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PRIORITY SETTING MODELS FOR HEALTH

The role for priority setting and a critique of alternative models
A summary

Report to the Population Health Division
Department of Health and Aged Care

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Contribution

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Synopsis

The Population Health Division of the Commonwealth Department of Health and Aged Care commissioned the Health Economics Unit, Monash University, to review alternative priority setting models to identify a preferred priority setting framework for use by the Division and more broadly by health policy makers. The preferred model is then to be applied to a selected disease or health problem and desirable resource shifts determined.

The priority setting question concerns the allocation of ‘health care’ resources for the benefit of society as a whole, which is properly the perspective of a regional or national health agency/department, but possibly not of an agency or health care provider. The need for a formal approach to priority setting is identified as arising out of market failure in health.

A set of performance criteria is developed and various models for priority setting assessed against these criteria. The performance criteria adopted are that:

- a decision rule is specified;
- a societal perspective and a health system wide approach are adopted;
- service options are precisely defined and selected to ensure comprehensiveness of coverage;
- a mechanism exists to determine objectives and incorporate them into the measure of benefit;
- a marginal perspective is adopted;
- costs and benefits are derived from objective evidence;
- the method can be implemented.

Priority setting approaches are reviewed against these criteria under three broad headings:

i. Implicit approaches - historic decision rules and best practice guidelines;

ii. A set of models focused on the description of health needs and health problems:
   - community surveys, goals and targets,
   - cost of illness/burden of disease, and
   - avoidable mortality/morbidity;

iii. A set of models said to be based on economic principles:
   - Health-Sector-Wide Disease-Based Model (HSW-DBM),
   - Health Benefit Groups/Healthcare Resource Groups (HBGs/HRGs) approach,
   - Program Budgeting and Marginal Analysis (PBMA), and a modified approach incorporating a requirement for objective evidence and an exclusive focus on the margin (dubbed EBMA, evidenced based marginal analysis),
   - QALY League Tables,
   - Large scale comparative program evaluation – as exemplified by the work of the Pharmaceutical Benefits Advisory Committee (PBAC).

Most models perform well with respect to perhaps two or even three criteria, but fail badly on others. HSW-DBM and EBMA are the only two models that meet all/most criteria. Both were developed in an attempt to address the formal requirements of a model for priority setting, and in view of apparent weaknesses of other models.
They come closest to achieving implementability without undue compromise to the theoretical principles. They best address the challenge of retaining breadth of scope in specification of the research question, whilst also demanding high levels of evidence and the adoption of a genuine marginal analysis, within realistic health planning budgets.

Recent applications of these two models, for the Health-Sector-Wide Disease-Based Model (HSW-DBM) to non-insulin dependant diabetes and of EBMA to selected interventions for cancer, have confirmed the suitability of both of these models for the setting of priorities for the health sector.

The HSW-DBM may be most appropriate where the task is resource allocation across the entire health sector, while EBMA is possibly suitable for an agency or provider with a more narrowly defined research question, although this model could plausibly be applied across the health sector using the framework of the HSW-DBM.

In terms of the specific interests of population health, the HSW-DBM is particularly useful. It is specified in a way to question the balance in current resourcing of primary prevention, early diagnosis and management, and by alternative modalities. For instance, the funding of services to address risk factors is analysed in the context of a specific health problem potentially influenced by the risk factor. This means that desirable resource shifts can be identified not just within public health, but also between public health and primary care, acute, residential care etc.

It is concluded that the preferred priority setting model would combine desirable features from:

i. HSW-DBM:
   - the health sector wide framework, the approach to staging of the analysis by health problem and disease stage,
   - the approach to defining intervention options to ensure comprehensiveness;

ii. EBMA:
   - the use of an expert panel to assist in specification of intervention options for review and to contribute to the specification of program objectives and the most suitable measure of benefit, and to achieve support for recommendations;

iii. common elements:
   - the decision criteria - which is to maximise net benefits, however defined,
   - the use of published evidence to establish cost-benefit/cost-utility ratios, and
   - the adoption of a marginal analysis.
SECTION I INTRODUCTION

1 Scope of the project

This Summary Paper represents the first output of a priority setting research program commissioned by the Population Health Division of the Department of Health and Aged Care to identify suitable models to guide resource allocation for public health and the health sector more broadly. The Summary Paper is supported by a detailed Technical Report.

An Options Paper to explore possibilities for application of the recommended priority setting model is the next paper in the series. The final research phase is the application of the priority setting model to a selected health problem area. The case study could constitute the first in an on-going commitment by the Department of Health and Aged Care to priority setting, to establish desirable resource shifts, and to optimise the health service mix. A possible fourth stage of the research program is the consideration of incentives and health system reform options that would support the achievement of the recommended resource shifts.

2 Context: Priority setting within a broader health planning framework

Priority setting is one of the important health planning tasks that face governments in seeking to enhance the distribution of health care resources. As shown in Figure 2.1, there are two primary points at which governments can intervene to adjust the health service mix and access by the community to health services. These are i) the way health funds are allocated to populations, which can be primarily driven by supply or allocated through a needs adjusted funding formula to meet equity objectives, and ii) the way resources are allocated between programs and services which can be essentially adhoc or based on a formal priority setting mechanism, supported by complementary incentives.

Thus funds are allocated to regions and ultimately to services and consumers though a combination of program based payments and in response to service provision/demand, occurring through HIC payment for medical services and drugs (listed on the PBS). The opportunity for determining the funding to regions or programs is identified with the current interest in the application of resource allocation formula, based on needs adjusted calculations. The second influence on resource allocation can occur through the setting of priorities and the adoption of incentives for their achievement. This is again illustrated in Figure 2.1.

The activities involved in setting priorities are described further in Figure 2.2, where the major inputs to that process have been identified. This identifies for instance the role for needs-based studies and randomised control trials.

This paper is primarily concerned with the allocation of the communities’ resources at the regional or national level although some comments are made about the relevance of the models to priority setting at the agency level.
Priority Setting Models for Health. The role for priority setting and a critique of alternative models: A summary

Figure 2.1 Health sector planning framework

FUNDER

Resource allocation formula
eg. Risk-adjusted capitation

Single fundholder/Purchaser
eg. regional health authority

Priority setting
eg. using HSW-DBM

Program based payments
eg. cancer screening, aged care

Supply driven payments
eg. under MBS

Health System Elements eg. Payment arrangements, entitlements under Medicare

Priority setting

Providers/Services

Consumers, Patients/Citizens
Figure 2.2  Health planning for priority setting

- Define objectives of the health sector
- Select disease/health problem
- SET PRIORITIES
  - Apply priority setting framework (eg. HSW-DBM, PBMA)
- Implementation strategy
- Monitoring

Data inputs/research requirement:
- Community surveys, review policy documents
- Needs Based Studies - Cost of illness etc., evidence of misallocation of resources
- CEA, CUA, CBA; informed by RCTs, health service use and cost
- Health system reform, health services planning, PHEBAM
3 Need for a formal approach to priority setting

3.1 Overview

There is reason to believe that the current health service mix is sub-optimal and that there would be large gains from shifting resources between programs/services. This is suggested by:

- the nature of the health market, which embodies characteristics of market failure, and
- the observed differentials in cost-effectiveness ratios for health interventions.

This evidence is outlined below and provides the rationale for a priority setting mechanism to identify desirable resources shifts. This is followed by a description of the desirable features of a model for priority setting and a set of criteria against which to assess the performance of competing models. The remainder of the paper contains a brief description and a critique of alternative models, which is supported by a more comprehensive discussion in the companion technical report.

3.2 The nature of health and characteristics of market failure

In the neoclassical theory of perfect competition, the assumed characteristics of profit maximisation, market contestability and independent and well informed consumers, ensure productive efficiency (least cost production), and allocative efficiency (the optimal mix of goods and services).

The central features of the competitive market are:

- supply side competition - many potential providers of (health) services and minimal restrictions on the nature of provision,
- informed consumers able to give effect to their preferences,
- the absence of externalities - all costs of production are borne by the suppliers and all benefits of consumption are reaped by consumers.

The market in health does not meet these conditions, due to aspects intrinsic to health, and the government role in the health market. These distortions in the health market, which are outlined below, mean that resources for health will not be allocated efficiently.

I. Aspects intrinsic to health

i. Traditional causes of market failure – externalities, public goods, natural monopoly merit goods: Externalities occur when the benefits (and costs) of consumption are not captured by the individual. Consequently too little of the service would be purchased by the consumer, who would not consider the benefits accruing to others in their decisions. This is a common feature of health. Consider for instance drug and alcohol harm minimisation programs and immunisation against infectious diseases, which typically yield benefits beyond the individual, (eg to the family and the wider society).

1 For further discussion on sources of market failure in health, see Le Grand et al 1992, or McGuire et al 1988.
Public goods relate to goods or services for which it is difficult to preclude persons from consumption, making private market supply problematic. Typical examples are clean air policy, food safety standards, public health promotion campaigns (to reduce the spread of AIDS, for road safety, etc.). In the absence of health services planning and public sector support, supply of such services will tend to be lower than is socially desirable.

Natural monopoly covers goods and services for which provision through a single provider is most efficient. Public health/engineering services, such as sanitation and clean water are typical examples of natural monopolies. Private provision will tend to restrict supply and compromise quality to maximise profits, resulting in sub-optimal provision where access and quality assurance are of concern.

