

Construction Of The Contingent Valuation Market In Health Care: A Critical Assessment

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Abstract:

Contingent valuation is becoming more widespread in health care. However, it has been criticised for being too hypothetical, with resultant willingness-to-pay values being subject to either 'hypothetical' or 'strategic' bias. That is, the *expressed* values bear no relation to the *actual* values held by the respondent and are thus invalid for use in cost-benefit analysis.

The key to these sources of bias is how realistic and believable the contingent market is. This is dependent upon the construction, specification and presentation of the commodity being valued and the market context in which it is valued, including issues of specifying the characteristics of the commodity, the impact of uncertainty and the payment vehicle involved.

This paper presents a review of five key aspects in construction of the contingent market, and reviews how health care studies conducted between 1985 and 1998 have approached this issue. It is concluded that studies have not performed well in constructing, specifying and presenting the market and thus hypothetical bias cannot be ruled out.

2. INTRODUCTION

Contingent valuation (CV) is a means of assessing the monetary value of the benefits of a commodity that is not available in the market. This involves constructing a hypothetical market for that commodity and asking individuals directly the maximum amount they are 'willing-to-pay' (WTP) to have the commodity in question¹.

Interest in the use of CV for the measurement of benefits in health economics is a recent phenomenon (Diener et al, 1998)². In contrast, CV has been extensively used and developed over the last 50 years in the fields of environmental and transport economics³, where considerable methodological development has occurred and its routine use for valuing non-marketed commodities adopted.

However, a significant criticism of the CV method is that it elicits hypothetical answers as a necessary result of the hypothetical survey situation; often termed 'hypothetical bias' (Diamond & Hausman, 1993). CV surveys are conducted because the commodities being valued are not available in the market, and as such are either unfamiliar, or are presented in unfamiliar circumstances. Thus, individuals have no experience of the commodity, or, potentially, close substitutes, and therefore have little or no underlying information or preference upon which to base their decision concerning its value. In this case WTP "represents a guess as to what the commodity might be worth, rather than an evaluation based on experience" (p13, Diamond & Hausman, 1993). A related criticism is that a hypothetical survey allows a respondent to *deliberately* give a WTP amount that differs from their true WTP amount (conditional on the perceived information) in an attempt to influence the provision of the good and/or the respondents level of payment for the good; termed 'strategic bias' (Mitchell & Carson, 1989).

Since CV requires respondents within a survey to consider the contingency of an actual market existing for a commodity and reveal the maximum they would be WTP to purchase that commodity, this means that in practice the market context within which the commodity is offered and valued is fundamental to the veracity of the WTP results. The contingent market must therefore be realistic, but not likely to elicit strong preferences due to its contextual features. Factors of most importance in constructing and presenting the contingent market are: (i) how the information is gained and presented; (ii) type of payment vehicle used to express WTP; (iii) whether the commodity is valued under uncertainty; (iv) over what time period it is valued; and (v) how the survey is administered.

The purpose of this paper is to consider issues in the construction, specification and presentation of the contingent market and critically appraise the conduct of CV studies conducted in health care with respect to the five factors outlined above. Following this introduction, Section 2 briefly reviews the nature of hypothetical bias. Section 3 describes the method for selecting the CV studies reviewed, and Section 4 then provides the results of this review. The paper concludes with a discussion in section 5.

¹ Or the minimum amount they would be 'willing-to-accept' in compensation to be deprived of it. However, among the various theoretical measures which exist (see O'Brien and Gafni, 1996 for an overview), WTP is the most widely applied and all but one of the studies in health care reviewed here (Lindholm et al, 1994) adopt it.

² The first WTP study in health care is widely acknowledged to be one assessing the valuation of reductions in risk from mobile coronary care units (Acton, 1973). However, from then there were only another four studies conducted prior to 1990 (Thompson 1984, 1986; Berwick and Weinstein 1985; Reardon and Pathak 1989).

³ Carson et al (1993), for example, list over 1,400 contingent valuation studies conducted in environmental economics since 1964.

3. DEVELOPING THE CONTINGENT MARKET: ATTITUDINAL VERSUS BEHAVIOURAL SURVEY

“I see that saying and doing are two different things, and hereafter I shall better observe this distinction” (John Bunyan, The Pilgrim’s Progress)

John Bunyan recognised the importance of the distinction between *saying* and *doing*, which might more formally be constructed as the distinction between *attitudes* and *behaviour*. Economists have long recognised that to observe that someone likes a Mars Bar, and even states that they intend to eat it, is not the same as them actually purchasing and eating it. It is only when the individual *actually* eats it that the link between intent and behaviour can be made (ie their preference ‘revealed’). There is a considerable amount of evidence concerning consumer purchasing anticipations and new product launches which supports the view that market prediction is unreliable (Kemp and Maxwell, 1993). Behaviour is ultimately what is observed, and it is argued that it is a long road from intent to acting out that intent (Bishop & Heberlein, 1986).

