

Individuals' Validation of a Health Improvement – Is it Linear?

A quantitative and qualitative study of people's preferences regarding healthcare priorities

Veronica Gundersen



Master Thesis

Institute of Health Management and Health Economics

UNIVERSITY OF OSLO

May, 2008

PREFACE

The process of this master thesis started several months ago, in my internship at the National Institute of Public Health (August to October 2007), nevertheless, the main work was done between January and May 2008.

There are a number of people who are entitled to an acknowledgement. First of all, my sincere thank goes to my supervisor Professor Sverre Ole Grepperud at the Institute of Health Management and Health Economics, who patiently worked with me to the bitter end. His guidance, useful comments, and encouragement have greatly improved the quality of this thesis. Thanks to Erik Nord at the National Institute of Public Health in Oslo, for letting me take part in his research, and getting the chance to collaborate with him in my internship period. Last but not least, my profound thanks goes to all my respondents at the National Institute of Public Health, the Institute of Health Economics and Health Management, and the helpful students at Institute of Economics at University of Oslo, for taking off their useful time, and for providing me with all the necessary information I needed for this master thesis to be completed - without your help and useful responses, this thesis would not exist.

Veronica Gundersen

Oslo, May 2008

ABSTRACT

BACKGROUND: The intention of this thesis has been to investigate the functional form of the preferences for health – in particular whether or not the preferences for health are linear. The reason for this is because linear preferences for health (and health effects) is, according to authors in the field of economic evaluation, believed to be an assumption that underlies standard QALY analysis. Linear preferences can be said to imply two things: (i) that the marginal utility of additional health is constant. This means that the severity level in health before treatment will have no effect on the valuation of an additional unit of health (proportionality assumption), (ii) given linear preferences in health, individuals exposed to health risks will be risk-neutral meaning that they will be indifferent between two projects (a risky one and a non-risky one) with similar expected values.

METHODS: In this study, two groups of individuals were confronted with four hypothetical questions concerning choosing between competing treatments alternatives and competing insurance contracts, in order to reveal their preferences. The questionnaire was used among 33 employees at the National Institute of Public Health, together with 28 students at the Institute of Health Management and Health Economics, and the Institute of Economics. All questions were followed by a semi-structured interview.

RESULTS: In question 1, the respondents do not consider treatment potential as a crucial factor when asked to evaluate how strong desire for operation, in those who stand to gain only a little, compared to those who stand to gain more, even though there exist an mortality risk of 5 %. Furthermore, in question 2 and 3, the respondents were mainly concerned with avoiding the worst state, instead of maximizing individual benefit (treatment effect). Last, in question 4, equity concerns were revealed, and arguments about severity of illness were also identified. Overall, other factors, such as treatability, concerns for fairness, and goals in life were also emphasized.

CONCLUSION: Based on the questions given, it is difficult to draw any strong conclusions on whether or not preferences for health are linear, and also whether or not people show risk-averse behaviour.

Table of Contents

PREFACE	2
ABSTRACT	3
TABLE OF CONTENTS	4
1. STATEMENT OF PROBLEM	6
1.1 INTRODUCTION.....	6
1.2 RESEARCH ISSUES	7
1.3 MOTIVATION FOR STUDY.....	9
1.4 LITERATURE SEARCH	10
2. THEORETICAL FRAMEWORK	11
2.1 CONCEPTS OF UTILITY.....	11
2.2 RISK PREFERENCES	13
2.2.1 <i>Expected Utility Theory</i>	14
2.3 QUALITY-ADJUSTED LIFE-YEARS (QALYs).....	15
2.3.1 <i>Distributive neutrality</i>	16
2.3.2 <i>Proportionality</i>	17
2.3.3 <i>Mutual utility independence</i>	17
2.3.4 <i>Constant proportional trade-off</i>	17
2.3.5 <i>Risk neutrality on life-years</i>	18
2.3.6 <i>Additive separability</i>	18
2.4 CONCERNS FOR FAIRNESS	18
2.4.1 <i>Severity of illness</i>	20
2.4.2 <i>Realization of own health potential</i>	20

2.4.3	<i>Aversion to inequalities in health</i>	21
2.5	OTHER FACTORS	21
3.	RESEARCH METHODOLOGY	23
3.1	OBJECTIVES AND HYPOTHESIS	23
3.2	SAMPLE CHARACTERISTICS.....	23
3.3	INTERVIEW	24
3.4	QUESTIONS	25
3.4.1	<i>Question 1: Judgements of patients' desire for treatment</i>	26
3.4.2	<i>Question 2: Preferences for private insurance concerning quality of life</i>	28
3.4.3	<i>Question 3: Preferences for private insurance concerning life-years gained</i>	29
3.4.4	<i>Question 4: Preferences for increasing public hospital treatment capacity</i>	30
4.	RESULTS	31
4.1	QUANTITATIVE DATA	31
4.2	QUALITATIVE DATA.....	35
4.2.1	<i>General qualitative observations</i>	35
5.	DISCUSSION	41
5.1	GENERAL STUDY LIMITATIONS	46
6.	CONCLUSION	49
	TABLE OF AUTHORITIES	51
	APPENDIX: QUESTIONNAIRE	55

1. STATEMENT OF PROBLEM

1.1 Introduction

In proportion to the increasing demand for healthcare services, treatment capacity is limited and resources are scarce. Healthcare decision makers increasingly have to prioritize their expenditures to be as efficient as possible. New updates on technologies and services will complicate the process of decision making in determining which services to provide. Priority setting does not only take place in the healthcare sector, but is relevant for other sectors such as the educational sector and the welfare sector. In addition, the various sectors themselves compete for resources.

In order to ensure that healthcare resources are spent in the most appropriate manner, to accomplish maximum social returns and patient satisfaction, healthcare decision makers need to adopt a forceful process for setting priorities. Nevertheless, no matter what priority setting rule you apply, there will always be individuals that will be denied access to free healthcare services. The considerations are many - should the priority setting rule be based on age, the severity of illness, the degree to which treatment cures the disease, the cost-effectiveness ratios, socio-economic background, whether or not the patients brought the ill health on themselves (responsibility), or the degree of uncertainty associated with the predicted costs and outcomes?

What is desirable when it comes to setting healthcare priorities is widely discussed among scholars. In health economics, this debate mainly focuses on improving efficiency in the sense that the health gains, or the welfare arises from the same gains, are to be maximized for any given budget. This is done by choosing those healthcare technologies that have the lowest costs per health effect unit, or the value of each health effect unit. It follows that economists are concerned with both effects and costs when evaluating healthcare technologies. An important health economic perspective, at least in some parts of the literature, is that the preferences of those in need for healthcare services should be taken into account when prioritizing rules are set.

The Norwegian guidelines for priority setting in healthcare (see NOU 1997:18) present the following three criteria: (i) the severity of state (condition); (ii) the expected gains from treatment (effect); and (iii) the expected gains relative to costs (cost-effect). In addition, all resources consumed should be used in the most efficient way (cost-effectiveness). The guidelines do not say anything about what weight each of the three criteria should have. It is also noted that both criteria (ii) and (iii) are concerned with the effects from treatment – introducing a type of double counting of this dimension.

The economic literature generally refers to three different techniques that are used to evaluate healthcare technologies, and for which gains and costs are considered simultaneously; cost-effectiveness analysis, cost-utility analysis and cost-benefit analysis (Drummond et al. 2005). One of these, the cost-utility analysis, is concerned with valuing health effects according to the preferences of those that demand and/or will demand healthcare services. Here, all positive effects that arise from an intervention (various life quality improvements and increased life expectancy) are summarized into one single unit. This unit is called "quality-adjusted life-years" (QALYs). In standard QALY theory, individual utility can either be measured as "decision utility" concerned with individual feelings and judgements *ex ante* to illness (before treatment), or "experienced utility" concerned with individual feelings and judgements *ex post* to illness (after the treatment) (Nord, 1999, p. 80).

1.2 Research Issues

As currently practised, cost-utility analysis is based on different assumptions. These assumptions are referred to as "(mutual) utility independence", "constant proportional trade-off" and "risk neutrality on life-years" (Pliskin et al. 1980). Pliskin et al. (1980) say that imposing (mutual) utility independence and constant proportional trade-off, but not risk neutrality on life-years, ensures that the preferences of individuals preference relation can be represented by a standard QALY model in which life-years do not enter linearly, but are adjusted for risk attitudes. What is said in the standard QALY theory (Gold et al. 1996) is that people will value a given health improvement equally, regardless of the context in which it is received, and that people's strength of interest in an outcome increases *proportionally* to the size of the health outcome (effect).

Furthermore, the approach to priority setting in healthcare, promoted by many health economists, is the *maximization* of QALYs (e.g. Williams, 1985; Maynard and Bloor, 1998). This approach rests on the assumption that the healthcare system should aim at maximizing the number of QALYs gained for a group of individuals, with the resources that are available, irrespective of how these benefits are distributed across people. Nord (1999, p. 22) denotes such an approach *distributive neutrality*. The programme that produces the largest number of QALYs for a given cost is considered the most efficient one. An individual's health is measured in terms of QALYs, and the community's health is measured as the sum of all QALYs (Wagstaff, 1991).

The QALY approach has repeatedly been criticized for assuming proportionality between the value of and the size of a health outcome. This proportionality seems to assume a linear utility function. Studies done by Nord (1993b) and Abellan-Perpignan & Pinto-Prades (1999) propose that this assumption may possibly not hold, meaning that the general public may be less willing to discriminate between potential beneficiaries of healthcare services on the basis of potential health, than the assumption about distributive neutrality might suggest. People may value a given unit of health improvement differently if the improvement is received on its own, or by others (as part of a series of units of health improvements), and individual strength of interest is influenced by a desire to become "as well as possible" (Nord, 1999). Nord (1999), therefore suggests, that individuals may give more weight to early units of improvement in health, relative to subsequent units. This is what Nord (1999, p. 55) refers to as "marginally decreasing value to health gains". In a more recent work done by Nord, he questions whether the assumption of proportionality between value and size of benefit assumed in the standard QALY approach holds in the context of *ex ante* desirability at an individual level.

The approach of distributive neutrality (maximizing QALYs) is disputed. As laid down by Nord (1992), we may perhaps want to change the utility measure in the cost-utility equation. Instead of using QALYs, one may want to use a measure that also takes into account fairness considerations, and ethical judgements. Nord and others have questioned whether the information obtained from maximizing QALYs is consistent with deeper values and goals of decision makers, and the healthcare system in general.

For that reason, my research issues are the following: First, I will give an overview over some of the key assumptions that matter for cost-utility analysis (QALYs). Second, I will test one of the assumptions – the proportionality assumption (between value and size of health outcome). Third, I will investigate the role of risk-preferences when it comes to priority setting. My research question can be summarized as follows:

Do preferences for health show a linear utility function, and do individuals have risk-averse behaviour when being confronted with decisions on priority setting?

This is done by confronting two groups of individuals with four hypothetical questions, making them choose between competing treatment choices and competing insurance contracts. The first group is a sample of employees at the National Institute of Public Health (NIPH) in Oslo, while the second group is a sample of students from Institute of Health Management and Health Economics, and the Institute of Economics (HLED) at the University of Oslo.

The structure of this thesis is as follows. In the next chapter, I will provide a more thorough presentation of concepts of utility, with particular emphasize on QALYs. Furthermore, the concepts of diminishing marginal utility (DMU) and risk-preferences are presented. My methodology is presented in chapter 3. Chapter 4 presents the results from the questionnaires. Finally, chapter 5 discusses my findings, while section 6 concludes the thesis.

1.3 Motivation for study

This thesis is part of a pilot study established by senior researcher Erik Nord at National Institute of Public Health (NIPH) in Oslo, Norway. All questions used in the questionnaire are worked out by Nord.

In the summer of 2007 master student Anja Enge, from London School of Economics, started the project by choosing a small convenience sample of 24 participants at NIPH, asking questions about how they would prioritize in various health-related situations. Autumn 2007 (August to October), I was fortunate enough to spend my internship at the Department of Mental Health at NIPH. Here I got to know Erik Nord and his ongoing

project, and was asked to finalize the study started by Enge, by doing yet another interview session on a new sample of 33 employees at NIPH. An edited questionnaire was then worked out.