Merit goods: Most societies accept an obligation to dissuade individuals from behaving in a way that is seriously damaging to their health. An example is the use of harmful drugs which is, in most societies, discouraged regardless of individual preferences, again suggesting the market solution will not be optimal.

ii. Equity and access: Perhaps the most compelling reason for not relying on the market for resource allocation in health is the importance of 'fair' access to health services. Few, if any, communities accept the proposition that access to health services should be determined entirely (if at all), by willingness and ability to pay. Rather, there is a widely held view that need, however defined, should be the primary determinant of access. Large differences in health outcomes between subgroups are widely viewed as unacceptable. The distribution of health, not just the sum, is of concern to society. Furthermore the objectives of efficiency and equity must be addressed simultaneously rather than sequentially. The production and distribution of health services are contiguous, and income transfers do not represent an acceptable recompense for health degradation.

iii. Uncertain impact of health service use and health: People seek health services for their capacity to contribute to their health and wellbeing. But the relationship between health and wellbeing, and the consumption of health services is complex. Outcomes can be highly variable, influenced by patient and provider characteristics and random variation. Documentation of the effectiveness of even common health interventions is incomplete, and rarely available at the clinician or hospital level. The capacity for informed decision-making is further compromised by the inaccessibility of health information about oneself. Patient information typically resides with numerous service providers, with no-one holding complete knowledge of current patient care, health status, tests performed, test results, drug reactions and the like.

iv. Provider as agent: Consumers invariably seek the advice of clinicians in making decisions about health care. The provider is in effect the patient's agent. But, a number of characteristics of providers impinge on their capacity to fulfil the agency role. The provider does not necessarily acknowledge or understand the role of agent, and may have a vested interest in the advice given.
II. Distortions arising from the Government's role in the health market

v. **Moral hazard and adverse selection**: Because of the unpredictable nature of health and ill health, and the possible size of health expenditures, insurance is a common solution to the sharing of risk. In removing the direct relationship between use of services and payment, there may be an incentive by the patient to over-consume. This is referred to as ‘moral hazard’.

vi. ** Preferential status is conferred on certain types of services and delivery arrangements**: Only medical consultations and optometry are eligible for reimbursement through the Medicare Benefits Schedule (MBS), promoting the use of these services compared with other private health professional services not so covered - such as allied health services or nurse education.

The GP also has privileged status as ‘gate keeper’ to specialist services, and with other medical practitioners as the referral source for pathology, investigative procedures and pharmaceuticals. The MBS also provides, almost exclusively, payment for services delivered through one-on-one provider/patient consultation, distorting the models of care.

vii. **Program based service provision**: Health services are provided through numerous separate programs, each with their own funding arrangements, inhibiting resource shifts between programs limiting the capacity of providers and the service system to respond to changing health care needs. The juxtaposition of uncapped funding, (for example of medical services and pharmaceuticals) and capped funding of other programs exacerbates the distortions implied by program based funding.

viii. **Shared responsibility for funding and delivery of health**: Responsibility for health and other human services is shared between Federal, State and local governments. No single agency or level of government has responsibility for the overall health of a community or commensurate control over the health budget. The shared responsibility, combined with multiple funding sources and inadequate performance criteria encourages each agency to focus on its own financial targets, rather than the health outcomes for the community. Cost shifting is rewarded, perverting the health service mix. Decision making based on financial considerations for the agency is unlikely to be efficient from the community perspective.

ix. **Lack of control over budgets and multiple funders**: Consumers rarely pay directly for all their health services, nor are health services funded through a single funder. Without the control over an entire health budget, the consumer and/or their agent is poorly placed to make an informed choice about the optimal mix of health services.

### 3.3 Differentials in cost-effectiveness ratios

Observed differentials in cost-effectiveness ratios provide evidence that the allocation of resources in the health sector is not optimal. This is as predicted from the nature of the health market and the role of government, further supporting the role for a priority setting framework.
In a major US study by Tengs and colleagues (1995), estimates of the cost-effectiveness ratios of 500 life saving interventions, drawn from the health, transport, industry and environment sectors have been brought together. Within the health sector substantial variation in cost-effectiveness ratios is identified. Programs range from cost saving for some drug and alcohol treatment programs, prenatal care and well targeted public health programs, to over US$200,000 (~A$333,000) per life year gained for others, (eg poorly targeted intensive care services, some screening programs).

Differences in cost-effectiveness ratios are also reported in Australia. Some health interventions that could be expanded are potentially cost saving - such as interventions for the prevention of type 2 diabetes (Segal 2000) and expansion of the SunSmart and Tobacco control programs (Carter 2000), while other services could be contracted at substantial cost saving for only a small increase in risk of death, (such as extending the screening interval for cervical cancer from two to three years or delaying age of screening commencement from 18 to 25 years, at a saving of over $500,000/life year lost - Carter 2000). Drugs submitted for reimbursement through the PBS between 1994 and 1997 have been approved at cost/life year saved ranging between $5,050 and $68,900 per life year gained (George et al 1999).

3.4  Role for a priority setting framework

The potential gains from addressing allocative inefficiency, by redirecting resources from services which perform relatively poorly, to those which yield greater benefit per unit of cost are real and substantial. The transfer of resources from a program that yields one life year per $100,000 allocated to an alternative program that yields one life year per $5,000 would achieve a net gain of 19 life years for each $100,000 transferred.

It can also be observed that developments in health delivery systems have not obviated the need for models of priority setting. Purchaser-Provider, Managed Competition and Managed Care models of health care funding and delivery demand and facilitate a formal priority setting activity. Purchasers require advice on how to select between competing health interventions to meet the health needs of their communities.
4 Performance criteria

4.1 Introduction

Priorities can either be implicit or explicit. The former are the unintended outcomes of the various pressures on providers, government agencies, purchasers and patients – seen for instance in waiting lists, and the inability to access some services, while access to other services is unimpeded. An explicit approach to priority setting requires the development of a framework or model, and a set of protocols for decisions about which services and programs are to be provided/expanded and which services are to be contracted. It is only by using an explicit approach that resources can be directed to maximise the achievement of the objectives of society in relation to health. Implicit approaches will not do this for the reasons explained above.

4.2 Performance criteria

A number of criteria have been developed against which the performance of models for priority setting can be assessed. In broad terms a model for priority setting needs to meet three primary requirements. Firstly, there is a process for setting priorities and recommending resource shifts that recognises the reality of scarcity and the need to make choices; secondly, there is a logic relating the priority setting process to the communities’ objectives; and finally the process is capable of implementation in the context of a ‘reasonable’ health planning budget. These performance criteria reflect priority setting in the context of a region or state setting to allocate resources to maximise the objectives of their community.

They have been translated into seven distinct criteria:

i. **The decision rule and process for setting priorities are specified:** The most basic requirement is that a decision rule is specified, resource scarcity is recognised, and precise criteria for the redirection of resources are enunciated.

ii. **The research question and analysis perspective is that of society:** For a regional or national model the research question should be defined broadly to encompass the entire health/welfare sector, and a societal perspective is adopted, or as a second best the perspective is explicit.

iii. **The selection of program/service options is comprehensive and precisely defined:** The selection of program/service options should be comprehensive and precisely defined with options unconstrained by existing services or current program boundaries. The model should facilitate identification and comparison of interventions offered through various delivery settings (potentially outside the health sector), provided by various agencies, and supported through different funders.

iv. **Objectives are well defined:** A mechanism exists to determine objectives to reflect society values and to incorporate into the measure of benefit.
v. **A marginal perspective is adopted:** A marginal perspective should be adopted relating to program decrements/increments, identifiable sub-populations and alternative program characteristics, and whereby the impacts at the margin are recalculated after each presumed resource shift.

vi. **There is rigour in measurement of costs and benefits:** The adoption of high standards of evidence in the measurement of program impacts both costs and benefits. Decision making based on inadequate data should be discouraged. The specification of data collection needs is a valuable outcome of the priority setting process.

vii. **There is capacity of implementation:** Specifically are the resource requirements of the model (in terms of skills, expertise, funding), commensurate with the importance of the task, not simply against the resources actually allocated to the task of priority setting.²

4.3 **Models subject to review**

A number of Models have been reviewed to assess their integrity relative to these criteria. They are:

i. implicit approaches - historic decision rules and best practice guidelines,

ii. a set of models focused on the description of health needs and health problems:
   - community surveys, goals and targets,
   - cost of illness/burden of disease, and
   - avoidable mortality/morbidity,

iii. a set of models said to be based on economic principles:
   - the Health-Sector-Wide Disease-Based Model (HSW-DBM),
   - the Health Benefit Groups/Healthcare Resource Groups (HBGs/HRGs) approach,
   - Program Budgeting and Marginal Analysis (PBMA),
   - QALY League Tables,
   - program evaluation – as exemplified by the work of the Pharmaceutical Benefits Advisory Committee (PBAC).

The description and critique of these models is the subject of Section II of this paper, with conclusions about performance and selection of a preferred model in Section III.

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² For instance total health services expenditure in 1997-98 was $47,267 million (AIHW Health Expenditure Bulletin No 15). Given the evidence of inefficiency in resource allocation, this provides a prime face justification for a substantial budget for priority setting.
SECTION II MODELS FOR PRIORITY SETTING: DESCRIPTION AND CRITIQUE

5 Implicit models

5.1 Introduction
There are a number of health planning processes, which influence resource allocation, but in a way that is implicit rather than explicit. Specifically considered here are historic-based decision making and the development and adoption of best practice guidelines. While both these approaches have their use, in the first instance to achieve budget control and in the second case to guide clinical practice, the impact on resource allocation is incidental and as such unlikely to maximise the benefits to society.

5.2 Historic-based model
Description
Under historic-based decision rules, program funding is based on the previous year’s allocation, adjusted for changes in selected parameters presumed to influence unit cost or demand, with program areas treated alike regardless of performance. This approach is commonly applied often as the default option rather than a purposeful choice.

Performance
Historic funding can be highly effective in achieving nominated financial outcomes. It imposes low transaction costs for decision making and training. However, the model in effect assumes that existing priorities, as embodied in the current resource allocation is optimal, and that any reduction or increase in program funding will be equally effective, regardless of to where additional resources are allocated, or from where they are withdrawn. This is not consistent with the evidence as noted in Section 1.

5.3 Best practice guidelines
Description
Best practice guidelines are developed by clinical groups, primarily to support the adoption of best practice care. They tend to ignore the capacity of the health system to deliver best practice care, guidelines are based on evidence of clinical effectiveness and can have an important influence on the pattern of patient care and management. Though best practice guidelines are not usually considered a formal priority setting mechanism, they may have a major influence on the pattern of patient care and management and thus the health service mix.

Performance
Best practice guidelines are developed on the basis of clinical effectiveness. The implication is that all those with capacity to benefit should receive care. This discourages provision where an alternative superior intervention exists or where benefits are unlikely.
However, it has no process to establish priorities if resources are insufficient to provide best practice care to all those who meet the relevant clinical criteria. The approach cannot be translated into service implications and recommended resource shifts in the context of resource scarcity. In the absence of such criteria, rationing will be implicit (for instance based on age or capacity to pay).