However, although a hypothetical question *will* yield a hypothetical answer, that does not mean it is not of any use in public decision making. The critical aspect is whether the survey generates ‘formal’ or ‘substantive’ hypotheticality. ‘Formal hypotheticality’ arises from *attitudinal* surveys, of the sort used in opinion polls, that commonly contain phrases such as ‘imagine’, ‘what if’ and ‘suppose’, which suggest to respondents that the choice they are offered is of little *real* consequence. Such surveys mitigate against obtaining an economically meaningful response to the WTP question. In contrast, ‘substantive hypotheticality’ arises from *behavioural* surveys where, although the respondent knows that they are not *actually* at that point being asked to pay, the situation is *realistic* enough for them to believe that this *could* happen. This involves simulating a plausible real-life situation with sufficient possibility that respondents take it seriously. This too tackles ‘strategic bias’, where the problem is to make the exercise *sufficiently* realistic to elicit truthful values, but not *too* realistic to elicit ‘free-riding’ behaviour (Mitchell & Carson, 1993). In essence, if a well-constructed *behavioural* survey is used, people will try to oblige with honest answers to the best of their ability (thus generating only substantive hypotheticality). Whilst these may not *exactly* match actual behaviour in a market, they are the best indication of the individual intent and value of the programme.

This distinction is important as the CV survey is used as, and should therefore be *designed* to be, a *behavioural* survey, not an *attitudinal* survey. If the CV survey is constructed (deliberately or accidentally) to be *attitudinal*, then two key problems will arise.

First, whenever scenarios⁴ fail to provide information about factors of importance, respondents fill these ‘information gaps’ with default assumptions (ie guesses) concerning the likelihood of the programme working, what happens if the programme does not work, what substitutes might be available and how long or often they might have to pay for the programme (Fischhoff and Furby 1988). Such interpretation about key issues in the programme being valued “render a CV study’s estimates *uninterpretable* because there is no way of knowing what they were buying [and] even if this was known, it would differ from one respondent to another” (Mitchell & Carson 1993, p13 (emphasis added)).

Second, a clearly defined scenario is required to ensure ‘economic validity’ of the results, as a key axiom of economic theory is that as the characteristics of a good change so the value of it will, *ceterus paribus*, change. If the programme is described vaguely it is to be expected, therefore, that WTP responses are vague, and thus, for example, insensitive to the scope of the programme offered.

⁴ By scenario we are referring to the attributes of the commodity (ie health and non-health benefits and side-effects) and other features of the market, such as payment vehicle, diagnosis, and WTP question.

The importance of the description and presentation of the market cannot, therefore, be over-emphasised in creating a behavioural, as opposed to attitudinal, survey. Mitchell & Carson (1993) stress that “only questions that create a realistic market for a precisely defined good can measure the type of income-constrained behavioural intention information suitable for use in economic analysis” (p10). Attitudinal surveys only vaguely describe the commodity, the benefits derived from it, how it is to be paid for and over what time period. Thus WTP results based on attitudinal surveys lack validity as there is no clearly defined good or necessary market context for a meaningful valuation - these are left to the respondents imagination. It is vital that the CV survey is behavioural in design, seeking to measure an intention to pay for a specific programme, with specific attributes, in a clearly defined fashion, as “the description of the good and the market context together comprise the conditions on which the willingness to pay decision is contingent” (Mitchell & Carson, 1993: p10). This requires the survey to ensure that respondents: (i) clearly understand the characteristics of the commodity to be valued and the context in which it is offered; and (ii) find this market situation plausible. There are several key factors in achieving this, which are discussed in detail in Section 4, after presenting the method for selecting papers reviewed.

3. METHOD FOR SELECTING PAPERS FOR REVIEW

Papers were reviewed which reported from CV surveys of health care programmes or of dimensions of health published during the period 1985-1998⁵ (see Appendix 1 for full listing). The selected papers were identified from three sources. First, a computerised bibliographic database search of MedLine and EconLit was conducted for papers written in English. The search was conducted using keywords (singularly and in combination with health and health care), as follows: contingent valuation, willingness to pay, willingness to accept, and cost-benefit analysis. Full details, including abstracts, were downloaded and reviewed for appropriateness and relevance to this review.

Second, during the review of these papers (once collected) any which looked to be of importance, and had been neglected by the above review, were noted and ordered.

