

**The appropriate use of financial incentives
to encourage preventive care in general
practice**

Dr Andrew Boyden

Manager, Medical Affairs,
National Heart Foundation (Victoria Division)

Rob Carter

A/Professor (Health Economics),
Centre for Health Program Evaluation

CENTRE PROFILE

The Centre for Health Program Evaluation (CHPE) is a research and teaching organisation established in 1990 to:

- undertake academic and applied research into health programs, health systems and current policy issues;
- develop appropriate evaluation methodologies; and
- promote the teaching of health economics and health program evaluation, in order to increase the supply of trained specialists and to improve the level of understanding in the health community.

The Centre comprises two independent research units, the Health Economics Unit (HEU) which is part of the Faculty of Business and Economics at Monash University, and the Program Evaluation Unit (PEU) which is part of the Department of General Practice and Public Health at The University of Melbourne. The two units undertake their own individual work programs as well as collaborative research and teaching activities.

PUBLICATIONS

The views expressed in Centre publications are those of the author(s) and do not necessarily reflect the views of the Centre or its sponsors. Readers of publications are encouraged to contact the author(s) with comments, criticisms and suggestions.

A list of the Centre's papers is provided inside the back cover. Further information and copies of the papers may be obtained by contacting:

The Co-ordinator
Centre for Health Program Evaluation
PO Box 477
West Heidelberg Vic 3081, Australia
Telephone + 61 3 9496 4433/4434 **Facsimile** + 61 3 9496 4424
E-mail CHPE@BusEco.monash.edu.au

ACKNOWLEDGMENTS

The Health Economics Unit of the CHPE is supported by Monash University.

The Program Evaluation Unit of the CHPE is supported by The University of Melbourne.

Both units obtain supplementary funding through national competitive grants and contract research.

The research described in this paper is made possible through the support of these bodies.

AUTHOR ACKNOWLEDGMENTS

We would like to thank Professor Jeff Richardson for the valuable advice he provided in his role as independent examiner of this project. We would also like to express our gratitude to Ms June Hooper and Ms Debbie Hedger, both of the National Heart Foundation of Australia (Victoria Division) for their help in locating much of the literature referred to in this study.

This paper was prepared by Andrew Boyden, under the supervision of Rob Carter, as part of his studies for the Masters of Public Health Degree.

Summary

This research report in health economics entailed a literature review covering theory and case studies to address the research question - Is the use of financial incentives an appropriate policy option for encouraging population-based preventive care in general practice in Australia?

Whereas there are World Health Organisation (WHO) criteria available to assist policy makers determine the appropriateness of health screening activities, there are no such criteria to help determine the appropriateness of financial incentives in healthcare. Therefore to address the research question, it was necessary to develop and define the following criteria against which any proposed financial incentive scheme designed to stimulate the provision of preventive services in general practice could be assessed:

- The incentive scheme should address a prioritised public health problem stimulating the provision of evidence-based, cost-effective interventions.
- The objectives of an incentive scheme need to be clearly defined taking health economic principles into account.
- The incentive scheme needs to be planned as one part of a broadly based solution to a public health problem.
- The negative aspects of the incentive scheme need to be considered against the benefits.
- The incentive needs to operate within an effective payment system, cognisant of barriers to care and stimulate the delivery of services which are acceptable to consumers and compatible with routine general practice.
- An incentive scheme in general practice should be supported by a systems based infrastructure and information technology.
- Payment should be based on reliable measurement of valid indicators of health promoting activity in general practice.

Due to the complexity of, and the strong interrelationships between, the public health and health economic issues analysed in the report, most of these criteria are multi-dimensional in character. Analysis around these issues and criteria led to the conclusion that financial incentives to encourage population-based preventive care in Australian general practice is a policy option worthy of consideration. However, caution needs to be applied to this statement because of the deficiency of good empirical information in this area and structural deficiencies within the Australian healthcare system which may restrict the ability of incentives to work effectively. It is recommended therefore, that incentive schemes are specifically targeted and appropriately piloted prior to implementation, with the need for more attention to be given to the opportunity costs associated with incentives.

Table of Contents

Summary	i
1 Introduction	1
1.1 Research Question	1
1.2 Aims	1
1.3 Methodology	1
1.4 Background	2
1.5 Limitations and assumptions	5
2 Discussion	6
2.1 Public health importance, evidence and cost-effectiveness	6
2.2 Defining the problem being addressed and benefits sought	8
2.3 Determinants of health	10
2.4 Detrimental effects of incentive schemes	11
2.5 The effect of incentives in general practice	13
2.6 Population health and infrastructural needs in general practice	17
2.7 Indicators	18
3 Conclusion	20
References	21
List of Tables	
Table 1 Criteria of appropriateness for a medical screening program	4
Table 2 Recommended criteria against which any proposed financial incentive scheme designed to encourage the delivery of a particular population-based preventive care activity in general practice should be assessed	19

The appropriate use of financial incentives to encourage preventive care in general practice

1 Introduction

1.1 Research Question

Is the use of financial incentives an appropriate policy option for encouraging population-based preventive care in general practice in Australia?

1.2 Aims

- Within a health economic and public health context to investigate and describe the appropriate use of financial incentives in general practice to stimulate the delivery of underprovided specific preventive public health services.¹
- To develop a set of criteria against which any proposed financial incentive scheme designed to encourage a particular population-based preventive care activity in general practice, could be assessed.

1.3 Methodology

- The method was to review the public health and health economic literature on financial incentives in general practice (including relevant government policy documents), with criteria defined through analysis and discussion of theory and case studies.
- Articles, government policy documents and other forms of relevant information were located from:

literature searches:

a) National Library of Medicine-Internet Grateful Med Search Screen (1975-1999) and Proquest search engines (1988-1999) incorporating Medline and health policy/ health economics databases were used, using 'subject' stems:

b) *incentive(s)/financial incentive(s) and general practice/ preventive care/ prevention/ immunisation/cervical cancer/cervical cytology.*

c) Titles arising from these searches were selected and further reviewed according to the relevance of their abstracts to the objectives of the report and their availability.

¹ A public health service is seen here as 'conceived and delivered with whole populations and their health status in mind' (Deeble, 1999: p.1).

d) government sources (key policy documents):

e) Australian Institute of Health and Welfare
Department of Health and Aged Care
Australian Government Publishing Service
National Public Health Partnership

f) health economics and health policy textbooks.

1.4 Background

Justification for investigating the possible use of financial incentives to influence preventive care in general practice relates to strong evidence surrounding their potential to influence providers' behaviour (Carter, 1997; Richardson, 1990; Richardson et al, 1995). Thus, Richardson (1990: p.18) states that,

'in virtually all contexts it has been observed that on the margin, behaviour is altered by economic incentives and there are no reasons for supposing that doctors are different in this respect. Therefore a prediction is that there will be greater doctor enthusiasm for undertaking tasks which increase income, compared with those that are less well rewarded.'