Best practice guidelines can provide a useful input into a priority setting process, contributing to the definition of possible intervention options. They can also contribute to health planning, and assessment of the resource implications and manpower requirements of access to best practice care.
6 Health planning approaches

6.1 Introduction
There are various health planning models which seek to assess health problems and needs, and which are sometimes proposed as approaches to priority setting. They include community surveys and epidemiological studies, burden of disease and cost of illness studies and the avoidable mortality/morbidity approach. All of the needs-based approaches are essentially descriptive in nature. They provide valuable insights into the size and distribution of health problems and can contribute to the prioritisation of health problems and in monitoring the achievement of access and equity objectives. None of the models include decision criteria for translating problem identification into desirable resource shifts, and thus do not provide an approach to priority setting.

6.2 Community surveys
Description
Needs assessments, based on community surveys are commonly undertaken by agencies with a regionally defined constituency, such as local government. They tend to highlight a wide range of health concerns, encompassing such issues as personal safety, the physical environment and opportunities for productive use of time. Disease or ill-health is rarely the over-riding concern (Summers 1992, Higginbotham et al 1993).

Performance
Even though community surveys are relatively common, there is little documentation about how such surveys might be used. There is no specified process for determining priority programs or recommended resource shifts. Such studies, including also epidemiological studies of comparative health status, can however provide a useful input to the priority setting task in identifying areas that may warrant a priority setting program.

6.3 Goals and Targets
Description
The use of ‘Health Goals and Targets’ for health care decision making was initiated by WHO in the late 1970s, under the slogan ‘Health for All by the Year 2000’, and has been used in Australia, for instance in developing ‘Goals and Targets for Australia’s Health in the Year 2000 and Beyond’ (Nutbeam et al 1993). This document covers numerous diseases/health problems, with a brief description of disease burden and presumed ‘preventability’ followed by targets for reduction in disease incidence and prevalence. Goals and targets are expressed either in general terms, eg ‘reduce the incidence of osteoporosis in older women’ (Nutbeam et al 1993, P93), or more precisely eg to ‘reduce mortality from heart disease in males aged 30-64 years by 50% by 2010’ (Nutbeam et al 1993, P34).
Performance

These studies tend to be vast in scope, resulting in analyses that lack depth. There are no defined criteria for the setting of goals and targets, no explanation of the methods by which the goals and targets have been derived, and no discussion of how the goals and targets are to be achieved and no process to prioritise recommendations. The Goals and Targets approach does not constitute a model for the setting of priorities or advising on desirable resource shifts.

6.4 Cost of Illness/burden of disease

Description - general Cost of Illness studies

Cost of illness or burden of disease studies aim to measure the impact of a particular disease, or risk factor on the community, in terms of mortality, morbidity and/or health service use and cost. Cost of illness studies typically cover three components:

i. **Direct costs** - health service costs for management (and prevention) of the subject disease (including complications);

ii. **Indirect costs** - the reduced value of economic activity through illness and premature death attributable to the subject disease; and

iii. **Intangible costs (direct health burden)** - the loss in wellbeing through the impact of the subject disease on health related quality of life and premature death. While both ill health and premature death are tangible, the valuation placed on this loss is intangible.

There is a fundamental difference between the latter two cost categories ii) and iii) which reflect the burden of disease incurred and i) the direct cost on the health system, which reflects the costs incurred to reduce that burden.

The Australian Institute of Health and Welfare (AIHW) has undertaken a series of Cost of Illness studies to estimate the impact of disease on the community, by major disease class and subclass, by risk factor, age and sex (Mathers 1996). The focus of this work has been to attribute health service costs – for hospital inpatient services, medical services, pharmaceuticals, nursing homes and allied health services, to disease classes and risk factors – based on aggregate health expenditure data. This research is now known as the Disease Costs and Impact Study (DCIS). Early versions of this research program also included estimates of attributable mortality, in total deaths and life years lost (to age 65 or 75), and an estimate of indirect costs based on estimated lost work days through illness and premature death.

Description - Global Burden of Disease and Australian Burden of Disease studies

Most prominent of the cost of illness type studies is that initiated in the early 1990’s jointly by the World Bank (1993) and WHO, commonly known as the ‘Global Burden of Disease Study’ (GBD). This was the first attempt to quantify the impact of disease, injury and health risks worldwide. The focus of this work is intangible costs ie. Class iii as mentioned above. Disease burden has been quantified across 108 major causes of death and disability, for eight geographic regions and ten age-sex groups and attributable to several risk factors, for 1996 and projected to the year 2020 (Murray and Lopez 1996).
The Global Burden of Disease study has used the Disability-adjusted Life Year (DALY) as the measure of health status/disease burden, in order to combine morbidity and mortality into a single burden of illness measure. The DALY comprises years of life lost (to a nominated life expectancy), plus years lived with disability (YLDs) multiplied by the relevant disability weight. The higher the disability weight (to a maximum of 1) the worse the health state. The Global Burden of Disease study also utilised age weights.

The AIHW and the Victorian Department of Human Services have also completed similar analyses to estimate the burden of disease for Australia and Victoria in DALYs. A comprehensive set of DALY estimates for all major disease and injury groups has been published (Mathers et al. 1999, DHS 1999a, 1999b). The two Australian studies adapted the GBD methodology to suit the Australian context. For example differential age weights were not adopted and alternative disability weights were used for selected conditions.

**Performance**

The role of cost of illness studies has been the subject of on-going debate. Disease costings can be used, in a simplistic way to estimate the potential savings from a reduction in disease incidence (eg see Box 6.1). Diseases responsible for a high level of health service cost and morbidity and mortality burden can be highlighted, as a potential focus for a priority setting exercise.

**Box 6.1 Macro economic evaluation model (MEEM)**

Rob Carter has used the Cost of Illness approach (which he was instrumental in developing while at the AIHW), to undertake hypothetical studies of the potential impact on health service costs of disease prevention (Carter 1994). The MEEM model assumes that any reduction in disease incidence will be accompanied by an equivalent proportional reduction in the cost of disease management. Projected downstream savings (suitably discounted) can be estimated and offset against the costs of disease prevention.

Cost of Illness and Burden of Disease studies do not include any criteria for recommending resource shifts. Despite a presumption that where disease burden is greater ‘more resources should be allocated’, this does not constitute a criterion for resource allocation. Also as noted by Drummond and colleagues (1986), where cost of illness is defined in terms of attributable cost to the health system, this would suggest that priority should be given to those health problems which already attract more resources, which might be quite inappropriate.

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3 This contrasts with the QALY, Quality Adjusted Life Year, for which the lower the value the worse the health state.

4 Applying a positive weighting to ages 10 to 55 years (to peak at 150% at 25 years) and a negative weighting at ages less than 10 years and above 55, to be 0 at birth and 40% at 90 years.
Thus while Cost of Illness and Burden of Disease studies have undoubted value as health status descriptors, their role in the context of priority setting is quite limited. There has been a lively debate over the use of cost of illness and burden of disease estimates for priority setting. Mooney and others have argued that they have no role in the setting of health service priorities (Mooney and Creese 1994; Mooney, Irwig and Leeder 1997), while Vos and Mathers (1998) and Mathers et al (1998) who have been the primary developers of cost of illness estimates in Australia have argued that disease costing studies have a central role in priority setting.

While the Cost of Illness/Burden of Disease methods fail to define decision rules for making choices between competing uses of health care resources, they cannot provide a mechanism for priority setting. For instance there is no process for identifying intervention options. Even if it agreed that 'size of burden' is important, this does not define where health resources should be allocated.

However, Burden of Disease and other cost of illness studies can contribute in other ways to the health planning task. For instance, in describing health status across different populations, observed differences in health status can inform equity objectives and provide a basis for monitoring their achievement (or failure there-of). Needs-based studies, such as these may provide information that can be used by health planners in determining where to focus a priority setting work program.

6.5 Avoidable mortality and morbidity

Description

'Avoidable mortality and morbidity' relates to the capacity to prevent/ameliorate/delay illness or death through prevention, early diagnosis or treatment. It has been suggested that this concept defines 'potential' health gain and may be of value in priority setting.


i) 'primary avoidable mortality' preventable by addressing risk factors,
ii) 'secondary avoidable mortality' responsive to early detection and management,
iii) 'tertiary avoidable mortality' where case fatality rate is responsive to medical or surgical treatments,
iv) 'preventable hospitalisations' avoidable through population-based health promotion strategies,
v) 'ambulatory sensitive hospitalisations' responsive to primary health care and
vi) hospitalisations avoidable through injury prevention.

Deaths and hospitalisation for a large number of disease conditions have been allocated to each category, based on literature review and use of expert opinions and subject to external peer review. The resulting estimates appear in the Ministry of Health Report (1999). In 1996-7 almost 70% of deaths to age 75 were assessed as being potentially avoidable. The approach to defining and classifying mortality and morbidity as 'avoidable' appears to be quite subjective and does not rest on a thorough and detailed assessment of all the possible intervention options for reduction in disease burden, through primary prevention, primary care and tertiary prevention.
Performance

As a method for setting priorities this approach suffers from precisely the same limitations as the cost of illness and burden of disease studies, in that it does not incorporate any decision process for choosing between competing health care demands. Furthermore the methods used to classify what is avoidable and how avoidability is to be allocated across primary prevention, primary care and tertiary prevention are questionable at best and there is no formal examination of the costs and effectiveness of possible interventions. The interpretation of results is also unclear. For instance an increase in avoidable deaths might reflect new possibilities for control, or deterioration in the quality of management.

In sum, the non-economic approaches, while they represent a dominant thrust of health services planning, fail to incorporate decision rules for priority setting in a situation of resource scarcity. Thus, they cannot provide a mechanism for adjusting the health service mix towards optimal. They can however, provide a valuable input into a priority setting exercise (see Figure 2.2), but the decision rules for making choices will have to be introduced from elsewhere.
7 Economic approaches

7.1 Introduction

The approaches considered here are Program Budgeting and Marginal Analysis (PBMA), the Health-Sector-Wide Disease-Based Model (HSW-DBM), the QALY League Table approach, the Health Benefit Groups/Healthcare Resource Groups (HBGs/HRGs) and program based approaches. All of the approaches to priority setting based on economic principles recognise resource scarcity. They have several other features in common, such as a focus on interventions, their cost and effectiveness, a recognition of the need to define health objectives, most also take a marginal approach. But only some, notably the HSW-DBM and the QALY League Table offer a health sector wide approach with a societal perspective.