Third, once the complete list of empirical studies was decided upon, this was sent to four main authors in this area (Cam Donaldson, Magnus Johannesson, Bernie O’Brien and Mandy Ryan) who were asked to identify whether all relevant papers of their own had been included, and whether they were aware of any other papers, not on the list, which they thought should be included in the review.

3.1. Exclusion criteria

Four ‘exclusion criteria’ were applied. First, those papers which did not report the results of a survey. The majority of papers found in the review did not report from any specific WTP survey conducted, but addressed methodological or theoretical issues which could be of relevance to health. Second, papers which reported on a survey more extensively reported in other publications already included (Miedzybrodzka et al 1994, 1995; Johannesson 1992a, 1992b; Tambour and Zethraeus, 1998; Zethraeus et al, 1997, Anderson et al, 1997). Third, papers which reported from surveys on WTP for the size of the health care sector (Eckerlund et al 1995) or the value of reduced waiting time (Johannesson et al 1998, Propper 1990). These papers made no reference to any health *outcomes* nor to any health care *programmes*. Fourth, papers which were tangential to survey-based specific WTP, particularly those considering conjoint analysis (e.g. Ryan 1997), were excluded as this method does not explicitly ask for a monetary value, but implies such values indirectly.

Following this procedure, 71 papers were identified and reviewed.

⁵ Unfortunately, pressures of time meant that WTP studies published in 1999 could not be reviewed.

5. THEORY VERSUS PRACTICE: KEY ISSUES IN THE DESIGN OF CV STUDIES AND THEIR APPLICATION IN HEALTH (CARE)

4.1. Scenario Construction and Presentation

If the scenario is not constructed and presented ‘correctly’ then the validity of the measure is in question regardless of subsequent measurement issues (Mitchell and Carson, 1989, 1993). Critical to this is how the information expressed in describing the commodity is obtained, and how the market is described to respondents.

First, information concerning the commodity to be valued must be obtained, which may be from, for example, research literature, discussions with users, or a relevant profession. This stage in the CV survey is vital, as information derived from these sources will determine the range of attributes of the commodity which are considered to be important, as well as the *relative importance* of these attributes. These depend crucially upon where and how this information has been gathered. Health professionals, industry representatives, current users, ex-users, etc. will all bring a slightly different perspective to the relative desirability of the commodity, the attributes which result from that commodity and the relative value of these attributes. It is therefore important that a range of views is assessed in the building up of a ‘picture’ of the commodity, which may best be achieved through the use of ‘focus groups’ or ‘delphi panels’, where a broad spectrum of individual views may be explored (Smith & Dobson, 1993).

Second, the market must be congruent with the actual decision context the researcher will be using the values for (Ajzen and Fishbein 1977; Kahneman et al, 1993). This means the *features* of the market, such as what is being purchased, who is going to provide it and how it will be paid for, must be clearly understandable and believable.

Simply because the researcher *thinks* they have correctly specified the scenario does not mean that the respondent *understands* it as the researcher supposes: the scenario must be communicated clearly (Mitchell and Carson 1993). Important issues in this include: (i) use of scientific words, or technical terms, which may be understandable by the researchers, but not understood, or misunderstood, by the respondent; (ii) cognitive overload in presenting too much detail; and (iii) insensitivity to leading wording or phrasing⁶. It is well known that even apparently ‘irrelevant’ changes in wording of the question (from the perspective of normative theory) can produce substantial changes in the valuation of those scenarios (eg Schoemaker 1982; Tversky & Kahneman, 1981; McNeil et al, 1982; Gerard et al 1992; Smith & Dobson, 1993; Jones-lee, 1989). The essential problem with scenario development, in terms of framing and labelling effects, is summed by Schoemaker (1982), who stated that it “is inherently a subjective matter, subject to only limited normative evaluation. Indeed, there exists no general normative theory as to how problems should be defined, or how language and context should be encoded” (p556). The NOAA Panel in particular recognised the importance of making scenarios understandable and believable, recommending a “high standard of richness in context to achieve a realistic background” (NOAA, 1993, p4608).

Due to these problems there is some argument that only those who have experienced the good should be assessed [ref]. However, these authors would agree with Mitchell & Carson (1993) that “prior experience with a good is not required, as some have argued, for respondents to understand its characteristics. While it is often easier to describe a good to a respondent who has had experience with it, this is not always the case.” (p18). Within health care, of course, an additional problem is that it may be difficult to find sufficient people who have experienced the good. The debate thus becomes one of degree; that one ‘framing’ of the commodity is ‘better’ than another.

