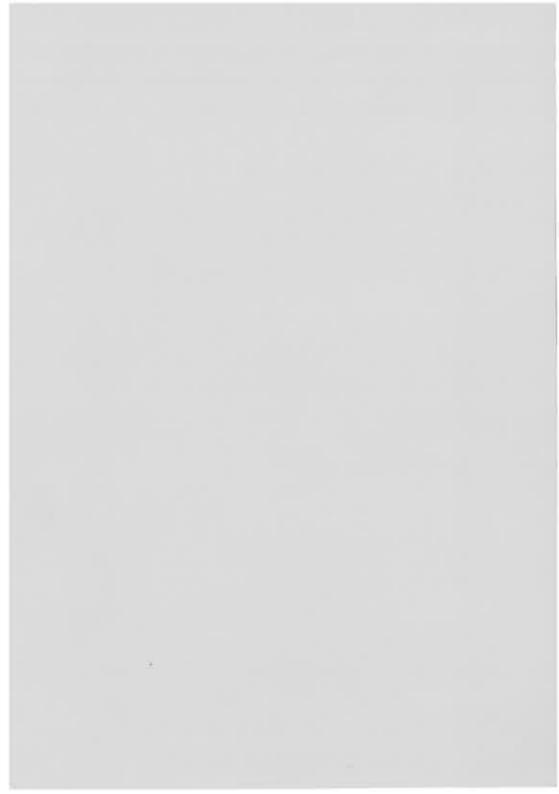
## WORKING PAPER 337

# COSTS AND MODELLING IN HEALTH SERVICES -A BIBLIOGRAPHY

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# WORKING PAPER School of Geography University of Leeds



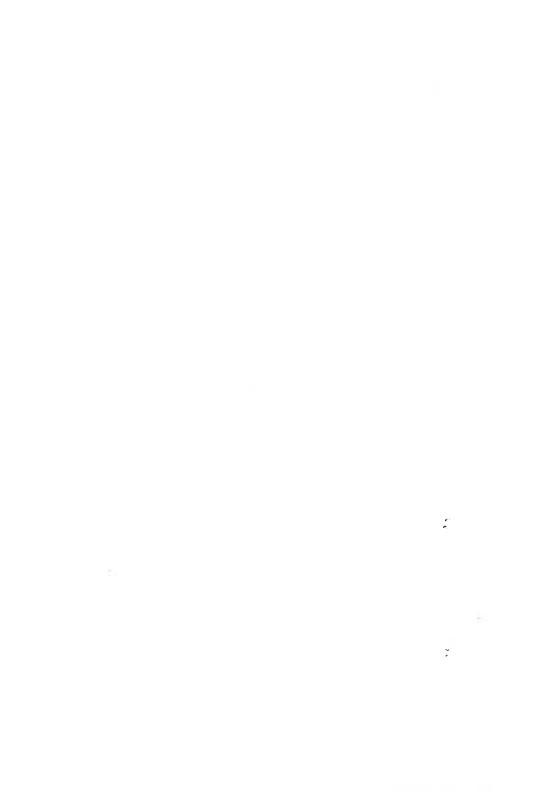
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## INTRODUCTION

Over recent years economic recession in Britain has been accompanied by a decline in most sectors of public expenditure. The National Health Service (NHS) has not escaped this and health authorities can now no longer assume steadily increasing real growth in their funding. Increasing emphasis is being placed on efficient use of resources available and strict financial targets are being imposed. Under such circumstances the need for information on how much health services cost to provide, their efficiency and their effectiveness (by no means easy to determine given the nature of this industry's "output") becomes of paramount importance. This is particularly the case in the field of forward planning and the allocation of resources among various services in different locations.

A research team at the School of Geography, University of Leeds, is currently investigating planning and resource allocation problems in health service provision. This bibliography arises from part of that work in relation to the costs of providing services and in modelling their planning and allocation.