The approach to evidence also varies. The PBAC Guidelines adopt the most stringent requirements in relation to rigour of evidence. All models involve some compromise given the enormity of the priority setting task if conducted according to the theoretical ideal. For instance the standard PBMA approach fails to ensure comprehensiveness in the coverage of interventions and accepts poor quality evidence on costs and benefits to allow priorities to be established with limited research effort.

The HBGs/HRGs model maintains a breadth of scope, but at the sacrifice of confidence in the quality of data and vagueness in the specification of interventions. The PBAC model maintains a consistency in approach and high quality of evidence, but at the cost of a narrowly defined research question and narrowly defined objectives. The QALY League Table approach promises a breadth of scope and consistency of approach, but at the cost of data quality and a general failure to adopt a marginal analysis. While the definition of benefit is acknowledged as an important issue and a focus of several models, research into the objectives of the health sector as defined by the community is required, which could proceed independently of a priority setting process.

The quest is to find which model(s) retain the greatest integrity within a manageable process.

7.2 Health-Sector-Wide Disease-Based Model

Model development

The Health-Sector-Wide Disease-Based Model (HSW-DBM) was developed in 1993 at the Health Economics Unit, Monash University5, as a framework for priority setting that would meet the formal needs of a priority setting model. It is based in the discipline of economics, with a focus on resources and interventions, and in the process for making choices under scarcity.

A priority setting exercise must disregard existing program boundaries, if it is not to perpetuate existing inefficiencies. Thus, framing of the research question, to encompass the entire health/community services sector and ensuring comprehensiveness in the selection of interventions for comparison were important in the development of the Model. But, this implies a very large research task and the need for a strategy to make the task manageable.

The solution was to develop an approach to staging the priority setting activity, such that intermediate conclusions are likely to be consistent with the global optimum. This is most likely to occur where the research question is structured by health problem rather than by service type or health delivery setting.

**Key features of the Health-Sector-Wide Disease-Based Model (HSW-DBM)**

The HSW-DBM is described with reference to Tables 7.1 and 7.2. Table 7.1 depicts the total health (and community services) sector. (The scope of ‘the health sector’ is not resolved as part of the Model definition, but is a matter for interpretation in the particular application.) The Framework provides for all health services, actual and potential to be classified by i) health problem/disease class (the horizontal axis) and ii) population subgroup at key stages in the disease process/health problem development (the vertical axis).

Each column in Table 7.1 encompasses all the potential interventions that may address the specific health problem/disease, grouped by stage of disease and population target:

- the healthy community or persons at risk - a possible target for prevention services,
- persons with early stage disease/health problem development - potentially suitable for screening and early case finding,
- persons with established disease or health problem - suitable for management,
- persons with intractable disease - suitable for end stage management or palliative care.

**Table 7.1 Framwork for Health-Sector-Wide Disease-Based Model**

<table>
<thead>
<tr>
<th>Disease Stage/Population or patient target</th>
<th>Health problem/Disease class</th>
<th>Total resource use</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Endocrine Disorders</td>
<td></td>
</tr>
<tr>
<td></td>
<td>type 2 diabetes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>type 1 diabetes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cancers</td>
<td></td>
</tr>
<tr>
<td></td>
<td>breast lung etc</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Neurological</td>
<td></td>
</tr>
<tr>
<td></td>
<td>stroke</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cardio-vascular</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CHD etc</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Family at risk</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Alcohol etc.</td>
<td></td>
</tr>
</tbody>
</table>

Primary prevention. *Population at risk*  

Early identification. *Persons with undiagnosed disease*  

Disease management/ prevent complications. *Persons with established disease*  

Treatment of end stage disease, palliative care. *Persons with advanced disease*  

Total resource use
Table 7.2  Framework for ranking of interventions at each disease stage

<table>
<thead>
<tr>
<th>Disease Stage</th>
<th>less cost-effective</th>
<th>more cost-effective</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary prevention population at risk</td>
<td>A₁, A₂, A₃, A₄, A₅, A₆, A₇, A₈, Aₓ</td>
<td></td>
</tr>
<tr>
<td>Early diagnosis population at risk</td>
<td>B₁, B₂, B₃, B₄, Bₓ</td>
<td></td>
</tr>
<tr>
<td>Disease management persons with established disease</td>
<td>C₁, C₂, C₃, C₄, Cₓ</td>
<td></td>
</tr>
<tr>
<td>End stage care persons with advanced disease</td>
<td>D₁, D₂, D₃, D₄, Dₓ</td>
<td></td>
</tr>
</tbody>
</table>

Notes:
Aᵢ (Bᵢ) is the ith primary prevention (early case finding) intervention option addressed to the at-risk population, ranked from least cost-effective A₁ (B₁) to most cost-effective Aₓ (Bₓ).
Cᵢ (Dᵢ) is the ith intervention option for management of persons with established disease, (end stage care program for persons with advanced disease) ranked from least cost-effective C₁ (D₁) to most cost-effective Cₓ (Dₓ).

Rationale for the health problem/disease focus

A disease/health problem focus as the structure for the priority setting task has been adopted for several reasons:

i. **To ensure a focus on resource allocation between disease stages**: Typically separate budgets and planning bodies apply to broad program areas (such as public health, acute health, residential care, mental health). Resources tend to be locked in program streams. But, efficiency requires resource allocation between disease stages and between services offered by different agencies, in different settings etc.

ii. **To support a staging of the research task but without sub-optimisation**: Each stage of the priority setting task has a definable research question and a focus on the population/health problem as the unit of analysis not agency or service, which minimises the risk of suboptimisation.

iii. **Capacity to observe distributional impacts**: The identification of population subgroups with a disease/health problem at each stage, will facilitate the observation of distributional impacts of resource shifts and if desired incorporate weightings to reflect community preferences.

iv. **Opportunity to use intermediate outcome measures**: In the first stage of the priority setting task, where the interventions being compared are addressed at a single disease stage, there is the possibility of using intermediate health outcome measures. It may be possible therefore to use cost-effectiveness analysis, an economic evaluation technique with less demanding data requirements than cost-utility analysis.
v. **Research efficiency**: The priority setting task will need to draw on published research about the subject disease, with much of the literature pertinent to the analysis of interventions addressed at various disease stages.

**Model description**

The HSW-DBM involves the staged comparison of health interventions to eventually cover the entire ‘health’ sector, through a structured approach involving:

1. **Selection of disease/health problem**: This selection is not critical to the integrity of the Model. The choice of where to start is less important than the commitment to a staged priority setting research program. Suggested criteria are listed below (see Box 7.1).

2. **Ranking at each disease stage**: Compare interventions at each disease stage to identify the least and most cost-effective and desirable resource shifts (see Table 7.2). This requires a number of research tasks to be completed:
   - Devise a structure for analysis of the disease/health problem and classify into disease stages/problem development based on a knowledge of risk factors, nature of disease progression and alternative approaches to management;
   - Identify all possible intervention options at each disease stage, including existing as well as potential services (in and outside the health sector), various delivery settings, modes of action, philosophy, patient/population targets and unconstrained by funding source or responsible agency. Program characteristics need to be described in detail;
   - Determine a suitable measure of benefit to form the criteria for ranking. The way the disease stage/population/patient group has been defined may suggest a simple, outcome measure common to all interventions;
   - Rank interventions at the disease stage, to identify the most marginal programs, based on cost-effectiveness or cost-utility analyses, (see Table 9.2). Estimates of program costs and outcomes (including the impact on downstream resource use) should be based on objective evidence;
   - Draw preliminary conclusions about desirable resource transfers between the least and most cost-effective interventions at the disease stage.

3. **Comparison across disease stage**
   
   i. **Preliminary comparison**: If cost-utility analysis (or equivalent) has been conducted at the disease stage, undertake a simple comparison across disease stages. Otherwise select a universal outcome measure and redo as cost-benefit or cost-utility analyses. Preliminary conclusions can then be drawn about desirable resource shifts. (For example as per illustration in Figure 7.2 recommend a resource shift from B to the least cost-effective screening program, to A, the most cost-effective primary prevention program).

   ii. **Incorporate equity and access objectives**: If the description of benefit has incorporated equity and access, then the rankings will already reflect this dimension. Otherwise, equity and access objectives will need to be considered at this stage.
One possible approach is to ascertain the impact, on defined sub-populations of the resource shifts recommended on efficiency grounds and consider whether the distributional implications are likely to be consistent with community values. Where a conflict does arise, the attitude to trading-off equity and efficiency would need to be established.

4. **Replication of steps 1 to 3 for all diseases and health problems:** Replicate steps 1 to 3 for all diseases and health problems to eventually cover the entire health sector, to identify resource shifts necessary to achieve allocative efficiency. The Model provides a framework for a research program to be implemented progressively over the entire health sector. The final phase of the analysis is to draw conclusions about desirable resource shifts between disease categories and health problems. The task involves comparison of the most marginal interventions, regardless of disease stage addressed at different disease categories, normally based on cost-utility analysis, or an alternative comprehensive measure of benefit.

5. **Monitoring/revision:** Revise in response to new information, and to reflect changes in the cost and effectiveness of interventions, associated with resource shifts, new health technology, change in disease patterns and population attributes and to reflect changes in community values. It would be desirable for a complementary research program to be in place to meet critical data gaps about the costs and effectiveness of key health interventions identified during application of the priority setting framework.

