomous choice (DC) elicitation technique. The DC technique consists of asking respondents whether or not they would be willing to pay a certain amount of money to benefit from the good in question; researchers usually vary the proposed amount from one individual to another to estimate a demand function. Given the binary nature of DC results (yes/no answers), discrete regression models such as the logistic function specification can be directly used to assess the probability of accepting a bid as a function of a set of explanatory variables (including the bid itself). Thus, the demand function is directly obtained, as well as the marginal effects of price and income on demand, using logit or probit estimation techniques. The authors in (Johannesson and Jonsson, 1991) noted that: 'The function that is calculated (i.e. the probability to accept a bid) can be viewed as a survival function with respect to willingness to pay (bid)' – for an illustrative example about how to calculate price-elasticity following DC WTP data, see (Population Council, 1998). A non-parametric estimation technique, based on survival analysis, has been also proposed by Kriström (1990) to estimate mean WTP following DC elicitation.

It has been argued that the DC approach should be the elicitation technique of choice for CV studies, based on the assumption that such technique makes respondents answer the hypothetical questions as if they were involved in real economic situations because they have no incentive to misrepresent the

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context of their decision (Arrow *et al.*, 1993). However, the issue of validity of alternative elicitation techniques in CV studies remains controversial. The validity of the DC method has been questioned by some authors who detected significant differences between respondents' answers to hypothetical and real DC in CV randomized and controlled experiments (Cummings *et al.*, 1995). Valid results have been obtained using open-ended questions (e.g. payment card) (Donaldson *et al.*, 1997) and it can be argued that this elicitation technique may collect much more complete information about respondents' actual preferences (Gyldmark and Morrison, 2001).

In our study, we proposed an alternative approach to generate a demand and price-elasticity assessment from continuous WTP values: survival modeling allowed us to use continuous WTP values to get an indirect estimate of the probability to demand the quality-improved service as a function of the price of the service and individual's socioeconomic and demographic characteristics. The Weibull distribution appears to be well adapted to our study context. It resulted in estimates consistent with our *a priori* expectations, especially, regarding the positive effect of the amplitude of quality improvements, and respondents' income, on the probability to demand the quality-improved service following price-increase. The α-parameter in the model was estimated to be <1, supporting our hypothesis of a decreasing hazard. Moreover, the effects of the different explanatory variables on demand, as suggested by the Weibull regression analysis, are highly comparable to results previously obtained using Tobit regression analysis (Mataria *et al.*, 2004). Beside being an evidence for the appropriateness of the Weibull distribution, the latter do also provide new insights on the applicability of CV in the context of developing countries (Mataria *et al.*, 2004), and on the validity of the stated WTP results (Hassan *et al.*, 1994; Asenso-Okyere *et al.*, 1997; Onwujekwe *et al.*, 2002).

In our study, we selected a user-based payment vehicle due to its resemblance to the way health care is financed in Palestine. Indeed, this was a way to increase scenario realism and enhance validity. Our use of the decomposed valuation scenario implied that the value of improvements over one attribute did not depend on the level of other attributes (inter-attributes independence). A holistic valuation scenario was not attempted in order to avoid an excessive cognitive burden on respondents, and consequently, to increase the precision of results. However, we cannot exclude that the way a patient values improvements of one attribute may depend to some extent on how she/he assesses the whole service for other attributes. For instance, a patient might support having a 'Very far' PHC center – and thus state a low value for improvements over the geographical proximity attribute – if she/he knows that she/he would not wait long before being examined by the doctor. Further analysis is therefore needed to verify the existence of such inter-attribute dependence and to adjust for it.