However, there is little information about how incentives can be specifically manipulated to influence behaviour and health outcomes (Hemenway, 1990; Grumbach et al, 1998). Nevertheless, in recognition of their generic potential to influence doctor behaviour, financial incentive schemes have been introduced into health systems. In the United Kingdom incentives have been used for many years to try and stimulate the provision of services and encourage preventive activities in general practice in the areas of childhood immunisation, cervical cancer and cardiovascular disease (Hughes, 1993; Langham et al, 1995). In the United States incentives have been used within managed care systems, both to try and increase doctor provided services (eg childhood immunisation) (Fairbrother et al, 1999), and conversely to try and restrict 'overprovision' in terms of limiting doctors' rates of referral to hospital and specialist services (Grumbach et al, 1998).

In Australia, the first use of incentives in such a specific way has been through the General Practice Immunisation Incentive (GPII) Scheme which was introduced in 1998. This scheme gives 'service incentive payments' to doctors for their notifications of completion of age specific immunisation schedules relating to individual patients. These payments are supplemented by outcomes payments which depend on the achievement of particular immunisation target levels in the practice population (DHAC, 1998a). In addition to this specifically targeted approach, the Australian government plans to introduce a new Medicare item for annual voluntary health assessments in people aged 75 years (King, 1999). These initiatives together with the 'coordinated care trials' appear to be in response to an increasing concern that Australian general practice, with its focus on individual care and isolation from the broader health system, has become too far removed from its potential to deliver more

comprehensive, coordinated and preventive care with a greater population health focus (Pringle, 1999; General Practice Strategy Review Group, 1998).

Market Failure

This report is underpinned by a philosophy accepting that government intervention in healthcare is a logical response to inefficiencies resulting from market failure. The economic model of a free competitive market assumes that states of equilibrium are reached between consumers' demands and producers' supplies of goods and services. On the margins, additional costs to producers equilibrate with prices that consumers are willing to pay. If, for any particular good or service, marginal benefits to the consumer exceed the marginal costs to the producer, the industry expands. Conversely, if consumer benefits are less than producer costs the industry contracts. Thus, due to these competitive market forces resources are allocated efficiently in a way which maximises the delivery of society's wants with the limited resources available. However, several assumptions on which the model are based are not satisfied in healthcare and therefore market failure occurs (Richardson, 1987; Richardson, 1991; Folland et al, 1997). This is largely in relation to:

- asymmetry of information in favour of providers over consumers;
- the presence of externalities whereby healthcare of an individual may influence the healthcare of others;
- a tendency for providers to be non competitive by 'joining forces' and concentrating their power into monopolies; and
- the notion of benefits that are not solely individually based (ie externalities, public goods and merit goods)².

These factors interact to result in market failure and the misallocation of resources and thus, provide justification for government intervention in healthcare. Intervention can also be justified on the basis of healthcare being subject to ethical and social values (eg a wish for equity in healthcare). These values which are the basis of merit goods, cannot be adequately addressed by the free market (Ibid).

Government intervention in healthcare can occur at various levels through the provision of goods and services, the redistribution of resources and regulatory mechanisms (Folland et al, 1997). Financial incentives³ are an example of a set of interventional tools that can potentially be used for leverage in healthcare markets in order to stimulate or hinder activity according to social wants. Logically such

² See section 2.2 for further explanation of externalities and merit goods.

³ There is no common definition for the term 'financial incentive' within the literature on this topic. For the purposes of this report a financial incentive is here defined as a monetary payment designed to act as an inducement to the payee or group of payees to behave in a predetermined way. However, it is important to note that 'incentives' exist in healthcare systems and influence provider behaviour even when they are not being used as specific tools in the way defined in this report.

In order to describe financial incentives, this report will necessarily make reference to ways they have been used to reduce the provision of services. However, as a public health report, the main focus will be on supply in the context of *the potential use of financial incentives as a means to increasing the provision of preventive care services in general practice*.

The need for criteria

Prior to introducing new general practice preventive care financial incentive schemes, their suitability in health economic, public health and policy contexts should ideally be comprehensively analysed. This is particularly important in Australia where the government has indicated its interest in extending the Targeted Incentives Program to areas other than immunisation (General Practice Review Group, 1998), such as cervical cancer screening (DHAC, 1999a). There are, however, no readily available guidelines or criteria outlining the factors that need to be taken into account to help determine the appropriateness or otherwise of providing incentives to promote specific preventive care activities in general practice. Nevertheless, the assessment of a public health care proposal against a set of criteria has been used in other contexts. Notably the World Health Organisation (WHO), developed a set of criteria to determine the appropriateness of health screening activities (Wilson and Jungner, 1968). The worth of these criteria (see Table 1) is exemplified by their use as a basis to formulating government policy on prostate cancer screening (AHTAC, 1996).

Table 1 **Criteria of appropriateness for a medical screening program**
(Modified from: Wilson and Jungner, 1968; AHTAC, 1996)

❖	The condition should be an important public health problem.
❖	There should be a recognisable latent or early symptomatic stage.
❖	The natural history of the condition should be adequately understood.
❖	There should be a suitable test or examination.
❖	The test should be acceptable to the population.
❖	There should be an agreed policy on whom to treat as patients.
❖	Facilities for treatment and diagnosis should be available.
❖	The cost should be economically balanced in relation to expenditure on medical care as a whole.
❖	Case finding should be a continuing process and not a 'once and for all' project.

In a similar context, through a literature review and analysis of theory and case studies, this report sets out to define a set of criteria to assist with assessing the appropriateness of incentive schemes for preventive care in general practice.

1.5 Limitations and assumptions

This study is necessarily based on some assumptions and has limitations particularly relating to the broader health system, priority setting, payment methods and evaluation.

The broader health system

Specific financial incentives in general practice will operate as only a small part of the overall health financing system. Thus, in Australia the national system of Medicare funding for general practice operates within a broader structure which has been described as cumbersome and inefficient. This is because of complex funding and service delivery arrangements that exist between state and federal governments. It is associated with poor integration and duplication of services (COAG Task Force, 1995). It can be assumed that these factors will inevitably impinge on the ways in which financial incentives targeted specifically at general practice operate. It should be borne in mind that a financial incentive formulated in isolation may be overwhelmed by existing incentives in the broader system, or may go too far. However, any such effects are not analysed in detail in this study.

Priority setting

Financial incentive schemes should arise out of priority setting processes, as described by Richardson et al (1995: p.3), based on the premise that,

‘the objective is to maximise community wellbeing from community resources

This study is based on the same premise, but does not aim to address priority-setting issues in detail. However, the general relationship of financial incentives to priority setting should be noted. That is, it is generally acknowledged that there are three separate but interrelated aspects related to priority setting. The first addresses the classification of objectives, whereas the second refers to the particular mechanism or approach for selecting the priorities. The third aspect which is relevant to the operation of financial incentives is the organisational and/or financial context which either aid, hinder or are neutral in influencing the achievement of the chosen priorities (Carter, 1998).

Payment methods

Although this study makes reference to case studies illustrating the use of financial incentives operating within various medical remuneration systems, it does not aim to analyse payment issues in detail. However, it is logical to conclude that the appropriateness of a financial incentive scheme will depend on the presence of *an effective payment system*. Thus, this point has been incorporated into the criteria defined in this report (see Table 2- criterion 5).

Evaluation

Although this report provides insights into the needs around health program and health economic evaluation relating to financial incentive schemes in general practice, it does not aim to specifically address evaluation issues.

2 Discussion

The discussion is structured under the headings of the main issues being analysed. The criteria formulated on the basis of these analyses are highlighted in the shaded boxes proceeding the relevant discussion and analysis.

