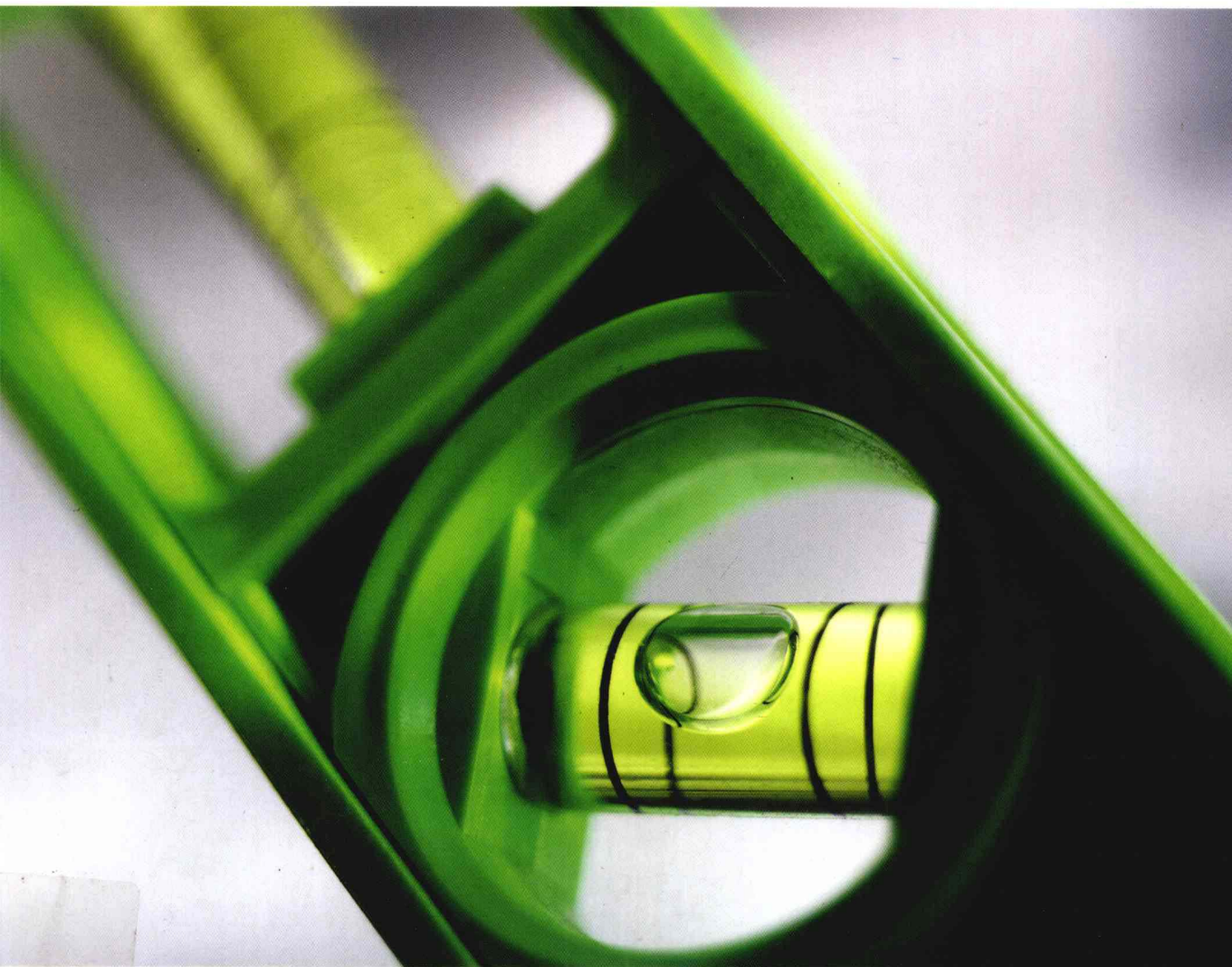


Economic Analysis

IN HEALTH CARE



STEPHEN MORRIS | NANCY DEVLIN | DAVID PARKIN

Economic Analysis in Health Care

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West Sussex PO19 8SQ, England
Telephone +44 (0) 1243 779777

Email (for orders and customer service enquiries): cs-books@wiley.co.uk

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Wiley also publishes its books in a variety of electronic formats. Some content that appears in print may not be available in electronic books.