After my internship period, it was decided to continue this project by including yet another sample. This time, a group of students from the University of Oslo was interviewed. A total number of 28 students from both the Institute of Health Management and Health Economics, and the Institute of Economics were asked the same questions as the group at NIPH. All interviews were conducted by me. For further details about the structure of the questionnaire see appendix (in Norwegian), and chapter 3 for additional information on the methodology used.

1.4 Literature Search

The first step towards conducting this study was to get insight into the relevant existing literature. Nord gave me several articles that were meant to shed light on main topics of the specific area of research. Some of these articles were conducted by him, but also articles done by other researchers were emphasized.

The second step towards identifying a theoretical framework was to perform my own literature search, to get an overview of other relevant literature. In my search, I mainly focused on published articles from PubMed and Google Scholar, using at least one of the following keywords: *Quality-adjusted life-years (QALYs)*; *Cost-utility analysis*; *QALY maximizing*; *Distributive neutrality*; *QALY assumptions*; *Diminishing marginal utility*; *Prospect theory*; *Expected-utility theory*; *Risk attitude*; *etc.*

2. THEORETICAL FRAMEWORK

This chapter gives a brief overview of the literature that addresses some of the central ideas and topics discussed in my thesis.

In decision making literature there is often a well-defined distinction between normative theories and descriptive theories; how people should make decisions and how people actually are making decisions. The last decades, Expected utility theory (EUT) has in many ways dominated the analysis of decision making under risk. The theory in itself has been accepted and widely applied as the normative model for rational choice. However, the core issue lies in the fact that people do not always value in accordance to the so-called normative model (Treadwell & Lenert, 1999). The use of decision theory to health related problems often requires the measurement of health utilities as outcomes.

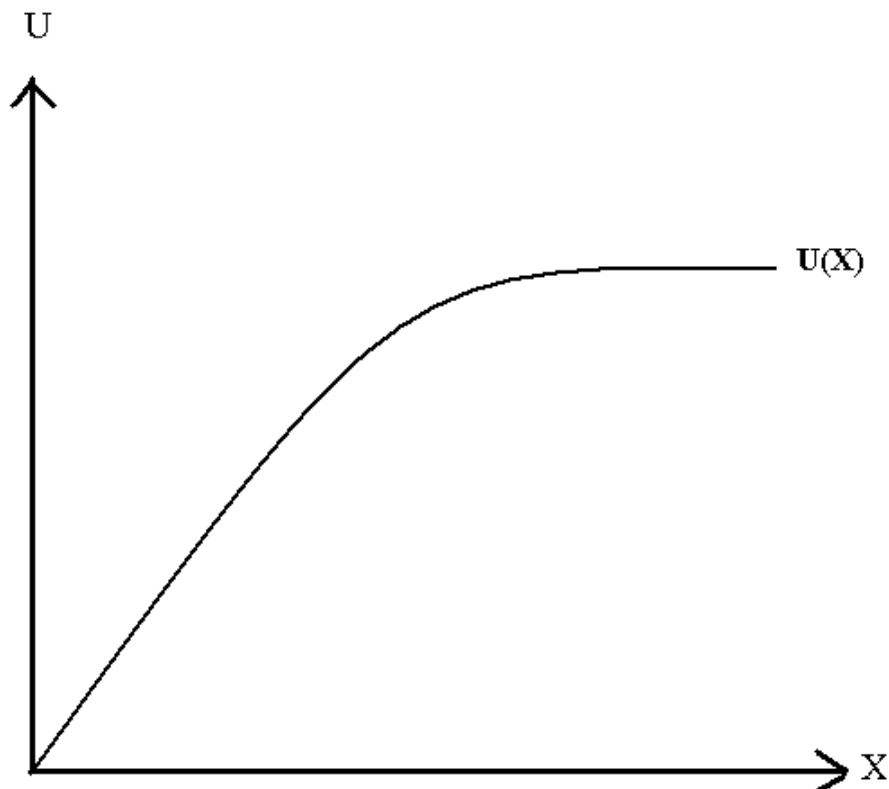
2.1 Concepts of Utility

Utility theory portrays individuals (consumers) as having consistent preferences over different types of goods. The preferences are presented by the utility function; $U(x, y)$ where x and y denotes the quantities of two goods. In figure 1, a representation of a utility function defined over one good only is presented. It follows from figure 1, that this function assumes diminishing marginal utility.

Utility is a word that has caused a lot of confusion the last few centuries, since being defined in different ways. Bernoulli (1738) was one of the first to apply the concept of utility, and proposed that human beings will maximize utility: “The value of an item must not be based on its price, but rather on the utility it yields” (Bernoulli, 1738, p. 24). To Bernoulli, utility was a numerical measure of a person’s subjective value of wealth that was independent of probability and risk. He suggested that the utility of wealth usually would increase at a decreasing rate, later known as *diminishing marginal utility*; DMU (Vickrey, 1945), and more specifically, that the utility added by the next increment of wealth is inversely proportional to the amount of wealth already on hand.

The theory on DMU of wealth says that although 100 units of a good is twice as much as 50 units of the same good, we should not assume that people prefer 100 units twice as much as 50 units. This is because, there can be said to be a diminishing marginal value to incremental health benefits. This property can be transferred to other goods as well, such as health; the health you already have, will affect the increase in utility you have from the next increment of health.

Figure 1: The utility function



The concept of *utility* has also been used by Bentham (1789). He believed that nature has placed humans under two masters; pleasure and pain, and while the intensity of these sensations may vary, the nature of the resulting “utility” is essentially the same irrespective of its source (Bentham, 1789). This view, with some modifications, has later been adopted by many economists, for instance Viner (1925).

2.2 Risk Preferences

As simple as it sounds, risk preferences are nothing more than a descriptive label for the shape of the utility function $U(\mathbf{x}, \mathbf{y})$ presumed to underlie a person's choices (Frank, 2006). Said in another way, a person's risk attitude follows as a result of the shape of his or her utility function (derived from a series of risky choices) for the outcomes in question (Weber et al. 2002). A person who has a strictly concave utility function in wealth (or health) is said to be risk-averse. The risk-seeking individual, on the other hand, will have a strictly convex utility function – the slope gets steeper as the health stock increases (Frank, 2006). An individual is said amongst others to be risk-averse when rejecting risky alternatives in favour of less risky alternatives for similar expected values, risk neutral if he is indifferent between them, and risk-seeking if preferring the more risky alternatives (Drummond, 2005).

Most of the economic literature dealing with decisions and risky choices, assumes that decision makers are risk-averse. However, theories presented by for instance Fishburn (1977) and Kahneman & Tversky (1979) (behavioural theories) emphasize the role of reference (target) levels and aspiration when discussing attitudes towards risk. According to Drummond (2005), individuals do not have a constant risk attitude over multiple scenarios being the case for the QALY methodology, but that risk preferences may depend on how the question is asked.

Mainstream economic theory, explains risk aversion by assuming that people generally have diminishing marginal utility in wealth (health). As Rabin (2000, p. 1281) puts it;

Diminishing-marginal-utility-of-wealth theory of risk aversion is psychologically intuitive, and surely helps explain some of our aversion to large-scale risk: we dislike vast uncertainty in lifetime wealth because of a dollar that helps us avoid poverty, is more valuable than a dollar that helps us become very rich.

Yet, Rabin (2000) emphasizes that people are generally risk neutral when it comes to small-stake risks, while Kahneman and Tversky (2000) conclude that aversion to modest-stakes risk has nothing to do with the diminishing marginal utility of wealth. Bernoulli (1738) on the other hand, believed that the diminishing marginal value for outcomes could explain why decision makers are reluctant to take risk. Consequently, the issue of diminishing marginal utility can possibly explain why people show risk aversion.

2.2.1 Expected Utility Theory

The confusion about the word *utility* was taken further by the economic theory of choice under uncertainty, advanced by von Neumann-Morgenstern (1944); saying that decision makers choose between risky or uncertain alternatives by comparing their expected utility values – the weighted sum obtained by adding the utility values of outcomes multiplied by their respective probabilities. According to Expected Utility Theory (EUT), people are believed to prefer less risky alternatives to more risky ones if not the expected values differ significantly. Furthermore, a key assumption in the EUT is that the expected values of the outcomes of a set of alternatives do not need to have the same ranking as the expected utilities for the same alternatives. Expected value is known as the sum of all possible outcomes, weighted by its probabilities of occurrence (Frank, 2006).

Several researchers, however, have spread serious doubts concerning the von Neumann-Morgenstern EUT (e.g. Fishburn, 1989; Schoemaker, 1982). Mongin (1997) presents three critical questions; 1) what do the utility numbers in the formula really refer to, and do they belong to the same value scale as the utility numbers that represent the decision maker's choices under uncertainty; 2) is the weighted sum procedure of combining probability and utility values the only one to be considered; and 3) should it be taken for granted that the decision maker relies on probability values?

In addition, Schoemaker (1982) puts forward serious doubts when it comes to the EUT's holistic approach. According to the EUT, people are intended to be rational, but lack the mental capacity to abide by the EUT. Schoemaker (1982) concludes that it is doubtful that the EUT should (or could) serve as a general descriptive model, so he further emphasizes that it is important to go deeper into the psychological understanding on how people *do* make decisions under uncertainty.

It is worth mentioning that Kahneman and Tversky (1979) introduced a descriptive theory called “prospect theory” on how people make decisions under uncertainty, established as a psychological alternative to the EUT. When considering risky options, Kahneman and Tversky (1979) pronounce that people tend to give each outcome a “decision weight” that represents the degree to which that outcome influences the decision. The typical finding is that people overweight low probabilities, and underweight moderate and high probabilities.

In general, people are said to be risk-averse for gains, risk-seeking for losses, and that losses appear larger than gains (Wakker & Tversky, 1993).

Furthermore, Kahneman and Tversky (1979) emphasize that prospect theory distinguishes between two phases in the decision making process; the *editing* phase and the *evaluating* phase respectively. First, people decide which outcomes they perceive as identical and they set a reference point, and consider lower outcomes as losses and larger outcomes as gains. Second, Kahneman and Tversky (1979) emphasize that people behave as if they would compute a utility based on the potential outcomes and their respective probabilities, and then choose the alternative that has a higher utility.

2.3 Quality-Adjusted Life-Years (QALYs)

One form of cost-effectiveness analysis, that provides health policymakers with information on the effectiveness of health interventions, is cost-utility analysis. For this methodology, all health benefits are measured by a single unit – often being quality-adjusted life-years (QALYs). QALYs are used to compare interventions with respect to the health benefits actually experienced by patients or others, or benefits they expect to have (decision utility or experienced utility, see section 1.1). A QALY is in many ways a weighting system that assigns a value, q , ranging from 1 (perfect health) to 0 (death) to represent the quality of life in a given period (Gold et al. 1996). Every QALY represents one life-year in full health, and the QALY is a product of the value of health states and their duration (Dolan et al. 2005).

The QALY calculation takes into account the following four dimensions; 1) the number of patients receiving the programme; 2) the survival gain (the gains from extended life expectancy); 3) the gain in quality of life; and 4) the probability of treatment success (Roberts et al. 1999). The specific method used to calculate QALYs can for example be found in Drummond et al. (2005, pp.177-178).

2.3.1 Distributive neutrality

In this subsection, I will describe the assumptions that matter for QALYs that are referred to above.

The QALYs gained for each individual are often added without any weighting (QALY maximization or distributive neutrality) across individuals. Dolan et al. (2005) state that the rule consists of the product of gains in quality of life, the length of life, and the number of patients treated. However, it is questionable whether or not the maximization of QALYs is valid. Dolan et al. (2005) find that in practice the marginal social value from both quality and length of life is being reduced for higher quality levels and life lengths. In addition, reductions in health inequalities are appreciated, and the social values also depend on factors such as having dependants and whether patients have a bad lifetime health prospect, or not.

For QALYs to precisely represent individuals' preferences over time, a number of restrictive assumptions need to be imposed about the nature of people's preferences. An important assumption about QALYs is related to the notion of "a QALY, is a QALY, is a QALY" (Weinstein, 1988). This means that a QALY has the same social value regardless of who gets it (distributive neutrality), and is independent of the health state. Brazier (2008) emphasizes that an increase in health (QALYs) from 0.1 to 0.3 is the same (has the same value) as an increase of health from 0.7 to 0.9, or 10 years in health state 0.5 is the same as 5 years in full health (equal to 1.0), or 2 people benefiting by an increase equal to 5 QALYs is the same as 1 person benefiting by 10 QALYs.