2.1 Public Health Importance, Evidence And Cost-Effectiveness

The incentive scheme should address a prioritised public health problem stimulating the provision of evidence-based, cost-effective interventions.

A financial incentive scheme should address the underprovision of a preventive service related to an important prioritised public health problem, in which there are opportunities for significant health gain through prevention. Thus, childhood immunisation against vaccine preventable diseases is a suitable area for attention. This is because of the overwhelming evidence of potential for health gains through better immunisation on the basis of generalisable scientific evidence pertaining to its effectiveness as a preventive strategy (AIHW, 1998; DHAC, 1998a).

Incentive schemes should aim to stimulate the delivery of effective services and therefore arise from an evidence-based framework. The economic rationale for an evidence-based approach is that ineffective interventions are inefficient because they reflect the misallocation of limited healthcare resources. Recognising this, the National Health and Medical Research Council (NHMRC, 1999) recommends that clinical guidelines are developed on the basis of a structured evidence-based approach. In summary, this entails a comprehensive assessment of the quality of the scientific evidence, statistical power of the studies and the magnitude of clinical effect demonstrated. It is recognised that many evidence-based findings, even when incorporated into clinical based 'best practice' guidelines are not necessarily implemented by medical practitioners (Lee, 1997). On the basis of their ability to influence doctors' behaviour, it is argued that it is logical to contemplate the use of financial incentives to encourage 'best practice medicine' (Carter, 1997). Thus, the payment of financial incentives could be linked to the proven delivery of care outlined in evidence-based guidelines of NHMRC standard. For example, guidelines could be written to recommend the routine prescription of lipid lowering medications to most people who have had a diagnosis of coronary heart disease (CHD), and payments made to doctors who prescribed lipid lowering drugs in these situations. This strategy could feasibly be justified on the basis of: a) CHD being an important public

health problem, and; b) the existence of good quality, high level scientific evidence showing that lipid lowering in patients with pre-existing coronary heart disease and with 'normal' and higher cholesterol levels, results in considerable benefits in terms of morbidity and mortality savings (DHAC & AIHW, 1999; LIPID study group, 1998).

Research results, however, may not be generalisable because they are based on trials in which there is tight control over the characteristics of the study populations and the interventions under investigation. Therefore, it is important to determine whether research findings on which financial incentives could be based, are generalisable to practice settings (Hennekens & Buring, 1987). In doing this, an understanding is needed and an assessment should be made of those barriers potentially restricting the uptake of a defined service by the target group (also see section 2.5). This information could feasibly be gathered through appropriate pilot testing and trials in real and representative clinical contexts in a similar way to that undertaken with the Australian general practice coordinated care trials (DHS, 1995).

Further consideration of the possible use of a financial incentive scheme to increase prescribing rates of lipid lowering drugs illustrates the importance of considering generalisability prior to the introduction of incentive schemes. Even though the quality of research and magnitude of clinical effect are high with respect to the use of lipid lowering medications in CHD secondary prevention (LIPID study group, 1998), these findings cannot necessarily be transferred to general practice settings. In this example, poor compliance is likely to restrict the ability of increased prescribing rates to translate into improved health outcomes because studies have shown up to 60% of patients receiving newly prescribed lipid lowering drugs discontinue therapy within 12 months (Simons et al, 1996).⁴ Clearly, a financial incentive that improved general practitioner initial prescribing rates would be ineffective if it did not also result in an improvement in longer-term patient compliance.

Apart from being effective in a physiological sense and transferable to general practice settings, the interventions need to be cost-effective. That is, the interventions being considered need to be defined in terms of its costs and benefits and *compared with alternative interventions or strategies* to address the same problem, using techniques such as cost-effectiveness or cost-utility analysis (Drummond et al, 1997). There are probably no realistically cost-effective alternatives to immunisation or cervical cancer screening to address the respective diseases being targeted. On the other hand, assuming that poor compliance with lipid lowering therapy in secondary CHD care could be overcome, and that an incentive scheme to increase prescribing rates was being considered, cost-effectiveness or cost-utility studies would need to be undertaken in this area. That is, prior to the introduction of any such scheme its cost-effectiveness would need to be considered against alternative strategies, such as increased expenditure on lifestyle intervention programs, to determine whether resources would be efficiently allocated if spent on the incentive scheme. It can be argued that the most useful analyses will place the cost-effectiveness considerations of the

⁴ Reasons given for discontinuation of lipid-lowering therapy are complex and include patients being 'unconvinced of the need for treatment'. Adverse events and side-effects related to treatment only explain a relatively small proportion of the reasons for discontinuation (Simons et al, 1996).

incentive scheme within the broader setting of the cost-effectiveness of the actual intervention being encouraged (ie marginal analysis of design features).

2.2 Defining The Problem Being Addressed And Benefits Sought

The objectives of an incentive scheme need to be clearly defined taking health economic principles into account.

It is important to clearly define the 'problem' being addressed by an incentive scheme and the associated objectives of the scheme. To do this it is useful to refer to health economic theory.

Responding to externalities, and underprovision of merit goods

The free market tends to underprovide services which are subject to positive externalities in which benefits are experienced by others not using the service. Incentive schemes can be used to try and compensate for this problem of market failure. Childhood immunisation is a good example of this objective because immunisation confers benefits to the non-immunised because of reduced disease transmission. A related issue is that the free market, by definition, cannot deliver 'merit goods' in an appropriate way. These are commodities determined by decision-makers as beneficial for individuals (and therefore society), regardless of individual preference (Folland et al, 1997). It can be argued that general practice financial incentive schemes designed to increase the rates of cervical cancer screening and cardiovascular disease prevention in the United Kingdom, and childhood immunisation in the United Kingdom and Australia, have operated in this sense.

Promoting economic efficiency

Although this report primarily focuses on the potential use of financial incentives to stimulate the provision of preventive care activities in general practice it is important to analyse the interrelated issue of how incentives relate to economic efficiency. Economic efficiency has both technical and allocative components and refers to maximising the healthcare benefit obtainable from a limited amount of resources (Coast, 1996).

Financial incentives have been used to try and improve allocative efficiency particularly in the United States. Thus, US managed care organisations have been commonly applying this principle to reduce costs by providing incentives to primary care doctors who limit their use of hospital services and rate of referrals to specialists (Grumbach et al, 1998). In the United Kingdom, financial incentives have also been used in a specific though limited capacity to curtail service specific expenditure. For example, in a trial of non-fundholding practices, financial incentives were shown to be successful in affecting doctors' prescribing behaviour, and reducing prescribing rates and costs (Bateman et al, 1996). General practice fundholding systems in the United Kingdom provide a more general 'incentive' for doctors to improve efficiency in that savings from within allocated funds can be

reallocated to approved service and practice developments (Bateman et al, 1996; Iliffe and Munro, 1993).

These incentive schemes have not been designed to encourage doctors to reallocate their consulting time towards delivering specifically defined and prioritised preventive or public health activities. Alternatively, the Australian General Practice Immunisation Incentives (GPII) Scheme and the United Kingdom incentive schemes for immunisation, cervical cancer screening and cardiovascular disease prevention, have been attempts to address allocative inefficiency by encouraging the delivery of selected 'merit goods', at the implied expense of other 'less worthy' goods.