⁶ It has also been suggested that pictures or diagrams best enable the good to be understood, rather than words (Appel et al, 1990; Miller & Guria, 1991; Thompson et al, 1984).

However, notwithstanding this, the degree of information required to adequately describe the programme, its context and the market within which it is offered may impose a significant cognitive burden on respondents. For this reason the researcher must endeavour to minimise the information which is needed, and communicate it in a clear and concise manner. The first may be achieved with extensive pre-survey assessment of relevant factors. The second through following several techniques which have been used successfully including: use of simple language, elimination of unnecessary words, and logical sequence of presentation of material; interspersing the narrative with questions to involve the respondent; using face-to-face interviews; careful training of interviewers to read material at appropriate pace, use of conversational inflection, pauses and eye contact; and use of various visual display items (Mitchell & Carson, 1993).

4.1.1. Health Care Studies

In terms of the (apparent) process undertaken to construct the scenario concerning the commodity being valued, 80% of the studies reviewed (57/71) did not provide *any* information on where information concerning the commodity was derived. This is a concern as the scenario, and the information upon which it is based, determine precisely what is being valued. Of the remaining 14 studies, three had scenarios based on information derived from a focus group or delphi panel (to develop a ‘consensus’ view on the attributes of the commodity), and ten were based purely on the researchers own interpretation (including information gained from literature) of the attributes of the market. One study had information based on a combination of researcher and expert opinion. Thus, out of 71 studies we can only say for sure that three (4%) used information from those who have experience of the commodity.

One reason for the large number not using focus groups to develop the scenario may be that over 65% (47) of studies sampled current or past *users* of the commodity for their WTP. Table 1 supports this hypothesis, showing that the majority of those studies where scenario development is unavailable were ones sampling users (40/56). It might be inferred from this that these studies considered it unnecessary to develop a full scenario outlining the characteristics of the commodity as it was assumed that those giving their WTP would have experience of it and therefore be able to make such a judgement based on their own experience rather than requiring it to be described. As discussed above, this is a contentious view, and these authors would argue that there is a need to determine the attributes being valued across respondents otherwise we cannot be sure that all are valuing the ‘same’ commodity. Furthermore, there are still 16 studies not sampling solely users who did not provide any information on scenario development. Of most concern, however, are the 10 studies which were developed solely by the researcher, especially as five of these were used for assessing values from non-users.

Table 1: Scenario Development by Response Type

| RESPONSE TYPE | SCENARIO DEVELOPMENT | | | | N/A | Total |
|--------------------|----------------------|------------|-----------|---------|-----|-------|
| | Expert | Researcher | Focus grp | Mixture | | |
| Users | | 5 | 2 | | 40 | 47 |
| Convenience sample | 1 | 3 | | | 8 | 12 |
| General pop | | 1 | | 1 | 7 | 9 |
| User+conven | | 1 | | | | 1 |
| User+genpop | | | | | 1 | 1 |
| Conven+genpop | | | 1 | | | 1 |
| TOTAL | 1 | 10 | 3 | 1 | 56 | 71 |

With respect to presentation of the scenario in the paper, 44% (31/71) of studies presented all elements of the scenario, which is encouraging. Of those who did not, there was a roughly equal split between those providing diagnosis only (10/71), those providing the diagnosis and the WTP question (11/71) and where none of this information was available (13/71). Only six studies

presented just the WTP question.

Overall, that 13 studies were found where none of this information is available is some cause for concern, although over time the reporting of these elements has improved, as indicated in Table 2, with a greater proportion of studies presenting full scenarios.

Table 2: Scenario Presentation by Publication Period

| PUBLICATION PERIOD | SCENARIO PRESENTATION | | | | | TOTAL |
|--------------------|-----------------------|--------------|----------------|----------------|---------------|-------|
| | Scenario presented | WTP question | Only diagnosis | WTP qst +diag. | Not available | |
| 1985-98 | 1 | | 3 | 2 | 2 | 8 |
| 1990-93 | 5 | 2 | 2 | | 5 | 14 |
| 1994-96 | 9 | 2 | 5 | 1 | 4 | 21 |
| 1997-98 | 16 | 2 | | 8 | 2 | 28 |
| TOTAL | 31 | 6 | 10 | 11 | 13 | 71 |

WTP studies conducted in health care thus contain two significant problems: (i) the reader is unable to assess where the information concerning the attributes of the commodity being valued was derived from, and thus cannot place any confidence that all important and relevant dimensions have been covered⁷; and (ii) much of the information concerning attributes and the contingent market itself is not available from the information provided in the papers. We have no way of determining whether the information was presented to respondents in a ‘clear and concise’ fashion, and was made understandable to them, and therefore cannot rule out the possibility of hypothetical bias.