A standard representation of the idea behind QALYs is as follows:

$$U(\mathbf{q}, \mathbf{t}) = \mathbf{H}(\mathbf{q}) \mathbf{t}$$

where \mathbf{U} is the benefit function, \mathbf{H} is the utility from life quality, \mathbf{q} is the health state, and \mathbf{t} is the expected life-years (Bleichrodt et al. 2005). It follows that the benefit function is linear in life-years, meaning risk neutral preferences. Also, for QALYs to represent individual preferences over health profiles, health state values must be independent of the duration of the states, when they occur (independent of age), and in what sequence they occur (Brazier et al. 2007). According to the Welfare Theory, QALYs are to represent individuals' own utility over own health improvements (Brazier et al. 2007).

2.3.2 Proportionality

The standard QALY model assumes proportionality between value and health gains (effects), as in a linear utility function. According to Nord (2008), one can say that the proportionality assumption takes place along two dimensions: Value is proportional to the size of the benefit (effect), where benefit can be (a) in terms of quality of life, a gain measured on a scale of disutility of health problems as judged by people in normal health, and (b) in terms of duration (including gained life-years). This means that the value of a health improvement is proportional with the size of the difference between the value of the initial state of health and the latter state of health, and is proportional to the number of years gained (when discounting is ignored).

However, preference studies (Nord, 1993b; Abellan-Perpignan & Pinto-Prades, 1999) show that these two proportionality assumptions do not hold in an overall societal value interpretation. Nord (1999) asks whether people's strength of interest in an outcome increases in proportion to the size of the outcome, or if the strength of interest is much determined by a desire to *become as well as possible*. This hypothesis will be further discussed in later chapters of this thesis.

2.3.3 Mutual utility independence

According to Nord (2008), the value judgement of one state is independent of its duration, and that the value judgement of winning X number of years compared to Y years is independent of the state of health.

2.3.4 Constant proportional trade-off

The strength of preference between any two constant health profiles, holding quality of life fixed, remain constant when their respective duration are varied by the same time period (Brazier et al. 2007). In other words, the proportion of remaining life that one would be willing to trade for a quality improvement is independent of remaining life-years. According to Nord (2008), this means that for avoiding state X, you would be willing to sacrifice an equal amount of expected lifetime, whether it is specified as long, or short (e.g. 2 years of 10 years, or 4 years of 20 years).

2.3.5 Risk neutrality on life-years

The standard QALY calculation assumes risk neutrality with respect to life duration, which means that the utility function over life-years is linear (Johannesson et al. 1994). This implies that when health quality is fixed, an uncertain lifetime of expected duration T is equally preferred to a certain life time duration T (Miyamoto et al. 1998). However, we can adjust for non-neutral preferences if individuals show a consistent risk attitude (Brazier, 2008). Evidently, for most people this is not the case.

2.3.6 Additive separability

For QALYs to represent individual preferences over time, what has happened before treatment and what comes after, should not influence one individual's preferences, called *additive separability*; "the utility derived from a whole profile is the same as the sum of the utility from each state" (Brazier, 2008, p. 10).

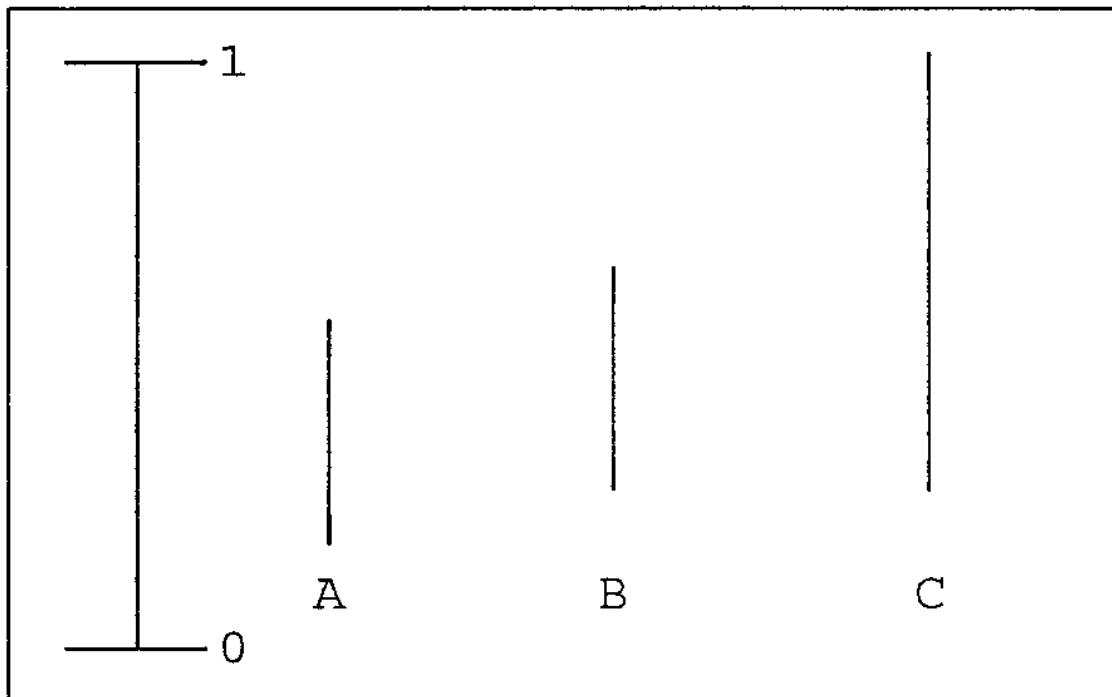
2.4 Concerns for Fairness

"A QALY is a QALY is a QALY" (Weinstein, 1988) is a debated assumption among scholars since ignoring fairness considerations. Nord (1999) gives us an example with three hypothetical programmes (see figure 2), which show the assumptions made in the standard QALY model. A, B, and C are three groups of patients who differ in health state and/or the effects from health interventions. Their health related utility is expressed on a scale from zero to one (see figure 2 below). The bottom ends of the three lines in figure 2 represent the utility of being untreated, while the top ends indicate the utility of each group (quality of life) after having received treatment. The three groups are assumed to have the same life expectancy with and without treatment. The treatment costs are also assumed the same for all three groups.

It follows from figure 2, that the patients in group A are more severely ill than those in group B and C (lower health-related utility) without any treatment. It also follows, that the benefit from treatment is the same for group A and B, while it is higher for group C. Patients in group C will benefit more from treatment.

According to Nord (1999), if the goal is to maximize QALYs (distributive neutrality), patients of group C will be given priority to patients of group A and B, while patients from groups B and C are given the same priority.

Figure 2: Three improvements in health on a 0-1 scale (Nord, 1999)



However, such a priority setting rule needs not to be in accordance with how individuals give priorities in real life. Nord (1999) emphasizes that there are three concerns for fairness among people that may run counter to the assumptions about maximizing the number of QALYs (distributive neutrality); (i) severity of illness, (ii) realization of own health potential, and (iii) aversion to inequalities in health.

The next section will discuss these concerns for fairness in more depth.

2.4.1 Severity of illness

Nord (1999, p. 27) stresses that group A can be looked upon as a more severely ill patient group compared to group B and C, and could for this reason be considered by people to have a stronger claim for treatment than group B and C. This could be so, although the potential utility gains from treatment are not the highest.

This is a controversial issue in the literature on priority setting in healthcare – should the healthcare personnel give priority to the group of patients that is more severely ill, or should those with the highest potential for health improvements be prioritized?

2.4.2 Realization of own health potential

Group C, scores better than patient group B (and A) when it comes to benefits from treatment – they have a higher quality-adjusted-life-years-score. However, as Nord (1999, p. 28) puts it;

It may be seen as unfair to hold against patients in group B that they happen to have a lesser degree of treatability than group C. Their potential for health improvement is still substantial and important to themselves, and they are just as ill as the patients in group C.

One may ask why one individual should “give up” treatment just because another patient has a greater health potential and can potentially benefit even more. Harris (1987) argues strongly against such discrimination, while Williams (1987, p. 123), concludes that there is no reasonable answer to this ethical dilemma, and says “at the end of the day, we simply have to stand up and be counted as to which set of principles we wish to have underpin the way the healthcare system works”.

Nord (1999) on the other hand, concludes that it seems like society does not want to discriminate as strongly against those with less health-improving potential as distributive neutrality may suggest, and there might be that people do not bother so much about the treatment effects, and do in fact not necessarily want to prioritize C over B. If this is true, one interpretation is that people only value the first health improvement higher than the subsequent one, which may suggest that people have a type of diminishing marginal utility as concerns the effect from treatment.

2.4.3 Aversion to inequalities in health

Nord (1999, p. 29) says that if only one group of patients is offered treatment, and this group is C, then we are confronted with a problem of inequality in respect to health. Giving priority to group C may be considered unfair because group A is worse off, or because of concerns with respect to the realization of own health potential.

Hadorn (1991, p. 14) emphasizes the equity limitation concerning the QALY approach; “if a choice comes down to treating one person who stands to gain ten QALYs, or nine people who each stand to gain one QALY, then the single person should be treated”, if the goal is to maximize the number of QALYs. Wagstaff (1991) concludes that the main (negative) message is that maximization of QALYs fails to reflect the aversion society feels towards inequalities in health outcomes (states).

In fact, human beings are not always self-centred and egoistic; people often want to help others in addition to themselves, and have what, Nord (1995) defines as “equity considerations”. Evidently, it is believed that the general public may take several distributional factors into account when evaluating gains in utility that partly interfere with the values underlying the assumptions of QALYs (Nord, 1993a; Dolan, 1996).

2.5 Other factors

Below, I will discuss other factors that potentially can be important for how people value health benefits.

According to Simon (1955), people are said to be bounded rational. Bounded rationality can be related to what Tversky (1972) defines as “isolation effects”, where people tend to simplify the choices between alternatives, and often disregard components that the alternatives share and focus on the components that distinguish them. People are then required to simplify even simple problems, and are forced to focus more on certain aspects than others.

Tversky and Kahneman (1973) give weight to that people will base their valuations solely on the frequencies of which they hear of them. This means that individuals will value in accordance to what is familiar to them, and what they know of. In addition, as mentioned in

earlier chapters (see section 2.2.1), Kahneman and Tversky (1979) also stress the importance of overweighting of “certainty effects”, which favours risk aversion in the domain of gains and risk-seeking in the domain of losses. Certainty increases the awareness of losses as well as the desirability of gains (Kahneman & Tversky, 2000).

Menzel et al. (2002) emphasize the degree of adaptation when it comes to disability and disease in health state valuation. An individual in an ill health state is likely to adapt over time, both physically and emotionally. People may also lower their expectations of what they can achieve. According to Kahneman & Tversky (2000), it is well established in the literature that people in fact tend to underestimate their ability to adapt.

Williams (1997) expresses what can be known as the “fair innings argument”. He argues that everybody is entitled to a lifetime of around 70-75 years of age. If you do not achieve this you have in a sense been “cheated”, and if you get more you have in fact got “borrowed” time. Williams (1997) concludes that if certain groups in society are not achieving what society view as a “fair innings”, either in terms of life-years or quality-adjusted life-years, then they deserve to be given priority in terms of access to healthcare.

Last, Jonsen (1986) introduces the term “rule of rescue”, which can be related to what I discussed earlier about aversion to inequalities in health (see section 2.4.3), and says that the desire to help people in need would outdo the concerns about risk and the opportunity costs of doing so; life saving is always given the highest priority. However, it is important to distinguish between the “self-interest perspective” and the “caring-for-others perspective” (Nord, 1999, p. 8), because empirical studies show that individuals do not necessarily judge health improvements of others as the same as health improvements to themselves (Richardson & Nord, 1997).

3. RESEARCH METHODOLOGY

In search of answering my research question, and to get insights about people's preferences concerning priority setting in healthcare, this particular study has applied both qualitative methods and quantitative techniques. To be able to get the data I needed for analysis, I was, during the interviews, taking notes about the comments made while at the same time asking relevant questions when needed.