Ideally, the introduction of financial incentives to promote economic efficiency would only occur as the result of priority-setting exercises based on sound economic evaluation and analysis, in which various alternatives for health expenditure were compared in terms of their ability to maximise a pre-defined health benefit, at minimal cost. It is beyond the scope of this report to analyse the strengths and weaknesses of the various economic tools such as cost-effectiveness study, cost-utility analysis and Program Budgeting and Marginal Analysis (PBMA), which could be used to assist with rationing tasks and have been described by others (Coast, 1996; Richardson et al, 1995). However, an important underlying principle and prerequisite for the valid application of all these tools is the need to clearly define the health benefit sought, whether it is simply just to maximise 'life years gained' or to also consider quality of life.

Promoting equity of service provision and accessibility

Australian society appears to have placed a high value on equitable access to a minimum level of healthcare regardless of ability to pay (Swerissen & Duckett, 1997). This suggests that society will support the use of incentives to achieve this goal, and it is logical therefore to consider using financial incentives as a possible means to improve disadvantaged groups' access to health services. In Australia, this could be relevant for groups including Australian Aboriginals and Torres Strait Islanders, rural and remote populations, and people of lower socio-economic background who have poor health status compared with the general population (AIHW, 1998).

The international experience of using incentives in this way appears to be limited. However, in Australia financial bonuses have been used to try and attract doctors to provide general practice services to medically under-resourced rural and remote locations (DHFS, 1996).

Several studies point to the relative ineffectiveness of incentive schemes with respect to increasing the rates of immunisation, cervical cancer screening and provision of 'health promotion clinics' in socio-economically deprived areas (Langham et al, 1995; Lynch, 1994; Scott, 1996). Therefore, in recognition of increased efforts required in these areas to achieve immunisation targets, incentive schemes in the United Kingdom have provided extra financial compensation to doctors in areas of socio-economic deprivation. Nevertheless, these have been reported to have been ineffective in improving the level of immunisation uptake (Lynch 1995).

Promoting provision of quality care

Financial incentives have been used to foster 'quality' primary care and patient satisfaction in managed care organisations in the USA (Adams Dudley et al, 1998; Grumbach et al, 1998). However, there is little in the literature on the details of such incentive schemes nor of associated evaluations and it appears that no prospective controlled trials of direct payments on quality have been published (Adams Dudley et al, 1998).

Given the difficulties involved in defining, and measuring quality, it is hard to envisage how financial incentives could be targeted to improve the quality of specific healthcare services. Furthermore, Magnus (1999) believes that the efficacy of financial incentives to improve the quality of healthcare is open to question. This argument is given on the basis of the results of non-health sector management research which have consistently shown that whereas financial incentives may be used to increase productive work output in selected areas, they have not been used as a successful tool for stimulating the delivery of specific quality services. This does not mean to say, however, that quality is not an important issue to be taken into account when devising incentive schemes, only that the role of incentives as a primary tool to improve the quality of specific health services may be limited (also see section 2.4).

Quality care in general practice, is more likely to be addressed at a broader structural level through strategies such as vocational training, continuing medical education and practice accreditation requirements, financial support to doctors for developing practice based information technology systems and the establishment of divisions of general practice to support doctors in all these areas (General Practice Review Group, 1998).

2.3 Determinants of Health

The incentive scheme needs to be planned as one part of a broadly based 'solution' to a public health 'problem'.

In recent years, more emphasis is being placed on the need to better define, measure and direct resources to the non- medical determinants of health which influence health status. These include low socio-economic status, psychological stress in work and non-work environments, poor early life environment, social exclusion and unemployment (WHO, 1998a). The relative inability of incentives to effect change in socio-economically deprived areas in the area of childhood immunisation (also see 2.2), may relate to non-health sector barriers to health care, such as poor education and housing over which incentives have little influence (Scott, 1996). These factors need to be considered in the general practice sector to identify and devise strategies to respond to the 'barriers for the patient' preventing uptake of preventive care in general practice (Huang and Sculthorpe, 1998) - (also see section 2.5).

It is likely, that better gains will be made from incentive schemes targeted to preventive care in general practice if they are designed to operate in a broad social context. Therefore, it is appropriate that the Immunise Australia campaign has a 'seven point plan' to promote childhood immunisation. This includes school entry requirements, an education and research strategy, a monitoring and evaluation of immunisation targets and the provision of demand side financial incentives to parents through maternity allowance and childcare assistance schemes⁵, as well as the provision of financial incentives to general practitioners (DHAC, 1999b).

2.4 Detrimental Effects Of Incentive Schemes

The negative aspects of the incentive scheme need to be considered against the benefits.

The benefits derived from an incentive scheme will depend on the extent to which it achieves its pre-determined objectives whether these are to improve efficiency, increase provision of a merit good (eg increased immunisation or cervical cancer screening rates), achieve improved equity of access to services and/or ultimately achieve specific health outcomes (eg reduced childhood illnesses, cervical cancer rates). In order to determine the overall worth of a scheme the 'costs' of the scheme, defined in a broad context need to be considered alongside and offset against the benefits.

Efficiency, equity and quality

Potential negative consequences relate to the unpredictability of incentive effects and the trade-off between efficiency and equity which occurs in healthcare systems (Coast, 1996; Folland et al, 1997; Richardson, 1991). There are related ethical issues that need to be considered. Thus, it has been stated by Hillman (cited by Magnus, 1999: p.71);

'the crucial question is not whether financial incentives affect physicians' decisions, but whether some financial incentives distort physicians' judgement. In other words, in the pursuit of cost-effective medicine, do some HMO incentives influence doctors to conserve medical resources to excess to the point where some patients do not receive the medical care they need?'

Therefore, where incentives are introduced with the aim of increasing efficiency, for instance by limiting unnecessary doctors' referrals to specialists (Grumbach et al, 1998), or curtailing drug prescriptions (Bateman et al, 1996), an important evaluative component should be to determine the extent to which equity of access to these 'services' and 'quality of care' suffer as a result (also see 2.2).

⁵ The Immunise Australia strategy provides specific financial bonuses to parents who ensure that their child's immunisation coverage is complete (DHAC, 1999).

Quality considerations are also important for incentive schemes designed to expand preventive and public health services. Improved rates of service delivery do not necessarily translate into improved health outcomes if there is poor quality service delivery. For example, the effectiveness of immunisation is dependant on the maintenance of a continuous refrigeration cycle of vaccines (NHMRC, 1994). Similarly, effective cervical cancer screening is dependent on the application of high quality techniques by practitioners when obtaining cervical cell specimens, and in pathology laboratories when analysing specimens (Curtis et al, 1999). Furthermore there is evidence suggesting that the quality of activities 'stimulated' by incentives may not be high. These issues are exemplified by Iliffe and Munro (1993) who claim that specific incentive schemes in general practice in the United Kingdom which were designed to encourage general practitioners, rather than specialists, to provide contraceptive care and excision of skin lesions, resulted in less choice for consumers in contraceptive care and an increased proportion of incomplete excision of malignant skin lesions respectively. Moreover these authors (p. 1157) believe that:

'Incentives to increase service provision may result in less time available for communication with and education of patients and therefore lower quality care.'