Anniversary logo design: Richard J. Pacifico

Library of Congress Cataloging-in-Publication Data

Morris, Stephen.

Economic analysis in health care / Stephen Morris, Nancy Devlin, David Parkin.

p. : cm.

Includes bibliographical references and index.

ISBN-13: 978-0-470-01685-5 (pbk. : alk. paper)

ISBN-10: 0-470-01685-X (pbk. : alk. paper) 1. Medical care – Case studies. 2. Medical care – Finance – Case studies. 3. Medical care – Finance – Cross-cultural studies. I. Devlin, N. J. (Nancy J.) II. Parkin, David. III. Title.

[DNLM: 1. Delivery of Health Care – economics. 2. Costs and Cost Analysis. W 84.1 M877c 2007] RA394.E2566 2007
338.433621 – dc22

2006100396

A catalogue record for this book is available from the British Library

ISBN 978-0-470-01685-5

Typeset by SNP Best-set Typesetter Ltd, Hong Kong

Printed and bound in Great Britain by Bell & Bain, Glasgow

This book is printed on acid-free paper responsibly manufactured from sustainable forestry in which at least two trees are planted for each one used for paper production.

This book is for our lovely children: from Steve to Eve and Stella;
from Nancy to Sophie, Molly and Hugh; from Dave to
Susannah, Eleanor, Laura and Stephen

Preface

Each of us has, for many years, taught health economics courses to both masters and undergraduate students in the UK (and, in Nancy's case, New Zealand) – and our objective here was to write the sort of book we always wished was available for our students.

As health economics has grown as a subdiscipline, so too have the number of textbooks that are available. The many fine US textbooks in this subject are inevitably influenced by the particular system for funding and provision of health care in that country; the focus of these is not always appropriate for the principal concerns and issues in *other* health care systems. And while there are textbooks on health economics in the UK, for example, these generally either aim to provide an easy-to-understand, non-technical introduction to health economics for those with no economics background, or focus on one particular aspect of health economics, such as economic evaluation or health care financing. While some of these books are excellent, their objectives limit their usefulness as a teaching tool for a more general course in health economics.

This book is written to provide (we hope!) a useful balance of theoretical treatment and breadth of content for use in undergraduate modules in health economics for economics students, and for students taking a health economics module as part of their postgraduate training. Although we are writing from a UK perspective, we have attempted to give an international flavour to the book by drawing on examples, case studies and boxed highlights not just from the UK but from a wide range of countries including Canada, Finland, Ireland, Italy, New Zealand, Sweden, Thailand and the USA, plus multinational sources including the OECD, the United Nations, the WHO and the World Bank.

There are other things about this book that we hope will be of particular value to students. First, we have paid special attention to explaining key elements of theory in health economics – for example, the contributions of Arrow (1963) and a full account of the Grossman (1972) model, both of which we view as critical to any account of health economics. We have not shied away from presenting and explaining the technical aspects of the theory, but have endeavoured to do so in as user-friendly a manner as possible. Secondly, we have been careful to link the practice of economic evaluation to underlying concepts in production, costs and efficiency. This reflects our own view that, as the practice of economic evaluation has come to be dominated by increasingly

sophisticated statistical and modelling techniques, the underlying economics concepts (and, incidentally, a remaining rich research territory) are sometimes overlooked.

We very much hope that this book will serve to provoke thought and stimulate a deep interest in health economics, in the same way as earlier writers, particularly Alan Williams, Victor Fuchs and Tony Culyer, served to inspire us in our careers.

Finally: both for you and for us, this book represents a starting point. In addition to what you read between these covers, we have a wide range of complementary teaching and learning resources – study questions, practical exercises, and animated slides, that we have developed over many years of lecturing, which will be made available online to lecturers and students using this text and will be continuously updated.