3.1 Objectives and Hypothesis

As stated earlier, my research objectives underlying this study is first, to give an overview over some of the key assumptions that matter for cost-utility analysis (QALYs). Second, the study will also test one of the assumptions, namely the proportionality assumption (linearity). And third, I will give an attempt to investigate the role of risk-preferences when it comes to priority setting. My research question can be summarized as follows:

Do preferences for health show a linear utility function, and do individuals have risk-averse behaviour when being confronted with decisions on priority setting?

3.2 Sample Characteristics

The National Institute of Public Health (NIPH)

First, a convenience sample of thirty-three participants was selected for this study. The participants were all employed at NIPH, and the interviews were done in the period between August and October 2007. The participants were recruited through the e-mail network at NIPH, and those wanting to participate were further contacted. The participants had an overall mean age of 46, ranging from 25 to 64 years. Eleven (33 %) were men and twenty-two women (66%). Eighteen respondents (54 %) held university degrees at either bachelor- or master level, while eleven respondents (33 %) held PhDs. Furthermore, thirteen (40 %) of the respondents were working as researchers, and twelve (36 %) of the respondents were working as advisors at NIPH. The remaining eight respondents (24 %) held either administrative-, student-, research fellow-, or engineers positions.

All the respondents were highly educated and some had been confronted with similar questions earlier. Hence, this group is clearly not representative for the general population, but may be representative of the staff at NIPH as a whole, although there are some potential selection problems present.

Institute of Health Economics and Health Management (HLED)

To get a more diverse sample, also students from the Institute of Health Management and Health Economics, in addition to students from Institute of Economics at the University of Oslo were recruited from January through February 2008. All students selected, were either attending the master's program in Health Economics, Policy and Management, or were bachelor-/master students at Institute of Economics at the University of Oslo (39 %). This sub sample had had an overall mean age of 28, ranging from 21 to 52 years, where 14 were men and 14 were women. The participants were recruited through the e-mail network at HLED. To get a more equal share of both men and women, which was not achieved at NIPH, there was decided to contact male students at the Institute of Economics. Approximately all held university degrees at either bachelor or master level (86 %).

By including this sub sample to my study, it became possible to compare the two groups to see whether or not there are differences among them. In addition, a higher number of individuals will in itself provide me with stronger evidence as concerning the research issues that are to be investigated.

Yet, it is necessary to keep in mind that the two samples cannot say much about the preferences of the population as whole; it will only give us an idea on how people might think when being confronted with health related questions.

3.3 Interview

The interviews were structured in the following way. First, a written statement was sent out to all the participants informing them about the particular study they were about to be involved in. The statement contained information about the procedure of the interview; what type of questions, and how long it would take. A series of semi-structured in-person interviews were done by myself after detailed instructions defined by Erik Nord at NIPH. During the interview, I took detailed notes of the comments made by the respondents, both

before and after the questions were given. All together, this made it easier for me to recognize the respondents' way of thinking afterwards. On average, the interviews lasted for 20 minutes, with the longest taking 35 minutes and the shortest about 10 minutes.

Before the interview started, the subjects were given a short introduction with a few general instructions. They were particularly instructed to think aloud and make comments while considering the different options. Further, they were informed that the main purpose of the interview was to find out more about individual's preferences when it comes to healthcare. Neither quality-adjusted life-years, attitudes towards risk nor the proportionality assumption was mentioned during the interview. All respondents were asked four hypothetical questions in the same order. They were told that there were no correct or incorrect answers to any of the questions. Furthermore, they were told that although some questions may appear somewhat abstract and/or strange, they should answer as best they could in accordance with their own preferences.

The respondents were allowed to ask questions during the interview. However, it turned out that only a few of the respondents choose to do so. The respondents were encouraged not to go back to look at their own answers to former questions.

3.4 Questions

Each of the four questions given was presented in a healthcare context. Every question was directly or indirectly asking about the respondent's decision utility as ex ante preferences (see section 1.1) involving feelings and judgements to illness before treatment. All questions used in the questionnaire are worked out by Nord, hence my intention is just to present the questions given, and highlight possible limitations.

The four questions can be classified under the following four themes:

Question 1: Judgements of patient's desire for treatment.

Question 2: Preferences for private insurance concerning quality of life.

Question 3: Preferences for private insurance concerning life-years gained.

Question 4: Preferences for increasing public hospital treatment capacity.

By looking at the preferences of the respondents in different contexts, the hope was to get an enhanced understanding of the respondents' way of thinking when forced to prioritize between healthcare interventions in different circumstances.

3.4.1 Question 1: Judgements of patients' desire for treatment

In question 1, the respondents were asked to consider two groups of patients, A and B, with different diseases, which were both in the same functional level - level 6 (see table 1), but that have different potentials for health improvements for treatment (arrive at functionality levels 2 (group A) and 4 (group B), respectively). Both treatments (operations) were expected to have a 5 % risk of mortality.

Based on empathy and introspection, the respondents were asked to think of themselves in the two patient groups' situation and to judge *the strength of desire for surgery in the two groups*.

Three response options were given:

1. Patients with illness A will have a much stronger desire for surgery than patients with illness B.
2. Patients with illness A will have somewhat stronger desire for surgery than patients with illness B.
3. The desire for surgery will be much the same in the two groups.

Table 1: A scale of severity of illness

Functional level	Severity of illness
1	No problems with walking around
2	Able to walk at home and outdoors. Difficulties with walking more than 500 meters
3	Able to function well at home. Difficulties in stairs and outdoors
4	Difficulties with moving around at home. Needs assistance in stairs and outdoors
5	Able to sit. Need help to move around – both at home and outdoors
6	To some degree bedridden. Able to sit approx one half day in a chair if helped up by others
7	Permanently bedridden

A description of the functionality levels is available in Table 1. The table was originally constructed by Sintonen (1981), but the version presented over is somewhat modified by Nord. The different functionality levels were constructed so that each level should appear as equally significant in terms of individual utility. For instance, should moving one person from functional level 2 to level 1 produce as much utility for that person as moving from functional level 7 to 6 and so on. In an earlier study done by Nord (1993b), most respondents stated that the intervals between the various functional levels presented in Table 1 appeared as quite equal. Furthermore, Nord et al. (1999) and Nord (2007) have further interpreted the use of this scale.

3.4.2 Question 2: Preferences for private insurance concerning quality of life

Question 2 was meant to say something about own personal preferences rather than judgements of other people's preferences. The question went as follows:

“Imagine that you live in a country where it is common to have some private health insurance for things not covered by the public health service. Typically, these are fairly rare diseases for which treatment is very expensive. You cannot afford to include all such diseases and are forced to prioritize. Among the various candidates are two diseases that both will put you in a wheelchair for a year's time if you are left untreated. Treatment potentials are as follows:

Disease A: Treatment restores you quickly to full health.

Disease B: Treatment brings you quickly out of the wheelchair, but you will still have considerable problems with walking.

After a year or so the diseases will in any case end, and you will be back in normal health. If you were to prioritize between the two diseases in you private insurance plan, you might think in one of the following ways:

- (1) If the diseases are equally likely, you would give priority to insurance for disease A, since you would obtain a greater health benefit if you got disease A and were insured for that compared to if you got disease B and were insured for that.

- (2) You would primarily be interested in avoiding the serious condition that both diseases lead to, and not worry so much about whether treatment would make you a good deal better or restore you to full health. Therefore you would give priority to insurance for the disease with the highest probability.

With which of these ways of thinking do you agree most?”

After responding to the above questions, the respondents were presented with two follow-up questions. At NIPH seventeen respondents were told that the probabilities of getting disease A and B were 10% and 20 %, respectively. The sixteen other respondents were told that the same probabilities were 10% and 25%, respectively. At HLED all respondents were presented with probabilities of 10% and 25%. This was done in order to see if the choice of statement did change when the probabilities were explicitly stated. The respondents were

again asked to indicate which of the two diseases they would include in their insurance contract now knowing the risk.

To improve the understanding of the responses given, the interviews included a task in which the respondents were asked to locate the state resulting from treatment of disease B (“able to move a few meters without a wheelchair, for instance at home”) on a rating scale from zero to 100 (full health) with ‘completely dependent on wheelchair’ prefixed at fifty. This exact text was given (for Norwegian text see appendix):

“Functional level in your daily life means the ability to take care of yourself, manage to move around, perform work, manage to do your spare time activities, be together with friends, read, and watch TV etc. Imagine an interval scale for functional level in your daily life which goes from zero (completely disabled) to one hundred (completely healthy). If the state of health “completely dependent on a wheelchair” scores fifty on this scale, where will you place the state of health that is achieved in treatment for disease B (you are dependent of your wheelchair, but manage to move around to some extent, for instance at home)?”

The two follow-up questions were asked to test the respondents’ strength of commitment to the alternatives presented earlier.

3.4.3 Question 3: Preferences for private insurance concerning life-years gained

In question 3, the text concerns private insurance, as was the case for question 2, however, health benefits were now addressed in terms of life-years, rather than quality of life. The question went as follows:

“Imagine two diseases A and B that both in short time lead to death if one is left untreated. For disease A there is a treatment that does not cure, but statistically postpones death by ca. 20 years. For disease B there is also a treatment that does not cure, but statistically postpones death by ca. 7 years. In both cases health related quality of life is good in the gained years of life. If you were to prioritize between the two diseases in your private insurance plan, you might think in one of the following ways:

- (1) You would emphasize the number of years to be gained from treatment. Unless disease B was clearly more common, you would therefore give priority to insurance covering disease A.
- (2) Given the severity of the diseases, you would give priority to insurance for the most likely disease, and not emphasize so much whether you would gain 7 or 20.”

The respondents were also now confronted with a follow-up question presenting explicit probabilities. The probability given for A was 10% while it was 20% for B.

3.4.4 Question 4: Preferences for increasing public hospital treatment capacity

Individuals are not accustomed to purchasing private health insurance. This is at least the case in a country like Norway having a National Health Service (NHS). For this reason it was decided to present the respondents to a question concerned with the preferences for treatment capacity in the NHS. The question went as follows:

“Consider two muscular diseases A and B. Both result in pain that leads to severe limitations in mobility and to some problems with sleep. Both are chronic.

There are treatments for both illnesses, but they are very expensive and treatment capacity is insufficient at the moment.

A medical examination reveals that your risk of getting A is 15 %. For B your risk is 30 %.

With both illnesses the effect of treatment is that symptoms will not occur daily, in other words that the patients have good days in between bad days. But the effects are different in size:

Treatment for illness A: A couple of days per week will be OK.

Treatment for illness B: Ca. one day per week will be OK.

If you were to express your preferences for treatment capacity for A and B in the NHS, you could have in mind one or more of the following:

- You want to make sure that you receive treatment for the most likely illness.
- You want to avoid having to live with the symptoms in question every day.
- You want to make sure that you receive treatment for the illness for which treatment is most effective.

Thinking only about your self-interest, for which of the two diseases (A or B) would you most strongly want the NHS to increase treatment capacity? “

4. RESULTS

In this chapter, I will first present my main quantitative findings from the responses to the questionnaire. In addition, I will present some conclusions from the follow-up questions (the semi-structured interviews). The results, however, should be seen in relation to some of the limitations concerning the research methodology (see chapter 5.1).

4.1 Quantitative Data

This subsection summarizes the findings from the interviews carried out (see table 2). Following, I will present the distribution of the different answers to each of the questions in the questionnaire.

Question 1

In question 1, a total of 39 (64%) respondents thought that patient groups (A and B) in severe levels of disability (level 6), would have the same desire for treatment (operation). This is somewhat surprising since one of the groups (group A), had a much higher effect from treatment than the other (group B). Another 16 (26%) respondents thought that the latter group (group A) would have a somewhat stronger desire for treatment (operation). Only 6 out of 61 respondents (10%) indicated that they believed patients in group A to have a “much stronger” desire for operation.

What is surprising is that there was almost no difference between the two samples (NIPH and HLED); with majority answering that they believed the two patient groups to have the same desire for operation in both samples (63.6% and 64.3%, respectively).