4.2. Payment Vehicle

Payment vehicle refers to the manner in which the WTP payment is to be made in this hypothetical market. Amongst the more common payment vehicles are direct out-of-pocket (OOP) expenditure, taxation, and private insurance premia. Evidence shows that WTP values derived for particular commodities are not neutral (respondents are not indifferent) to the payment vehicle employed to elicit this hypothetical payment (see, for example, Randall et al, 1978; Rowe et al, 1980; Brookshire et al 1980, 1981; Daubert and Young, 1981; Greenly et al, 1981), and an inappropriate choice of payment vehicle may therefore lead to strategic bias (for example to avoid paying additional taxes) or hypothetical bias (an unrealistic contingent scenario, such as purchasing high technology health care OOP).

It is therefore appropriate to see the payment vehicle as forming a part of the market context, as inextricably linked to the programme being valued, thus implying that there is no ‘one’ value for a commodity, but a series of values all dependent upon the particular payment vehicle used (Cummings et al, 1986; Rowe et al, 1980). However, although a plausible scenario offers a way of paying for the programme that seems ‘reasonable’ to respondents, they won’t necessarily like it, leading to possible ‘protest votes’. This, it has been suggested, might be addressed by informing respondents that they will not actually be expected to make such a payment [ref], and so the vehicle does not matter. However, this invalidates the CV survey results, as it compromises the behavioural design and generates a largely attitudinal survey at substantial risk of strategic bias, thus creating ‘formal’ hypotheticality. The possibility of ‘protest votes’ should be addressed as a separate issue, rather than compromising the integrity of the contingent market upon which the WTP results rest.

Within health economics there is some debate concerning which payment vehicle is appropriate, with

⁷ Although we might say with confidence, however, that virtually none of the studies conducted any extensive assessment using focus groups or delphi panels to canvass views on the attributes of important, and pilot testing of the scenarios was not conducted, as far as we could tell, for any study.

some arguing that insurance premiums should be used as health care is a good which yields ‘option’ value in an *ex ante* situation (Birch, 1993), whilst others have argued for different vehicles (Donaldson et al, 1995). Which is most suitable will undoubtedly depend ultimately upon the context in which the questions are being asked, differing across cultures, countries and products (eg insurance perhaps more suitable for high technology items, or expensive low probability items, but OOP payment, in the form of a co-payment, for more consumer based products, such as pharmaceuticals (Drummond et al, 1997))⁸. Mitchell and Carson (1993), for example, recommend that one which is currently used for paying for the commodity, or a similar programme, be used. Of utmost importance is perhaps that studies specify the vehicle explicitly and clearly, and that this is seen to be based on what will be most realistic to respondents, clarified perhaps in pilot analyses.

4.2.1. Health Care Studies

Studies were classified according to the following payment vehicles: (i) out-of-pocket (OOP); (ii) taxation; (iii) private insurance; (iv) voluntary donation; (v) combinations of these; and (vi) not available. As reported in table 3, the most frequent payment vehicle was OOP (59/71 studies, or 83%). Studies using multiple vehicles are those where multiple commodities are valued, and as such may be effectively excluded from analysis, suggesting that taxation was the only other form of payment.

Given this, tables 3 and 4 cross-tabulate payment vehicle with two possible influencing factors of country where the study was conducted and whether the study seeks to address use, option or externality value.

Table 3: Payment Vehicle by Country

| Payment vehicle | COUNTRY | | | | | Total |
|-----------------|---------|----|--------|--------|-------|-------|
| | USA | UK | Sweden | Canada | Other | |
| Out of pocket | 13 | 25 | 4 | 9 | 8 | 59 |
| Tax | | | 2 | 2 | | 4 |
| tax+voldon | | | | 1 | | 1 |
| oop+tax+insur | 1 | | | | | 1 |
| not available | 1 | 1 | | 1 | 1 | 4 |
| Oop+tax | 1 | | | | | 1 |
| oop+insur | | 1 | | | | 1 |
| Total | 16 | 27 | 6 | 13 | 9 | 71 |

Table 3 shows that, contrary to what we might expect, there seems to be no use of tax payments in the UK and that insurance, despite recommendations referred to in the introduction, does not really figure in any country.