Although WTP is 'stated' rather than 'revealed', we take this approach for the potential benefits in addressing policy issues in the absence of market data. It is often argued that WTP estimates by CV overstate the true WTP (Kemp and Maxwell, 1993; Liljas and Blumenschein, 2000; Onwujekwe *et al.*, 2005). The questionnaire of the present study was designed to minimize such bias. For example the WTP estimates were obtained by payment card elicitation technique, to select the highest extra UF she/he would be willing to pay for the specified improvement. The UFI scale was 0–10 New Israeli Shekel (NIS) in addition to an open question for the maximum WTP. Finally, a major limitation of any CV study is its dependence on hypothetical markets that makes it impossible – in most of the cases – to verify respondents' answers. However, the practical implementation of health care reforms in Palestine will give new opportunities to observe real patients' behaviors and to compare their evolution between sectors (public/NGO run centers versus private sector) and before and after the introduction of both quality improvements and cost-recovery policies. This may create the opportunity to confront effective responses of patients' behaviors to policy changes with the WTP values obtained in this study, in a way to assess CV external validity.

Some other limitations of our study are worth mentioning. The demand analysis was restricted to a random sample selected amongst the current users of the service. Improvements in the quality of the service would most probably attract new users who were seeking care in other sectors, such as private

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clinics. Therefore, our assessments of demand elasticity and extra revenues have to be taken as conservative estimates. Future studies should be based on sampling from the general population.

A practical limitation that might have affected our study results is the bad political situation in Palestine at the time of data collection. Check points were installed at all cities' entries depriving the population from easy access to and from the cities and between villages. This had strongly affected travel time to health centers. The study period was also characterized by high unemployment rates, which would have affected respondents' incomes and their appreciation of the value of 'Time'; some respondents said that they were willing to wait and not to pay because they had nothing else to do, except for being at home. Given that this situation had persisted for a long time before the beginning of the study, it can be considered that this has become the 'normal' living standard.

Finally, it would be interesting to compare our results from the Weibull parametric modeling with those from less restrictive non-parametric survival models; e.g. piece-wise models. These can also be used to analyze continuous WTP data using our theoretical framework without being restricted to an underlying functional form. This was left for further investigation.

Cost-recovery policies were introduced in health care systems of developing countries as an attempt to supplement government's budgetary resources for the health sector and to motivate users to better exercise their 'consumer sovereignty' in their relationship with health care providers (McPake, 1993; Gilson, 1997). Since their initiation, these policies have remained a matter of controversy about their impact on both efficiency of health care systems and equity in access to health care (Gilson and McIntyre, 2005). Experience clearly suggests that the introduction of user fees may have a quite different impact according to different income classes (Chernichovsky and Musook, 1986; Ellis *et al*., 1994; Sauerborn *et al*., 1994). Moreover, it is worth to note that the circle of raising revenues from a price increase associated with a quality improvement does not always go hand in hand in many developing countries, especially when the entire health services are in need of an overhaul. In addition, one should not undermine all the difficulties to be encountered by any systemic change and mainly the extra administrative burden that an implementation of a price discrimination policy would necessitate, in managing the system and in identifying eligible and ineligible (Gilson, 1997). Our study in Palestine not only confirms this point but suggests that assessing respondents' WTP values and identifying their determinants may be a way to inform pricing policies for health services while taking into account variability of both individual preferences and levels of income (Sauerborn *et al*., 1994; Gilson and McIntyre, 2005). This may contribute to clarify trade-offs between efficiency and equity issues in a way that goes beyond ideological *a priories*.

CONCLUSION

Demand and price-elasticity of quality-improved PHC were assessed using patients' WTP values for enhancing health care quality. Conceptual analysis of respondents' reactions to stated monetary valuation questions was used to model the demand function for quality-improved health care, using a parametric survival model. Results were consistent with economic theory and with our *a priori* expectations. It was argued that, continuous WTP data hold much more information relevant to demand modeling than simple descriptive analysis used in previous literature. Validating our approach could promote another potential application for CV method beside its use for monetary valuation of health benefits in cost–benefit analysis. Information about users' WTP values allows to justify (or not) the implementation of different quality improvements and furthermore, to help in elaborating optimal and successful pricing strategies for PHC services. The latter would integrate different income, social and demographic classes' own preferences and financial capacities in the decision-making process; hence, help to adjust public efficiency objectives on the equity dimension. Operational decision tools elaborated in developed countries should not be automatically and 'blindly' transferred to developing