Stephen Morris, Nancy Devlin, David Parkin

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Chapter 1

Introduction to Economic Analysis in Health Care

1.1 LIFE, DEATH AND BIG BUSINESS: WHY HEALTH ECONOMICS IS IMPORTANT

You may come to this book knowing a great deal about economics, but not a great deal about health care, other than your personal experience of ill health and its treatment. Alternatively, you may come to this book with experience in the health care sector, but no training in economics. Whatever background you bring to it, we are confident that you will find the study of health economics fascinating. Learning to look at health and health care issues through the distinctive lens of the economist will forever change the way you think about them.

Understanding the economics of health care is important for a number of reasons. First, health is important to us as individuals and as a society, and health care is one, though not the only, way of modifying the incidence and impact of ill health and disease. The availability of health care can determine the quality of our lives and our prospects for survival. Economic analysis offers a unique and systematic intellectual framework for analysing important issues in health care, and for identifying solutions to common problems. Quite literally, then, the economics of health care is a matter of life and death.

Secondly, the health care sector of the economy is very large. In the USA, spending passed the US\$ 1000 billion mark in 1997 and currently accounts for just over 15% of the US Gross Domestic Product (GDP). Forecasts by the Office of the Actuary at the Centers for Medicare and Medicaid Services (2005) suggest that spending on health care will account for US\$ 3600 billion – nearly one-fifth of all US economic activity – by 2014. Researchers from the US National Bureau of Economic Research suggest that it is entirely plausible that health care spending will reach 33% of GDP by the middle of the century (Hall and Jones, 2004). In the UK, where health care is predominantly funded by general taxation, spending on health care comprises 17% of all government spending (Chote *et al.*, 2004) and health care is a major consideration in fiscal management of the economy. Indeed, health care is a major component of spending, investment and employment in every developed economy (Reinhardt *et al.*, 2002, 2004; Fuchs, 2005), so the economic performance of the health care system is crucially linked to the overall economic well-being of a country and its citizens.

Thirdly, decisions about how health care is funded, provided and distributed are strongly influenced by the economic environment and economic constraints. Global, national and local policy responses to health issues are increasingly being informed by economics ideas and methods of analysis. One good reason for understanding health economics, even if you do not intend ultimately to practise as an analyst yourself, is to be able to engage in policy debates as an informed critic. As Joan Robinson commented: ‘the purpose of studying economics is not to acquire a set of ready-made answers to economic questions, but to learn how to avoid being deceived by economists’ (Robinson, 1980, p. 17). Less cynically, for those working in the health services, familiarity with the theory and methods of economic analysis is becoming essential, both to understand the context of your practice and because evidence on productivity, efficiency and value for money are increasingly the norm in modern health care systems.

Health economics is the application of economic theory, models and empirical techniques to the analysis of decision making by individuals, health care providers and governments with respect to health and health care. It is a branch of economic science – but it is not merely the *application* of standard economic theory to health and health care as an interesting topic. Health economics is solidly based in economic theory but it also comprises a body of theory developed specifically to understand the behaviour of patients, doctors and hospitals, and analytical techniques developed to facilitate resource allocation decisions in health care. Health economics has evolved into a highly specialised field, drawing on related disciplines including epidemiology, statistics, psychology, sociology, operations research and mathematics in its approach. Alternatively, it may be regarded as an essential part of a set of analytical methods applied to health, which are usually labelled *health services research*.

This chapter provides a gentle introduction to some of the basic economics concepts that underpin the more detailed and rigorous treatment of health economics in the remainder of the book.

1.2 HEALTH CARE AS AN ECONOMIC GOOD

Economics is a social science. Its central concern is the study of behaviour of economic agents – individuals, firms, governments and other organisations – when confronted with scarcity. Underpinning economic analysis are the general observations that:

- resources are limited; and
- potential uses of those resources are unbounded.

The focus of economic analysis is decisions and choices about the production and consumption of *economic goods*, defined as any good or service that is scarce relative to our wants for it.

Using this definition, health care is an economic good, in the following specific sense. The resources that are used to produce health care services, such as human resources, capital and raw materials, are finite: more of these resources can be devoted to the production and consumption of health care only by diverting them from some other use. Our wants for health care – what we would choose to consume, in the absence of constraints on our ability to pay for it as a nation or as a consumer – have no known bounds. No health care system, anywhere in the world, has achieved levels of spending sufficient to meet *all* its clients' wants for health care.