Despite these views, very few studies have evaluated quality in relation to financial incentives (Adams et al, 1998). This highlights the need for incentive schemes to be evaluated through the ongoing measurement of quality indicators' judged against pre-defined benchmarks (Pretzer, 1996).

Opportunity costs

Doctors time resources are limited, and therefore an incentive which successfully stimulates their activity in one area, will necessarily result in a decrease in other doctor activities. Therefore, consideration of the opportunity costs, being the benefits forgone (Folland et al, 1997), should be taken into account when planning, monitoring and evaluating incentive schemes. In this respect it has been argued that an opportunity cost of 'health promotion clinics' in the United Kingdom may have been that the associated incentives caused doctors to encourage 'healthy' patients to attend the clinics while prejudicing the care of sicker patients in need of more acute care (Al-Bashir and Armstrong, 1991). Despite this reference to the opportunity costs associated with incentive schemes, there is little in the literature on this important issue which reflects the difficulties associated with modelling, predicting and measuring changes to doctors practice and lack of evaluation research in this area.

2.5 The Effect Of Incentives In General Practice

The incentive needs to operate within an effective payment system, cognisant of barriers to care and stimulate the delivery of services which are acceptable to consumers and compatible with routine general practice.

Deliverable as part of routine general practice

Doctors are probably more likely to respond to incentives which relate to their routine general practice skill set, rather than in more obscure health areas. Thus, Rivo (1998) believes that general practitioners have the best chance of implementing effective preventive care at a practice population level by concentrating on the prevention of common conditions (such as cardiovascular disease), for which they can provide most care. Indeed, all of the preventive care incentive schemes trialed in the United Kingdom and Australia have all dealt with further stimulating activity in areas that would have already been considered common general practice activities prior to their introduction. For example, although childhood immunisation rates have been too low, 60% of childhood immunisation was already delivered in general practice in Australia prior to the introduction of the General Practice Immunisation Incentives Scheme (Achat et al, 1999).

Underprovision

In order for incentive schemes to be effective they need to stimulate activities which are accepted by both doctors and patients as suitable for delivery in general practice settings, and have been identified as being underprovided. Ideally, the reasons for underprovision should be identified prior to implementing an incentive scheme to assist with planning and targeting the incentives appropriately. Huang and Sculthorpe (1998) have reviewed the factors which act as barriers or facilitators to the delivery of preventive care in general practice. This review shows that price and income signals and remuneration are only some of the many financial, psychological, environmental, organisational and knowledge based factors which can act at both the doctor and patient levels, as barriers to the delivery of preventive care in general practice. Therefore, the main barriers to the provision of particular preventive care activities could be social and/or economic barriers for the patient (a demand problem), rather than barriers for the doctor. Directing financial incentives to the suppliers of the service in these instances may be inefficient unless they are able to overcome such demand constraints.

In recognition of the importance of patient barriers to preventive care in general practice the attitudes of patient populations need to be taken into account when devising schemes to increase the uptake of preventive care uptake in general practice. In this context it is recognised that the appropriateness and success of a screening test is dependant on the process and physical procedures of testing being 'acceptable to the population as whole' (AHTAC, 1996). There is little in the literature on this issue with respect to incentive schemes in general practice. However, there is a view that the relative ease with which childhood immunisation incentive schemes have fulfilled their target

objectives compared to cervical cancer screening schemes, can be partly explained by differences in attitudes in general practice populations about the effectiveness of these procedures (Lynch, 1994).

Although many studies have confirmed that doctors 'respond' to financial incentives, there is very little empirical evidence surrounding the degree of responsiveness, that is the 'price elasticity', demonstrated by doctors in relation to the size and type of financial incentives and the environmental context of their application (Carter, 1997). Thus, studies have not been able to isolate the specific effect of incentives (Hemenway, 1990), nor how they can be specifically designed or manipulated for a pre-determined effect. This problem reflects the limitation of studies that have largely compared doctors working in different settings. It also signifies the complexity of general practice systems in which many confounding factors including, inter- and intra-country differences in remuneration systems, practice organisation and patient health status, socio-economic, cultural, and demographic characteristics are likely to influence doctor behaviour and their ability to influence public health outcomes (Hemenway, 1990; Lynch 1994). Moreover Scott (1996: p.24) emphasises the lack of knowledge about possible non-financial professional and personal incentives such as continuing medical education and a 'less stressful working environment' and believes that;

'if more appropriate incentives are to be designed it is important to find out what, apart from income, is important to general practitioners.'

Income elasticity and medical remuneration

It is important to try and understand the way an incentive can motivate doctors to change their behaviour within the broader medical remuneration system. This is because doctors demonstrate significant income elasticity, meaning that they have a concern with total income. This may be particularly relevant in Australia because cross-sectional surveys show that remuneration is a vexed issue for general practitioners with poor remuneration cited as one of the main dissatisfactions of working in general practice (Messenger, 1996; Sibthorpe et al, 1997). In relation to this observation, Carter (1997: p.2) states:

'The prevalence of general practitioners concern with their income, suggests that for many, income effects (ie income elasticity) will be just as important as price effects (ie price elasticity) in their response to financial incentives. While on the one hand this may suggest a greater responsiveness to financial incentives, it also means that the remuneration impact of adhering to the best practice guidelines, will also be a factor that needs to be carefully considered in evaluating system effects.'

This suggests that doctors will respond to financial incentives that provide them with an opportunity to maximise income. Therefore, characteristics of medical remuneration systems themselves, and how these are perceived by doctors in terms of opportunities for income maximisation, may influence the effectiveness of incentives. Unfortunately, little research has been done in this area although the

literature refers to the broader strengths and weaknesses of fee-for-service, salary, capitation and other remuneration systems (Hughes, 1993; Krasnik et al, 1990; Richardson 1990; Richardson et al, 1995), from which some general themes can be identified.

It is relevant to compare fee-for-service and capitation payment systems. Fee-for-service payments encourage activity with the associated advantage of patient accessibility to general practitioners. In Australia where these services are largely paid for through universal insurance, 'bulk-uncapped Medicare budget, it also promotes social equity. However, a criticism is that this system is inefficient due to the excessive demand for services (associated with the 'moral hazard' of universal insurance) and 'supplier induced demand', whereby doctors respond to 'perverse incentives' which reward doctors for patient throughput rather than for population health outcomes (General Practice Review Group, 1998; Pringle, 1999). Alternatively, it is argued that an advantage of a capitation system in which doctors are paid according to the size and characteristics of their enrolled patient population, is that it is likely to promote preventive care and reduce overservicing. The 1990 health reforms in the United Kingdom, were designed particularly to change the emphasis from treatment to prevention in general practice and accordingly aimed to increase the proportion of general practitioners' total income derived from capitation payments from an average of 46% to 60% (Hughes, 1993). On the other hand, it is argued that capitation payments can provide an incentive for doctors to underservice sicker people in the enrolled population and unnecessarily refer patients to more expensive secondary services (Richardson, 1990), thus reducing accessibility and efficiency.

In the face of these dilemmas and the lack of evidence surrounding the 'best' methods of medical remuneration, there is growing international consensus that a pragmatic response is required to deal with these issues. Notably with reference to general practice in Europe, the World Health Organisation (WHO, 1998b: p.7) states that;

'the payment system should be well balanced, preferably combining a salary or other form of fixed payment, a capitation fee, and fee-for-service. Its aim should be to stimulate the provision of the full range of services within the domain of general practice and to offer high quality primary care by offering different services'.