Table 4: Payment Vehicle by Type of Value

| Payment vehicle | different types of value | | | | | Total |
|-----------------|--------------------------|--------------|---------------|------------------------|-----|-------|
| | use value | Option value | Externalities | option & externalities | N/A | |
| Out of pocket | 36 | 6 | 1 | 5 | 11 | 59 |
| Tax | 2 | | | 2 | | 4 |
| Tax+voldon | 1 | | | | | 1 |
| Oop+tax+insur | | | | 1 | | 1 |
| Not available | 2 | 1 | | 1 | | 4 |
| Oop+tax | | | | 1 | | 1 |
| Oop+insur | | 1 | | | | 1 |
| Total | 41 | 8 | 1 | 10 | 11 | 71 |

⁸ Also influenced by how risk and uncertainty are approached, as discussed in Section 4.3..

The interest of table 4 is that of eight studies looking to explicitly determine option value, six assessed this using OOP payment and not insurance or taxation. There seems to be some confusion in the conduct of studies judging from these results.

4.3. Incorporating Uncertainty And Risk

The incorporation of probability in the contingent market will be expected to partly determine the value of that commodity, since it is well documented that individuals are generally not risk-neutral. Thus, part of the WTP value will be to avoid (if risk averse) the risk involved (that is, valuing those commodities with a greater probability of success more than those with a lesser probability, *ceterus paribus*). It is therefore of concern to determine the relative appropriateness of specifying benefits with certainty or risk.

Probability may be incorporated at two levels. First, in *ex-ante*, versus *ex-post*, valuation of the commodity. Arguments that probability should be a feature of the contingent market have been largely based on the view that expected-utility theory requires *ex-ante* valuation, implying that respondents *may* require this commodity (Birch, 1993). If this is the case, then the value primarily being determined is 'option value'. There are two issues to resolve here. First, it may be that conceptually or politically there is a desire to have a valuation made for the benefits of the commodity *per se*, and not for one 'confounded' by risk, for *societal* decision-making. If so, then it would be appropriate to value the commodity with certainty and adjust for probability separately (thus preserving risk neutrality)⁹. In this case we would primarily be assessing 'use values' (which are likely, *ceterus paribus*, to be higher than option values, reflecting the consumption value to the individual of the benefits conferred by the treatment). Second, methodologically there is concern that respondents will misperceive, or deny, the risk and thus provide a higher or lower WTP accordingly. Evidence from environmental and transport literature suggests that respondents typically have difficulty facing changes in risk, particularly if those changes in risk are of a relatively small magnitude, resulting in their subjective assessment of the risk bearing little relation to the objective risk, meaning the objective probabilities cannot legitimately be employed (Miller & Guria, 1991; Jones-Lee et al, 1985; Thompson et al, 1982, 1984; Thompson, 1986; Mitchell & Carson, 1989; Viscusi & Magat, 1987). In addition, respondents will try to relate the objective risk presented to them to their subjective assessment of the risk. If the objective risk is perceived to be unrealistic they may provide invalid responses (Miller & Guria, 1991; Thompson et al, 1984; Mitchell & Carson, 1989). Furthermore, respondents may be so averse to risk that they exhibit 'general aversion' (Slovic et al, 1980; Kahneman & Tversky, 1979; Starr et al, 1976), where the individual will try to eliminate the general anxiety which accompanies risk and uncertainty by simply denying it altogether.

The second level where probability may be incorporated concerns the likelihood of the benefits of the commodity being received once it is consumed (irrespective of whether or not the respondent has been presented with certainty in requiring the treatment). Here we are considering the attachment of probabilities to the *outcomes* of the consumption of the commodity. It is likely that this probability will be both substantially higher than the one concerned with the chance of requiring the commodity, and thus perhaps overcoming the problem of levels of understanding. In addition, the valuation of attitude toward risk may well in such a circumstance be of relevance to the valuation of health care programmes¹⁰.

Although no strong guidelines appear to exist for incorporation of risk, these authors feel that incorporation at the second level outlined would seem reasonable and appropriate to health care decision making, as well as methodologically feasible and realistic, but that the first level does not.

⁹ Which is the approach generally adopted in estimating QALYs.

¹⁰ Note that expression of externality values, although of importance, is not, for reasons of length, considered here.

4.3.1. Health Care Studies

Fifty-one studies (71%) did not have any element of risk or uncertainty presented in the contingent market. Of the 20 studies which did, 12 presented risk in the context of *ex-ante* versus *ex-post* risk, and eight in terms of probability of the benefits derived from the commodity. Table 5 presents a cross-tabulation of the incorporation of risk tabulated with the type of respondent used. Thirteen studies used users and presented risk within the scenario. It is arguable whether a user will respond to the presentation of risk, and not simply place certainty on the equation given their status viz. the commodity in question.