<table>
<thead>
<tr>
<th>Box 7.1: Criteria for selecting health problem/disease for priority setting task</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The health problem is identified as an area of concern to the community:</td>
</tr>
<tr>
<td>• through community surveys,</td>
</tr>
<tr>
<td>• measured by disease burden eg DALYs/QALYs, cost of management.</td>
</tr>
<tr>
<td>2. The current health service mix is apparently sub-optimal as indicated by:</td>
</tr>
<tr>
<td>• substantial variation in management practices,</td>
</tr>
<tr>
<td>• large differences in cost-effectiveness ratios,</td>
</tr>
<tr>
<td>• major departures from best practice care.</td>
</tr>
<tr>
<td>3. Consistency with stated government priorities.</td>
</tr>
<tr>
<td>4. Access to data - on costs and effectiveness of existing and possible interventions</td>
</tr>
</tbody>
</table>

**Assessment of HSW-DBM against the performance criteria**

The performance of the HSW-DBM is assessed against the nominated criteria as follows:

i. **The decision rule and process for setting priorities are specified:** All the economic models, including the HSW-DBM meet the first requirement - an explicit process for setting priorities and decision criteria for resource shifts that recognises resource scarcity. The decision rule is to transfer resources from services with low benefit per unit cost to services that yield greater benefit per unit cost. Allocative efficiency is achieved when marginal benefit-cost ratios across all services are equalised.

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6 If community values are not known, a complementary research program may be required to establish such values.
ii. **The research question and analysis perspective is that of society:** The research question and analysis perspective is that of society and there is a breadth of scope. The HSW-DBM defines the health problem in terms of the entire community (at the regional or national level) and is designed to cover the entire health sector encompassing all modalities of care and disease stages. The limitations that arise from taking the restricted viewpoint of a particular agency or funder are avoided. The community perspective is taken in the conceptualisation and measurement of benefits and costs.

iii. **The selection of program/service options is comprehensive and precisely defined:** The selection of program/service options of the HSW-DBM is comprehensive and precisely defined. Through its structure and task statement, it is focused on intervention options and has an explicit approach to achieving comprehensiveness in the description of options, as outlined in Box 7.2. The staging of research tasks makes it feasible to pursue a more comprehensive set of intervention options than would otherwise be possible.

### Box 7.2: Process for selecting interventions for comparison

1. Develop a classification system for describing interventions, pertinent to the disease and stage, to include:
   - target group – age, ethnicity, family history, co-morbidities, lifestyle attributes etc.,
   - health delivery setting - hospital-in-patient, out-patient; community-health centre, patient's home, private rooms, residential care facility, etc.,
   - health professional, whether sole professional or multi-disciplinary team,
   - philosophy of care – such as empowerment or medical model,
   - approach to care - behavioural, surgical, drug, media etc.

2. Select program options for review to cover:
   - the widest possible range of options,
   - the major funded and proposed programs,
   - examples of ‘best practice’,
   - services suggested by ‘experts’ as possibly highly cost-effective or highly cost-ineffective.

iii. **Objectives are well defined:** The HSW-DBM provides a mechanism to incorporate societal objectives into the priority setting process. This occurs firstly, through the selection of a suitable outcome measure/measure of benefit for comparison at the disease stage and then across disease stages, and secondly through the two stage process for developing recommendations for resource shifts. The latter is designed to ensure the explicit consideration of equity/distributional effects of the ‘efficient solution’. Where there is no agreed understanding of the communities objectives in relation to health, exploration of these matters is desirable, possibly as a separate but complementary research program. The HSW-DBM also requires explicit consideration of the impact on population subgroups, which is relevant to access and equity objectives.
iv. v. **A marginal perspective is adopted:** The concept of the margin applies along several dimensions and the HSW-DBM in theory incorporates all, although application will be limited by the available data.

The Model adopts a marginal perspective and aims to identify the most marginal services (most and least cost-effective) for expansion and contraction; to calculate cost-effectiveness ratios relative to the status quo, and to identify the truly marginal cases – the population subgroup that will gain most from program expansion or loose least from program contraction.

vi. **There is rigour in measurement of costs and benefits:** The use of objective evidence in the measurement of costs and benefits is an explicit requirement of the HSW-DBM.

vii. **There is capacity of implementation:** The final requirement is that the Model can be implemented given a ‘reasonable’ budget for health planning. The HSW-DBM meets this challenge through the structuring of the research question into health problem and disease stage which permits the staging of the analysis. Research activities of a manageable size can be defined to be accomplished by a small research team. The focus on the disease or health problem also provides for efficiency of research effort. The application of the HSW-DBM to NIDDM, a complex disease, was achieved through the input of approximately 3 to 4 person years.

**Overview**

The HSW-DBM is seen to meet the nominated performance criteria and thus is a model that can be recommended for use for priority setting. It is especially applicable in the context of a regional or national health authority (or health scheme) with responsibility for the health of a defined population, and a mandate to take a health system wide perspective.

**7.3 Health Benefit Groups/Healthcare Resource Groups**

**UK Healthcare Framework**

A purchaser-provider split in the delivery of health care was introduced in the UK in the early 1990s. The Health Benefit Groups/Healthcare Resource Groups approach was one of the tools established to inform decisions for the contracting of purchasing of health care (Sanderson 1996, NTHS 1999, Mountney 1999). Health Benefits Groups (HBGs) are designed to categorise the population on the basis for their need for healthcare, with broad categories selected being: persons at risk, those with symptoms, persons with confirmed disease, and those with ongoing consequences. The Healthcare Resource Groups (HRGs) (similar to DRGs) are groups of treatments that use similar amounts of resources and that are clinically similar.

While initially focused on acute care, the UK National Health Service has recently extended the HBGs/HRGs to be applied across the health care continuum (NHS 2000). The approach is to map HBGs onto HRGs and by incorporating appropriate process and outcome indicators and the health status of the population, determine the current and downstream healthcare resource requirements. It is suggested that the resource implications and benefits of alternative patterns of health resourcing can also be established, although the capacity to do this is yet to be demonstrated.
The UK NHS has conducted pilot studies, in which multi-disciplinary working groups have been established to define HBGs for the major health conditions (cancers, CHD, stroke, head injury) and to determine HRGs - acute inpatient days, outpatients, primary care, mental health and palliative care, (Mountney 1999). The literature provides only limited explanation concerning how the approach is to be implemented.

**Northern Territory Health Service (NTHS) Computer-Based Model of HBGs/HRGs**

Drawing upon the concept of the HBGs/HRGs from UK and the HSW-DBM (Segal and Richardson 1994), the Northern Territory Health Service (NTHS) has developed a Computer-Based Model as a health planning exercise to assist in the setting of health service priorities within the Territory (Beaver et al 1999, NTHS 1999).

The NT HBGs/HRGs model is designed to determine the future call on health care resources and the impact of possible changes in the pattern of resourcing, based on the existing health status of the population and current management patterns (Beaver et al 1999; NTHS 1999). The nominated tasks that can be inferred from documentation are:

- selection of disease for analysis;
- allocation of population into HBGs are presumed to experience similar health problems and similar use of services; defined as i) population not at risk, ii) population at risk, iii) presentation, iv) acute disease, v) chronic disease;
- allocation of the services into HRGs;
- determination of current resource allocation to each of the health benefit groups across all modalities of care;
- identify general strategies to reduce disease burden, through prevention, investigation, health promotion, acute care, or continuing care;
- estimate the impact of the alternative strategies on disease burden and cost, measured in terms of net health service cost and DALYs.

The model has been applied in an illustrative fashion to diabetes, hypertension, renal disease and ischaemic heart disease. For each of these diseases the population is allocated to HBGs and the average cost of care for each group determined by interrogating health databases.

The likely impact on disease progression of additional resourcing targeted at alternative HRGs is determined. The work has not yet proceeded beyond scenario development. (For instance, in relation to diabetes, investment in ‘prevention’ of an extra 10% each year for 5 years, is ‘expected’ to decrease new presentations, the number of acute care patients, and the number of persons with chronic disease patients by 10% after 5 years). The predicted change in HBGs drives a change in use of health care resources, presuming no change in average per patient cost in each HBG, and in DALYs. The desirable investment strategy can then be determined once the investment criteria is adopted such as maximising DALY gain, minimising cost per DALY gain or maximising cost savings.

In theory, it is possible to establish the best strategy, depending on the objectives of the health agency. Use of the model for priority setting however relies on the validity of the assumptions underpinning the analysis. The process of moving from an illustrative exercise to one more firmly based on evidence is not a trivial step and is yet to be demonstrated as feasible.
Performance of the NTHS HBGs/HRGs Model

Reviewed in terms of the seven criteria the model performs well in some respects and poorly in others.

i. **The decision rule and process for setting priorities are specified:** The HBGs/HRGs framework allows various criteria for determining performance and describes in broad terms a process for setting priorities. However the actual application of that process is not entirely clear.

ii. **The research question and analysis perspective is that of society:** The research question is described broadly. While the model could be applied across the entire health sector to encompass all modalities of care, how the disease studies might be brought together is not described. The model allows various perspectives to be taken, notably that of the community, by modality of care or funder.

iii. **The selection of program/service options is comprehensive and precisely defined:** The model does not refer to specific interventions, but rather to broad areas for health service investment. This is probably the weakest aspect of the model. It is difficult to understand how impact on health status and resources use can be determined without reference to specific interventions.

iv. **Objectives are well defined:** The model is not explicit about the objectives of the health sector, although current applications by the NTHS uses the DALY as the primary measure of health benefit. Financial impact overall and by year is also highlighted as a possible subsidiary objective or constraint. Distributional impact, while not explicitly mentioned, could be accommodated, given an appropriate segmentation of the population.

v. **A marginal perspective is adopted:** The Model adopts a marginal perspective in the sense that costs and health impacts are measured relative to the status quo, (the ‘no policy change’), but projects downstream costs based on current expenditure on each HBG which is presumed to be unaltered over time. Also because specific interventions are not identified, there is no sense in which the model can identify marginal interventions.

vi. **There is rigour in measurement of costs and benefits:** The Model recommends the use of existing health data-bases for the attribution of the population into the HBGs and HRGs, although some difficulty with this process is noted (NTHS 1999). A means to incorporate objective evidence in the specification of the alternative ‘investment strategies’ and the impact of these on disease progression and expected health service use and health outcomes, is yet to be developed.

vii. **There is capacity of implementation:** Both the UK and the NT HBGs/HRGs have been implemented to a degree. While the UK has operated largely in the acute sector as casemix groupings (Mountney 1999), the NTHS is applying the method across the health sector. Whether the application can be developed in a way to engender confidence in the assumptions and data inputs and the results of the model is yet to be seen. Full implementation of the model would be resource intensive and data intensive.
Overview

The HGBs/HRGs model, in the context of a developed computerised health information system, may provide a decision support system for health planners, by identifying the future resource requirements of current health problems (addressed using current management strategies). Whether it can also provide a sound basis for setting priorities for resource allocation is yet to be established.

