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Attributing a monetary value to patients' time: A contingent valuation approach

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ABSTRACT

It is hard to ignore the importance of patient time investment in the production of health since the influential paper by Grossman (1972). Patients' time includes time to admission, travel time, waiting time, and treatment time and can be substantial. Patients' time is, however, often ignored in economic analyses. This may lead to biased results and inappropriate policy recommendations, which may eventually influence patients' health, wellbeing and welfare.

How to value patient time is not straightforward. Although there is some emerging literature on the monetary valuation of patient time, an important challenge remains to develop an approach that can be used to monetarily value time of patients not participating in the labour market. We aim to contribute to the health economics literature by describing and empirically illustrating how to monetarily value the time of patients not participating in the labour market comprehensively, using the contingent valuation method. It is worth noting that our method can also be applied to people participating in the labour market.

This paper describes the development of the contingent valuation survey. We apply our survey approach to a sample of 238 Dutch patients not participating in the labour market: n = 107 Radiotherapy department (data collected between November 2011 and January 2013); n = 44 Rehabilitation department (March 2012–May 2012); n = 87 Orthopaedics department (January to June 2013). Results show that those patients value waiting time the highest (€30.10 per hour) and value travel and treatment time equally with respectively €13.20 and €13.32 per hour.

This paper encourages future empirical research refining and applying the developed survey methodology to create more data on how other subgroups of individuals value their patients' time.

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1. Introduction

Time is a scarce resource and plays an important role in the economic literature, see for instance the seminal work of Becker (1965) and the paper of De Serpa (1971). Both authors emphasize that individuals use market goods and time to produce commodities that enter the utility function and that the level of utility that can be achieved depends on the time that is allocated to produce these commodities. They state that the available amount of time is a constraint for achieving higher utility levels. Consequently, individuals have to decide on the allocation of their own time to the production and consumption of commodities (De Serpa, 1971).

The importance of time investment in the production of health was demonstrated by Grossman (1972). His theory of demand for health uses the production function model of consumer behaviour developed by Becker (1965) to describe the relationship between market goods and time (labeled as 'health inputs') and health as output. Clearly, medical care is one of the market goods that can be used to produce health. For instance consumers may use general practitioner (GP) visits *and* their own time for visiting the GP to improve their health.

Patient time uses related to medical care consumption include time to admission, travel time, waiting time and treatment time. Time to admission can be defined as the time between the first referral and the moment that the treatment actually starts. Travel time is defined as the time that a patient needs to travel between

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the place where the patient lives and the medical care centre where the patient is treated. Waiting time is defined as the time that the patient waits at the health centre before treatment. Treatment time is defined as the time spent receiving the active treatment e.g. by a doctor, nurse or technician. Time to admission differs from the other types of time. In principle when the patient is waiting to be invited for treatment he can use that time to do other things which is not true for the other types of time. Waiting for access to treatment might however involve various degrees of psychological burden for patients (Vermeulen et al., 2005; McCormick et al., 2006) or those who care for them (Claar et al., 2005).

In the area of economic evaluations of healthcare interventions, the valuation of patient time is a topic of debate; see Ernst (2006) for an overview of the conceptual issues involved in the valuation of patient time for economic evaluations. It has been argued that ignoring time in cost-effectiveness analysis (CEA) can bias the results, especially when time costs are substantial. For instance, Russell (2009) investigates the effects of patient time in smoking cessation interventions on CEA results. She shows that, for some interventions, taking into account patient time does not affect the results of CEA, whereas, for others, it invalidates the results. For instance, in the case of group intensive counseling without nicotine replacement for smoking cessation, costs per quality-adjusted life-year (QALY) were substantially higher after inclusion of patient time. In contrast, in the case of full counseling by a physician without nicotine replacement for smoking cessation, inclusion of patient time did not increase the costs per QALY as much. Also, inclusion of patient time substantially changed the cost per QALY of screening colonoscopy and self-monitoring of blood glucose (Russell, 2009). Whether or not as well as how to include and value patient time could therefore influence resource allocation decisions via the results of economic evaluations and may even ultimately influence patients' welfare.