Also, when we look at those considering patients in group A to have a “somewhat stronger” desire for treatment, there is almost no difference between the samples at NIPH and HLED (24.2% and 28.6%, respectively). Even, when looking at those considering patients in group A to have a “much stronger” desire for treatment, there is not a great difference between the two samples (12.1% and 7.1%, respectively).

Table 2: Response distribution

QUESTION	NIPH (N=33)	HLED (N=28)
1. Judgements of patient's desire for treatment		
Much stronger desire in group A than in group B	4	2
Somewhat stronger desire in group A than in group B	8	8
The desire for surgery will be much the same in the two groups	21	18
2. Preferences for private insurance concerning quality of life		
Agreed most with emphasizing the effect size	12	13
Agreed most with emphasizing the probability (risk)	17	15
In doubt	4	0
p (A) = 10%, p (B) = 20%		
Priority to insurance for A	12	
Priority to insurance for B	5	
p (A) = 10%, p (B) = 25%		
Priority to insurance for A	4	10
Priority to insurance for B	12	18
Average rating of treatment result in disease B	63.4	64.6
3. Preferences for private insurance concerning life-years gained		
Agreed most with emphasizing the effect size	18	20
Agreed most with emphasizing the probability (risk)	8	5
In doubt	7	3
p (A) = 10%, p (B) = 20%		
Priority to insurance for A (20 years)	13	11
Priority to insurance for B (7 years)	20	17
4. Preferences for increasing public hospital treatment capacity		
Priority to illness A (p=15%, 2 symptom free days a week)	10	8
Priority to illness B (p=30%, 1 symptom free day a week)	23	19

Question 2

In question 2 (as well as for question 3), two alternatives were presented. It follows from table 2, that the majority of both samples (NIPH and HLED), agreed with the statement that emphasized the probabilities of getting the disease (alternative 2) (51.5% and 53.6%, respectively). In total, at NIPH and HLED, 40.9% emphasized the treatment effect.

However, when seventeen of the respondents at NIPH were presented with the first follow-up question, involving probabilities 10% (disease A) and 20% (disease B), now preferred insurance for disease A (the one with the best treatment effect) (70.6%). This means that about 19% (from 51.5% to 70.6%) of the respondents at NIPH changed their mind when they saw the probabilities, and answered they would give priority to treatment effect instead of probabilities when choosing between insurance contracts.

On the other hand, among the sixteen other respondents at NIPH being confronted with the probabilities of 10% (disease A) and 25% (disease B), significant majority preferred insurance for disease B (75%). This means that many of the respondents who initially answered that they would give priority to disease A (treatment with best effect), would now change their mind because of the probabilities. In other words, at NIPH, the preference of the majority seems to switch from disease A to B, when the probabilities for disease B increased from 20% to 25%.

A similar pattern was identified at HLED (see table 2). Here, all the respondents were confronted with 10% (disease A) and 25% (disease B), and as many as 64.3% answered that they would prefer insurance for disease B which had a 25% chance of occurring. This again means that about 11% (from 53.6% to 64.3%) of the respondents shifted from disease A to disease B when the probabilities were presented.

In the second follow-up question, the respondents were asked to indicate on a rating scale how significant they thought the improvement for disease B was in order to evaluate whether or not what was said in the initial questions were in accordance with each other. The average rating scale scores of this result were 63.4 at NIPH and 64.6 at HLED. This suggests that the respondents perceived the treatment effect in disease B as less than 50% of the effect in disease A.

Question 3

In question 3, the two alternatives concern how to give priority between two different treatment options with different possibilities for improvement (difference in life-years gained from treatment). From table 2, it follows, that in both samples (NIPH and HLED) a significant majority (62.3%) emphasized the treatment effect (life-years gained) since being in favour of disease A (20 years). In total, only 21.3% emphasized the probability in this question.

However, when confronted with the follow-up question where the probabilities were specified as 10% (disease A) and 20% (disease B), the distribution was again reversed in favour of insurance for disease B. Then as many as 60.6% answered that they would give priority to disease B over disease A considering the probabilities presented. This means that as many as 23% of the respondents (from 62.3% to 39.3%) changed their mind, and wanted to give priority to disease B over disease A, when they saw the probabilities.

Question 4

Regarding question 4, the respondents were asked to only think about their own personal interest, and express what disease they would like the National Health Service (NHS) to give priority to by increasing the future treatment capacity. Now, a clear majority preferred to have treatment capacity increased for the illness that was twice as likely (disease B), but had a treatment effect that was only half the size (1 day a week without symptoms). A total of 42 respondents (69 %) answered they would want the NHS to give priority to disease B. However, one of the respondents from HLED was indifferent between the two alternatives.

Once again, what is striking is that there are surprisingly equal responses among the two samples (NIPH and HLED). In fact, there are exactly identical percentual shares (69%) between the two alternatives given.

4.2 Qualitative Data

This subsection is concerned with the qualitative data gathered during the semi-structured interviews. The data are primarily based on my own personal notes, as well as other observations done during the interviews.

To start with, I had expected to identify some differences between the employees at NIPH and students at HLED, especially when it came to arguments about severity of illness and aversion to inequalities in health. However, what is striking is that the two samples are surprisingly similar regarding preferences both as concerns quantitative and qualitative data. However, what is worth mentioning, is that there is not performed any statistical tests concerning significance. In addition, the selection of subject to the questionnaire was only based on voluntary participation, which would probably lead to selection bias. I will come back to this in section 5.1.

The structure of the following section will be as follows; first, I will present my general qualitative observations from the semi-structured interviews summarized in a few main points; and second, I will go deeper into the qualitative data concerning each question in the questionnaire.

4.2.1 General qualitative observations

Based on the qualitative data, from both question 2, 3, and 4, there is no strong evidence for suggesting that the respondents were thinking about maximizing own health benefit when prioritizing between different healthcare programmes. However, a considerable amount of respondents highlighted the seriousness of the disease being studied, and were for that reason not so much willing to take the existing risk. What became evident was that the two samples (NIPH and HLED) tended to give priority to the disease with the highest chance of a successful outcome (question 2, 3, and 4), equity concerns among respondents were revealed (question 4) and arguments about severity of illness were emphasized (question 1).

Another important observation that I did during the interviews, were that some of the respondents seemed to include additional information when answering the questions, than was presented to them. Some did interpret the information available to them in a different

manner than was thought of by those designing the questions. The questions are mainly concerned with eliciting ex ante preferences to illness. Yet, some of the respondents had experiences with similar diseases before, either personally or in near circle of acquaintances, which may have influenced their answers in one way or another. For instance one respondent said: “I have been using crutches myself for two years, which worked out quite well” (male, researcher, 36 years old).

Several of the respondents had clear ambitions and goals in life, and were therefore more likely to accept risky options to achieve their goals. First of all, many respondents brought up goals related to children and family; “if I live for twenty more years, I will still be relatively young and have much left to experience in life, like for instance starting a family”. Others said that “twenty years would mean a lot to me, because then I can take care of my children as long as possible”. Second, respondents also mentioned career related goals; “I want to gain as many years as possible so that I can finish my studies and get a good job.” The career related goals were mostly found in the sample at HLED. Third, some of the older respondents emphasized what I identify as retirement goals; “I want to gain twenty years so that I can work until I am 67, and get the chance to enjoy my retirement”. Others had more unspecified goals; “if I live for twenty years I will still be relatively young, and can accomplish a lot more in life”. Evidently, both students at HLED and employees at NIPH had clear goals, which obviously influenced how they would prioritize between treatment options. This was particularly evident in question 2 and 3, concerning functionality loss and gained life-years in respect to health.

The study also found that goals in life tend to get less important with increasing age of the respondents, which means that it is influenced by realistic expectations about life expectancy. For example, 20 years of extended lifetime may be well below the goals of a 30-year-old respondent, whereas, it may be far beyond the goals of a 60-year-old. For instance one said “because of my age I would like to get insurance for the disease it is most likely that I get. However, I would most likely choose otherwise if I was younger - per today I am not willing to take the risk” (female, senior engineer, 56 years old). Another said “the effect of treatment is more important to me, than the risk of getting the disease” (female, master student, 29 years old). Although there was some evidence of this trend, there was also individual variability.

The next section will go through each question one at the time, and explain what the main qualitative findings were.

Question 1

In question 1, the respondents were asked to judge the strength of desire for surgery in the two groups (A and B). A large majority of the respondents did not want to discriminate against patient groups with a lower health potential. The majority of the respondents answered in a way that emphasized that patients in group A would have a somewhat stronger desire, or that both patient groups would have an equal desire for operation. Those respondents with linear or almost linear preferences in the relevant region are expected to choose statement 1 – the term “much stronger” (corresponding to “much larger improvement”). Moreover, if the respondents answer “somewhat stronger” (statement 2), it may suggest a diminishing marginal utility to health, and also if responding “equally strong” (statement 3) the underlying preference function can be interpreted as being horizontal in the relevant region (no utility gains from a higher health state).

Of those respondents answering alternative two or three (“somewhat stronger” or “equally strong”), three main explanations were identified. First and foremost, the main argument offered was that both groups would have a strong desire for any intervention that could reduce the severity of the initial conditions, and that being confined to bed most of the day, is a terrible state of health for both patient groups. Second, the aspect of taking care of yourself without any help from others, was considered extremely important by many of the respondents. A third explanation commonly used, was the argument concerning realization of own health potential (see section 2.4.2). Many of the respondents were thinking that no matter how promising the treatment potential of a disease is, the particular patient would want to get as healthy as possible - their potential for health improvement is still substantial and important to themselves.

The explanations given for those who agreed that the patients in group A had a much stronger desire for treatment (operation) emphasized the expected treatment effect of patients in group A. One of the respondents compared it with winning the lottery; “1 million vs. 10 millions. The person who knows he has the possibility of winning 10 millions would have a much higher incentive for playing the game, than the person knowing he only has the possibility of winning 1 million”. However, only a few respondents, surprisingly or not,

answered in a way that emphasized that this patient group (A) would want treatment more than the other (B).

Question 2

Several factors were emphasized by the respondents when confronted with question 2. Some highlighted that they wanted “to be as healthy as possible”, and that the value of being completely healthy meant a lot, which correspond to statement 1 (treatment effect) in the questionnaire. Many respondents emphasized the fact that you know that the disease would only last for one year (back to perfect health after that one year), and were therefore repeatedly willing to take a higher risk of getting the disease. Others again, said “one year is a very long time in a wheelchair” and highlighted that it is important to manage to take care of yourself without any help from others. Some respondents were concerned about their active lifestyle which did not “allow” for being in a wheelchair, and were therefore willing to do a lot to not get in a wheelchair. A number of respondents drew attention to the fact that they were not risk-averse, and did not consider the probabilities to be significant.

Respondents who chose the alternative that emphasized the probability of getting the disease (statement 2), provided, in many ways, different arguments for their choices. First, they were primarily not willing to take the risk (medical expenses risk) of such a serious disease that would put you in a wheelchair. And since the disease would pass after one year, several of them said that they were willing to spend one year in a wheelchair. Others would like to get at least a little bit better, compared to being completely dependent on the wheelchair.

Arguments about having a family with children to take care of were mentioned repeatedly particularly for this question, and they could not risk getting in a wheelchair *all* of the time compared to *most* of the time. What many of the respondents choosing statement 2 underlined was that the difference in probability of attracting the two diseases had to be significant (as for question 3). When confronted with the different probabilities, those respondents asked to consider 10% (disease A) versus 20% (disease B) of getting the diseases, responded that they would take the risk, which means that they would choose disease A over disease B, while the majority of the group asked to consider 10% (disease A) versus 25% (disease B) felt that the risk was too large, and changed their mind (took B rather than A).

Question 3

Regarding question 3, on life-year gamble, involving a long period of survival (20 years) versus shorter period of survival (7 years), the majority of the respondents chose in a manner that considered the expected health improvement following treatment to be more salient than the risk of attracting the disease, at least when explicit knowledge about the probabilities were not yet introduced. One respondent said “I would like to postpone death as long as possible. There is a large difference between 7 and 20 years gained. However, I have to admit that I probably belong to the group that think ‘this will not happen to me’”. Another said that “given that the life quality is good in the years I am gaining, I would want to gain as many years as possible”.