This statement, albeit in the absence of good empirical information, suggests that within a balanced system, there is room for targeted incentive schemes to operate at the margin and in a strategic way to encourage services where gaps have been identified. This will entail selectively incorporating different incentives into the various payment components of a blended payment system.

The medical remuneration system in the United Kingdom is a blended payment system. This is exemplified by the following structure of the early 1990's; capitation-59%, allowances for providing certain types of services/hours-19%; fee-for-service-11%; sessional payments-3%, and 8% for target

payments (eg for achieving certain levels of immunisation in practice population) (Hughes, 1993). The extent to which different incentive schemes in the United Kingdom have been successful over the last 30 years or so is still not clear. For example, although the introduction of specific fees for undertaking cervical cytology in the 1960's and for the provision of contraceptive services in the 1970's, was associated with an increase in the number of services provided by general practitioners, Whynes and Baines (1998: p. 18) believe that;

'it remains unclear whether the economic incentive effect was responsible as opposed to changing professional attitudes, and increased demand for the service'.

More recently as part of the 1990 general practice contract in the United Kingdom, fee for service payments for childhood immunisation and cervical cytology were replaced with 'target payments'. Thus, practices were rewarded for achieving target rates of immunisation coverage and/or cervical cancer screening. That is, an immunisation payment was introduced for general practitioners achieving 70% coverage of their eligible population, with a higher payment for 90% coverage. For cervical cancer screening the target levels were 50% and 80% (Hughes, 1993). Although it is generally agreed that this was associated with a significant increase in the rates of immunisation (Fairbrother et al, 1999), the extent to which these incentives have been specifically responsible for improvements in immunisation and cervical cancer screening rates is not clear because other factors influencing service delivery rates, including, more emphasis on professional and consumer education and improved information systems were already in place prior to the introduction of the contract (Achat et al, 1999).

In Australia, remuneration for general practice is still predominantly based on a fee-for-service system in which payments are almost entirely independent of consultation content and *specific* health promoting activities. However, plans have been announced to introduce a new MBS item for annual health assessments of people 75 years of age and over, in an effort to stimulate the provision of preventive care in the elderly (King, 1999). In recent years, however, firstly through the Better Practice Program and more recently through the Practice Incentives Program, a relatively small blended component has been introduced into the remuneration system. Some of these payments have been designed to encourage doctors to contribute to public health activity at a structural level through the establishment of practice IT systems and their provision of practice based population data to the divisions of general practice. The General Practice Immunisation Incentive (GPPI) Scheme is targeted more specifically to a public health activity and appears to be based on the United Kingdom model which rewards doctors for achieving target levels of immunisation coverage in their practice populations. The answer to the question of whether these 'capitation like incentives' (ie payment based around service delivery to a target population) can appreciably influence doctors' behaviour in Australia within the predominant fee-for-service system is unclear, although the planned evaluation of the General Practice Immunisation Incentive (GPPI) Scheme may provide some insight (DHAC, 1999b).

2.6 Population Health And Infrastructural Needs In General Practice

An incentive scheme in general practice should be supported by a systems based infrastructure and information technology.

In order to implement public health initiatives effectively in general practice a methodical, systems-based approach to primary care is needed. This requires identification and contact with a target group of patients within a practice population, a well developed call and recall system, evidence-based clinical assessment and intervention relating to prioritised public health areas, and the ongoing measurement and recording of activity and outcomes (Lynch, 1994; Rivo, 1998; Taplin et al, 1998). The need to support this approach with effective data collection and IT systems is self evident. Moreover, such support will assist the reliable measurement of health promoting indicators from which incentive payments to doctors are determined (see 2.7).

In the United Kingdom, the National Health Service (NHS) has an infrastructure which has enabled the implementation of several public health oriented incentive schemes in general practice. Australian general practice, however, which operates in a less regulated environment, faces barriers to the introduction of comprehensive systems based approaches to primary care. The fundamental issues in Australia are the lack of national comprehensive datasets describing general practice public health activities and outcomes (CHPE, 1997) and the absence of practice based patient enrolment and individual patient identifier and record systems (Malcolm, 1998; Montalto, 1997; Pringle 1999). The Australian government has, however, made attempts to try and address some of these problems. For example, the establishment of the divisions of general practice has provided a regional support network for doctors, providing opportunities for them to become more involved in public health. For example, divisions of general practice now support general practitioners to develop information technology systems and supply practice-based health data, which can be incorporated into regional public health projects and help satisfy the divisions' outcomes based funding requirements (General Practice Review Group, 1998). Moreover, financial incentives are now given to general practitioners through the Practice Incentives Program (PIP) to encourage them to cooperate with divisions in these ways (DHAC, 1998b).⁶

The problems remain, however, that this is a voluntary system and there is no national patient record system which could potentially be used to measure and analyse the use of healthcare resources in general practice, to enable more sophisticated analysis and measurement of the opportunity costs associated with general practice incentive schemes. In the meantime and as a second best, though necessary strategy, new incentive schemes need to have their own support mechanisms developed in isolation from the broader general practice system. Thus, the General Practice Immunisation

⁶ This report focuses on financial incentives to encourage specific preventive care activities in general practice and therefore incentives encouraging structural change in general practice (eg. practice IT development, data collection for divisions of general practice etc) are not analysed here.

Incentives (GP11) Scheme is a stand alone program with its own database - the Australian Childhood Immunisation Register (ACIR). This database is used to record and monitor immunisation rates in general practice populations (DHAC, 1998a).

2.7 Indicators

Payment should be based on reliable measurement of valid indicators of health promoting activity in general practice.

There is a long time lag between the delivery of preventive health services and the expression of health outcomes and therefore it is difficult to calculate the level of payment on the basis of the longer term health outcomes. It may be more feasible, however, to calculate payments as a proportion of the expected benefit (Diamond et al, 1993). However, a difficulty in doing this is that there are many non-provider factors which affect individual risk of disease (eg genetic factors, previous lifestyle choice over many years). There is also a lack of information and models allowing individual risk adjustment to determine the probability of a particular outcome (Adams et al, 1998). Due to such difficulties, there is interest in the use of surrogate markers of quality (eg process measures) and intermediate health outcomes (eg blood sugar levels in diabetics). The value of such indicators is determined on the basis of the strength of their association to clinically significant outcomes (Adams et al, 1998; Diamond et al, 1993).

There is strong evidence that the effective delivery of childhood immunisation and cervical cancer screening will result in improved health outcomes (AIHW, 1998; DHAC, 1998a). Therefore it is sensible that in the United Kingdom and Australia general practitioner payments have been made dependant on the achievement of delivering these services to satisfactory 'target' levels in pre-defined 'at risk' populations (Ibbotson et al, 1996, Achat et al, 1999). However, as discussed earlier (see section 2.4), improved rates of service delivery will not necessarily translate into improved health outcomes if there is poor quality service delivery. Thus, it is essential that quality control and evaluation mechanisms incorporating the measurement of quality indicators be in place to ensure the effective delivery of preventive services for which incentives are paid.

