

The purpose and scope of this book

The measurement and valuation of health benefits forms a major component of economic evaluation in health care. It continues to be a major source of contention, and yet at the same time the last three decades have seen major advancements in the methods of measuring and valuing health benefits. The range of tools has expanded considerably from the early notion of a 'health index' in the USA (Fanshel and Bush 1970) and the development of the Rosser Scale in the UK (Rosser and Watts 1972) in the 1970s, to the emergence of the EQ-5D in Europe (Brooks 1996) and the Health Utilities Index in Canada (Feeny *et al.* 2002). At the same time there have been important debates in the literature on a range of key issues such as the definition of health, the techniques of valuation, who should provide the values, techniques for modelling health state values, the appropriateness of valuation tools in children and vulnerable groups, cross-cultural issues and the problems of selecting instruments from the ever growing number available. These issues raise normative and positive problems that are core to the practice of economic evaluation. By addressing these issues in depth, this book aims to supplement a range of excellent texts on economic evaluation in health care (Gold *et al.* 1996; Drummond *et al.* 2005; Neumann 2005). Any reader of this book is encouraged to read one of these to provide them with the context for this book.

The issues addressed in this book are also important to health services research and to the field of quality of life research (sometimes known as patient-reported outcomes) in general, to which economics is but one contributing discipline. This field has seen contributions from an array of disciplines, including psychology and psychometrics, sociology, statistics, philosophy and the many health professions. The field of measuring health status and health-related quality of life already has a number of classic texts (Streiner and Norman 1989; Bowling 1991; Wilkin *et al.* 1992; McDowell and Newell 1996). These texts are primarily concerned with what economists would regard as measurement rather than valuation and are not concerned with the very specific requirements of economic evaluation. This book aims to

help bridge the gap between conventional psychometric approaches to measuring health and the needs of economic evaluation.

We hope our book provides the reader with an in-depth knowledge of one of the key elements of economic evaluation in health care, the measurement and valuation of health. It is written as a textbook, aiming to be comprehensive in coverage of topics, but at the same time up to date at the time of going to press. We believe it fills an important gap that has been generated by the establishment of the National Institute for Health and Clinical Excellence (NICE) and similar bodies around the world that require cost-effectiveness evidence in the form of incremental cost per quality-adjusted life year (QALY). It is aimed at academics and students of health economics and other areas of economics concerned with the valuation of intangible benefits such as health; practitioners from economics and other disciplines engaged in generating economic evaluations for research bodies; governmental agencies in health care (such as NICE) and non-health care agencies whose programmes affect health (e.g. human services, environment and transport); pharmaceutical companies and management consultancies. The book should appeal to professional economists and comparative novices alike. The measurement and valuation of health is a multidisciplinary endeavour, and this book seeks to be inclusive by being accessible to a wide audience.

Chapter 2 is an introduction to the topic, and experienced health economists may prefer to skip it. It provides a justification for why health economists have entered an already crowded field. It presents the basic economic problem of scarcity and choice, and an overview of the techniques developed to assess the relative efficiency of different programmes. The chapter then considers the role and limitations of existing clinical and health-related quality of life measures in economic evaluation. These limitations provide the rationale for developing an alternative measure of the value of health, namely the QALY. The QALY is then briefly described. One of the best known examples of a measure to value health states to calculate QALYs is the generic preference-based measure, the EQ-5D (Brooks 1996). However, underpinning this and similar instruments are a number of core questions: what should be the measure of value, how should it be described, how should health states be valued, who should provide the values, and how should these values be aggregated? The remainder of this book addresses these questions from a number of different perspectives and examines the many methods used.

Chapter 3 examines the theoretical foundation of valuing health benefits and the appropriate measure of value. It starts with a review of welfare economics and market failure. It considers in some detail the theoretical foundation for assessing programmes using the Pareto criterion and the

Kaldor–Hicks compensation criteria. It then considers why the method of willingness to pay, which is often the preferred approach in economics to valuing intangibles, has not been as widely used in health care. The chapter then offers alternative justifications for the QALY including its foundations in welfare economics and non-welfare economic approaches. The chapter goes on to examine the foundation of the QALY in consumer theory, and specifically expected utility theory. For QALYs to represent preference-based utilities requires a number of restrictive assumptions to hold. The extent to which these assumptions are violated is reviewed, along with alternative preference-based measures such as the healthy year equivalent.