7.4 Program Budgeting and Marginal Analysis

Introduction

The technique of Program Budgeting and Marginal Analysis (PBMA) was developed in the early 1990s (Mooney et al 1992) from the US Plan-Programming-Budgeting-Systems (PPBS) model of the 1960s. A recent application of PBMA in Australia as part of the national cancer control initiative has refined the original PBMA methodology. Both the original and refined models are described and reviewed in this section.

The original PBMA model

Mooney and colleagues developed PBMA to assist the purchasing role of regional health authorities in the context of the split in purchaser and provider roles in Britain (Mooney et al 1992; Donaldson and Mooney 1991; Shiell et al 1993).

It has been applied in various contexts since (Cohen 1994; Cohen 1995; Peacock et al 1997a; Peacock et al 1997b; Craig et al 1995; Jones and Wright 1995; Twaddle and Walker 1995; Street et al 1995; Ratcliffe et al 1996). It aims to establish those services for which extra resources will make the greatest contribution to health gain (or other community objectives) and other services where a reduction in resources will result in least loss of benefit and recommend resource shifts from the most to the least cost-effective.

The suggested activities of the PBMA approach are:

- Allocate the current program/agency budget across all projects/services/interventions;
- Define the objectives of each program/sub-program, using the working party (established for the priority setting exercise), and/or input from the wider community;
- The working party to develop a preliminary list of services for potential expansion - expected to generate most benefits for additional resources allocated, and another list of services for possible contraction - expected to involve the least loss of benefits, for a given reduction in resources;
- Estimate, for a nominated budget transfer, the level of additional services in the expansion list and level of service reduction in the contraction list;
- Calculate additional benefits obtainable from services in the expansion list and loss of benefit from services identified for potential contraction;
- Recommend resource shifts – from those services, which would result in least loss of benefit, to services, which will generate most additional health benefit.
Performance of PBMA – original model

There have been several reported applications of PBMA that broadly follow the above steps. Some applications have resulted in recommended resource shifts, while others have not.

The major problems with implementation have been in allocating budgets to programs and services, and identifying services for potential contraction, where agreement can be reached that a reduction in services will result in minimal loss of benefit. Those engaged in the process have also expressed concern at the subjective nature of the way contraction and expansion lists are developed.

While services on the list may be subject to formal cost-benefit (or cost-effectiveness) analyses, this does not always occur, and in any case the selection on the list may not include the most marginal services.

In a recent study in which services selected for the expansion and contract lists were subject to a formal cost-benefit analysis, it has been found that projects identified on expansion lists did not perform better than projects nominated for contraction (Peacock et al 1997). This lack of congruence raises concerns about the capacity of the PBMA approach to identify the appropriate programs for expansion and contraction.

Performance of PBMA against criteria:

i.  **The decision rule and process for setting priorities are specified:** PBMA has a clearly defined process for establishing priorities and recommending resource shifts.

ii.  **The research question and analysis perspective is that of society:** The perspective of PBMA is normally the agency - a provider or perhaps a regional health service region. The agency perspective may, or may not be consistent with a community perspective. This will depend on how benefits and costs are defined and the constraints on choice of projects. PBMA is most applicable to the within program context, taking agency and program boundaries as givens. It is a partial model and does not describe a framework for priority setting across the entire health sector. While the PBMA model approach could be used with the framework described under the HSW-DBM to cover the entire health sector, an approach to coverage of the health sector is not a feature of the PBMA model.

iii.  **The selection of program/service options is comprehensive and precisely defined:** The initial nomination of services on the expansion list and contraction lists by the working party is critical as only those services that appear on either list are subject to any further analysis. This process needs to ensure, with reasonable certainty, the inclusion of the most marginal services. The capacity of a ‘working party’ to do this, and how it might be influenced by membership of the working party is not known. The evidence and information available to working party members and time frame for the priority setting exercise may all influence the expansion and contraction lists produced.

iv.  **Objectives are well defined:** The PBMA approach incorporates as one of its specified tasks, definition of program objectives - by the working party, possibly involving the wider community.
In published PBMA studies a number of objectives are identified typically covering efficiency, equity and access dimensions, but may also cover objectives specific to the mandate of the agency undertaking the priority setting exercise. There are many outstanding research issues (not peculiar to PBMA), such as how objectives are to be combined or how the various views are to be accommodated.

v. **A marginal perspective is adopted:** PBMA is concerned with the margin, defined in terms of a hypothetical reduction or increase in the budget allocated to services within the program area under review. It is not clear, however, whether all pertinent aspects of the margin are incorporated into the decision making process. The PBMA method also has a program budget component, involving the estimation of total resources allocated to a program and to individual services. The purpose of this task in the priority setting exercise is not self-evident.

vi. **There is rigour in measurement of costs and benefits:** The PBMA model presumes that estimates of benefits will in large part be based on the judgements of working parties, informed where possible by the literature. PBMA exercises are often completed within short time frames, making use of whatever evidence is available. Projected costs and benefits of services contained on expansion and contraction lists may be based primarily on ‘expert opinion’.

vii. **There is capacity of implementation:** A major attraction of the PBMA approach is the promise of setting priorities on the basis of relatively small resource input, (although the time allocated by the working party members can be considerable). However, reported applications also note some difficulty in implementing the program budgeting component and drawing up contraction lists.

**Overview**

The strength and weakness of the PBMA approach lie in its focus on decision making in the agency setting. The involvement of agency staff and key stakeholders in the priority setting task can facilitate a shift in the culture of an agency to focus on options for change, program objectives, costs and outcomes. It can contribute to an acceptance of resource scarcity, and bring service providers and others together in a potentially productive health planning exercise. On the other hand, the PBMA approach with its reliance on expert panels may compromise the quality of the information base and the capacity to identify the most and least cost-effective services. These concerns have been raised by various researchers, including Posnett and Street (1996) and Coast (1996). It is also the case that PBMA represents a partial approach and does not propose a framework for priority setting across the entire health sector.

**7.5 Refined PBMA model: a move towards an evidence-based approach**

In 1999, a research team, lead by the Health Economics Unit, Monash University was commissioned to trial the use of PBMA to contribute to the work of the Australian Cancer Strategies Group (CSG) review of priorities for reducing the burden from cancers. The PBMA model was substantially refined for use in this trial, to address weaknesses in the original model. The program budgeting component was excluded, to focus entirely on the marginal analysis; the reliance on expert opinion was replaced by the use of objective evidence from the literature to determine effectiveness and costs; and a societal not agency perspective was adopted.
The PBMA elements retained relate to the use of an expert panel to identify the options for consideration and to define the benefit concept. The following description of the model is based on the research report 'Trial of Program Budgeting and Marginal Analysis (PBMA) to Assist Cancer Control Planning in Australia' (Carter et al 2000).

A Working Party was constituted to both manage and participate in the PBMA pilot. The options selected for exploration were informed by the work of the National Cancer Control Initiative (NCCI 1998) and the National Cancer Strategy Development Workshop (DHAC 1999). The final selection of options for study was based on a set of criteria: the detail and precision with which the intervention was specified, access to evidence on effectiveness, the need to include both poorly and well performing programs, the need to include options from across the disease pathway (prevention to palliation), to include options for which both mortality and/or morbidity impacts are relevant. Cost-effectiveness analyses were conducted for the interventions meeting these criteria.

The objectives of the priority setting exercise were based on the ‘Cancer Control 2002’ (NCCI 1998) and the ‘National Cancer Strategy Report’ (DHAC 1999) to:

- reduce the incidence of cancer;
- increase survival and improve quality of life;
- meet community expectations;
- identify and reduce inequities in the system;
- increase research capacity and the knowledge base for cancer control; and
- optimise the use of resources.

These objectives were seen to support effectiveness, equity, consumer empowerment, integration of agencies and jurisdictions and efficiency in the use of resources. The Working Party proposed a two-stage approach to ranking of the options: firstly according to resource use, and size and distribution of anticipated health gain, measured in DALYs, and secondly to consider acceptability/feasibility issues. The DALY was chosen as the measure of health gain because it is a combined measure of mortality and morbidity and Australian and Victorian values had been recently calculated across a range of diseases. The intention was for the DALYs attributed to each intervention to be weighted for equity, based on health status, socio-economic status, Aboriginal and Torres Strait Islander status, rurality, and ethnicity. This could not be pursued.

Health service costs were considered from a societal perspective, and adjusted for estimated downstream impacts, based on the estimated use of health services associated with each intervention, (reflecting expected change in the utilisation patterns). The approach to measurement of cost was typical of any cost-effectiveness analysis. Sensitivity analyses were performed to develop a plausible range of cost-utility values. Interventions were ranked on the basis of the cost-per DALY, and recommendations for expansion or contraction were made after considering issues around implementation, equity and access.

**Performance of the Evidence-Based PBMA approach**

The revised PBMA model performs better than the original model when assessed against the performance criteria developed in Section 4.2.

i. **The decision rule and process for setting priorities are specified**: The model has a clearly defined process for ranking interventions and recommending resource shifts.
ii. **The research question and analysis perspective is that of society:** The refined evidence-based PBMA approach adopts a community perspective, moving away from the agency perspective. However, the model does not specify how the priority setting task is to be extended across the entire health sector, if that is the intention.

iii. **The selection of program/service options is comprehensive and precisely defined:** Like the original model, the refined PBMA approach focuses on interventions. More careful consideration is given to the process for selecting the interventions for further consideration, which should ensure more appropriate coverage.

iv. **Objectives are well defined:** The specification of objectives is identified as an important task. Whether the DALY represents a desirable health outcome measure is yet to be explored.

v. **A marginal perspective is adopted:** A marginal perspective is adopted with care taken to define intervention options relative to a nominated base case, and for particular patient or population groups. The model meets the requirement for a marginal perspective.

vi. **There is rigour in measurement of costs and benefits:** The use of objective evidence in the measurement of cost and benefits is a principle requirement of the refined PBMA approach.

vii. **There is capacity of implementation:** The refined model has recently been applied in a comprehensive manner, to explore options to reduce the disease burden from cancer. The study resulted in a set of clear recommendations for projects to be expanded and contracted, supported by cost-utility analyses. The model is capable of implementation with the modest application of resources, (of approximately 2 person years of input).