Incentive schemes have been criticised where payment has been based on indicators which are not necessarily indicative of health outcomes. For example, in the early 1990's general practitioners in the United Kingdom received an incentive payment for each 'he no requirement for the provision of more detailed information describing specific health activity or outcomes. This scheme was subsequently replaced with one that concentrated on cardiovascular disease prevention. To qualify for payment in this newer scheme, doctors had to supply information on the prevalence of coronary heart disease risk factors in their practice populations. Again payment was not linked to specific interventions or outcomes. These scenarios led Langham et al (1995: p. 668) to state that:

'Financial incentives are only linked to information about patients, not to health promotion activity nor, more importantly, to the outcome of that activity'.

It seems that in practical terms the best measure of the benefits of financial incentives, or the best way of encouraging the achievement of these benefits, may mean focussing on activity and payment for activity demonstrating the delivery of cost-effective programs. However, payment for activity with no established rationale in relation to outcomes or monitoring should clearly be avoided.

It is hoped that such considerations will be taken into account by the Australian government when implementing the recently announced scheme (King, 1999) to provide a specific Medicare payment for general practitioners to deliver comprehensive health assessments to people over the 75 years old.

Table 2 Recommended criteria against which any proposed financial incentive scheme designed to encourage the delivery of a particular population-based preventive care activity in general practice should be assessed

-
1. The incentive scheme should address a prioritised public health problem stimulating the provision of evidence-based, cost-effective interventions.
 2. The objectives of an incentive scheme need to be clearly defined taking health economic principles into account.
 3. The incentive scheme needs to be planned as one part of a broadly based solution to a public health problem.
 4. The negative aspects of the incentive scheme need to be considered against the benefits.
 5. The incentive needs to operate within an effective payment system, cognisant of barriers to care and stimulate the delivery of services which are acceptable to consumers and compatible with routine general practice.
 6. An incentive scheme in general practice should be supported by a systems based infrastructure and information technology.
 7. Payment should be based on reliable measurement of valid indicators of health promoting activity in general practice.
-

3 Conclusion

Criteria developed in this report can assist in determining the appropriateness of financial incentive schemes to encourage preventive care in general practice in Australia. However, unlike the WHO criteria of appropriateness for a screening program, which are based on straightforward, uni-dimensional definitions (Table 1), most of the criteria presented here are more complex, multi-dimensional definitions (Table 2). This is a reflection of the complicated interrelationships between the public health and health economic issues analysed in the report. It should be noted that while some of these criteria are generic in nature (ie criteria 1-4; Table 2), others are more specific to general practice (ie criteria 5-7; Table 2).

Analysis of the issues underpinning these criteria suggests that the use of financial incentives is an appropriate policy option for encouraging population-based preventive care in general practice in Australia. Indeed, the government appears committed to such a belief through its introduction of the General Practice Immunisation Incentives (GPPI) Scheme. However, caution needs to be applied to this statement. Firstly, despite the establishment of divisions of general practice which support general practitioners in public health activity, Australian general practice has not been truly incorporated into a national public health system. Thus, national data on general practice activity and outcomes is deficient, and without such data it is not possible to accurately determine where best to stimulate specific general practice activity with specific incentives in order to best allocate scarce resources. Secondly, a major limitation is the lack of empirical data in relation to financial incentives, making it difficult to develop financial incentive schemes which accurately deliver predetermined changes in doctor behaviour and improved health outcomes. An important and related issue is the lack of information on the negative effects of incentive schemes, particularly on how other aspects of general practice care may be detrimentally affected as a result of their implementation.

These concerns do not mean that financial incentive schemes should not be considered, but they do highlight the need for more context specific research in this area and lead to the recommendation that incentive schemes be considered as one possible means of responding to specific service gaps. If implemented, they should be specifically targeted to operate within selected components of a blended payments system. It is also recommended that such schemes be piloted to allow evaluation around many of the criteria and issues outlined in this report (see Table 2). Importantly, as well as gathering information on the positive effects of a scheme in terms of increased preventive health delivery to the general practice patient population, the potential losses to that population in terms of resources misallocated, and health benefits foregone also need to be assessed.

References

Achat H, McIntyre P & Burgess M 1999, Healthcare incentives and immunisation. *Australian and New Zealand Journal of Public Health*, vol 23, no 3, pp285–8.

Adams Dudley R, Miller RH, Korenbrot TY & Luft HS 1998, The impact of financial incentives on quality of health care, *The Milbank Quarterly*, vol 76, no 4, pp649–86.

AHTAC (Australian Health Technology Advisory Committee) 1996, *Prostate Cancer Screening*, Australian Government Publishing Service, Canberra.

AIHW (Australian Institute of Health and Welfare) 1998, *Australia's health 1998*. Australian Institute of Health and Welfare, Canberra.

Al-Bashi M & Armstrong D 1991, Preferences of healthy and ill patients for the style of general practitioner care: implications for workload and financial incentives under the new contract, *British Journal of General Practice*, vol 41, pp 6–8.

Bateman DN, Campbell M, Donaldson LJ, Roberts SJ & Smith JM 1996, A prescribing incentive scheme for non-fundholding general practices: an observational study, *British Journal of Medicine*, vol 313, pp535–8.

Carter R 1997, 'Some critical issues in use of economic levers to encourage evidence-based clinical practice', Work in progress, Centre for Health Program Evaluation, Melbourne.

Carter R 1998, Lecture in health economics for Master of Public Health, University of Melbourne.

CHPE (Centre for Health Program Evaluation) 1997, *National public health infrastructure and investment mapping project – stage 1*, Centre for Health Program Evaluation, Melbourne.

COAG Task Force on Health and Community Services 1995, *Health and Community Services: meeting people's needs better: a discussion paper*, Commonwealth Department of Human Services and Health, Canberra.

Coast J 1996, 'Efficiency: the economic contribution to priority-setting', In J Coast, J Donovan & S Frankel (eds), *Priority-setting: the health care debate*, Wiley, Chichester.

Curtis P, Mintzer M, Morrell D, Resnick JC, Hendrix S & Qaqish BF 1999, Characteristics and quality of Papanicolaou smears obtained by primary care clinicians using a single commercial laboratory, *Archives of Family Medicine*, vol 8, pp407–13.

Deeble J 1999, Resource allocation in public health – an economic approach, *A background discussion paper for the National Public Health Partnership, 2nd edition*, National Public Health Partnership, Melbourne.

DHAC (Commonwealth Department of Health and Aged Care) 1998a, *General practice immunisation incentives*, Commonwealth Department of Health and Aged Care, Canberra.

DHAC (Commonwealth Department of Health and Aged Care) 1998b, *An outline of the practices incentives program*, Commonwealth Department of Health and Aged Care, Canberra.

DHAC (Commonwealth Department of Health and Aged Care) 1999a, *Request for tender: evaluation of the General Practice Immunisation Incentives Scheme*, Commonwealth Department of Human Services and Health, Canberra.

DHAC (Commonwealth Department of Health and Aged Care) 1999b, *Immunise Australia – the seven point plan*, <http://www.health.gov.au/pubhlth/strateg/immunis/7point.htm>, Commonwealth Department of Health and Aged Care, Canberra.