## A NOTE ON CONTENT AND CLASSIFICATION

The content of the bibliography arose from research interests in the Leeds project; hence its focus on health economics, costs and planning and resource allocation models. Sections 1-3 concentrate on the former topics whereas Sections 4 and 5 have planning and modelling as their main theme. However a link between those themes is made if it is considered that modelling often needs to know the costs of providing services to represent the system accurately and be of use in planning and resource allocation.

There is, of course, a very wide range of literature available on the subject and it has been impossible to be sure of including eyery last reference. It is hoped, however, that omissions are not major. Additional material would be appreciated for future reference.

The classification of the bibliography is a division into five main sections and a series of one or more subsections. Cross referencing has been done by quoting the other sections and a reference may be found in the parentheses after its citation. The classification system adopted is, hopefully, adequate for this version of the bibliography despite its shortcomings and suggestions for its future improvement would also be welcomed.

## **ACKNOWLEDGEMENT**

This work is supported by a grant from the S.S.R.C. - Grant No. HR.7850/1.

## LIST OF JOURNALS

Many journals contain articles on health economics and planning and are worthy of regular consultation. They fall into three main categories and these are listed below together with some of the relevant journals.

## 1. Economics

American Economic Review
Applied Economics
Economica
The Economic Journal
International Journal of Social Economics
Journal of Political Economy
Oxford Economic Papers
Review of Economics and Statistics
Scottish Journal of Political Economy
Socio-Economic Planning Science

## 2. Medical and medical administration

British Journal of Surgery British Medical Bulletin British Medical Journal Health and Social Services Journal Health Trends The Hospital and Health Services Review Hospital Management International Journal of Epidemiology International Journal of Health Services Journal of Chronic Diseases Journal of Epidemiology and Community Health Journal of Nursing Administration Journal of the Royal College of General Practitioners Journal of the Royal College of Physicians Lancet Medical Care Nursing Research Social Science and Medicine

# 3. Operations Research/Modelling

Environment and Planning A
Geographical Analysis
Health Services Research
Inquiry
International Journal of Operational Research
Journal of the Royal Statistical Society
Management Science
Operations Research
Operational Research Quarterly/Journal of the Operational Research
Society
Social Science and Medicine

#### ECONOMICS AND HEALTH 1.

There are two subsections under this heading. The first contains references which serve as an introduction to the use of economics in the field of health care; the second examines the results of empirical work in applying the economic tools of costbenefit analysis and cost-effectiveness analysis to health services.

## 1.1 Health economics : general references

For general economic principles the reader is referred to standard economic text books (Lipsey 1979; Samuelson, 1980) but as health services have established their own niche in economics so has grown up an extensive range of literature on that subject. These cover British (Cullis and West, 1979) and American (Feldstein, P.J., 1968) viewpoints and many are edited collections of papers often from conference proceedings (Perlman, 1974). Some references are on specific economic factors affecting health services (Fuchs, 1967; Crossman; 1972).

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## 1.2 Applications of cost-benefit analysis and cost-effectiveness analysis to health care services

Report Series, WHO, Geneva.

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#### : 2. COSTS AND COST MODELS IN HEALTH CARE SERVICES

Beginning with some statistical sources the following subsections examine work which has been carried out in estimating the costs of individual treatments, in hospital costs and also at the national level of the N.H.S.

#### 2.1 Some British Statistical Sources

The N.H.S. routinely gathers a large amount of data, much of it generated , as a result of case load (see the D.H.S.S. annual returns on Health and Personal Social Services Statistics for example). However they are not always presented in a useful form and their accuracy is also in doubt (Alderson and Dowle. 1973):

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- facts and figures". Health Trends 8, pp. 8-12.

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  D.H.S.S. (1969-71) (annually) "Digest of health statistics for England and Wales". D.H.S.S., London.

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- London.
- D.H.S.S. and O.P.C.S. (1972 annually) "Report on hospital inpatient enquiry for 1970 - preliminary tables". Continued (1977 - as "Hospital inpatient
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## 3. INDICATORS OF HEALTH SERVICE EFFECTIVENESS

Use of economic analysis in the health services is handicapped by, amongst other things, the difficulty in relating inputs (essentially money) to outputs (a change in the health status of an individual or community). Indicators of the effectiveness of health services form a large part of research into ways of improving the efficiency of those services. Indicators of demand for health services by use of waiting lists or health status indices are also included under the heading of this section as by working to reduce or improve them does (crudely) count towards increasing effectiveness.