Table 5: Risk/Problems in the Scenario by Respective Type

| RESPONDENT TYPE | RISK/PROBABILITY IN THE SCENARIO | | TOTAL |
|-----------------|----------------------------------|----|-------|
| | Yes | No | |
| Users | 13 | 34 | 47 |
| Conven sample | 4 | 8 | 12 |
| General pop | 1 | 8 | 9 |
| User+conven | 1 | | 1 |
| User+genpop | 1 | | 1 |
| Conven+genpop | | 1 | 1 |
| TOTAL | 20 | 51 | 71 |

Table 6 shows that out of eight studies concerned with option value, five did not present any risk or probability in scenario. This seems somewhat at odds with the theoretical argument that it is probability which generates option value.

Table 6: Risk/probability by type of value

| risk/prob in the scenario | Different types of value | | | | | |
|---------------------------|--------------------------|--------------|---------------|-----------------|-----|-------|
| | use value | option value | Externalities | Option & extern | N/A | Total |
| Yes | 8 | 3 | 1 | 6 | 2 | 20 |
| No | 33 | 5 | | 4 | 9 | 51 |
| Total | 41 | 8 | 1 | 10 | 11 | 71 |

4.4. Time Period Over Which WTP Is Estimated

There is little discussion within the literature (environmental, transport or health care) relating to the time period over which WTP values could, or should, be assessed. Yet the time period is important as it provides the foundation for the respondents budget constraint, and will be influenced by the respondents discount rate. Explicit specification of the budget constraint is required such that respondents are aware that a positive WTP means they will have less available to spend on other goods and services. If they are not, then their WTP may potentially be over-estimated (Johansson, 1995). Payment involving long periods of time presents issues of interpersonal comparison of discount rates. The discussion here concerns the budget constraint, although that of discounting is nevertheless an important one.

Typical time periods used within environmental and transport literature are ‘one-off’ payments for a commodity (invoking a ‘lifetime’ budget constraint), payments over a specified period (usually a year), or multiple payments over time (usually annually). However, there is no *a priori* reason to suspect that these measures (lifetime and present value of incremental time period WTP expressions) will yield equivalent WTP values, or even the same sign (Blackorby et al, 1984).

The ‘life-time’ model assumes that the individual will be free to borrow/lend any amount of money

required at the prevailing market rates. In contrast the ‘annual’ model assumes that the individual will be constrained by his/her ‘annual’ income, and will thus be unable to adjust consumption expenditure/borrowing over time. Under these conditions it can be shown that the (discounted) value of the sum of ‘annual’ WTP values will be less than the maximum ‘life-time’ WTP value (Johansson, 1995).

Appropriateness of time period depends upon two factors. First, whether the commodity being valued is *amenable* to payment on, for example, a yearly basis or can only be assessed as a one-off payment (a key factor here is the assessment of use versus option value, which reflects payment as a one-off versus insurance/tax premium). An additional factor is that respondents, in general, do not appear to feel any commitment to a multi-year payment beyond a couple of years, which negates the validity of this method (Mitchell & Carson, 1993; Bateman et al [ref]). Second, whether the *policy question* relates to such one-off payments or to annual payments. For example, it is clear that for a commodity to be funded by taxation (used as the payment vehicle), annual payment periods are more appropriate than one-off payments to the individual. We might conclude therefore that the appropriate time period is to be that which corresponds to the actual payment system invoked in the contingent market.

A final point is that it is possible that the *perceived* budget constraint differs from the *actual*, or the one the researcher wishes to invoke (Mitchell and Carson, 1989). Thus, it is recommended, for example by the NOAA Panel (1994), that the respondent should be made **explicitly** aware of their specific budget constraint, or the one which the researcher wishes to invoke. For this to be relevant the survey must also of course convey that provision of the commodity, and respondents’ WTP, might have actual financial consequences for the household. However, their budget constraint can only be *invoked over a specific time period*, with the time period therefore fundamental to the specification of the contingent market.

Thus, CV surveys should make the time period for the survey, and the appropriate budget constraint, explicit in the description of the contingent market, making it too a ‘part’ of the commodity being valued.

4.4.1. Health Care Studies

Studies were classified according to time periods of: (i) 12 months; (ii) 3 months; (iii) 1 month; (iv) 1 week; (v) lifetime; and (vi) per intervention (no time period, implying a one-off payment each time the commodity is used). From table 7 one can see that the majority of studies assessed WTP per intervention (36/71), as one-off payments each time the commodity is consumed. It is unclear if a time period is invoked here, as respondents may be viewing expenditure in terms of weekly, monthly or annual income, or may be considering what they could borrow over a life-time in order to consume the product. Out of the six studies **explicitly** invoking a budget constraint, three of those used a per intervention payment, two a per month payment and one a yearly payment. Thus only three of 36 studies seeking an open ‘per intervention’ payment reminded respondents of budget constraints, and therefore would imply a time horizon. Of those invoking a specific time period, the most frequent used was the one month time period, followed by the single year period. Few studies used any other period.