DHAC & AIHW (Commonwealth Department of Health and Aged Care and Australian Institute of Health and Welfare) 1999, *National health priority areas report-cardiovascular health – a report on heart, stroke and vascular disease*, Australian Institute of Health and Welfare, Canberra.

DHFS (Commonwealth Department of Health and Family Services) 1996, *General practice in Australia: 1996*, Commonwealth Department of Health and Family Services, Canberra.

DHSH (Commonwealth Department of Human Services and Health) 1995, *Calls for expressions of interest in conducting trials in coordinated care*, Commonwealth Department of Human Services and Health, Canberra.

Diamond GA, Denton TA & Matloff JM 1993, Fee for benefit: a strategy to improve the quality of health care and control costs through reimbursement incentives, *The American College of Cardiology*, vol 23, pp243–52.

Drummond MF, O'Brien B, Stoddart GL & Torrance GW 1997, *Methods for the economic evaluation of health care programmes*, (2nd edition), Oxford Medical Publications, Oxford.

Fairbrother G, Hanson KL, Friedman S & Butts GC 1999, The impact of physician bonuses, enhanced fees, and feedback on childhood immunisation coverage rates, *American Journal of Public Health*, vol 89, pp171–175.

Folland S, Goodman AC & Stano M 1997, *The economics of health and health care*, (2nd edition), Prentice Hall, New Jersey.

General Practice Strategy Review Group 1998, *General practice: changing the future through partnerships: report of the General Practice Strategy Review Group*, Commonwealth Department of Health and Family Services, Canberra.

Grumbach K, Osmond D, Vranizan K, Jaffe D & Bindman AB 1998, Primary care physicians' experience of financial incentives in managed-care systems, *The New England Journal of Medicine*, vol 339, pp1516–21.

Hemenway D 1990, Physicians' responses to financial incentives, *The New England Journal of Medicine*, vol 322, pp1516–21.

Hennekens CH & Buring JE 1987, *Epidemiology in Medicine*, Little, Brown and Company, Boston.

Huang N & Sculthorpe A 1998, *Primary prevention of cardiovascular disease – a guide for Divisions of General Practice*, Public Health and Health Promotion, SERU, University of Melbourne, Melbourne.

Hughes D 1993, General practitioners and the new contract: promoting better health through financial incentives, *Health Policy*, vol 25, pp39–50.

Ibbotson T, Wyke S, McEwen J, Macintyre S & Kelly M 1996, Uptake of cervical screening in general practice: effect of practice organisation, structure and deprivation, *Journal of Medical Screening*, vol 3, pp35–9.

Iliffe S & Munro J 1993, General practitioners and incentives: carrots and sticks may make GPs behave more like donkeys than doctors, *British Medical Journal*, vol 307, pp1156–7.

King C 1999, *Long term financing options for public health in Australia: discussion paper*, National Public Health Partnership, Melbourne.

Krasnik A, Groenewegen PP, Pedersen PA, von Scholten P, Mooney G, Gottschau A, Flierman HA & Damsgaard MT 1990, Changing remuneration systems: effects on activity in general practice, *British Medical Journal*, vol 300, pp1698–701.

Langham S, Gillam S & Thorogood M 1995, The carrot, the stick and the general practitioner: how have changes in financial incentives affected health promotion activity in general practice?, *British Journal of General Practice*, vol 45, pp665–8.

Lee AJ 1997, The role of financial incentives in shaping clinical practice patterns and practice efficiency, *American Journal of Cardiology*, vol 80, no 8B, pp28H–32H.

LIPID study group 1998, Prevention of cardiovascular events and death with pravastatin in patients with coronary heart disease and a broad range of cholesterol levels, *The New England Journal of Medicine*, vol 339, pp1349–57.

Lynch M 1994, The uptake of childhood immunisation and financial incentives to general practitioners, *Health Economics*, vol 3, pp117–25.

Lynch M 1995, Effect of practice and patient population characteristics on the uptake of childhood immunisations, *British Journal of General Practice*, vol 45, pp205–8.

Magnus SA 1999, Physicians' financial incentives in five dimensions: a conceptual framework for HMO managers, *Health Care Management Review*, vol 24, pp57–72.

Malcolm L 1998, Towards general practice-led integrated healthcare in New Zealand, *Medical Journal of Australia*, vol 169, pp147–50.

Messenger A 1996, Now is the season of discontent, *Australian Doctor*, June 21–23.

Montalto M 1997, Coordinated care: are we putting the cart before the horse?, *Australian Family Physician*, vol 26, suppl 2, ppS60.

NHMRC (National Health and Medical Research Council) 1994, *The Australian immunisation procedures handbook* (5th edition), Australian Government Publishing Service, Canberra.

NHMRC (National Health and Medical Research Council) 1999, *A Guide to the development, implementation and evaluation of clinical practice guidelines*, National Health and Medical Research Council, Canberra.

Pretzer M 1996, Medicine's most elusive goal, *Medical Economics*, vol 73, no 23, pp165–72.

Pringle M 1999, The hard choice facing Australian general practice-is it time to join the health system?, *Australian Family Physician*, vol 28, suppl 1, ppS46–S47.

Richardson J 1987, 'Ownership and regulation in the health care sector' in P Abelson (ed) *Privatisation: an Australian perspective*, Australian Professional Publications, Mosman.

Richardson J 1990, Methods of medical remuneration, *New Doctor*, vol 53, pp17–21.

Richardson J 1991, The effects of consumer co-payments in medical care, *National Health Strategy, Background Paper No. 5*, National Health Strategy, Canberra.

Richardson J, Segal L, Carter R, Catford J, Galbally R & Johnson S 1995, *Prioritising and financing health promotion in Australia*, Research Report 4, Centre for Health Program Evaluation, Melbourne.

Rivo .L 1998, It's time to start practicing population-based health care, *Family Practice Management*, vol 5, no 6, pp37–44.

Scott A 1996, Primary or secondary care? What can economics contribute to evaluation at the interface?, *Journal of Public Health Medicine*, vol 18, no 1, pp19–26.

Sibthorpe B, Bailie R, Douglas B & Broom D 1997, Discontent and change: GP attitudes to aspects of general practice remuneration and financing, *NCEPH Discussion Paper, No 13*, The Australian National University, Canberra.

Simons LE, Levis G & Simons J 1996, Apparent discontinuation rates in patients prescribed lipid-lowering drugs, *Medical Journal of Australia*, vol 164, pp208–11.

Swerisson H. & Duckett S 1997, 'Health policy and financing' in H. Gardner (ed) *Health Policy in Australia*, Oxford University Press, Melbourne.

Taplin S, Galvin M, Payne T, Coole D & Wagner E 1998, Putting population-based care into practice: real option or rhetoric?, *Journal of the American Board of Family Practice*, vol 11, no 2, pp116–26.

WHO (World Health Organisation) 1998a, *Social determinants of health – the solid facts*, World Health Organisation Regional Office for Europe, Copenhagen.

WHO (World Health Organisation) 1998b, *Framework for professional and administrative development of general practice/family medicine in Europe*, World Health Organisation Regional Office for Europe, Copenhagen.

Whynes DK & Baines DL 1998, Income-based incentives in UK general practice, *Health Policy*, vol 43, pp15–31.

Wilson JMG & Jungner G 1968, *Principles and practice of screening for disease*, World Health Organisation, Geneva.