**Overview**

The refined PBMA model, which is evidence based and focused on the marginal analysis, performs well against the nominated criteria.

### 7.6 The QALY League Table approach

**Introduction**

In the QALY League Table approach health services are ranked on the basis of their marginal cost per gain in quality adjusted life years (QALY). Methods for the development of League Tables and problems in their application have been discussed in the literature (Drummond et al 1993; Mason et al 1993; Gerard and Mooney 1993). The priority setting principle is that those services or interventions with a lower cost per QALY (marginal benefit cost ratio) receive priority over services with a higher cost per QALY.
The Oregon Plan

The Oregon Plan is a well known application of the QALY League Table, and the approach is now described by reference to that application (Coast 1996, Dixon & Welch 1991, Eddy 1991, Street & Richardson 1992, Hall & Hass 1993). The purpose of the study was to establish a set of core health services to be publicly funded through Medicaid (for low-income beneficiaries) for the State of Oregon. A number of approaches were applied (Models 1-3) before a final set of core services was adopted.

Oregon 'Model 1'

The original method involved a standard application of the QALY League Table approach. Cost/QALY estimates were derived for 1600 condition/treatment pairs. Costs of treatment were obtained from Oregon's Medicaid Program. Treatment effectiveness was determined from a literature review and clinician judgement of expected impact of nominated interventions on quality of life and life expectancy. Utility weights to be applied to health states were established through community consultation, using the Kaplan Quality of Wellbeing Scale. The ranking in order of cost/QALY and implied core services obtained from Model 1 was not accepted. It was not clear whether the problem was the quality of data on costs and effectiveness, or concern with the use of cost-effectiveness ratios as the basis for priority setting.

Oregon 'Model 2'

A revised approach was then adopted in which the cost/QALY became a secondary basis for ranking. Informed by community views, seventeen broad condition/outcome categories were developed by the Health Service Commissioners and ranked. All condition/treatment pairs were allocated to one of these categories, according to whether the condition was acute or chronic, likelihood of fatality and expected improvement in quality of life with treatment. Each condition/treatment pair was ranked, first according to the seventeen broad categories of benefit and within the seventeen groupings by QALYs. Costs were only incorporated into the ranking if services were ranked equally on QALYs. The Oregon Health Services Commissioners adjusted the rankings based on their judgement. The available Medicaid budget was applied, moving from the highest ranked condition/treatment pair, to establish the 'core set' of services to be funded. The ranking was still not accepted, due to a perceived discrimination against disabled persons in the use of QALYs. A third model was thus proposed.

Oregon 'Model 3'

In this approach, benefit was restricted entirely to prevention of death with quality of life excluded from the analysis, (except though the initial ranking into the seventeen groupings). Costs were also introduced only where two condition treatment pairs were ranked equally on benefit. Commissioner judgement was again applied to adjust ranking where this was thought warranted. The services to be funded reflected the available budget applied to the ranking. The final Oregon Plan was approved early in 1994, with 565 out of a list of 696 condition/treatment pairs approved for funding. Provision was made for items not approved for general funding to be approved in particular cases, through appeal.
Box 7.3 The New Zealand core services program

The New Zealand Core Services Program is an alternative approach to that adopted in Oregon for the identification of a set of core services to be supported through public funding contrast, (National Advisory Committee on Core Health and Disability Services 1992, the Bridgeport Group 1992, Coast 1996 Ch.3). Instead of employing the QALY League Table approach, the model was entirely reliant on community input and negotiation. Public input was sought through public meetings and a series of consensus conferences on key health problems and disease areas. The reliance on consensus through public input resulted in some paralysis in decision making, and a lack of concrete recommendations (Coast 1996). Difficulty was experienced in identifying areas not suitable for funding or for contraction other than for those services agreed to be deleterious. So while a process for decision making was specified because of the requirement for consensus and with the explicit rejection of cost-effectiveness ratios or any alternative objective criteria, the process resulted only in broad recommendations which could not be translated into resource shifts.

Performance of the QALY League Table approach

The QALY League Table approach, as illustrated by the Oregon experience, is reviewed against the priority setting criteria:

i. **The decision rule and process for setting priorities are specified:** The QALY League Table approach has a clearly defined decision rule and process for ranking interventions and recommending resource shifts.

ii. **The research question and analysis perspective is that of society:** The QALY League Table approach adopts a community perspective, with costs and benefits to be established from the viewpoint of the society. The scope of the priority setting exercise depends on the research question, but it can provide a structure for priority setting across the entire health sector.

iii. **The selection of program/service options is comprehensive and precisely defined:** The QALY League Table approach should result in the ranking of every existing and potential service option. However, in practice only a limited set of options can be ranked, so a prior selection process has to occur, and /or service options and client groups described in general rather than precise terms.

iv. **Objectives are well defined:** In the QALY League Table approach the objective is normally taken to be maximisation of QALYs for a given health budget, with a ranking of services on the basis of cost/QALY. The Oregon experience suggests the community may not be comfortable with a ranking simply based on cost/QALY.
v. **A marginal perspective is adopted:** While cost/QALY ratios could relate to the margin, they typically reflect average benefit cost ratios. This represents a serious weakness of this application of the League table approach, which would be avoided if marginal benefit cost ratios were used. For some services lower in the ranking (and thus excluded from funding) may, for some patients, generate greater benefit (per unit cost), than services higher in the ranking. Decisions based on averages, especially where condition treatment pairs include disparate patient groups are unlikely to maximise community benefit. A marginal analysis would require several cost/QALY estimates for each service, as a function of program size and patient type.

vi. **There is rigour in measurement of costs and benefits:** It is presumed that cost/QALY estimates will be based on the best available evidence. If this is to be based on objective data, a substantial information requirement emerges, which will require an intensive on-going clinical research program. Another issue relates to the use of the QALY as the measure of benefit. There is no consensus about the best way to calculate QALYs, and results from application of the available instruments show substantial divergence (Hawthorn et al 1999; Schwartz et al 1993; Richardson and Cook 1992; Richardson 1991).

vii. **There is capacity of implementation:** The Oregon Plan demonstrates that while the development of a health sector wide QALY League Table is possible, because of the massive data requirement, the scope of intervention options must be restricted and standards of evidence downgraded.

### 7.7 Program-based approaches – PBAC

**Introduction**

There is a vast literature on cost-effectiveness comparisons of small numbers of health service options for a particular health problem or sector of the health market (eg see Sculpher et al 1991; Hall et al 1988; Robertson and Segal 1999; Smith and Wideatmoko 1998). Such studies may be used to guide resource allocation decisions at a local or agency level.

A particularly comprehensive example of comparative cost-effectiveness analyses applied to a segment of the health market is the requirement by the Pharmaceutical Benefits Advisory Committee (PBAC) for economic analysis to support the listing of drugs on the Pharmaceutical Benefits Schedule (PBS). The approach is considered here in terms of its suitability as a framework for priority setting for pharmaceuticals and for the wider health sector. It also provides a means to explore the role for large scale but restricted comparative cost-effectiveness analyses. Other illustrations (not reviewed here) are the World Bank cost/DALY model (World Bank 1993) and the application of comparative cost-effectiveness analyses within the in-patient setting (Olsen et al 1996).
Pharmaceutical Benefits Advisory Committee (PBAC)

The framework which the Commonwealth Government formally adopted in 1993 for the listing of drugs on the PBS is an Australian example of the systematic use of comparative economic analyses to inform resource allocation decisions. Drugs listed on the PBS receive a substantial government subsidy, reducing the cost to the consumer. A request for listing of a new drug on the PBS must be supported by an economic analysis, submitted according to published Guidelines (Commonwealth Department of Health & Family Services 1995). Drugs may be refused, accepted at the proposed price, approved subject to a price reduction, or listed for a subset of patients (likely to benefit most).

The Guidelines require an incremental cost-effectiveness (or cost-utility) analysis, of the drug proposed for listing, against a suitable comparator, defined, by preference, to be another drug of the same class already listed on the PBS. The measure of effectiveness reflects the clinical role for which the listing is sought - such as patients achieving adequate control (of blood pressure, blood glucose etc), or time free of illness or symptoms. Life years or QALYs are also common outcome measures. Where an intermediate health outcome measure is used, the economic evaluation must demonstrate the relationship between the clinical parameter and a final health outcome.

The Guidelines are detailed. They define how costs are to be measured, the quality of evidence that is required, and the nature of the comparator. A comprehensive literature search is essential. Preference is given to evidence of effectiveness which is based on randomised control trials, and is applied to the relevant Australian population.

While the decision rule for the listing of a new drug is not defined, if the new drug absolutely dominates a drug on the PBS (additional benefits at lower cost), listing is normally guaranteed. Where additional benefit is achieved, but at additional cost, no formal cut-off, in terms of incremental cost per increment of benefit (QALY, life year etc.) has been specified. The final decision about listing on the PBS is made by the Government, informed by the PBAC and the Pharmaceutical Pricing Authority. However no drugs (till end of 1996) had been listed at a cost/life year gained (or cost/QALY) above $69,000, with listing almost guaranteed at a cost/life year (or /QALY) of $36,500 or less (George et al 1999).

The Guidelines have been in operation for seven years and have been instrumental in determining the drugs listed on the PBS and thus in receipt of government subsidy and at what price.