However, a number of respondents expressed that the years gained did not matter (alternative 2 – 21.3%) and consider the opportunity to get out of the severe condition to be the most important consideration, and that gaining “only” seven years was acceptable when the other option was to die almost immediately. By taking that standpoint, many of them were thinking about their families and children, and wanted to get at least seven more years left to live, rather than no years at all. On the contrary, one respondent said it was better to “die right away, rather than gaining only seven years”.

At the same time, as for question 2, several respondents underlined that the difference in probabilities of attracting the two diseases had to be significant, and when the probabilities were presented to them, the result shifted. Then the bulk of the respondents (60.6%) stated that the difference between 10% (disease A) and 20% (disease B) were significant, and that they would prioritize the disease that was most likely to occur. This, once again, shows that the majority of the respondents are considering the probabilities (risk) of getting the disease over the effect of treatment.

However, the respondents had somewhat different arguments concerning risk taking behaviour. For instance, one respondent said; “when it comes to postponing death with 7 or 20 years, I am willing to sacrifice a lot to gain as much as 20 years”. On the other hand, another respondent said; “when we are talking about death it is obviously much more serious, and I am not willing to take the chance of not gaining any years at all, instead of gaining 7 years”.

Question 4

In question 4, a clear majority of the respondents showed that they would want the National Health Service (NHS) to give priority to disease B which had the highest probability, although it only gave one symptom free day a week. Concerning increasing treatment capacity in the NHS, the argument the majority gives, is that the difference between one or two symptom free days seems too small, in relation to the risk of ending up in the severe state in question.

In addition, arguments involved explanations about aversion to inequalities in health; “I would want the NHS to prioritize the treatment that would help as many as possible”, and “it is difficult to only think of own personal interest when answering such a question, because I would want to help as many as possible”. These were both main explanations for choosing the disease that had the highest probability of occurring. Other arguments like “there is not a large difference between one and two okay days a week” and “I will suffer with a lot of pain no matter what disease I get” were also mentioned by several respondents.

5. DISCUSSION

What follows is a discussion of the results arrived in this study, including a presentation of the main study limitations. The intention of the study was to investigate the functional form of the preferences for health – in particular whether or not the preferences for health are linear. The reason for this is because linear preferences for health (and health effects) are, according to authors in the field of economic evaluation, believed to be an assumption that underlies standard QALY analysis. Linear preferences can be said to imply two things: (i) that the marginal utility of additional health is constant. This means that the severity level in health before treatment will have no effect on the valuation of an additional unit of health (proportionality assumption), (ii) given linear preferences in health, individuals exposed to health risks will be risk neutral, meaning that they will be indifferent between two projects (a risky one and a non-risky one) with similar expected values. The methodology chosen to solve this question was to confront individuals with hypothetical choices in order to reveal their preferences.

In the following I will discuss each of the questions one at a time (question 2 and 3 will be discussed together).

Question 1

With this question, the respondents (*ex ante*) are asked to say something about how the preferences for treatment are for people that are sick. This means that if they understand the question correctly, they do not necessarily reveal anything about their own personal preferences. Furthermore, the question is framed in a deterministic setting in the sense that risk do not differ between the two groups, however, both groups are confronted with same risk of dying in response to treatment.

An interval scale (see table 1, section 3.4.1) was used to elicit the strength of desire for surgery in the two samples (NIPH and HLED). Each step on the scale is supposed to appear as equally significant for the respondents. However, it is worth questioning whether it is reasonable to assume that moving one person from level six to level two, would yield twice as much individual utility, as moving another person from level six to level four. One

obvious limitation concerning the use of this scale is that it is extremely hypothetical, and it may be difficult to relate to.

The answers given from the respondents are quite surprising. In a sense, almost 2/3 of the respondents found the two patient groups to have much the same desire for treatment in spite of the treatment effect being much higher for one of the groups. One interpretation of this result is that the majority of those asked is of the opinion that other people have a horizontal utility function (or almost horizontal) in health, meaning that more health (or higher treatment effects) does not increase utility. The findings could also suggest that the preferences for health are non-linear – in the sense that the majority (90%) believes that the patients in group A only have a little stronger desire (or equal) for treatment than group B, in spite of significantly higher treatment effects.

However, one should be careful drawing the above conclusions. First, the results could be very different if the respondents were asked to prioritize between the two groups. Since equally sick, one would expect them to choose group A. If so, they confirm that more health is better than less health. Second, one could ask the respondents what would happen if they were sick themselves, and could choose between treatments which gave the health outcomes in group A and B. One would now expect the majority of the respondents to choose A rather than B, and if so, the majority would have preferences being non-horizontal.

The answers given could well be related to other factors than the shape of own utility functions. One possibility is that the respondents are of the opinion that being sick is a bad thing, and that the desire for treatment amongst those being sick is more or less the same independent of treatment effects. This, however, need not mean that a majority of sick patients would be indifferent between a treatment that produces health at functionality level 4 and functionality level 2. Another possibility is that the respondents are concerned with equity considerations (distributive values), in the sense that they feel that everyone, no matter the size of treatment effects, should be entitled to treatment. Given a need for priority setting they would draw random sample of patients to a given treatment, or look for other factors that could guide them in actual priority setting, for example age, the number of dependants, etc.

To sum up, it is not clear that the question raised is suitable for investigating whether preferences in health are linear, or not. It seems more that the question is capturing

something about people's preferences as concerning the right to healthcare services. It may very well be that own preferences for own health and own treatment effects differ much from what we consider as a just care. It could also be that this question is able to capture one dimension only – that being very sick means that people have strong preferences for treatment no matter the size of the effect. This finding does not confirm the existence of linear or horizontal utility functions in health.

Question 2 and 3

In contrast to question 1, the respondents were in question 2 and 3, asked to say something about their own preferences (*ex ante*), rather than making judgements of other people's preferences. Again, if they understood the question correctly, they would now reveal their own personal preferences, and not think about other than themselves. Furthermore, both questions presented two alternative ways of thinking (statement 1 and 2) when prioritizing between available insurance contracts; 1) you will give emphasis to the disease that has the highest treatment effect; or 2) you will not so much worry about the treatment effect, but rather give emphasis to the disease that was most likely to occur. The costs concerning the two diseases were considered to be of equal magnitude.

In question 2, the answers given among the respondents are quite divided between the two alternatives. In the first part of the question, about half of the respondents (52%), both at NIPH and HLED, clearly emphasized the risk of getting the disease over the treatment effect (statement 2), and showed unmistakable interest in avoiding the serious condition that the disease itself involved. However, another 41% of the respondents at NIPH and HLED emphasized the treatment effect when asked to consider the two insurance contracts, which on its own is a considerable share.

The answers given among the respondents, in question 3, on the other hand, are more centred on statement 1 (treatment effect). Here, as many as 62% indicated that they would give priority to the disease that has the best treatment effect (20 years gained). For those answering this alternative (statement 1), the treatment effect, and the considerable difference between 20 and 7 years were essential. Only a limited share of respondents (21%) specified that they would only emphasize the risk of getting the disease when we are talking about gained life-years.

Additionally, in the second part of question 2 and 3, where probabilities were introduced, the overall majority preference (59%) centred on disease B (with the highest probability). Of those who answered they would prioritize disease B (statement 2), in question 3, arguments were for instance; “it is not so important whether I gain 7 or 20 years”, and “the most important thing is to avoid sudden death, and to get some years instead of no years at all”. Considering these comments, we might say that there is some, but limited, evidence that people are not valuing gained life-years (effect) proportional to the life-years in itself. Similar responses were also found in question 2.

Moreover, in question 2, when the respondents were asked to locate the treatment result of disease B on a rating scale, most people did not consider the improvement to be substantial, and located it somewhere around 60/65. However, what is questionable is whether the respondents have a reasonable understanding of the rating scale, or if they understand it as just a random parameter. From time to time, I had the impression that the responses did not correspond with each other, and were in that way inconsistent. They might have answered differently if they had been in another setting, or if they had the opportunity to go back to earlier questions. For instance, when I asked them to put a number on the rating scale on how large they considered the improvement to be, some of the respondents placed a much higher number than I expected in relation to what they had said in initial questions. This may have been because of imprecise wording, or just the fact that people do not have the complete understanding and knowledge of such a scale.

It is difficult to say whether or not risk-averse behaviour is present in these questions. This is because risk aversion can possibly take place across two dimensions; (i) in respect to health, and (ii) in respect to wealth. Hence, it is difficult to say if the respondents are risk-averse in respect to health, when they might be including information regarding their own wealth instead of health. This can involve factors such as lost income when being dependant on a wheelchair. Also, several of the respondents commented that they would like to know the costs, and pointed out, that in real life this would be the case.

In addition, individuals may have a very different interpretation of risk; one individual may interpret it as low, while another will interpret it as much higher. For some of the respondents the years in nearby future seemed more valuable, than more remote life-years, which may indicate that they have a so-called diminishing marginal utility in respect to

health (or they might be discounting). This makes it difficult to say something about the risk preferences of the respondents, since they obviously will interpret it differently.

Going over the main points, it is difficult to draw any strong conclusions in both question 2 and 3, mainly because it is not clear whether the questions raised are suitable for investigating linear (proportional) preferences in health. In addition, the questions do not capture whether people are risk-averse in respect to health, since there might be some evidence for saying that people are risk-averse in respect to own wealth – but this is not the research agenda. However, what might be the case is, given that individuals, who are risk-averse in wealth, also are risk-averse in health. This question will, however, be remained unanswered. Both questions (2 and 3) are certainly capturing people's preferences in one way or the other, however, because we do not have the complete understanding of what people actually are thinking (unspoken factors), we cannot draw any final conclusions.

Question 4

In question 4, there is a strong majority preference (69%) for wanting the National Health Service (NHS) to increase treatment capacity for disease B, although the treatment effect is half that in disease A, however, it has the highest probability of occurring (30%). This is not so surprising - individuals are choosing the disease that is more severe (you will have 6 days a week with symptoms, in contrast to 5 days a week), and disease B is most likely to occur (30% over 15%).

Concerning increasing treatment capacity in the NHS, the argument the majority gives, is that the difference between one or two symptom free days seems too small in relation to the risk of ending up in the severe state in question. What the respondents then are saying is that there is a larger difference between moving from “no symptom free days” to “one symptom free day”, than moving from “one symptom free day” to “two symptom free days”. This might point towards that individuals have a diminishing marginal utility of health (risk-averse in respect to health) when confronted with such a question, but it is not possible to draw any certain conclusions concerning this statement, at least not in these samples of employees and university students.

In addition, strong arguments concerning distributive values were revealed (aversion to inequalities in health). Although, the respondents were only asked to think of self-interest, arguments like “I would like to help as many as possible”, and “it is difficult to only think of

my own personal interest because I would like to help as many as possible, although the treatment effect is worse”, were revealed. Another said it was better to help many with less improvement, than few with a larger improvement. Some also said they did not want to take the risk, and would therefore like the NHS to give priority to the disease that was most likely to happen to them.

To bring to a conclusion, it seems like people are not so much willing to discriminate between patients groups with different potential for health improvements than we might have expected. However, as for the other questions given, it is not clear whether or not question 4 is suitable for investigating linear (proportional) preferences in health. Mainly because it is not possible to see whether the respondents are risk-averse in respect to health, or if they are considering other unspoken factors (taxes, premiums, etc.), and are therefore risk-averse in respect to wealth, in addition. However, question 4 gives us some hints concerning how people would want the NHS to prioritize in a socio-economic manner.

5.1 General Study Limitations

The following subsection will provide some of the possible study limitations.

To get enough valid substantiation to answer my research question, there are, first of all, not possible to generalize the findings because of the relatively small and homogenous samples. However, because of the relatively small samples of respondents, the present study cannot be interpreted as representative for the Norwegian population as a whole, but, nevertheless, it can shed some interesting light on patterns related to how people will prioritize when it comes to health related questions, and also encourage other researchers to do more empirical investigation in the future. On the other hand, the results seem stable across the two samples (NIPH and HLED).

By presenting all the questions in exactly the same order across the two samples of respondents, would possibly lead to some biases in the data collection (ordering effects). On the other hand, the study done by Enge (2007) on the same topic using approximately the same questions, did not report any ordering effects after completing her study. So with this in mind, it is likely to believe that the order of the questions did not influence the overall result considerably.