Table 7: Time period by payment mechanism

| Time period | payment vehicle | | | | | | Total | |
|----------------|-----------------|-----|-------------|---------------|---------------|---------|-------|-----------|
| | out of pocket | tax | tax+vol don | oop+tax+insur | not available | oop+tax | | oop+insur |
| 12 months | 8 | 4 | | | 1 | 1 | | 14 |
| 3 months | 1 | | | | | | | 1 |
| 1 month | 16 | | | | 1 | | | 17 |
| 1 week | 1 | | | | | | | 1 |
| Lifetime | | | | 1 | | | 1 | 2 |
| Per intervent. | 33 | | 1 | | 2 | | | 36 |
| Total | 59 | 4 | 1 | 1 | 4 | 1 | 1 | 71 |

Table 7 also shows that of the 59 OOP payment studies the majority (33) assessed value per intervention. All those assessed using tax (4) did so over 12 month period.

4.5. Mode of Administration

The market, once constructed and specified, has to be presented to respondents in a survey, and how this survey is administered can impact upon the nature of the WTP values obtained. As mentioned, use of face-to-face administration, utilising trained interviewers, assists in the ability to present a realistic scenario, and ensure respondents take the valuation exercise seriously. However, survey administration comprises a significant element of a CV budget. It is therefore often the target for cost-cutting measures in survey design, through use of smaller samples or less expensive survey methodologies, such as postal questionnaires. However, apart from the quality of the market specification, the quality of the WTP values are only as good as the effort put in to obtaining those values (Mitchell and Carson, 1993).

Thus, face-to-face interviews are the overwhelming recommendation (Mitchell and Carson, 1989, 1993; NOAA, 1994). These allow presentation of a considerable amount of information whilst maintaining respondent interest and attention, control of the sequence of information presented, and command seriousness for the situation encouraging the respondent to carefully consider their response and take the matter as of importance (thus reducing the potential for ‘hypothetical bias’). Indeed, “the superiority of in-person interviews is so large that a decision to use another mode of administration, such as telephone surveys, will usually need strong justification” (Mitchell and Carson, 1993, p28). Use of another technique for budgetary reasons, the authors continue, is a question of under-resourcing of studies, and not of the appropriateness of the administration technique.

4.5.1. Health Care Studies

Twenty-seven studies (38%) collected data from face-to-face interview. Of the remaining 44 (62%) who did not undertake face-to-face interview, eight used telephone interview, 16 postal self-administration and 18 other self-administration. The technique was not available for two studies. There did not seem to be any trend for mode of administration compared with questionnaire format or sample size. Studies therefore do not appear to follow recommended data collection by personal interview.

5. DISCUSSION

John Bunyan recognised the importance of the distinction between *saying* and *doing*. However, from the review presented in this paper, it cannot be concluded that those undertaking CV studies in health care do.

It has been argued that, since the WTP values drawn from a CV study are based on the characteristics of the market specified to respondents, the construction, specification and presentation of the market are fundamental to the 'validity' of the values obtained, and how they may be used. Key in this is the creation of a behavioural, rather than attitudinal, survey. However, the impression gained from reviewing 71 studies conducted in health care is that, overwhelmingly, they have failed in this. Overall, CV studies in health care may generally be judged as having performed poorly in the construction, specification and presentation of the contingent market. We cannot, therefore, reject the possibility of hypothetical and strategic bias invalidating results, casting doubt on the 'validity' of the WTP results and their use in assisting priority-setting.

These authors suggest that there are two factors that need addressing if this situation is to improve. First, those undertaking CV studies are increasingly basing their study design on those previously conducted in health care, thus perpetuating the problem. Second, compared with the relatively large scale, fixed and one-off nature of environmental or transport interventions (dams, airports and Automatic Train Protection Systems for example), commodities assessed in health care are more 'minor' within themselves leading to lower levels of resourcing, in time, money and personnel, and thus making the development of a robust CV market impossible.

It is therefore concluded that there is an urgent need for the development of rigorous, consistent, guidelines concerning the construction of the contingent market, including an acknowledgement of the resource implications of performing sound surveys, if such studies are going to become a useful addition to the economic evaluation 'toolkit'.

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APPENDIX 1: COMPLETE REFERENCE LIST OF 71 PAPERS REVIEWED

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