Performance of PBAC approach

i. **The decision rule and process for setting priorities are specified:** The PBAC approach has a defined process for establishing priorities and recommending resource shifts.
ii. **The research question and analysis perspective is that of society:** The perspective of the PBAC is that of society, in the sense that costs and benefits are established from the viewpoint of society. But as the primary responsibility of the PBAC is pharmaceuticals, the impacts on government funding of pharmaceuticals and the publicly funded health system are also to be established. As dictated by the Guidelines, the scope of the research question is narrowly framed. If available the preferred comparator is another drug, already listed on the PBS of the same class. The question is not what is the best way to manage a particular health problem, but rather how the ‘new drug’ proposed for listing performs against similar drugs, for the particular indication.

iii. **The selection of program/service options is comprehensive and precisely defined:** Because of the narrow mandate of the PBAC, the selection of interventions for analysis is highly constrained. Choice of comparator is normally a drug of the same class already listed on the PBS. While the Guidelines allow for comparison across drug classes or with other modalities of care, this is discouraged, unless there are no drugs of the same class already listed. So, for instance, in evaluating a new ACE inhibitor for the management of hypertension, the comparison is other ACE inhibitors on the PBS, not other drug classes for the management of hypertension, or non-drug therapies. This restriction in scope of the research question may still allow technical efficiency to be addressed, but certainly weakens it as a means for addressing allocative efficiency. Because of the partial framework adopted, it is uncertain whether the resulting decisions will promote efficiency.

iv. **Objectives are well defined:** The PBAC Guidelines provide for benefit to be defined in terms of either intermediate or final health indicators. Each drug is analysed against the nominated comparator using the selected measure of benefit and decisions about listing are made separately for each drug, with the final decision about listing that of the government. Matters of equity and access cannot readily be incorporated into economic evaluations, so it has to be considered separately as part of the decision about listing. In subsidising drugs on the PBS, broad support is given to the access to cost-effective prescription drugs, based on need rather than capacity to pay.

v. **A marginal perspective is adopted:** The Guidelines are explicit that an ‘incremental’ cost/effectiveness ratio is to be derived, relative to the comparator drug. Precision about the target population, the indication for the drug, and the manner and context of delivery is consistent with a marginal perspective.

vi. **There is rigour in measurement of costs and benefits:** Cost-effectiveness analyses are required to be prepared to a high level of rigour, in terms of both methodology and evidence on costs and outcomes. Explicit direction is given concerning the quality of evidence and comprehensiveness required in the search for published evidence. The double blind randomised control trial is designated as the gold standard for data. The only potential concern with demanding very high quality evidence is that it may create a bias in favour of drugs/conditions for which the gathering of evidence is easier, for instance where the expected effect is observable within a short time frame. To deal with this concern, modelling is explicitly requested by the PBAC in instances where the gathering of evidence is difficult or even impractical.

vii. **There is capacity of implementation:** The approach is being implemented, demonstrating the capacity for application.
Overview

The PBAC requirements for the listing of pharmaceuticals on the PBS provide a highly rigorous framework for comparative cost-effectiveness/cost-utility analysis for pharmaceuticals which is having a major influence on the use of pharmaceuticals. The approach has been designed to address issues of technical efficiency within a specified modality of treatment and drug class. Due to its restriction to one modality of management, and restriction in choice of comparator it does not readily address allocative efficiency. If however, choice of comparator were broadened to cover other treatment modalities and prevention as well as management, it would provide a model suitable for more general application.
SECTION III  OVERVIEW OF PERFORMANCE AND RECOMMENDATIONS

8  Overview of performance of priority setting models

8.1  Health planning models

There are various health planning models which seek to describe health problems and needs, sometimes proposed as approaches to priority setting. They include community surveys/epidemiological studies, burden of disease and cost of illness studies and the avoidable mortality/morbidity approach. All are essentially descriptive in nature. They provide valuable insights into the size and distribution of health problems - in terms of community concern, impact on health status and health inequalities and in health resources applied. Such studies can, and do contribute to the prioritisation of health problems. They are also pertinent to the debate about the objectives of the health sector and in monitoring the achievement of access and equity objectives. They do not however, include decision criteria for translating problem identification into desirable resource shifts, a far from trivial task. As these models fail to incorporate decision rules for priority setting in a situation of resource scarcity they cannot provide a mechanism for adjusting the health service mix towards optimal. They can however, provide a valuable input to a priority setting exercise, but where the decision rules for making choices are introduced from elsewhere.

8.2  Best practice guidelines

Best Practice Guidelines represent an important influence on the pattern of patient care and management. They are developed, appropriately on the basis of clinical effectiveness, with little, if any regard to the capacity of the health system to deliver best practice care. Decision rules for making choices when resources are limited are implicit rather than explicit. There is no accepted process by which clinician can determine priorities when resources are not sufficient to offer best practice care to all who meet relevant clinical criteria. (Implicit rationing will occur, for instance based on age and capacity to pay).

Knowledge of what constitutes best practice care is an important input to priority setting, in defining preferred intervention options for consideration.

8.3  Economic approaches

All the approaches to priority setting based on economic principles recognise resource scarcity. However, the HSW-DBM and the QALY League Table approach and possibly the NTHS HBGs/HRGs approach are the only models to provide a structure for priority setting across the entire health sector. All the other models represent partial applications. There are valuable insights to be gained from all the models studied, such as the process within PBMA for eliciting objectives, and the consistency in approach and high quality of evidence demanded by the PBAC model.

All models involve some compromise with the theoretical ideal. For instance the standard PBMA approach fails to ensure comprehensiveness in the coverage of interventions and accepts poor quality evidence on costs and benefits. The NTHS model maintains a breadth of scope, but at the sacrifice of confidence in the quality of data and vague specification of interventions. The PBAC model maintains a consistency in approach and high quality of evidence, but at the cost of a restricted scope.
The QALY League Table approach promises a breadth of scope and consistency of approach, but suffers from excessive data demands, and a consequent neglect of marginal analysis. The concept of a core set of services to be funded based on average cost-effectiveness ratios fails to recognise the importance of the margin. The efficient solution is unlikely to involve the allocation of resources into those service with the greatest average benefit–cost ratio, until all opportunities for care are exhausted and only then moving to the next service. (Only if separate intervention options were defined for each sub-population taking account of regional variations and differential program characteristics, would this conceptualisation be valid, then average and marginal cost-effectiveness ratios would be equivalent.)

The Oregon experience suggests some disquiet within the community with cost-effectiveness and cost/QALY as decision criteria for the allocation of health care resources. While definition of benefit is acknowledged as an important issue for economics and a focus of several models, more research into the communities’ views about the objectives of the health sector and of the criteria for allocating health care resources seems to be required.

The HSW-DBM and the refined PBMA approach were found to perform best against the nominated criteria, involving least compromise with the theoretical ideal, as explained in the next section.
9 Summary of performance and recommendations

The performance of the nine models reviewed here, is summarised against the assessment criteria in Table 9.1. This assessment presumes a research objective of optimising the allocation of resources across the entire health sector. The evaluation of a single, or a small number of specific health services or of a complex health policy is not the research question. There are well-established techniques, for this purpose; namely cost-effectiveness, cost-benefit or cost-utility analysis, which does not require a priority setting framework.

Most models perform well with respect to perhaps two or even three criteria, but fail badly on others. The only two models to meet all/most criteria are:

i. the Health-Sector-Wide Disease-Based Model (HSW-DBM) and
ii. the refined evidenced based PBMA, (or EBMA – evidenced based marginal analysis).

Their strong performance is not surprising, as both of these models were developed in an attempt to address the formal requirements of a model for priority setting, and in view of apparent weaknesses of other models.

The major flaw with the original PBMA, the reliance on expert opinion in the selection of projects for the expansion and contraction has been addressed with the refined PBMA model. In this model a more comprehensive approach to the selection of potential interventions is adopted and the cost-effectiveness ratios are calculated based on objective evidence. Recommendations for project expansion and contraction reflects the objective evidence adjusted to incorporate other health service goals. The model still lacks a structure to guide priority setting across the entire health sector, or even a single health problem. While EBMA could be applied to a single health problem and repeated to eventually cover the entire health sector, this is not a feature of the EBMA model, but draws on the framework of the HSW-DBM. Such an approach would represent an amalgam of the two models.

The HSW-DBM on the other hand commences with the entire health (and community services) sector, and also incorporates the use of objective evidence and a focus on the margin. As reported earlier this model performs well in relation to all the pertinent criteria.

In sum, these two models come closest to achieving implementability without undue compromise to the theoretical principles. They best address the challenge of retaining breadth of scope in specification of the research question, whilst also demanding high levels of evidence and the adoption of a genuine marginal analysis, within realistic health planning budgets. Recent applications of these two models, for the HSW-DBM to non-insulin dependant diabetes and of EBMA to selected interventions for cancer have confirmed the suitability of both of these models for the setting of priorities for the health sector.

The HSW-DBM may be most appropriate where the task is resource allocation across the entire health sector. While EBMA is possibly more suitable for an agency or group with a more narrowly defined research question, although this model could also be applied across the health sector using the Framework of HSW-DBM.

Either model could potentially be applied to the setting of priorities to address selected risk factors, an issue of particular interest to the Population Health Division of the Department.
Although, as a research question the choice of risk factor lacks integrity, being more in the nature of a solution than a health problem, in effect constraining the choices. As noted under the discussion of the PBAC model, where options are constrained by the way the research question is framed, this will inevitably result in a solution that does not make the best use of resources, should the choices be unconstrained. The HSW-DBM is a preferable means of considering risk factors, as it does this in the context of the health problem to which the risk factor is related.

This means that desirable resource shifts can be identified, not just in relation to possible interventions addressed at the risk factor, but also between services to address the risk factor and other approaches to the health problem. The latter might include drugs, medical interventions or surgery. Techniques can be applied so that in taking a disease or health problem focus, the benefits from addressing the risk factor can extend beyond the disease under review.

Finally, in selecting a preferred priority setting model, an option is to combine desirable features of both models to include for instance:

i. from HSW-DBM:
   - the health sector wide framework and proposed approach to staging of the analysis by health problem and disease stage, and the classification into suitable population subgroups,
   - the approach to defining intervention options to ensure comprehensiveness;

ii. from EBMA
   - the use of an expert panel to assist in specification of intervention options for review and in the definition of program objectives and to achieve support for the recommendations;

iii. common elements:
   - the use of published evidence to establish cost-benefit/cost-utility ratios,
   - the adoption of a marginal analysis.
Table 9.1  Overview of performance of models for priority setting

<table>
<thead>
<tr>
<th>Model</th>
<th>Decision criteria for resource shifts</th>
<th>Scope: health sector wide, society perspective</th>
<th>Intervention: comprehensive and precise</th>
<th>Approach to objectives</th>
<th>Marginal analysis</th>
<th>Rigour in measurement</th>
<th>Ease of application</th>
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<td>HBG/HRG NTHS</td>
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Notes:
- ✓ partially meets the criteria
- ✓✓ fully meets the criteria
- Blank cells performs poorly with respect to the criteria
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