A vital limitation in the present study, is that there is not performed any statistical tests concerning whether or not the two samples (NIPH and HLED) differ from each other (statistical significant). In addition, the selection of subjects to the questionnaire was only based on voluntary participation, not a random sample.

Another possible limitation that will give bias is in the way the comments are being interpreted; the in-debt interviews were done in Norwegian, while the thesis was written in English. Although there is a possibility of such translation errors, I have tried to show a truthful picture of the responses, by presenting the comments as accurate as possible.

There are clearly several other factors that might influence the results of this thesis. Most importantly, the respondents' engagement to the task given, the age of the respondents, and the nature of the interventions, are all important aspects to how people will prioritize. Also, the individuals' family relations, and their goals in life are being emphasized. As far as one can tell, individuals may have strategic preferences in life to accomplish goals along the way. Sometimes this may be realistic goals, other times this may be what Schoemaker (1982) defines as "wishful thinking". Occasionally, individuals may show overconfidence in own personal health and what they are capable of achieving. "It won't happen to me" way-of-thinking is a statement several of the respondents highlighted when considering the more risky alternatives. "The risk seems too small" is another mentality I discovered when interviewing. According to Schoemaker (1982), people are generally overconfident when it comes to making decisions on their own behalf, but are more risk-averse when it comes to making decisions for others than themselves.

Past and present experiences with similar situations will affect the choices and preferences of the respondents. Individuals who in some way or another have any experience with similar diseases in near circle of acquaintances are in fact valuing the quality of life as considerably higher than individuals who have not any experience with such situations. Besides, individuals who have experienced such situations in the past may in fact have a higher appreciation to life.

By using face-to-face interviews rather than e-mail questionnaires, is one way to ensure that the respondents fully understood the nature of the exercise they were asked to undertake, and also a way to recognize their own personal thoughts behind the responses. In general, I had the impression that most of the respondents understood the given questions quite well, and

had understandable and reasonable arguments for their choices. However, what many of the respondents highlighted, were that they considered it as difficult to decide between the two options given, because they did not know what kind of diseases I was talking about, and also the fact that costs were not included, seemed strange to several of the respondents. Most of the respondents, who considered this a problem, chose the “in doubt” option, when possible.

The presence of the researcher may also in fact influence the respondent to answer in a way that he or she believes satisfies the researcher. Even though there is a possibility that some of the respondents felt the pressure to answer in an “acceptable” manner when I was listening, these errors should be minimized because of the possibility to ask questions during the process of the interviews, and also the opportunity to spend as much time as needed.

Even though the respondents had to use their imagination, and found it sometimes difficult to relate to the questions given, hypothetical thinking is the same approach as recommended by the Washington Panel (Gold et al. 1996). However, hypothetical situations evidently have some clear limitations, mainly because it seems like the respondents’ life situation and emotions play an important part when it comes to how they answer when being confronted with such hypothetical questions.

Another possible study limitation, and reason for people to answer the way they do, is what Tversky and Kahneman (1981) define as “framing effects”, characterized as an induced shift in reference level, depending on how a set of options is being described. Although the chance of such framing effects cannot be completely eliminated, considerable effort was put forward to ensure the neutrality of both expression and presentation of the scenarios presented. However, one observation that I did during the process of the interviews, was when I presented the probabilities of for instance 10% and 20%, several of the respondents commented that they did not consider it to be a significant difference between the two probabilities. Nevertheless, when I commented that this is the same as 1/10 and 1/5, many realized the large difference, and had to think twice about their decisions. This can be an effect of framing, or it can just be the fact that individuals do not have the complete understanding of probabilities. Probably you would get the answers you are looking for, if you just ask the “right” questions.

6. CONCLUSION

This thesis started out by saying that for cost-utility analysis to be a well functioning priority tool, it must be based several important assumptions; distributive neutrality (maximizing QALYs), proportionality (a linear utility function), mutual utility independence, constant proportional trade-off, risk neutrality on life-years, and additive separability. Furthermore, the intention was to confront individuals with hypothetical choices in order to investigate the functional form of the preferences for health – in particular whether or not the preferences for health are linear.

Considering the four questions given, there are several concluding remarks to be made. First and foremost, the questions asked are not perfectly composed when we want to find out whether or not individuals' show a linear utility function for health. If further research is to be done and stronger conclusions to be made, there might be an idea to construct questions which grasp the idea more closely. For instance, to find out whether individuals are risk-averse in respect to health, one might want to construct a question in the following way:

- A. Assume that you can choose a life that will for sure give you an average health equal to 80 (where 100 is considered as perfect health). In other words, your expected utility will be $U(80)$.
- B. Assume that you also can choose another life, where your average health will be 60 with 50% probability, and 100 with 50% probability. Your expected health will be: $0.5 \cdot 60 + 0.5 \cdot 100 = 30 + 50 = 80$ (the same as in A). Your expected utility will then be $EU = 0.5 \cdot U(60) + 0.5 \cdot U(100)$.

Following, if you are risk-averse in respect to health, you would now choose A over B – if you act in accordance with the expected utility theory. This is because your expected health is the same in A and B, but in B you are exposed to risk, and risk is a “cost” if you have a diminishing marginal utility in health (non-linear utility function).

In question 1, most people do not consider treatment potential as a crucial factor when asked to evaluate how strong the desires are for operation, in those who stand to gain only a little, compared to those who stand to gain more, even though there exist a mortality risk of 5 %. In question 2 and 3, when insurance alternatives are presented, the respondents were mainly

concerned with avoiding the worst state, instead of maximizing individual benefit (treatment effect). This becomes especially evident when the respondents are confronted with concrete examples of probabilities. In question 4, individuals show reluctance to inequalities in health, which makes it difficult to see whether or not people have risk-averse behaviour and therefore show a non-linear utility function (diminishing marginal utility). Overall, the respondents are seemingly taking several other aspects into account when considering competing treatment alternatives and insurance contracts, such as treatability, concerns for fairness, goals in life, etc. Several aspects may be unspoken and therefore not visible for me as a researcher, such as price of insurance, income lost, etc.

To sum up, it seems like the questions given could have been constructed in another manner to come to terms with the assumption about proportionality (linearity) more closely. Hence, the responses could well be related to other factors than the shape of own utility functions. However, the questions, is certainly capturing something about people's preferences as concerning the right to healthcare services, preferences for insurance contracts, and desires for increased treatment capacity. Yet, since we do not have the complete understanding of what people actually are including (unspoken factors), there is easier said than done to draw any strong conclusions. As a result, the findings are not confirming, neither the existence of linear utility functions, or risk-averse behaviour in respect to health.

Table of Authorities

- Abellan-Perpinan, J.M. & Pinto-Prades, J.L. (1999): *Health state after treatment: A reason for discrimination?* Health Economics, Vol. 8: 701-707.
- Bentham, J. (1789): *An Introduction to the principles of morals and legislation*. Oxford, UK: (Reprinted 1948) Blackwell, UK
- Bleichrodt, H., Doctor, J. & Stolk, E. (2005): A nonparametric elicitation of the equity-efficiency trade-off in cost-utility analysis. *Journal of Health Economics*, 24, (4): 655-678
- Brazier, J., Ratcliffe, J., Salamon, J. A. & Tsuchiya, A. (2007): *Measuring and Valuing Health Benefits for Economic Evaluation*. Oxford University Press, New York
- Brazier, J. (2008): *The QALY and its assumptions*. Lecture. Oslo: Institute of Health Management and Health Economics, 18.04.2008
- Bernoulli, D. (1738): *Specimen Theoriae Novae de Mensura Sortis*. *Commentarii Academiae Scientiarum Imperialis Petropolitanae*, Tomus V, pp.175-92. Translated by Louise Sommer as "Expositions of a New Theory on the Measurement of Risk". *Econometrica*, Jan. 1954, 22, pp. 23-26.
- Dolan, P. (1996): *The allocation of benefits in health care: Does equity matter?* Thesis for the first World Conference of the International Health Economics Association, Vancouver, May 1996
- Dolan, P., Shaw, R., Tsuchiya, A., & Williams, A. (2005): *QALY maximisation and people's preferences: a methodological review of the literature* 22. *Health Economics*, 14, (2) 197-208 available from: PM:15386656
- Drummond, F.M., Schulpher, J.M., Torrance, W.G., Bernie, J. O'Brien & Stoddart, L. G. (2005): *Methods for the Economic Evaluation of Health Care Programmes*. Oxford University Press, New York. 3rd edition.
- Enge, A. (2007): *A Quantitative and Qualitative Study of Individuals Preferences in Relation to Health Care Priorities*. Master Thesis, London School of Economics
- Fishburn, P.C. (1977): *Mean-risk analysis with risk associated with below target returns*. *American Economic Review*, 67: 116-126
- Fishburn, P.C. (1989): *Retrospective on the Utility Theory of von Neumann and Morgenstern*. *Journal of Risk and Uncertainty*, 2: 127-158.
- Frank, H.R. (2006): *Microeconomics and Behaviour*. McGraw-Hill/ Irwin, Business unit of the McGraw-Hill Companies, Inc., Avenue of the Americas, New York. 6th edition.
- Gold, M., Russel, L.B., Siegel, J.E. & Weinstein, M.C. (1996): *Cost-effectiveness in health and medicine*. New York: Oxford University Press.
- Hadorn, D.C. (1991): *The Oregon Priority-Setting Exercise: Quality of Life and Public Policy*. Hasting Center Report; 21, 3: 11-16. ProQuest Medical Library.
- Harris, J. (1987): *Qualifying the value of life*. *Journal of Medical Ethics*, Vol. 13: 117-123.

-
- Johannesson, M., Pliskin, J.S., & Weinstein, M.C. (1994): *A Note on QALYs, Time Trade-off, and Discounting*. *Medical Decision Making*, 14, 188-193
- Jonsen, A.R. (1986): *Bentham in a Box: technology assessment and health care allocation*. *Law in Medicine and Health Care*, Vol. 14: 172-174
- Kahneman, D. and Tversky, A. (1979): *Prospect theory: an analysis of decision under risk*.
- Kahneman, D. & Tversky, A. (2000): *Choices, Values and Frames*. Russell Sage Foundation, Cambridge University Press.
- Maynard, A. & Bloor, K. (1998): *Our certain fate: Rationing in Health Care*. London: Office of Health Economics.
- Menzel, P., Dolan, P., Richardson, J. & Olsen, J.A. (2002): *The Role of Adaptation to Disability and Disease in Health State valuation: a preliminary normative analysis*. *Social Science & Medicine*. Published by Elsevier Science Ltd.
- Miyamoto, J.M., Wakker, P.P., Bleichrodt, H., & Peters, H.J.M. (1998): *The Zero-Condition: A Simplifying Assumption in QALY Measurement and Multiattribute Utility*. *Management Science*, 44, (6) 839-849
- Mongin, P. (1997): *Expected Utility Theory*. Prepared for the Handbook of Economic Methodology (J. Davis, w. Hands, and U. Maki, eds. London, Edward Elgar, 1997, p. 342-350).
- Nord, E. (1992): *Kvalitetsjusterte leveår – muligheter, begrensninger, alternativer*. *Tidsskriftet Norske Lægeforening*; 112: 2668-70
- Nord, E. (1993a): *The trade-off between severity of illness and treatment effect in cost-value analysis of health care*. *Health Policy*, 24: 227-238. National Institute of Public Health, Oslo, Norway.
- Nord, E. (1993b): *The relevance of health state after treatment in prioritising between patients*. *Journal of Medical Ethics*, Vol. 19: 37-42.
- Nord, E. (1995): *The person-trade-off approach to valuing health care programs*. *Med Decis Making*. Vol. 15:201-208
- Nord, E. (1999): *Cost-Value Analysis in Health Care. Making Sense out of QALYs*. *Cambridge Studies in Philosophy and Public Policy*. Cambridge University Press. National Institute of Public Health, Oslo, Norge
- Nord, E., Pinto, J.L., Richardson, J., Menzel, P. & Ubel, P. (1999): *Incorporating societal concerns for fairness in numerical valuations of health programmes*. *Health Economics* Vol. 8: 25-39.
- Nord, E. (2007): *Diminishing Marginal Utility of Health gains: A potential Challenge for Cost-utility analysis*. National Institute of Public Health, Oslo, Norge
- Nord, E. (2008): Personal conversation, April 2008.
- NOU (1997:18): *Norwegian Commission on Prioritising in Health Care*, Norges offentlige utredning (Guidelines for prioritising in the Norwegian health service), Prioritering på ny. Gjennomgang av retningslinjer for prioriteringer innen norsk helsevesen. NOU 1997: 18. Oslo: Statens forvaltningstjeneste, Seksjon statens trykning, 1997 (text in Norwegian).