## 3.1 Waiting lists

The use of waiting lists as a surrogate measure of demand or output efficiency is not a foolproof method (Yates, 1980). However, it can give some indication of demand pressures.

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## 3.2 Health status indices

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# 3.3 Measures of output and effectiveness

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## PLANNING AND RESOURCE ALLOCATION IN HEALTH

In this section are presented references which cover the topics of planning and resource allocation in health. The first subsection deals with these subjects in general: the second takes a closer look at planning and resource allocation methods used in the N.H.S.

#### 4.1 General concepts in health planning

Some general problems are examined by Ahumada et al. (1965) and Phillips (1981). A view of the utility of economics in health planning is given by Mills and Lee (1979). Using cost and efficiency criteria for planning is one method (Elkin and Cornick, 1970) but for the politician role in planning see Parston (1980).

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# .2 Planning and resource allocation in the N.H.S.

Although there have been planning documents in the N.H.S. for many years (Ministry of Health, 1962) it was in the 1970s that 'planning' really began to emerge as an important concept linked to the availability and distribution of resources (D.H.S.S., 1975). The Resource Allocation Working Party Report (R.A.W.P.)(1976) has been influential in stimulating planning (D.H.S.S., 1980) and in the inequalities in resources available to different parts of the country (Snaith, 1978, Akhurst, et al., 1979).

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## OPERATIONS RESEARCH AND MODELLING IN HEALTH SERVICES

Mathematical modelling and other analytical techniques to increase understanding of the health system and to enable the consequences of decisions taken about it to be more accurately evaluated have been a feature of health services research over the past 25 years.

Some are based on simulation modelling and there is an extensive range of literature on public facility location and resource allocation modelling. Examples of modelling access to health services and of accident and emergency service provision are given to show how these techniques can be applied to specific problems.

## 5.1 An overview of OR in health

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## 5.5 Modelling applications I : access to health services

This and the subsequent subsection 5.6 list references associated with applications of modelling to particular research problems in health care Access to medical care is examined in this section, Aday, and Andersen (1974) offer a framework for study in this subject. researchers concentrate on the accessibility of particular health services; Ingram et al (1978), Knox (1978).

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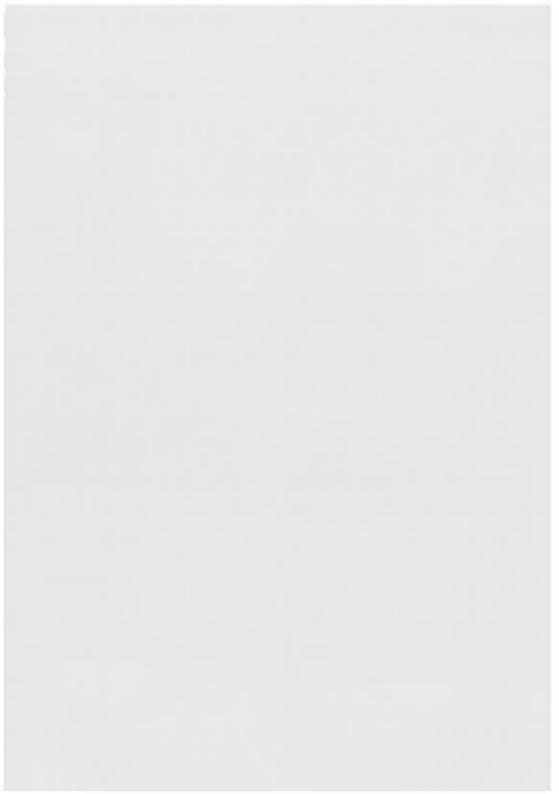
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5.6 Modelling applications II : accident and emergency services	
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