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countries without conceptual and empirical adaptations. Developing countries are usually deprived from social security schemes and patients actually pay for a significant portion of medical services. They therefore may constitute a fertile field for CV with much less hypothetical bias and higher methodological validity. We conclude that the WTP approach is a potentially valuable tool with important potential applications for informing health care financing reforms. However, our study remains an exploratory one and more empirical research is required to ascertain the validity of CV as a reliable tool to assist in enhancing quality improvements for health care in developing countries.

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APPENDIX A

Selected attributes and their measurement scales are given in Table AI.

Table AI. Quality attributes and their corresponding measurement scales

Attributes	*Measurement Scale*
1. Geographical proximity	Very far, far, average, close, very close
2. Waiting time	Very long, long, average, not long, not long at all
3. Attitude of PHC center's staff	Excellent, good, bad, very bad
4. Being able to see the same doctor	Always, often, rarely, never
5. Being able to discuss her/his problem with the doctor and receive sufficient information about her/his health status and the prescribed treatment(s)	Multi-item *Likert*-scaling; continuous: range [20,100]. *Items*: 1. I stayed sufficient time with the doctor 2. The doctor explained to me my health problem 3. The doctor explained to me how to use the prescribed treatment(s) 4. The doctor explained to me what I should do to prevent (or not to complicate) my health problem in the future 5. The information was clear and sufficient
6. Being able to purchase the prescribed treatment(s) at the center	All, Some of Them, None
7. Chance of Recovery	Multi-item *Likert*-scaling; continuous: range [20,100]. *Items*: 1. I usually recover after being examined by the doctor of the center 2. Many times, I need to go to a private clinic to be re-examined by a better doctor 3. The doctor who examined me was a good doctor who knows what he is doing 4. Private doctors are more competent 5. In general, I prefer to go to private clinic

Note: Attributes 2, 4, 5 and 7 were used in previous health care monetary valuation studies (Ryan *et al*., 2001); attributes 1, 3 and 6 were included due to their relevance to our study context. Respondents were also asked to add other quality attributes that they consider of importance; however, these were not included in this analysis.

APPENDIX B

Summary of the valuation process including the WTP questions are given in Table BI.

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Table BI. The valuation procedure for the seven quality-attributes

Would you be willing to pay any amount of money (even small amounts like 1, 2, 3 or 4 NIS) more than what you already pay in order to …	● Benefit from a PHC center similar to this one and located 'Very close' to your home? ● Have a PHC center with a 'waiting time' that you estimate as '*Not long at all*'? ● Benefit from an '*Excellent*' attitude from the PHC center staff?			● Have a PHC center '*Very close*' to your home; ● Have a PHC center with a 'waiting time' that you estimate as '*Not long at all*'; ● Benefit from an 'Excellent' attitude from the PHC center staff;		
	● Be able to see the same health professional every time you come to the center?	'Yes' →	What is the maximum amount of money that you would be willing to pay, extra to what you currently pay, in order to …	● Be able to see the same health professional every time you come to the center;	● Knowing that this extra amount of money will be paid at every coming visit? →	Payment card
	● Be able to stay sufficient time with the doctor to discuss with him your health problem, receive sufficient and clear information about your disease and the prescribed treatment(s)? ● Be able to find the prescribed treatment(s) 'always' available in the center?			● Be able to stay sufficient time with the doctor to discuss with him your health problem, receive sufficient and clear information about your disease and the prescribed treatment(s); ● Be able to find the prescribed treatment(s) 'always' available in the center;		
	● Be examined by more competent doctors and to have a higher chance of recovery?	'No' →	Why?	● Be examined by more competent doctors and to have a higher chance of recovery;		

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