-
- Pliskin, J.S., Shepard, D.S. & Weinstein, M.C. (1980): *Utility functions for life-years and health status*. Oper Res. Vol. 28: 206-224
- Rabin, M. (2000): *Risk aversion and expected-utility theory: a calibration theorem*. Econometrica, Vol. 68, No. 5, 1281-1292
- Richardson, J. & Nord, E. (1997): *The importance of perspective in the measurement of quality adjusted life-years*. Medical Decision Making 17:33-41
- Roberts, T., Bryan, S., Heginbotham, C. & McCallum, A. (1999): *Public involvement in health care priority setting: an economic perspective*. Blackwell Science Ltd 1999, Health Expectations, 2, pp.235-244
- Schoemaker, P.J.H. (1982): *The Expected Utility Model: Its Variants, Purposes, Evidence and Limitations*. Journal of Economic Literature. Vol. XX: 529-563. Graduate School of Business, University of Chicago, USA
- Simon, A.H. (1955): *A Behavioural Model of Rational Choice*. Quart. J. Econ., Vol. 69:174-183.
- Sintonen, H. (1981): *An approach to measuring and valuing health states*. Social Science and Medicine, 15c:55-65.
- Treadwell, J.R. & Lenert, L.A. (1999): *Health Values and Prospect Theory*. Medical Decision Making, 19:344-352. Center for Biomedical Ethics, Stanford University Medical Center, Palo Alto, California
- Tversky, A. (1972): *Elimination by aspects: a theory of choice*. Psychological review. Hebrew University of Jerusalem. Vol. 79, No. 4, pp. 463-492
- Tversky, A. & Kahneman, D. (1973): *Availability: A heuristic for judging frequency and probability*. Cognitive Psychology. Vol. 5(2):207-232
- Tversky, A. & Kahneman, D. (1981): *The Framing of Decisions and the Psychology of Choice*. Science, Vol. 211:453-458.
- Vickrey, W. (1945): *Measuring Marginal Utility by Reactions to Risk*. Econometrica, Vol. 13, No. 4: 319-333. Published by the Econometric Society
- Viner, J. (1925): *Utility concept in value theory and its critics*. In Utility Theory. A Book of Readings (Edited by Page, J.) Wiley, New York
- Von Neumann, J. & Morgenstern, O. (1944): *Theory of Games and Economic Behaviour*. Princeton University Press, Princeton, New Jersey
- Wagstaff, A. (1991): *QALYs and the equity-efficiency trade-off*. Journal of Health Economics 10: 21-41. North-Holland.
- Wakker, P. & Tversky, A. (1993): *An Axiomatization of Cumulative Prospect Theory*. Journal of Risk and Uncertainty. Kluwer Academic Publisher.
- Weber, E.U., Blais, A.R. & Betz, N.E. (2002): *A domain-specific risk-attitude scale: measuring risk perception and risk behaviour*. Journal of Behavioural Decision making; 15, 4; ProQuest Psychology Journals.

Weinstein, M.C. (1988): *A QALY Is a QALY Is a QALY – Or Is It?* Journal of Health Economics 7: 289-290. North-Holland

Williams, A. (1985): *Economics of coronary artery bypass grafting*. British Medical Journal, Vol. 291: 326-329.

Williams, A. (1987): *Response: QALYfying the value of life*. Journal of Medical Ethics 13:123. University of York.

Williams, A. (1997): *Rationing health care by age: the case for*. British Medical Journal, Vol. 314: 820-822.

APPENDIX: Questionnaire

Holdninger til prioriteringer i helsevesenet

Med denne undersøkelsen ønsker vi å kartlegge holdninger til prioriteringer i helsevesenet. Vi er spesielt opptatt av hvordan respondentene vektlegger sykdommens alvorlighetsgrad og behandlingseffekt i situasjoner hvor enkeltindivider bes om å gjøre prioriteringer mellom ulike behandlingstilbud. Det er ingen riktige eller gale svar på spørsmålene i undersøkelsen. Vi ønsker bare din personlige mening. Vennligst unngå å gå tilbake til tidligere spørsmål.

Kvinne

Mann

Alder _____

Stilling _____

Fagbakgrunn:

Psykolog

Medisiner

Samfunnsviter

Statistiker

Realist

Annet

Utdannelse

Grunnskole

Videregående

Bachelor eller master

Phd

Yrkesutdanning

Tema 1: Pasienters ønsker om behandling

Tenk deg to sykdommer, A og B:

- som rammer like mange mennesker

- og gir like alvorlige plager: Pasientene får funksjonsnivå 6 nedenfor.

Funksjonsnivå	Beskrivelse
1	Full gangfunksjon
2	Kan gå inne og ute, men besvær med å gå mer enn 500 meter.
3	Klarer seg bra hjemme. Beveger seg med besvær i trapper og ute.
4	Beveger seg med besvær i hjemmet. Trenger hjelp i trapper og ute.
5	Kan sitte. Må ha hjelp til å bevege seg omkring.
6	Delvis sengeliggende. Kan sitte ca. halve dagen i en stol hvis hjulpet opp av andre.
7	Permanent sengeliggende

Begge sykdommene kan behandles med kirurgisk inngrep. Operasjonsrisikoen for død er 5 % i begge tilfeller.

Behandlingseffekten er:

Operasjon for sykdom A: forbedring i funksjon fra nivå 6 til nivå 2

Operasjon for sykdom B:

forbedring i funksjon fra nivå 6 til nivå 4

Tenk deg at du er i pasientenes sted. Hva tror du om styrken av de to pasientgruppenes ønsker om operasjon? Sett et kryss ved utsagnet du selv er mest enig i.

1. Pasientene med sykdom A vil ha **mye sterkere ønske** om operasjon enn pasientene med sykdom B. _____
2. Pasientene med sykdom A vil ha **litt sterkere ønske** om operasjon enn pasientene med sykdom B. _____
3. Det vil være omtrent **like sterke ønsker** i begge grupper. _____

Tema 2: Ønsker om helseforsikring vedrørende funksjonsnedsettelse

To mulige sykdommer A og B: Begge ville gjøre deg **helt ute av stand til å gå og helt avhengig av rullestol i et års tid** hvis du ikke fikk behandling. Behandlingsmulighetene er:

Sykdom A: Behandling ville gjøre deg **helt frisk**.

Sykdom B: Behandling ville gjøre at **du klarte å bevege deg noen meter uten rullestol, for eksempel i hjemmet**.

Etter et års tid vil sykdommene uansett gå over og du vil være tilbake til normal helse.

Hvis du skal prioritere mellom dem i forsikringspakken din, kan du blant annet tenke på følgende to måter:

1. Du ville først og fremst være opptatt av effekten av behandling. Med mindre sykdom B var klart mer vanlig, ville du derfor prioritere forsikring som dekker sykdom A.
2. Du ville først og fremst være opptatt av å unngå den alvorlige tilstanden som begge sykdommene i utgangspunktet innebærer, og ikke legge så stor vekt på om behandlingen gjorde deg bare noe bedre eller helt frisk. Derfor ville du prioritere forsikring som dekker den sykdommen det var størst sjanse for å få.

Tenk litt over disse to tenkemåtene og sett ett kryss ved utsagnet du selv er mest enig i.

1. Jeg er mest enig i tenkemåte 1.
2. Jeg er mest enig i tenkemåte 2.
3. Jeg er i tvil.

Et konkret eksempel:

Sykdom A: 10 % sannsynlighet for å få sykdommen, behandling gjør deg helt frisk.

Sykdom B: 25 % sannsynlighet for å få sykdommen, behandling gjør at du klarer å bevege deg noen meter uten rullestol, for eksempel i hjemmet.

Jeg ville prioritere forsikring som dekker sykdom A.

Jeg ville prioritere forsikring som dekker sykdom B

Med funksjonsnivå i dagliglivet menes evne til å stelle seg selv, bevege seg omkring, utføre arbeid, utføre fritidsaktiviteter, være sammen med andre, lese, se på TV osv. Tenk deg en skala for funksjonsnivå i dagliglivet som går fra null (helt invalidisert) til 100 (helt frisk). Hvis vi sier at tilstanden 'helt avhengig av rullestol' skårer 50 på denne skalaen, hvor vil du plassere den tilstanden som oppnås av behandling for sykdom B ovenfor (trenger rullestol, men klarer å bevege seg noen meter uten rullestolen, for eksempel i hjemmet)?

Svar:

Tema 3: Ønsker om helseforsikring vedrørende livstruende sykdommer

Tenk deg to sykdommer A og B som begge innen kort tid fører til død om man ikke får behandling. Behandlingsmulighetene er:

Sykdom A: Behandling som ikke helbreder, men som statistisk utsetter døden med ca **20 år**.

Sykdom B: Behandling som ikke helbreder, men som statistisk utsetter døden med ca **7 år**.

I begge tilfeller oppnår man å ha god livskvalitet i de vunne leveårene.

Hvis du skal prioritere mellom sykdommene i forsikringspakken din, kan du blant annet tenke på følgende to måter:

1. Du ville legge vekt på hvor mange år som vinnes ved behandling. Med mindre sykdom B var klart mer vanlig, ville du derfor prioritere forsikring som dekker sykdom A.
2. Gitt sykdommenes alvorlighet, ville du prioritere forsikring som dekker den sykdommen som det var størst sjanse for å få, og ikke legge så stor vekt på om det var 7 eller 20 år som kunne berges ved behandling.

Tenk litt over disse to tenkemåtene og sett ett kryss ved utsagnet du selv er mest enig i.

1. Jeg er mest enig i tenkemåte 1.
2. Jeg er mest enig i tenkemåte 2.
3. Jeg er i tvil.

Et konkret eksempel:

Sykdom A: 10 % sannsynlighet for å få sykdommen, behandling utsetter døden med ca 20 år.

Sykdom B: 20 % sannsynlighet for å få sykdommen, behandling utsetter døden med ca 7 år.

Jeg ville prioritere forsikring som dekker sykdom A.

Jeg ville prioritere forsikring som dekker sykdom B

Tema 4: Ønsker om prioritering i det offentlige helsevesen

To muskel- skjelett sykdommer A og B: Begge gir smerte som fører til sterkt redusert bevegelighet og en del søvnløshet. De er altså like alvorlige, og begge er kroniske.

En legeundersøkelse avdekker at din risiko for å få sykdom A om noen år er ca **15 %**. Din risiko for å få sykdom B om noen år er ca **30 %**.

For begge sykdommene finnes det behandling, men de er svært kostbare, og behandlingsskapasiteten er i øyeblikket utilstrekkelig. For begge sykdommer gjør behandling at symptomene ikke melder seg daglig, m.a.o. at pasientene får gode dager innimellom:

Behandling for sykdom A: **Et par dager i uka blir OK.**

Behandling for sykdom B: **Ca én dag i uka blir OK.**

Det er ingen utsikter til bedring i behandlingsmulighetene. Altså:

Sykdom A: **15 % sjanse** for at du får den, behandling vil **redusere symptomene med ca 30 %**.

Sykdom B: **30 % sjanse** for at du får den, behandling vil **redusere symptomene med ca 15 %**.

Hvis du skal gi uttrykk for dine egne ønsker mht prioritering i det offentlige helsevesen, kan det være flere forhold du vil legge vekt på, bl.a. følgende:

Du vil sikre deg behandling for den sykdommen det er størst risiko for å få.

Du vil gardere deg mot å måtte leve med de nevnte plagene hver eneste dag.

Du vil sikre deg behandling for den sykdommen der behandlingseffekten er størst.

Tenk litt over dette og svar så på følgende: Hvis du bare skulle tenke på din egen interesse, for hvilken av de to sykdommene ville du ønske at det offentlige prioriterte å øke behandlingsskapasiteten? Sett ett kryss:

Sykdom A

Sykdom B