Chapter 4 deals with the second question, namely how should health be described. It considers the debates around the scope of a QALY from a narrow clinical definition of health through to a broad and all-encompassing definition of quality of life. This chapter reviews the pros and cons of generic and condition-specific measures in the context of economic evaluation. Can condition-specific measures, for example, be used to make cross-programme comparisons? If not, then what can be done when generic measures appear to be insensitive to a health change? The chapter also examines the more difficult conceptual issue of defining health, and considers the implications for health benefit measurement in economic evaluation. The chapter then moves on to consider more practical questions in the construction of health states: use of health state descriptive systems versus bespoke vignettes, generation and selection of dimensions and items, and the testing of the reliability and validity of the final measure (bearing in mind the context throughout is economic evaluation).

Chapter 5 turns to more familiar territory of how to value health states. It describes the range of techniques that are currently used and considers the arguments for and against each of them. It looks in some detail at the theory behind the methods and the issues in imputing health state values from these tasks. A more neglected topic has been the impact of different variants on the values obtained, which has been shown to be more important in some cases than the differences between techniques, which is also considered here.

Chapter 5 then examines the question of whose values. There is evidence that people's valuations for a state depend on who they are and the perspective they take. Values have been shown to differ systematically by a number of personal characteristics such as age and illness experience. It has also been shown that patients valuing their own state give different values from those given by members of the general population trying to imagine the state. The reasons for these differences are examined (with interesting parallels to the notion of response shift from the psychometric literature). In this chapter, we review the

normative arguments for and against using patient experiences compared with the hypothetical preferences of members of the general population.

Most descriptive systems give rise to a larger number of possible health states than can be feasibly valued in a valuation survey, and so values are usually elicited for a subset. The problem is then how to model from this subset in order to value all possible states defined by the instrument's descriptive system. Chapter 6 addresses this problem. Two main approaches have been used to estimate utility values for all states: methods based on multiattribute utility theory and those based on statistical inference. This chapter considers the technical issues in applying these approaches and reviews some of the latest developments in the field, including the use of a non-parametric Bayesian approach.

This is followed in Chapter 7 by an examination of the rapidly developing area of modelling ordinal data, such as data generated from ranking and discrete choice experiments (DCEs) to estimate health state values. Given the complexity of conventional cardinal valuation techniques, there has been interest in using apparently simpler tasks such as ranking and discrete choice experiments to estimate mean health state values. While ordinal methods, especially DCEs, have been used for a number of years in health economics, it is only recently that they have been used to value health for use in economic evaluation. Ordinal methods offer a promising approach to obtaining valuation data from more vulnerable groups such as children and the very elderly. This chapter presents the theoretical basis for using ordinal data and its analysis, and reviews recent empirical work.

Chapter 8 provides a highly practical review of approaches to obtaining health state values. It describes the different approaches including: using generic preference-based measures (including a detailed review of the EQ-5D, HUI2, HUI3, SF-6D, QWB and AQoL), mapping from health status and health-related quality of life measures onto a preference-based measure, valuing vignettes (compared with using a descriptive system such as the EQ-5D), direct preference elicitation from patients, and finally the use of health state values published in the literature. This practical guide offers a useful question and answer approach to deciding on the best way to obtain health state values under different circumstances.

Chapter 9 examines the analytical issues raised in two contexts: economic evaluations alongside clinical trials and decision analytic modelling. Their use in economic evaluations alongside clinical trials raises important issues of design, such as the design of the data collection, mode of administration, who to ask and how frequently to administer the measure. It also raises important analytical problems of dealing with missing data and uncertainty. The second, and increasingly the more important application, is in the context of decision

analytic modelling. Here the problem is built around the health states being used in the economic model, and the analyst must consider the best place to collect relevant data. This also raises the important problem of how to characterize the uncertainty around health state values for use in Monte Carlo models. The other consideration is whether QALYs should be discounted and, if so, at what rate.

Having calculated QALYs using one or other of the methods described in this book, the final question addressed in Chapter 10 is how such data should be aggregated. One important issue is whether a QALY to a group with one set of characteristics is the same as the QALY to another group that differs in terms of their socio-demographic variables, health status or even the extent to which they have brought the condition upon themselves.

Interest in using cost per QALY to inform resource allocation has mainly come from developed countries. Low- and middle-income countries have shown less interest, but for them it is arguably even more important. Chapter 11 reviews attempts to apply the ideas described in this book through the particular lens of the developing country perspective. We provide a brief introduction to the disability-adjusted life year (DALY), which is an alternative to the QALY that has been favoured in much of the cost-effectiveness work in developing countries, and extend the discussions of key issues in the definition, description and valuation of health to address some of the added considerations demanded by cross-cultural applications of the methods and tools that are the focus of this book.

The final chapter concludes with a discussion of the way forward in the light of the substantial methodological differences, the role of normative judgments and where further research is most likely to be productive in taking the field forward (at least in our opinion!).

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