How to value patient time is not straightforward (Russell, 2009). Various methods are available to value patient time monetarily. In the case of patients with paid jobs, one could use the opportunity cost methods and use patients' wage rate to value their time (e.g. Borisova and Goodman, 2003; Russell, 2009). In the case of patients not participating in the labour market, valuation of patient time is more complex. Patient groups not participating in the labour market include older (retired) individuals, housewives and -men, and people of working age who are not able to work because of health problems. These subgroups are a substantial part of the demand for care in the healthcare market. Although one could consider using patients' reservation wages to value their time, this seems an imperfect solution especially for the retired and people of working age who are not able to work because of health problems (Russell, 2009).

An important challenge is to develop an approach that can be used to monetarily value time consumed while undergoing medical treatment of people not participating in the labour market. Preferably the approach should not be too complex. We propose to use the contingent valuation method, as this method uses surveys to measure individuals' monetary valuation of hypothetical situations (O'Brien and Gafni, 1996). The advantage of this method is that it can be used to value welfare implications in the absence of a market (Propper, 1995), or via hypothetical situations in anticipation of medical innovations. The method is also less demanding for respondents than for instance discrete choice experiments (Van den Berg, 2005). It is worth noting that our method can also be applied to people participating in the labour market.

Ideally the developed methodology involves a comprehensive valuation of patient time. This means that it can be applied to various types of patient time, e.g. time to admission, travel time, waiting time and treatment time. So far other studies have focused on a particular type of time and we aim to contribute to the health economics literature by developing a comprehensive method to monetarily value patient time.

In this paper we describe the development of the contingent valuation. The contingent valuation can be used to monetarily value hypothetical situations in the absence of a market. It does so by framing scenarios which respondents are asked to imagine. Subsequently, respondents are asked whether or not they are interested in a given scenario (hence indicating the individual preferences toward this scenario). If they indicate they are interested, they are asked to state their maximum willingness to pay for the preferred scenario or their minimum willingness to accept if they are forced to have a non preferred scenatio (monetary values) (Mitchell and Carson, 1989; O'Brien and Gafni, 1996). This paper uses willingness to pay as it is about reductions in time (i.e., assumed to be a preferred scenario). The willingness to pay reflects the monetary value of patient time according to the contingent valuation method. As it is based on hypothetical willingness to pay it is followed up by a "certainty question" and respondents who are not certain about their willingness to pay are not counted which was found to reduce the effect of the situation being hypothetical (hypothetical bias) (Blumenschein et al., 2001, 2008).

This paper also presents the first empirical results of applying the developed survey methodology in a sample of patients not participating in the labour market. Data was collected in three departments of two Dutch hospitals: Radiotherapy, Orthopaedics, and Rehabilitation. They were chosen because the medical treatment of all subgroups involved a substantial amount of patient time and because a substantial number of patients were expected not to participate in the labour market.

2. Institutional context and the contingent valuation survey

The enactment of the Health Insurance Act in 2006 reformulated the Dutch health insurance system in a manner according to the principles of managed competition (Enthoven, 1978; Enthoven and Van de Ven, 2007). Under the Health Insurance Act, all citizens are required to be covered by private health insurance and all health insurers are required to accept all applicants during an annual open enrollment period. Coverage is financed by a combination of community-rated premiums, which are set by insurers, and income-related contributions set by the government. In addition, the new system includes a risk equalization mechanism to counteract incentives for risk selection (stemming from community rated premiums) with the goal of ensuring a level playing field for health insurers. Insurance products must cover a legally defined package of basic benefits, though the reform legislation gives insurers flexibility to design their products to better appeal to consumers and the ability to selectively contract with health care providers.

In this system, health insurers might be able to influence the length of different components of patients' time input. For instance, if health insurers believe that shorter waiting time for service in some providers is a reflection of consumers' preferences in favour of these providers, they could allocate extra money to these providers enabling them to increase capacity and therefore reduce waiting times. They might also contract health care providers with shorter waiting times (defined as time to admission and time spent in the waiting room). Also in case of travel time insurers could play a role. They seem increasingly supportive of, for example, hospitals which open specialized treatment centres in the community to facilitate access to treatment of older individuals. Another example relates to severely ill people as it is quite common that health insurers have contracts with taxi companies to reduce travel time and the discomfort associated with travel time. More generally, health

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