If we accept that health care is an economic good, the implications are quite profound. Choices must be made about what quantity and mix of health care to produce, how to produce it, who pays for it and how it is distributed. These basic economic questions are unavoidable. Health care is not available in endless supply, and the more health care we choose, the more of something else must be sacrificed. And because health care is so important to our welfare as human beings, these choices are particularly difficult and contentious ones to make.

The nature of choice, and the inevitable tradeoffs encountered in making these choices, are captured in what is probably the most fundamental notion in economics – *opportunity cost*. The opportunity cost of committing resources to produce a good or service is the benefits forgone from those same resources not being used in their next best alternative.

Each action taken by patients, by health care providers or by governments with respect to the use of health care involves the sacrifice of the benefits that would have been enjoyed by other, alternative uses of the resources used to provide that care. The concept of opportunity cost lies at the heart of *all* economic analysis: when

economists refer to cost, we mean opportunity cost – not to an accounting procedure. For example, weighing up the costs and benefits of a decision to make beta-interferon available to all multiple sclerosis patients involves assessing the benefits to multiple sclerosis patients from that treatment, compared with the benefits that would have been possible by using those same resources to treat *other* patients, suffering other conditions. Box 1.1 illustrates the concept of opportunity cost in relation to a 2004 recommendation by the UK National Institute for Health and Clinical Excellence that the NHS should fund in-vitro fertilisation (IVF) services for infertility (NICE, 2004).

Focusing on opportunity cost provides a powerful way of sharpening thinking about decision making at all levels of the health care system. Table 1.1 represents these decisions as a series of choices, identifying the opportunity costs associated with each.

In a predominantly tax-funded health care system such as those in New Zealand and the UK, where the government fixes the budget at the start of each period, these choices are effectively a ‘top-down’ hierarchy of decisions, implemented in roughly the order shown. In other health care systems, such as Germany’s social insurance system, or the complex mix of private insurance and federal- and state-funded programmes in the USA, there is no hierarchy – for example, how much is spent on health care overall is partly determined ‘bottom-up’, by decisions of individual insurers and patients.

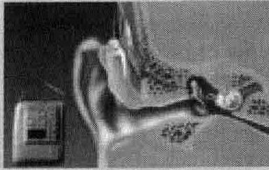
Regardless of how the health care system is organised, the key point is this: the production and consumption of health care incurs real, human costs, as well as creating real, human benefits.

Box 1.1 The opportunity cost of in-vitro fertilisation (IVF)

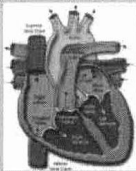
To provide one course of IVF treatment, the UK’s National Health Service pays around £2700. If each patient received, on average, three courses of IVF, the benefit, for women less than 40 years of age, is an increase in the probability of a successful pregnancy, defined as a live birth, by 0.3. Is this good value for money?

Answering this question requires us explicitly to weigh up this benefit against the opportunity cost (Devlin and Parkin, 2003). The resources devoted to each IVF patient could instead be used to provide the following.

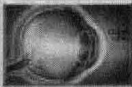
In the UK health care sector



One-third of a cochlear implant



One heart bypass operation



Eleven cataract removals



One hundred and fifty vaccinations for measles, mumps and rubella (MMR)

Elsewhere in the UK public sector



One-thousandth of a Challenger 2 military tank



Half a junior school teaching assistant for a year



Two thousand school dinners

From a limited budget, the most efficient mix of services to fund will be that which generates the greatest aggregate benefit. But efficiency is not the only criterion: equity – fairness in the distribution of health care and health outcomes – is also an important consideration in most health care systems.

Data Sources

Challenger 2 price estimates: <http://www.armedforces.co.uk/army/listings/10023.html>

Department of Health (2005) *National Tariff 2005–6*, Annex A. <http://www.dh.gov.uk>

Devlin and Parkin (2003)

National Institute for Clinical Excellence (2004) *Costing clinical guidelines: fertility (England)* 23 February 2004. <http://www.nice.org.uk>